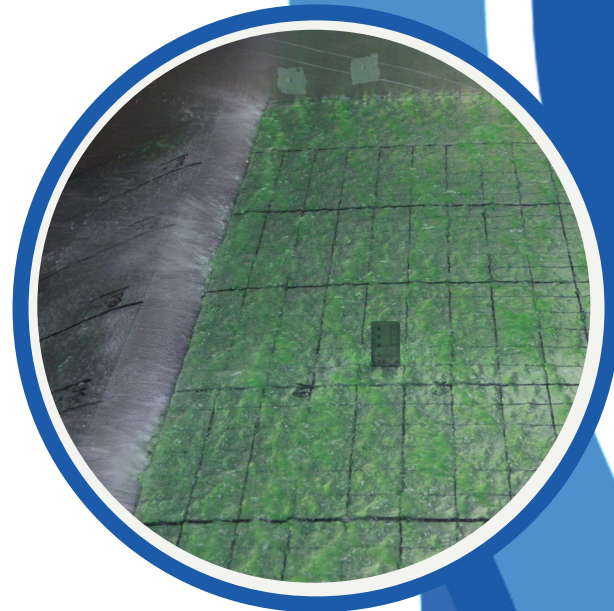




TP 15685E
Final Version 1.0
November 2025

WIND TUNNEL TRIALS TO SUPPORT FURTHER DEVELOPMENT OF ICE PELLET ALLOWANCE TIMES: WINTER 2024-25



Prepared for:

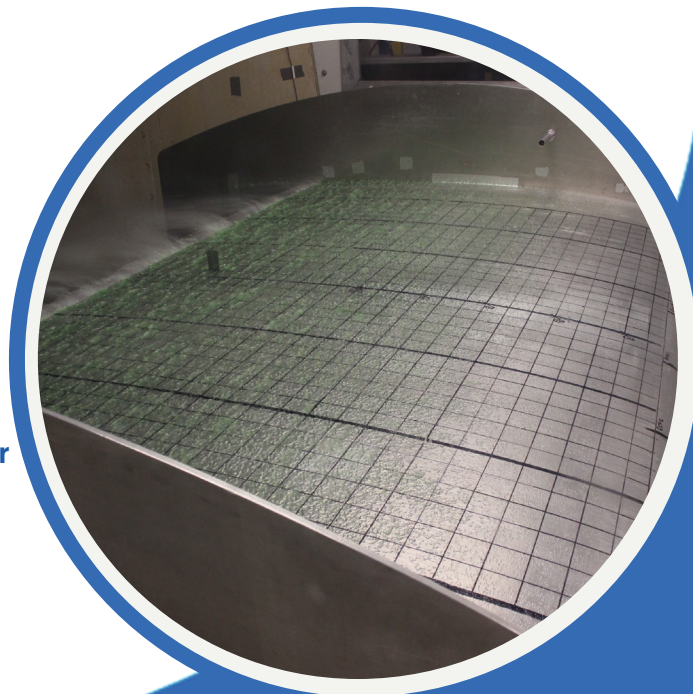
Transport Canada
Programs Group
Innovation Centre

In cooperation with:

Federal Aviation Administration
William J. Hughes Technical Center for
Advanced Aerospace

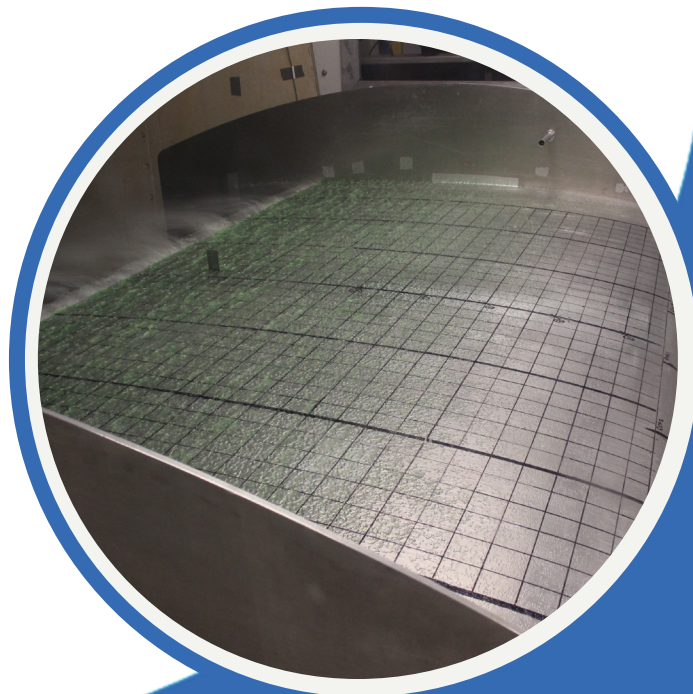
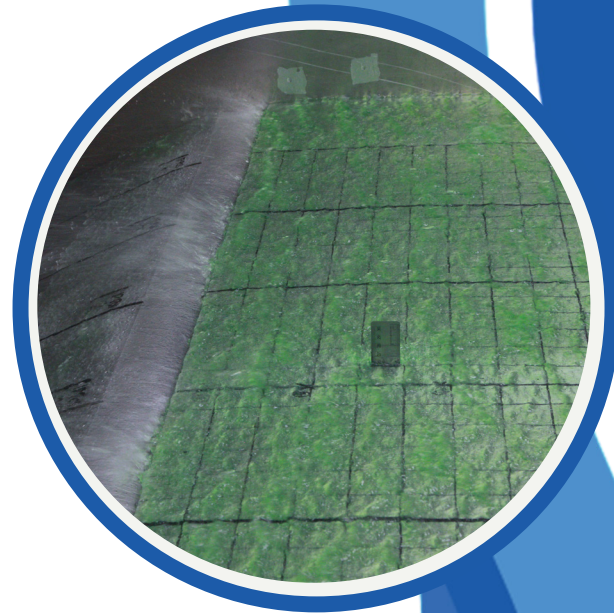
Transport Canada
Civil Aviation

Federal Aviation Administration
Flight Standards – Air Carrier Operations



TP 15685E
Final Version 1.0
November 2025

WIND TUNNEL TRIALS TO SUPPORT FURTHER DEVELOPMENT OF ICE PELLET ALLOWANCE TIMES: WINTER 2024-25



Prepared by:
Marco Ruggi

The contents of this report reflect the views of APS Aviation Inc. and not necessarily the official view or opinions of the Transport Canada Programs Group Innovation Centre or the co-sponsoring organizations.

Neither the Transport Canada Programs Group Innovation Centre nor the co-sponsoring organizations endorse the products or manufacturers. Trade or manufacturers' names appear in this report only because they are essential to its objectives.

DOCUMENT ORIGIN AND APPROVAL RECORD

Prepared by:

May 29, 2026

Marco Ruggi, Eng., MBA
Director – Aviation Services

Date

Reviewed by:

May 29, 2026

Benjamin Bernier, BSc, PMP
Leader – Aviation Services

Date

Approved by:

May 29, 2026

John D'Avirro, Eng., PBDM
Vice President – Aviation Services

Date

Un sommaire français se trouve avant la table des matières.

*This report was first provided to Transport Canada as Final Draft 1.0 in November 2025.
It has been published as Final Version 1.0 in May 2026.*

PREFACE

Under contract to the Transport Canada Programs Group Innovation Centre, APS Aviation Inc. has undertaken a research program to advance aircraft ground de/anti-icing technology. The primary objectives of the research program are the following:

- To develop holdover time data for all new de/anti-icing fluids;
- To conduct testing to determine holdover times for Type II, III, and IV fluids in snow at temperatures below -14°C ;
- To evaluate and develop the use of artificial snow machines for holdover time development;
- To conduct wind tunnel testing with a thin high performance wing model to support the development of guidance material for operating in ice pellet conditions;
- To conduct comparative endurance time testing and evaluate endurance times in several mixed conditions;
- To conduct general and exploratory de/anti-icing research;
- To conduct analysis to support harmonization of the Transport Canada and the Federal Aviation Administration visibility table guidance;
- To finalize the publication and delivery of current and historical reports;
- To update the regression information report to reflect changes made to the holdover time guidelines; and
- To update the holdover time guidance materials for annual publication by Transport Canada and the Federal Aviation Administration.

The research activities of the program conducted on behalf of Transport Canada during the winter of 2024-25 are documented in five reports. The titles of the reports are as follows:

- TP 15692E Aircraft Ground De/Anti-Icing Fluid Holdover Time Development Program for the 2024-25 Winter;
- TP 15693E Regression Coefficients and Equations Used to Develop the Winter 2025-26 Aircraft Ground Deicing Holdover Time Tables;
- TP 15684E Aircraft Ground Icing General Research Activities During the 2024-25 Winter;
- TP 15685E Wind Tunnel Trials to Support Further Development of Ice Pellet Allowance Times: Winter 2024-25; and
- TP 15686E Testing and Evaluation of Mixed Phase Icing Conditions: Winter 2024-25.

In addition, the following interim report is being prepared:

- *Artificial Snow Research Activities for the 2024-25 Winter.*

This report, TP 15685E, has the following objective:

- To conduct research in the National Research Council Canada Icing Wind Tunnel with a thin high-performance wing section to further support and develop the anti-icing fluid Ice Pellet Allowance Times.

This objective was met by conducting a series of full-scale tests using a thin high-performance wing model in the National Research Council Canada Icing Wind Tunnel with the cooperation of Transport Canada and the Federal Aviation Administration.

PROGRAM ACKNOWLEDGEMENTS

This multi-year research program has been funded by the Transport Canada Programs Group Innovation Centre, with support from the Federal Aviation Administration William J. Hughes Technical Center for Advanced Aerospace, Transport Canada Civil Aviation, and Federal Aviation Administration Flight Standards – Air Carrier Operations. This program could not have been accomplished without the participation of many organizations. APS Aviation Inc. would therefore like to thank Transport Canada, the Federal Aviation Administration, National Research Council Canada, and supporting members of the SAE International G-12 Aircraft Ground Deicing Committees.

APS Aviation Inc. would also like to acknowledge the dedication of the research team, whose performance was crucial to the acquisition of hard data, completion of data analysis, and preparation of reports. This includes the following people: Brandon Auclair, Steven D. Baker, David Beals, Benjamin Bernier, Chloë Bernier, Megane Brien, Sarah Chadzak, Kasandra Cook, Devin Costain, John D’Avirro, Peter Dawson, Sean Devine, Akvile Gigaite, Tyler Groleau, Cassidy Kinderman-McCormick, Kyra Kinderman-McCormick, Peter Kitchener, Francine De Ladurantaye, Shamim Nakhai, Dany Posteraro, Marc Quesnel, Salvatore Rosato, Marco Ruggi, Javad Safari, James Smyth, Yi Tian, Jeffrey Wajsberg, and Ian Wittmeyer.

Special thanks are extended to Antoine Lacroix, Yvan Chabot, Carlos Carreiro, Warren Underwood, Timothy McClain, Timothy G. Smith, Stephanie Divito, and Thomas Natoli who on behalf of Transport Canada and the Federal Aviation Administration, have participated, contributed, and provided guidance in the preparation of these documents.

PROJECT ACKNOWLEDGEMENTS

APS Aviation Inc. would like to acknowledge the team at National Research Council Canada who operate the Icing Wind Tunnel, especially Peter Forsyth and Catherine Clark for engineering support and aerodynamic expertise. APS Aviation Inc. would like to acknowledge Andy Broeren of National Aeronautics and Space Administration, whose engineering support and aerodynamic expertise have been crucial to the development of wind tunnel testing protocols used today. APS Aviation Inc. would also like to acknowledge the fluid manufacturers who have provided samples over the years to support the wind tunnel testing.



1. Transport Canada Publication No. TP 15685E		2. Project No. B14W/9A0A/8258		3. Recipient's Catalogue No.	
4. Title and Subtitle Wind Tunnel Trials to Support Further Development of Ice Pellet Allowance Times: Winter 2024-25				5. Publication Date November 2025	
				6. Performing Organization Document No. 301351	
7. Author(s) Marco Ruggi				8. Transport Canada File No. T8009-220126	
9. Performing Organization Name and Address APS Aviation Inc. 6700 Côte-de-Liesse Rd., Suite 102 Montreal, Quebec, H4T 2B5				10. PWGSC File No. 013sl T8009-220126	
				11. PWGSC or Transport Canada Contract No. CW2270722	
12. Sponsoring Agency Name and Address Transport Canada Programs Group Innovation Centre 330 Sparks St., 18th Floor Ottawa, Ontario, K1A 0N5				13. Type of Publication and Period Covered Final	
				14. Project Officer Antoine Lacroix	
15. Supplementary Notes (Funding programs, titles of related publications, etc.) Several research reports for testing of de/anti-icing technologies were produced for previous winters on behalf of Transport Canada (TC). These are available from the TC Programs Group Innovation Centre. Several reports were produced as part of this winter's research program. Their subject matter is outlined in the preface. This project was co-sponsored by the Federal Aviation Administration.					
16. Abstract <p>As part of a larger research program, APS Aviation Inc. (APS) conducted a series of full-scale wing tests in the National Research Council Canada (NRC) 3 m x 6 m Icing Wind Tunnel (IWT) to determine the flow-off characteristics of anti-icing fluids with and without mixed precipitation conditions with ice pellets.</p> <p>A wind tunnel testing program was developed for the winter of 2024-25 with the primary objectives of conducting aerodynamic testing to substantiate the current Type IV fluid Ice Pellet Allowance Times with new fluids, extend the current Type IV fluid Ice Pellet Allowance Times for ethylene glycol (EG) and propylene glycol (PG) fluids, and expand the current allowance times to include new temperature bands, new conditions, and mixed conditions.</p> <p>The wind tunnel testing conducted during the winter of 2024-25 validated the current Type IV allowance times for use with two of the three fluids tested: Chongqing Joba Chemical Co., Ltd FW-IV and Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS. Based on the test results, Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV did not meet the validation requirements. Transport Canada (TC) and the Federal Aviation Administration (FAA) reached out to the manufacturer to investigate this issue further and to determine the actions moving forward. The investigation is ongoing at the time of writing this report.</p> <p>Additional testing focused on collecting data to support expanding the allowance times for EG and PG fluids; however, no expansions to the allowance time guidance were proposed for 2025-26.</p> <p>Other changes made to the allowance time guidance include formatting changes, changes to the Moderate Ice Pellets mixed with Moderate Snow times, and updates to the list of fluids validated for use with allowance times. The notes in the allowance time tables were also updated to reflect the content changes.</p> <p>Through consultations with TC, the FAA, and the National Aeronautics and Space Administration (NASA), and based on industry discussions, higher priority areas of possible future wind tunnel testing and research have been identified, including the substantiation of Ice Pellet Allowance Times with new fluids, allowance time expansion, and the development of Type III mid-speed allowance times.</p>					
17. Key Words Ice Pellet, allowance time, high-speed rotation, low-speed rotation, Type II, Type III, Type IV, fluid adherence, fluid flow-off, wind tunnel, icing wind tunnel, wing aerodynamics			18. Distribution Statement Available from the Transport Canada Programs Group Innovation Centre		
19. Security Classification (of this publication) Unclassified		20. Security Classification (of this page) Unclassified		21. Declassification (date) —	22. No. of Pages xvi, 82 apps
					23. Price —



1. No de la publication de Transports Canada TP 15685E	2. No de l'étude B14W/9A0A/8258	3. No de catalogue du destinataire		
4. Titre et sous-titre Wind Tunnel Trials to Support Further Development of Ice Pellet Allowance Times: Winter 2024-25		5. Date de la publication Novembre 2025		
		6. No de document de l'organisme exécutant 301351		
7. Auteur(s) Marco Ruggi		8. No de dossier - Transports Canada T8009-220126		
9. Nom et adresse de l'organisme exécutant APS Aviation Inc. 6700, Chemin de la Côte-de-Liesse, Bureau 102 Montréal (Québec) H4T 2B5		10. No de dossier - TPSGC 013sl T8009-220126		
		11. No de contrat - TPSGC ou Transports Canada CW2270722		
12. Nom et adresse de l'organisme parrain Transports Canada Centre d'innovation du groupe de programmes 330, rue Sparks, 18^{ième} étage Ottawa (Ontario) K1A 0N5		13. Genre de publication et période visée Final		
		14. Agent de projet Antoine Lacroix		
15. Remarques additionnelles (programmes de financement, titres de publications connexes, etc.) Plusieurs rapports de recherche sur des essais de technologies de dégivrage et d'antigivrage ont été produits au cours des hivers précédents pour le compte de Transports Canada (TC). Ils sont disponibles auprès du Centre d'innovation du groupe de programmes de TC. De nombreux rapports ont été rédigés dans le cadre du programme de recherche de cet hiver. Leur objet apparaît à l'avant-propos. Ce projet était coparrainé par la Federal Aviation Administration.				
16. Résumé <p>Dans le cadre d'un plus vaste programme de recherche, APS Aviation Inc. (APS) a mené une série d'essais sur des ailes pleine grandeur dans la soufflerie de givrage de 3 m sur 6 m du Conseil national de recherches Canada (CNRC) afin de déterminer les caractéristiques de ruissellement des liquides d'antigivrage avec et sans conditions de précipitations mixtes comprenant des granules de glace.</p> <p>Un programme d'essais en soufflerie a été élaboré pour l'hiver 2024-2025 avec comme principaux objectifs de réaliser des tests d'aérodynamisme visant à corroborer les marges de tolérance actuelles pour les granules de glace avec de nouveaux liquides de type IV, à élargir les marges de tolérance actuelles dans des conditions de granules de glace pour les liquides de type IV à base d'éthylène glycol (EG) et de propylène glycol (PG) et à élargir les marges de tolérance actuelles pour y inclure de nouvelles plages de température, de nouvelles conditions météorologiques ainsi que des contextes de conditions mixtes.</p> <p>Les essais menés en soufflerie au cours de l'hiver 2024-2025 ont confirmé l'applicabilité des marges de tolérance actuelles des liquides de type IV à deux des trois liquides évalués, à savoir : Chongqing Joba Chemical Co., Ltd FW-IV et Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS. Selon les résultats des essais, Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV n'a pas répondu aux exigences de confirmation. Transport Canada (TC) et la Federal Aviation Administration (FAA) ont communiqué avec le fabricant pour approfondir la question et déterminer les prochaines mesures à adopter. L'enquête est en cours au moment de la rédaction de ce rapport.</p> <p>D'autres essais se sont concentrés sur la collecte de données afin d'appuyer l'élargissement des marges de tolérance pour les liquides à base d'EG et de PG; cependant, aucun élargissement des lignes directrices relatives aux marges de tolérance n'a été proposé pour l'hiver 2025-2026.</p> <p>Les autres changements apportés aux lignes directrices relatives aux marges de tolérance comprennent des changements apportés au format, des changements apportés aux durées associées aux conditions de granules de glace modérés mêlés de neige modérée, et des mises à jour apportées à la liste de liquides dont l'utilisation en fonction des marges de tolérance a été confirmée. Les notes des tableaux de marges de tolérance ont également été mises à jour afin de refléter ces changements.</p> <p>Par l'entremise de consultations auprès de TC, de la FAA et de la National Aeronautics and Space Administration (NASA) et à partir de discussions avec les parties prenantes du secteur, des domaines de priorité supérieure ont été définis pour encadrer les potentiels essais et travaux de recherche en soufflerie, notamment en ce qui a trait à la corroboration des marges de tolérance applicables aux nouveaux liquides dans des conditions de granules de glace, à l'élargissement des marges de tolérance et à la mise au point de marges de tolérance pour les liquides de type III sur des aéronefs à vitesse moyenne.</p>				
17. Mots clés Granule de glace, marge de tolérance, rotation à vitesse élevée, rotation à faible vitesse, type II, type III, type IV, adhérence des liquides, ruissellement des liquides, soufflerie, soufflerie de givrage, comportement aérodynamique des ailes		18. Diffusion Disponible auprès du Centre d'innovation du groupe de programmes de Transports Canada		
19. Classification de sécurité (de cette publication) Non classifiée	20. Classification de sécurité (de cette page) Non classifiée	21. Déclassification (date) —	22. Nombre de pages xvi, 82 ann.	23. Prix —

EXECUTIVE SUMMARY

Under contract to the Transport Canada (TC) Programs Group Innovation Centre, with support from the Federal Aviation Administration (FAA) William J. Hughes Technical Center for Advanced Aerospace, TC Civil Aviation, and FAA Flight Standards – Air Carrier Operations, APS Aviation Inc. (APS) carried out research in the winter of 2024-25 in support of the aircraft ground icing research program.

As part of a larger research program, APS conducted a series of full-scale wing tests in the National Research Council Canada (NRC) 3 m x 6 m Icing Wind Tunnel (IWT) to determine the flow-off characteristics of anti-icing fluids with and without mixed precipitation conditions with ice pellets.

Background and Objective

A wind tunnel testing program was developed for the winter of 2024-25 with the goal of conducting aerodynamic testing to accomplish the following objectives:

- Substantiating the current Type IV fluid Ice Pellet Allowance Times with new fluids using the thin high-performance regional jet (RJ) airfoil and, weather permitting, at temperatures close to each fluid's lowest operational use temperature (LOUT);
- Extending the current Type IV fluid Ice Pellet Allowance Times for ethylene glycol (EG) and propylene glycol (PG) fluids using the thin high-performance RJ airfoil; and
- Expanding the current allowance time tables to include new temperature bands, new conditions, and mixed conditions for EG and PG Type IV fluids.

Conclusions and Recommendations

The wind tunnel testing conducted during the winter of 2024-25 validated the current Type IV allowance times for use with two of the three fluids tested: Chongqing Joba Chemical Co., Ltd FW-IV and Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS. Based on the test results, Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV did not meet the validation requirements. TC and the FAA reached out to the manufacturer to investigate this issue further and to determine the actions moving forward. The investigation is ongoing at the time of writing this report.

Additional testing focused on collecting data to support expanding the allowance times for EG and PG fluids. The results obtained demonstrate potential for further

expansion of the Type IV EG and PG allowance times; however, it was determined that additional data was needed to further substantiate the results obtained. As such, no changes were proposed to the allowance time guidance for 2025-26. Other changes made to the allowance time guidance include formatting changes, changes to the Moderate Ice Pellets mixed with Moderate Snow times, and updates to the list of fluids validated for use with allowance times. The notes in the allowance time tables were also updated to reflect the content changes.

Through consultations with TC, the FAA, and the National Aeronautics and Space Administration (NASA), and based on industry discussions, higher priority areas of possible future wind tunnel testing and research have been identified, including the substantiation of Ice Pellet Allowance Times with new fluids, allowance time expansion, and the development of Type III mid-speed allowance times.

SOMMAIRE

En vertu d'un contrat avec le groupe des programmes du Centre d'innovation de Transports Canada (TC) et avec le soutien du William J. Hughes Technical Center for Advanced Aerospace de la Federal Aviation Administration (FAA), du département de l'aviation civile de TC, et de la FAA Flight Standards – Air Carrier Operations, APS Aviation Inc. (APS) a mené des essais au cours de l'hiver 2024-2025 dans le cadre d'un programme de recherche sur le givrage d'aéronefs au sol.

Dans le cadre d'un plus vaste programme de recherche, APS a mené une série d'essais sur des ailes pleine grandeur dans la soufflerie de givrage de 3 m sur 6 m du Conseil national de recherches Canada (CNRC) afin de déterminer les caractéristiques de ruissellement des liquides d'antigivrage avec et sans conditions de précipitations mixtes comprenant des granules de glace.

Contexte et objectifs

Un programme d'essais en soufflerie a été mis au point pour l'hiver 2024-2025 avec comme objectif de mener des tests d'aérodynamisme visant à :

- Corroborer les marges de tolérance actuelles pour les granules de glace avec de nouveaux liquides de type IV au moyen d'une surface portante haute performance à profil mince d'un avion de transport régional à réaction et, selon les conditions météorologiques, à des températures se rapprochant de la température minimale d'utilisation opérationnelle (LOUT) de chaque liquide;
- Élargir les marges de tolérance actuelles dans des conditions de granules de glace pour les liquides de type IV à base d'éthylène glycol (EG) et de propylène glycol (PG) au moyen d'une surface portante haute performance à profil mince d'un avion de transport régional à réaction;
- Élargir les tableaux de marges de tolérance actuelles pour y inclure de nouvelles plages de température, de nouvelles conditions météorologiques ainsi que des contextes de conditions mixtes encadrant l'utilisation de liquides de type IV à base d'EG et de PG.

Conclusions et recommandations

Les essais menés en soufflerie au cours de l'hiver 2024-2025 ont confirmé l'applicabilité des marges de tolérance actuelles des liquides de type IV à deux des trois liquides évalués, à savoir : Chongqing Joba Chemical Co., Ltd FW-IV et Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS. Selon les résultats des essais, Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV n'a pas répondu aux

exigences de confirmation. TC et la FAA ont communiqué avec le fabricant pour approfondir la question et déterminer les prochaines mesures à adopter. L'enquête est en cours au moment de la rédaction de ce rapport.

D'autres essais se sont concentrés sur la collecte de données afin d'appuyer l'élargissement des marges de tolérance pour les liquides à base d'EG et de PG. Les résultats obtenus démontrent un potentiel d'élargissement des marges de tolérance des liquides de type IV à base d'EG et de PG; cependant, il a été décidé que des données supplémentaires étaient nécessaires pour corroborer ces résultats. Ainsi, aucun changement n'a été proposé aux lignes directrices relatives aux marges de tolérance pour l'hiver 2025-2026.

Les autres changements apportés aux lignes directrices relatives aux marges de tolérance comprennent des changements apportés au format, des changements apportés aux durées associées aux conditions de granules de glace modérés mêlés de neige modérée, et des mises à jour apportées à la liste de liquides dont l'utilisation en fonction des marges de tolérance a été confirmée. Les notes des tableaux de marges de tolérance ont également été mises à jour afin de refléter ces changements.

Par l'entremise de consultations auprès de TC, de la FAA et de la National Aeronautics and Space Administration (NASA) et à partir de discussions avec les parties prenantes du secteur, des domaines de priorité supérieure ont été définis pour encadrer les potentiels essais et travaux de recherche en soufflerie, notamment en ce qui a trait à la corroboration des marges de tolérance applicables aux nouveaux liquides dans des conditions de granules de glace, à l'élargissement des marges de tolérance et à la mise au point de marges de tolérance pour les liquides de type III sur des aéronefs à vitesse moyenne.

CONTENTS	Page
1. INTRODUCTION	1
1.1 Background.....	1
1.2 Program Objectives.....	3
1.3 Previous Ice Pellet Allowance Time Tables	4
1.4 Report Format	4
2. METHODOLOGY.....	5
2.1 Test Schedule	5
2.1.1 Wind Tunnel Procedure.....	6
2.1.2 Test Sequence.....	6
2.2 Methodology for Developing or Expanding New Allowance Times.....	7
2.3 Methodology for Validating New Fluids for Use with Allowance Times	7
2.4 Wind Tunnel and Airfoil Model Technical Overview	7
2.4.1 Wind Tunnel Test Site	8
2.4.2 Generic Thin High-Performance “RJ” Type Commuter Airfoil	9
2.4.3 Test Area Grid	10
2.4.4 Wind Tunnel Measurement Capabilities	11
2.5 Simulated Precipitation	12
2.5.1 Ice Pellets	12
2.5.2 Snow	12
2.5.3 Freezing Rain/Rain.....	13
2.5.4 Definition of Precipitation Rates	13
2.6 Test Equipment	14
2.6.1 Video and Photo Equipment.....	14
2.6.2 Refractometer/Brixometer	15
2.6.3 Wet Film Thickness Gauges.....	15
2.6.4 Hand-Held Immersion and Surface Temperature Probes	16
2.7 Personnel.....	16
2.8 Data Forms.....	16
2.9 Data Collection.....	17
2.10 De/Anti-Icing Fluids.....	17
2.10.1 Viscometer.....	19
2.10.2 Type II/III/IV Fluid Application Equipment	19
2.10.3 Waste Fluid Collection	19
2.11 Analysis Methodology	20
2.11.1 Visual Ratings at the Start of the Test	20
2.11.2 Visual Ratings at Rotation	22
2.11.3 Eight-Degree Rotation Lift Loss	22
2.11.4 Overall Test Status.....	22
2.11.5 Dry Wing Calibration	22
3. FULL-SCALE DATA COLLECTED	31
3.1 Test Log.....	31
4. VALIDATION TESTING FOR NEW-TO-MARKET TYPE IV FLUIDS	35
4.1 Allowance Time Table Analysis Format	35
4.2 Chongqing Joba Chemical Co., Ltd FW-IV Testing Results	36
4.3 Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS Testing Results	39
4.4 Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV Testing Results	44

5. EXTENSION OF ALLOWANCE TIMES FOR EG AND PG FLUIDS	47
5.1 Analysis of EG Fluid Allowance Times	47
5.1.1 EG Fluid Expansion Data	53
5.2 Analysis of PG Fluid Allowance Times	54
5.2.1 PG Fluid Expansion Data	60
6. EVALUATION OF NEW MIXED CONDITIONS	63
7. OTHER EXPLORATORY R&D INITIATIVES	65
8. GENERAL CHANGES TO THE ALLOWANCE TIME TABLES	67
8.1 Expansion of Allowance Times	67
8.2 New Mixed Condition Allowance Times	67
8.3 Formatting and Editorial Changes	67
8.3.1 Moderate Ice Pellets Mixed with Moderate Snow	67
8.3.2 List of Fluids Validated for Use with Allowance Times	68
9. CONCLUSIONS	69
9.1 Validation Testing for New-to-Market Type IV Fluids	69
9.2 Expansion of EG and PG Allowance Times	69
9.3 New Mixed Condition Allowance Times	69
9.4 Other Exploratory R&D Initiatives	69
9.5 Changes to Ice Pellet Allowance Time Guidance	70
10. RECOMMENDATIONS	71
10.1 Changes to Ice Pellet Allowance Time Guidance	71
10.2 Future Research	78
10.2.1 Substantiation of Ice Pellet Allowance Times with New Fluids	78
10.2.2 Allowance Time Expansion and New Mixed Conditions	78
10.2.3 Testing with the NASA LS-0417 Wing Section to Support Development of Type III Mid-Speed Allowance Times	78
10.2.4 Ensuring Adequate Validation Testing of New Fluids	79
REFERENCES	81

LIST OF APPENDICES

- A Transport Canada Statement of Work Excerpt – Aircraft & Anti-Icing Fluid Winter Testing 2024-25
- B Procedure: Wind Tunnel Tests to Examine Fluid Removed from Aircraft During Takeoff with Mixed Ice Pellet Precipitation Conditions
- C High-Speed Testing 2024-25 Fluid Thickness, Temperature, and Brix Data Forms
- D 2009-25 Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing

LIST OF TABLES	Page
Table 1.1: Summary of 2024-25 RJ Wing Tests by Objective.....	3
Table 2.1: 2024-25 Calendar of Tests	5
Table 2.2: Wind Tunnel Fluid Viscosity Information for 2024-25 Testing	18
Table 4.1: Chongqing Joba Chemical Co., Ltd FW-IV Allowance Time Validation Tests.....	38
Table 4.2: Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS Allowance Time Validation Tests	41
Table 4.3: Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS Allowance Time Expansion Tests	42
Table 4.4: All Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS Allowance Time Tests.....	43
Table 4.5: Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface Cleansurface IV Allowance Time Tests	45
Table 5.1: All EG Fluid Data Collected Since 2009 with RJ Wing	49
Table 5.2: All PG Fluid Data Collected Since 2009 with RJ Wing	56
Table 10.1: 2025-26 TC Type III Ice Pellet Allowance Time Table.....	72
Table 10.2: 2025-26 FAA Type III Ice Pellet Allowance Time Table.....	73
Table 10.3: 2025-26 TC Type IV EG Ice Pellet Allowance Time Table	74
Table 10.4: 2025-26 TC Type IV PG Ice Pellet Allowance Time Table	75
Table 10.5: 2025-26 FAA Type IV EG Ice Pellet Allowance Time Table	76
Table 10.6: 2025-26 FAA Type IV PG Ice Pellet Allowance Time Table	77

LIST OF FIGURES	Page
Figure 2.1: Typical Wind Tunnel Test Timeline.....	7
Figure 2.2: Schematic of NRC Montreal Road Campus.....	8
Figure 2.3: Generic Thin High-Performance Wing Section.....	9
Figure 2.4: End Plates Installed on Thin High-Performance Wing Section.....	10
Figure 2.5: Location of RTDs Installed Inside Thin High-Performance Wing	12
Figure 2.6: Precipitation Rate Breakdown	14
Figure 2.7: Hand-Held Refractometer/Brixometer.....	15
Figure 2.8: Wet Film Thickness Gauges	15
Figure 2.9: Hand-Held Immersion and Surface Temperature Probes	16
Figure 2.10: Ice Pellet Test Analysis Criteria.....	21

LIST OF PHOTOS	Page
Photo 2.1: Outside View of the NRC Wind Tunnel Facility.....	23
Photo 2.2: Inside View of the NRC Wind Tunnel Test Section.....	23
Photo 2.3: Thin High-Performance Wing Section Used for Testing.....	24
Photo 2.4: Grid Markings on Thin High-Performance Wing Section	24
Photo 2.5: Refrigerated Truck Used for Manufacturing Ice Pellets	25
Photo 2.6: Calibrated Sieves Used to Obtain Desired Size Distribution	25
Photo 2.7: Ice Pellet Dispensers Operated by APS Personnel	26
Photo 2.8: Ceiling-Mounted Freezing Rain Sprayer.....	26
Photo 2.9: Wind Tunnel Setup for Flashes.....	27
Photo 2.10: Wind Tunnel Setup for Digital Cameras	27
Photo 2.11: 2024-25 Research Team	28
Photo 2.12: Brookfield® Digital Viscometer and Recirculating Bath	28
Photo 2.13: Stony Brook PDVdi-120 Falling Ball Viscometer.....	29
Photo 2.14: Fluid Pour Containers	29

This page intentionally left blank.

GLOSSARY

APS	APS Aviation Inc.
AS	Aerospace Standard
AWG	G-12 Aerodynamics Working Group
BLDT	Boundary Layer Displacement Thickness
CCTV	Closed-Circuit Television
CEF	Climatic Engineering Facility
DSLR	Digital Single-Lens Reflex
EG	Ethylene Glycol
FAA	Federal Aviation Administration
HOT	Holdover Time
IWT	3 m x 6 m Icing Wind Tunnel
LE	Leading Edge
LOUT	Lowest Operational Use Temperature
MID	Mid-Chord
MWG	METAR Working Group
NASA	National Aeronautics and Space Administration
NCAR	National Center for Atmospheric Research
NRC	National Research Council Canada
OAT	Outside Air Temperature
PG	Propylene Glycol
RJ	Regional Jet

RTD	Resistance Temperature Detector
SAE	SAE International
TC	Transport Canada
TE	Trailing Edge
UND	Under-Wing

1. INTRODUCTION

Under winter precipitation conditions, aircraft surfaces are cleaned prior to takeoff. This is typically done with aircraft ground deicing fluids, which are freezing point depressant fluids developed specifically for aircraft use. If required, aircraft are then protected against further accumulation of precipitation by the application of aircraft ground anti-icing fluids, which are also freezing point depressant fluids. Most anti-icing fluids contain thickeners to extend protection time.

Prior to the 1990s, aircraft ground de/anti-icing had not been extensively researched. However, following several ground icing related incidents in the late 1980s, an aircraft ground icing research program was initiated by Transport Canada (TC). The objective of the program is to improve knowledge, enhance safety, and advance operational capabilities of aircraft operating in winter precipitation conditions.

Since its inception in the early 1990s, the aircraft ground icing research program has been managed by TC, with the co-operation of the United States Federal Aviation Administration (FAA), the National Research Council Canada (NRC), several major airlines, and de/anti-icing fluid manufacturers.

There is still an incomplete understanding of some of the hazards related to aircraft ground icing. As a result, the aircraft ground icing research program continues, with the objective of further reducing the risks posed by the operation of aircraft in winter precipitation and other icing conditions.

Under contract to the TC Programs Group Innovation Centre, with support from the FAA William J. Hughes Technical Center for Advanced Aerospace, TC Civil Aviation, and FAA Flight Standards – Air Carrier Operations, APS Aviation Inc. (APS) carried out research in the winter of 2024-25 in support of the aircraft ground icing research program. Each major project completed as part of the 2024-25 research is documented in a separate individual report. This report documents the wind tunnel trials to further develop Ice Pellet Allowance Times.

1.1 Background

In 2005-06, the inability for operators to release aircraft in ice pellet conditions led TC and the FAA to begin a research campaign to develop related allowance times.

Developing holdover times (HOTs) was not feasible due to the properties of the ice pellets; they remain embedded in the fluid and take long to dissolve as compared to snow, which is immediately absorbed and dissolved. Research was initiated through live aircraft testing with the NRC Falcon 20 in Ottawa, Canada, and later progressed to a more controlled environment with the NRC 3 m x 6 m Icing Wind Tunnel (IWT), also in Ottawa.

The early testing in 2005-06 with the Falcon 20 primarily used visual observations to evaluate fluid flow-off. During the Falcon 20 work, the wing was anti-iced and exposed to contamination, and aborted takeoff runs allowed researchers onboard to observe and evaluate the fluid flow-off. Testing in the IWT began in 2006-07, allowing aerodynamic data to be used for evaluating fluid flow-off performance. The IWT also allowed for a more controlled environment, less susceptible to the prevailing weather.

The work continued each year, and the test methods and equipment improved, allowing for real-time data analysis, better repeatability, and overall greater confidence in the results. The work conducted by TC and the FAA has been presented by APS to the SAE International (SAE) G-12 Aerodynamics Working Group (AWG) and the HOT Committee yearly since 2006. Additional presentations were also given at the AWG in May 2012 and May 2013 by the National Aeronautics and Space Administration (NASA) and the NRC that focused on the extensive calibration and characterization work performed with a generic thin high-performance airfoil. This work helped to increase confidence in how the data was used to support the development of TC/FAA guidance material. A detailed account of the more recent work conducted is included in the TC report, TP 15232E, *Wind Tunnel Trials to Examine Anti-Icing Fluid Flow-Off Characteristics and to Support the Development of Ice Pellet Allowance Times, Winters 2009-10 to 2012-13* (1).

The Ice Pellet Allowance Time research has helped to further develop and improve the IWT facility. As a result, a new medium is now available for aerodynamic testing of aircraft ground de/anti-icing fluids with or without contamination in a full-scale format. Several other ground deicing projects have been ongoing as a result of industry requests and are expected to continue. The IWT has evolved into a multidisciplinary facility; however, it continues to be the primary source for the development and refinement of the ground deicing Ice Pellet Allowance Time guidance material.

For the winter of 2013-14, testing was once again focused on the development of Ice Pellet Allowance Times, with the intention of conducting yearly or bi-yearly testing campaigns. During the winter of 2014-15, the Ice Pellet Allowance Time testing was suspended to allow for a European Aviation Safety Agency–led project examining thickened fluid effects on unpowered elevators; TC and APS were also involved in this research. Ice Pellet Allowance Time testing resumed for the winter of 2015-16; however, funding was limited for the following winter, and no testing was therefore conducted during the winter of 2016-17. Yearly testing resumed as of the winter of 2017-18, focusing on substantiating the allowance times for new-to-market and previously untested fluids and expanding the existing allowance times. During the winter of 2024-25, the research continued, and this report contains the findings from these tests.

1.2 Program Objectives

A wind tunnel testing program was developed for the winter of 2024-25 with the goal of conducting aerodynamic testing to accomplish the following objectives:

- Substantiating the current Type IV fluid Ice Pellet Allowance Times with new fluids using the thin high-performance regional jet (RJ) airfoil and, weather permitting, at temperatures close to each fluid’s lowest operational use temperature (LOUT);
- Extending the current Type IV fluid Ice Pellet Allowance Times for ethylene glycol (EG) and propylene glycol (PG) fluids using the thin high-performance RJ airfoil; and
- Expanding the current allowance time tables to include new temperature bands, new conditions, and mixed conditions for EG and PG Type IV fluids.

In addition, baseline dry wing tests were conducted daily, as well as following any system changes, to validate the repeatability of the wind tunnel. Some additional general exploratory testing was also performed.

The statement of work for these tests is provided in Appendix A. Table 1.1 demonstrates the groupings for the global set of tests conducted at the wind tunnel during the winter of 2024-25 on the RJ wing.

Table 1.1: Summary of 2024-25 RJ Wing Tests by Objective

#	Objective	# of Runs
1	Baseline Tests (Dry Wing)	20
2	Ice Pellet Allowance Time Validation (New Fluids)	43
3	EG Fluids – Expansion of Allowance Times*	1
4	PG Fluids – Expansion of Allowance Times*	9
5	General Exploratory Testing	3
	Total	76

*Some tests also served as validation tests.

1.3 Previous Ice Pellet Allowance Time Tables

The Type IV Ice Pellet Allowance Time Tables have been available since the winter of 2007-08. The format included one Type IV table, applicable for both EG and PG fluids, and later a Type III table. For the winter of 2023-24, the Type IV table was separated into two tables for EG and PG Type IV fluids. Each year the Type IV testing has built upon the latest version of the allowance time tables published in the TC/FAA HOT Guidelines.

In the case of Type III fluid, a preliminary table was developed during the winter of 2008-09; however, high-speed rotation allowance time tables have been available and published only since the winter of 2014-15, following some more extensive testing. Future testing will build upon the latest version of the allowance time table published in the TC/FAA HOT Guidelines and look to expand the table to include low-speed rotations.

1.4 Report Format

The wind tunnel work has been conducted since the winter of 2006-07 and has been documented in yearly reports. TP 15232E (1) contains more thorough details regarding the testing methodologies as well as links to previous historical reports. The current report has been prepared in a more abbreviated format. The following list provides short descriptions of subsequent sections of this report:

- a) Section 2 describes the methodology used in testing, as well as equipment and personnel requirements necessary to carry out testing;
- b) Section 3 describes data collected during the full-scale testing;
- c) Section 4 describes the results from the validation testing for new-to-market Type IV fluids;
- d) Section 5 describes the results from the research aimed at extending the allowance times for EG and PG fluids;
- e) Section 6 describes the results from the research aimed at general allowance time expansion for mixed conditions;
- f) Section 7 describes the exploratory research and development initiatives;
- g) Section 8 describes the general changes to the Ice Pellet Allowance Time Tables that resulted from the research conducted this year;
- h) Section 9 provides a summary of the conclusions; and
- i) Section 10 provides a summary of the recommendations.

2. METHODOLOGY

This section provides a brief description of the test methodology and equipment specific to the full-scale aerodynamic tests conducted at the NRC IWT.

Note: TP 15232E (1) contains more thorough details regarding the testing methodologies.

2.1 Test Schedule

Ten overnight days of testing were organized starting January 12, 2025, and ending January 24, 2025. Setup and teardown were completed during the first two hours on the first day of testing and during the last two hours on the last day of testing, respectively. Table 2.1 presents the calendar of wind tunnel allowance time tests performed with the RJ wing. At the beginning of each test day, a plan was developed that included the list of tests (taken from the global test plan) to be completed based on the weather conditions and testing priorities. This daily plan was discussed, approved, and modified (if necessary) by TC, the FAA, and APS.

Table 2.1: 2024-25 Calendar of Tests

Date (Start date of overnight)	# of Tests Run
12-Jan-25	6
13-Jan-25	7
14-Jan-25	8
15-Jan-25	7
16-Jan-25	7
19-Jan-25	9
20-Jan-25	7
21-Jan-25	11
22-Jan-25	8
23-Jan-25	6
Total	76

2.1.1 Wind Tunnel Procedure

To satisfy the fluid testing objective, simulated takeoff and climb-out tests were performed with the thin high-performance wing section. Different parameters, including fluid thickness, wing temperature, and fluid freezing point, were recorded at designated times during the tests. The thin high-performance wing section was constructed by the NRC in 2009 specifically to conduct these tests following extensive consultations with an airframe manufacturer to ensure a representative thin high-performance design.

The typical procedure for each fluid test is described below.

- The wing section was treated with anti-icing fluid, poured in a one-step operation (no Type I fluid was used during the tests).
- When applicable, contamination, in the form of simulated ice pellets, freezing rain, and/or snow, was applied to the wing section. Test parameters were measured at the beginning and end of the exposure to contamination.
- At the end of the contamination period, the tunnel was cleared of all equipment and scaffolding.
- The wind tunnel was subsequently operated through a simulated takeoff and climb-out test.
- The behaviour of the fluid during takeoff and climb-out was recorded with digital high-speed still cameras. In addition, windows overlooking the wing section allowed observers to document the progress of fluid elimination in real time.

The procedures for the wind tunnel trials are included in Appendix B. The procedures include details regarding the test objectives, test plan, procedure and methodology, and pertinent information and documentation.

2.1.2 Test Sequence

The length of each test (from start of setup to end of last measurement) varied largely due to the length of exposure to precipitation (if applicable). Time required for setup and teardown, as well as preparing and configuring the wing section, was relatively consistent from test to test. Figure 2.1 demonstrates a sample timeline for a typical wind tunnel trial. It should be noted that a precipitation exposure time of 30 minutes was used for illustration purposes; this time varied for each test depending on the objective.

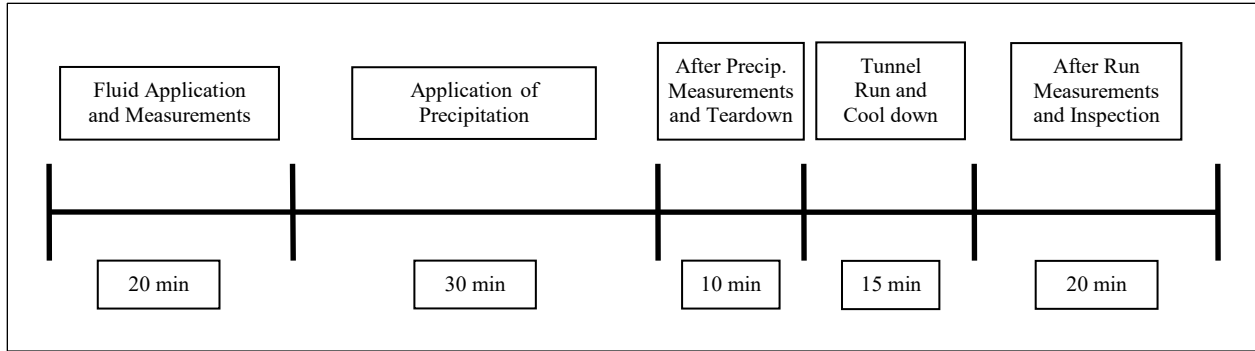


Figure 2.1: Typical Wind Tunnel Test Timeline

2.2 Methodology for Developing or Expanding New Allowance Times

Initial testing to first develop the allowance times is done with representative “grandfather” fluids (fluids with a long history of data). Testing is conducted at different temperatures and rates, and the allowance times are based on the limits where tests fail the acceptance criteria (based on visual ratings and aerodynamic performance). Multiple trials are generally needed to determine the limits of the allowance times (i.e., running tests with a grandfather fluid at 15, 20, and 25 minutes to determine that the allowance time should be limited to 20 minutes). Once the target allowance times are determined, they are validated using limited spot checks with multiple fluids. This methodology also applies to expanding allowance times for specific fluid types, like EG fluids, or for exploring new conditions.

2.3 Methodology for Validating New Fluids for Use with Allowance Times

Over the years, all new commercially available fluids have been tested. This is typically done when fluids become commercially available and are being mass produced. At a minimum, testing is conducted in a subset of conditions; the allowance times are generic, so this process is satisfactory and provides a “first alert” if a new fluid may be underperforming, in which case further action would be required.

2.4 Wind Tunnel and Airfoil Model Technical Overview

The following subsections describe the wind tunnel and major components.

2.4.1 Wind Tunnel Test Site

IWT tests are performed at the NRC aerospace facilities, building M-46, at the NRC Montreal Road campus, located in Ottawa, Canada. Figure 2.2 provides a schematic of the NRC Montreal Road campus showing the location of the NRC IWT. Photo 2.1 shows an outside view of the wind tunnel trial facility. Photo 2.2 shows an inside view of the wind tunnel test section. The open-circuit layout, with a fan at entry, permits contaminants associated with the test articles (such as heat or de/anti-icing fluid) to discharge directly, without recirculating or contacting the fan. The test section is 3 m (10 ft.) wide by 6 m (20 ft.) high by 12 m (40 ft.) long, with a maximum wind speed of 78 knots when using the electrical turbine drive and with a maximum wind speed of just over 115 knots when using the gas turbine drive. The fan is normally driven electrically, but high-speed operation can be accommodated by a gas turbine drive system. Due to the requirements of both high-speed and low-speed operations during the testing, the gas turbine was selected for all tests to allow for greater flexibility; the gas turbine drive can perform both low- and high-speed operations, whereas the electric drive is limited to low-speed operations. Scaffolding was constructed to allow access to the wing section, which facilitated the application of fluids and the subsequent inspection and cleaning of the airfoil.

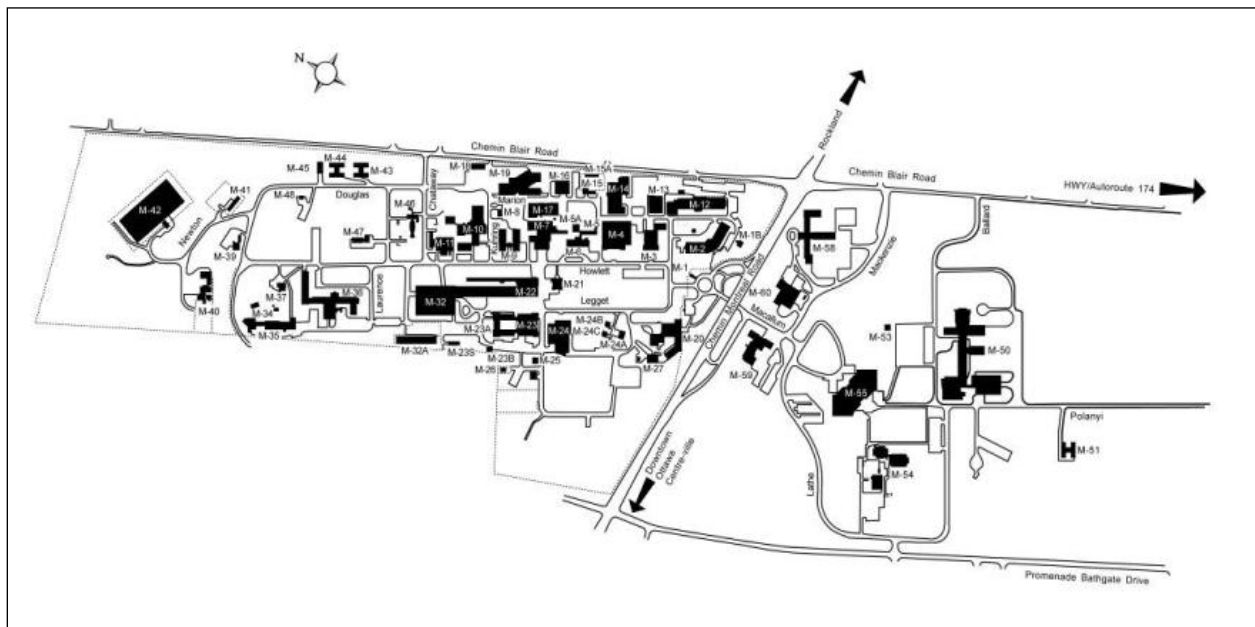


Figure 2.2: Schematic of NRC Montreal Road Campus

2.4.2 Generic Thin High-Performance “RJ” Type Commuter Airfoil

The wing section used for testing was a generic high-performance commuter airfoil, also referred to as a “thin high-performance” or “RJ” type. This wing section was constructed by the NRC in 2009 specifically to conduct these tests following extensive consultations with an airframe manufacturer to ensure a representative thin high-performance design. The original wing design was representative of an outboard section and did not include a flap; the flap was later added at the request of TC, the FAA, and APS. A computational fluid dynamics analysis of the modified wing section was conducted by the airframe manufacturer, and it was confirmed that the wing section provided a good representation of a flapped section of an operational thin high-performance wing. Photo 2.3 shows the wing section used for testing.

A cross-sectional view of the thin high-performance wing section used for testing is represented in Figure 2.3. Some of the pertinent dimensions of the wing section are as follows:

- Chord length not including flap: 1.4 m (4.6 ft.); and
- Width: 2.4 m (8 ft.).

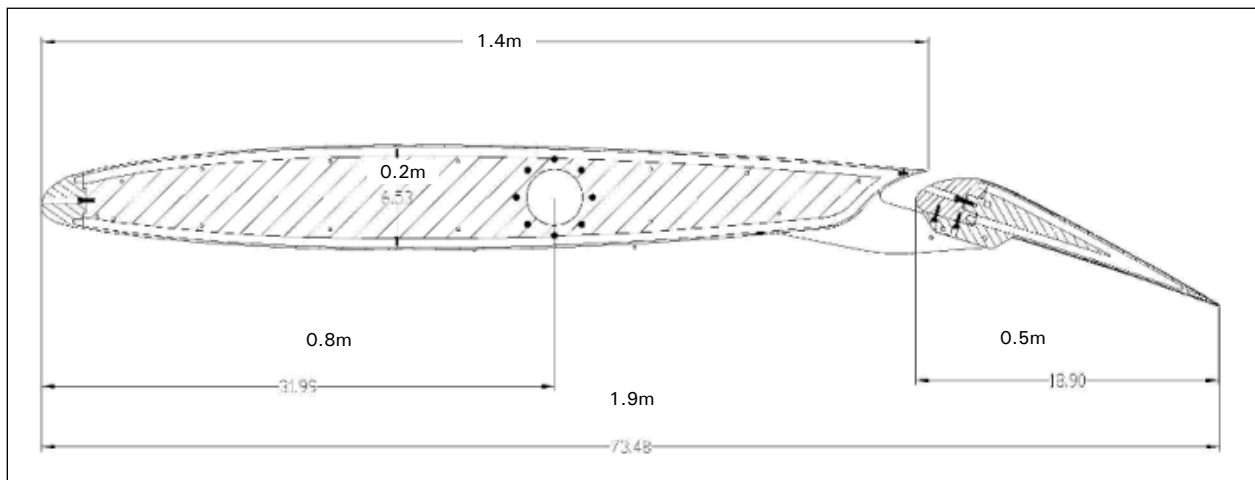


Figure 2.3: Generic Thin High-Performance Wing Section

An analysis of the wing section model was conducted by the airframe manufacturer to determine the typical rest position of this type of wing section. It was determined that, on a typical commuter aircraft, this section of wing would be pitched forward by 2° when sitting on the ground. As a result, the NRC ensured the rest position of the wing model was set to -2° for each test.

The wing section was fitted with a hinged flap. The flap position was fixed at 20° and was not intended to be changed during testing. The top surface of the flap section had a steeper angle; consequently, a flap setting of 20° created close to a 26° slope on the top surface of the flap (with the wing pitched forward by 2°). As testing progressed, the ability to change the flap setting to either 0° or 20° was necessary; contrary to a nested flap, which is typically protected during precipitation, a hinged flap is always exposed, and results indicated that earlier failures were produced by the shallower setting of the hinged flap. Modifications were made by the NRC to allow the flap setting to alternate between 0° and 20° for the fluid application and contamination periods; however, all takeoff simulations were conducted with the flap set to 20°. No moveable devices were available on the wing section. Detailed coordinates for this airfoil are available upon request.

End plates were installed on the wing section to eliminate the “wall effects” from the wind tunnel walls and to provide a better aerodynamic flow-off above the test area. Figure 2.4 demonstrates the end plates installed on the thin high-performance wing section. (Note: The wing section is depicted without the top wing skin).

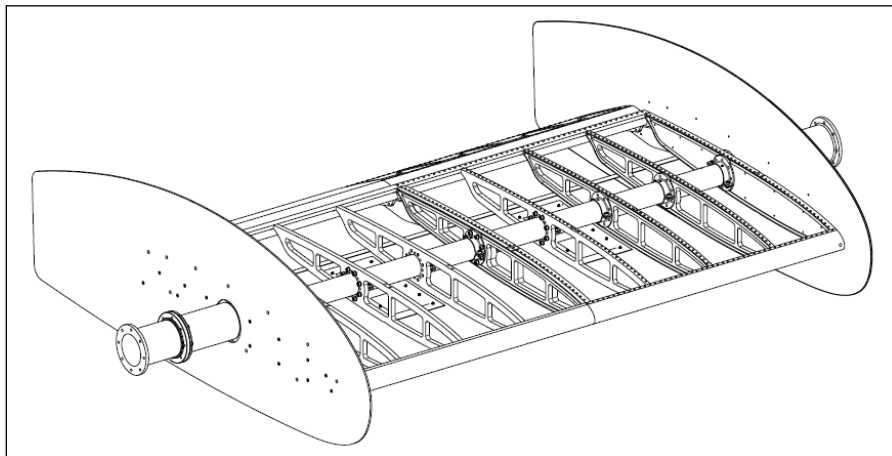


Figure 2.4: End Plates Installed on Thin High-Performance Wing Section

2.4.3 Test Area Grid

APS personnel used markers to draw a grid on the wing upper surface (excluding the flap). Each grid cell measured 5.1 cm x 5.1 cm (2" x 2") with the cell axes positioned perpendicular and parallel to the leading edge (LE) (see Photo 2.4). The grid section was 2.4 m (8 ft.), which covered the entire wing section. The grid markings began aft of the leading edge stagnation point and continued along the length of the main chord; grid markings were not drawn on the flap section. The grid was used to facilitate observations of the fluid shearing off the wing and the movement of ice pellets during takeoff.

2.4.4 Wind Tunnel Measurement Capabilities

The wing section was supported on either side by 2-axis weigh scales capable of measuring drag and lift forces generated on the wing section. The wing section was attached to servo systems capable of pitching the wing section to a static angle or generating dynamic movements. The servo system was programmed to simulate pitch angles during takeoff and climb-out based on operational aircraft flight profiles.

The wing section was also equipped with eight resistance temperature detectors (RTDs); these were installed by NRC personnel to record the skin temperature on the leading edge, mid-chord (MID), trailing edge (TE), and under-wing (UND). RTDs were placed in pairs along a chord 0.5 m (1.5 ft.) to the left and to the right of the wing centreline. The following are the locations of the RTDs for the RJ wing:

- RTD LE, located approximately 25 cm from the leading edge (as measured along wing skin curvature);
- RTD MID, located approximately 70 cm from the leading edge (as measured along wing skin curvature);
- RTD TE, located approximately 30 cm from the trailing edge (as measured along wing skin curvature); and
- RTD UND, located approximately 45 cm from the leading edge.

Figure 2.5 demonstrates the general location of the RTDs. These RTDs were primarily used to monitor the skin temperature in real time through the NRC data display system and were recorded by APS personnel.

The wind tunnel was also equipped with sensors recording the following parameters:

- Ambient temperature inside the tunnel;
- Outside air temperature (OAT);
- Air pressure;
- Wind speed; and
- Relative humidity.

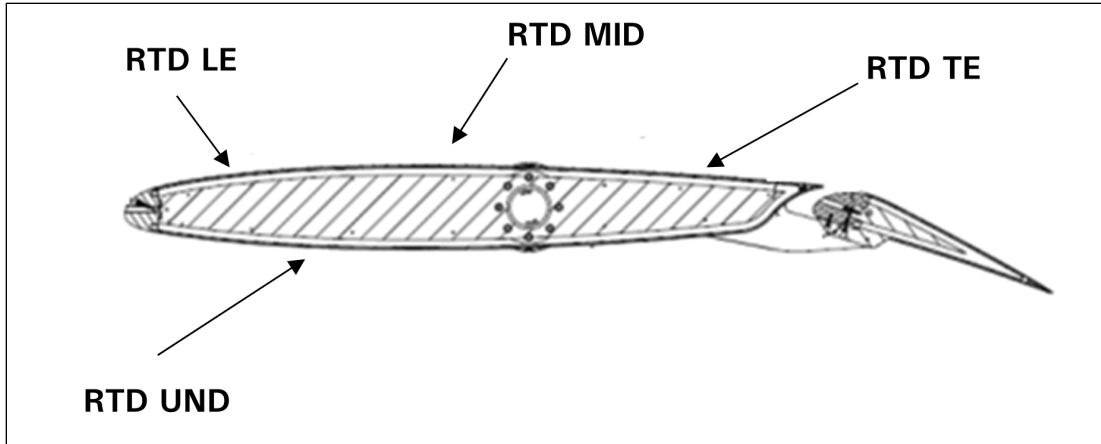


Figure 2.5: Location of RTDs Installed Inside Thin High-Performance Wing

2.5 Simulated Precipitation

The following types of precipitation have been simulated for aerodynamic research in the IWT:

- Ice Pellets;
- Snow;
- Freezing Rain/Rain; and
- Other conditions related to HOTs.

2.5.1 Ice Pellets

Simulated ice pellets were produced with diameters ranging from 1.4 mm to 4.0 mm to represent the most common ice pellet sizes observed during natural events. The ice pellets were manufactured inside a refrigerated truck (see Photo 2.5). Cubes of ice were crushed and passed through calibrated sieves (see Photo 2.6) to obtain the required ice pellet size range. Hand-held motorized dispensers (see Photo 2.7) were used to dispense the ice pellets. The ice pellets were applied to the leading and trailing edges of the wing at the same time.

2.5.2 Snow

Snow was produced using the same method as that used for producing ice pellets. The artificial snow consisted of small ice crystals measuring less than 1.4 mm in diameter. Previous testing conducted by APS investigated the dissolving properties of the artificial snow versus natural snow. The artificial snow was selected as an appropriate substitute for natural snow.

The snow was manufactured inside a refrigerated truck. Cubes of ice were crushed and passed through calibrated sieves to obtain the required snow size range. Hand-held motorized dispensers were used to dispense the snow. The snow was applied to the leading and trailing edges of the wing at the same time.

2.5.3 Freezing Rain/Rain

The same sprayer head and scanner used for HOT testing at the NRC Climatic Engineering Facility (CEF) were employed for testing. The sprayer system (see Photo 2.8) uses compressed air and distilled water to produce freezing rain. The temperature of the water is controlled and is kept just above freezing temperature to produce freezing rain. To produce rain, the temperature of the water is raised until the precipitation no longer freezes on the test surfaces.

2.5.4 Definition of Precipitation Rates

When simulating precipitation rates for full-scale and plate testing, the rate limits defined for standard HOT testing were referenced. Figure 2.6 demonstrates the HOT testing precipitation rate breakdown.

HOT testing protocol for ice pellets does not currently exist. As a result, ice pellet precipitation rate limits were based upon the light freezing rain and moderate rain rate breakdown. The following precipitation rates were used for the testing:

- Light Ice Pellets: 13-25 g/dm²/h;
- Moderate Ice Pellets: 25-75 g/dm²/h;
- Light Freezing Rain: 13-25 g/dm²/h;
- Freezing Drizzle (Heavy): 5-13 g/dm²/h;
- Light Rain: 13-25 g/dm²/h;
- Moderate Rain: 25-75 g/dm²/h;
- Light Snow: 4-10 g/dm²/h; and
- Moderate Snow: 10-25 g/dm²/h.

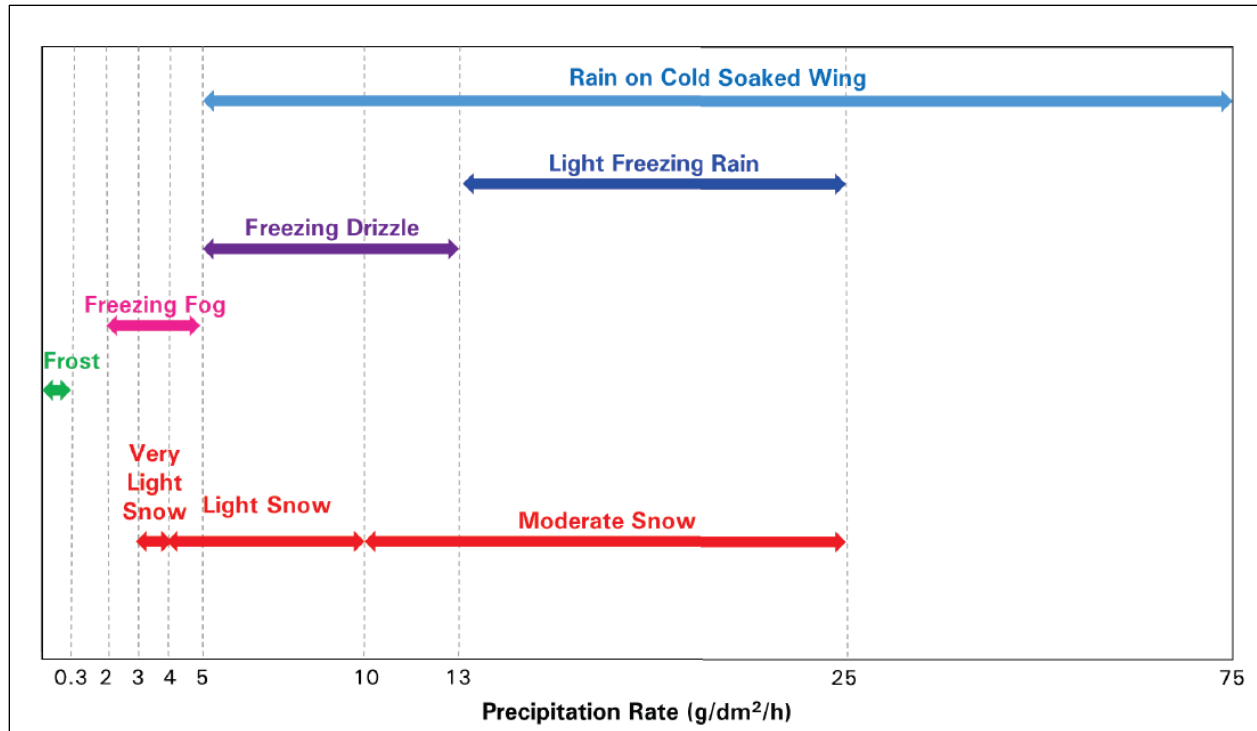


Figure 2.6: Precipitation Rate Breakdown

2.6 Test Equipment

A considerable amount of test equipment was used to perform these tests. Key items are described in the following subsections. A full list of equipment is provided in the test procedure, which is included in Appendix B.

2.6.1 Video and Photo Equipment

APS used the observation windows on the sides of the test section to install Canon® EOS XTi Digital Single-Lens Reflex (DSLR) cameras and Godox® SL150W II LED video lights to capture second-by-second photography with an intervalometer. An Osmo® camera was used for wide-angle filming of fluid flow-off during the test runs.

Due to facility occupancy and travel restrictions, a closed-circuit television (CCTV) system was installed by APS and allowed remote viewing of the tests by stakeholders using iPad®-based software. The CCTV cameras were positioned to provide different angle views of the wing model.

Photo 2.9 and Photo 2.10 demonstrate the camera setup used for the testing period.

2.6.2 Refractometer/Brixometer

Fluid freezing points were measured using a hand-held Misco® 10431VP refractometer with a Brix scale (shown in Figure 2.7). The freezing points of the various fluid samples were determined using the conversion curve or table provided to APS by the fluid manufacturers.

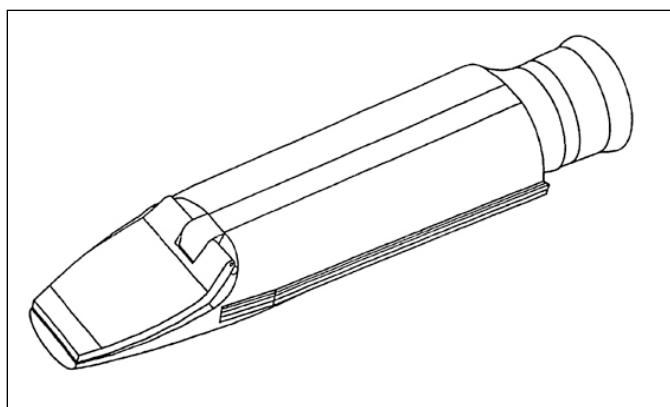


Figure 2.7: Hand-Held Refractometer/Brixometer

2.6.3 Wet Film Thickness Gauges

Wet film thickness gauges, shown in Figure 2.8, were used to measure fluid film thickness. These gauges were selected because they provide an adequate range of thicknesses (0.1 mm to 10.2 mm) for Type I/II/III/IV fluids. The rectangular gauge has a finer scale and was used in some cases when the fluid film was thinner (i.e., toward the end of a test). The observer recorded a thickness value (in mils), as read directly from the thickness gauge. The recorded value was the last wetted tooth of the thickness gauge; however, the true thickness lies between the last wetted tooth and the next unwetted tooth. The measured thickness was corrected accordingly.

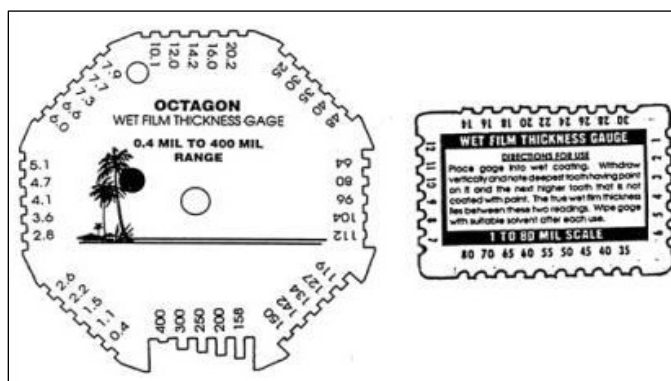


Figure 2.8: Wet Film Thickness Gauges

2.6.4 Hand-Held Immersion and Surface Temperature Probes

Hand-held immersion and surface temperature probes were used to provide instantaneous fluid temperature and wing skin temperature measurements during testing. These devices have an accuracy of $\pm 0.4^{\circ}\text{C}$ with a 2-3 second read time. Figure 2.9 shows a schematic of the probes.

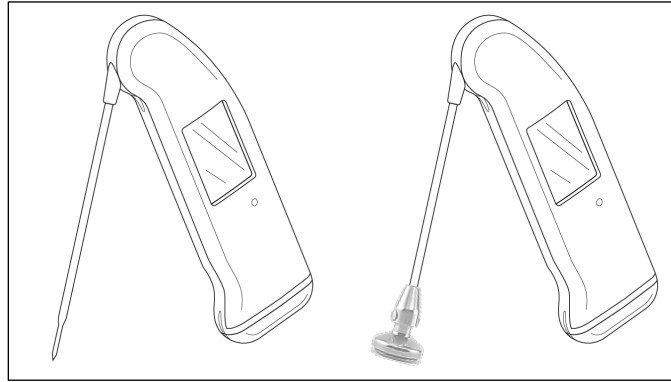


Figure 2.9: Hand-Held Immersion and Surface Temperature Probes

2.7 Personnel

During the fluid testing and exploratory research testing, three APS staff members were required to conduct the tests, and five to six additional people from Ottawa were hired and tasked to manufacture and dispense ice pellets, as well as to help with general setup tasks. A professional photographer was retained to record digital images of the test setup and test runs. Representatives from TC and the FAA provided direction in testing and participated as observers. Photo 2.11 shows a portion of the research team (due to scheduling, not all participants were available for the photo).

2.8 Data Forms

Several different forms were used to facilitate the documentation of the various data collected in the wind tunnel trials. These forms include the following:

- General Form;
- Wing Temperature, Fluid Thickness, and Fluid Brix Form;
- Ice Pellet and Snow Dispensing Forms;
- Sprayer Calibration Form;

- Visual Evaluation Rating Form;
- Condition of Wing and Plate Form;
- Fluid Receipt Form; and
- Log of Fluid Sample Bottles.

Copies of these forms are provided in the test procedure, which is included in Appendix B. Completed Wing Temperature, Fluid Thickness, and Fluid Brix Data Forms have been included in Appendix C.

2.9 Data Collection

Fluid thickness, fluid Brix, and skin temperature measurements were collected by APS personnel. The measurements were collected before and after fluid application, after the application of contamination, and at the end of the test. The completed data forms have been scanned and included in Appendix C for referencing purposes.

High-speed digital photographs of each test were taken. In addition, videos were also recorded during a majority of the tests. Due to the large amount of data available, photos of the individual tests have not been included in this report, but the high-resolution photos have been provided to TC in electronic format and can be made available upon request.

2.10 De/Anti-Icing Fluids

For the winter of 2024-25, three fluids were received: Chongqing Joba Chemical Co., Ltd FW-IV, Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS, and Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV. Several other fluids remained in inventory from previous years' testing and were used for allowance time expansion testing. The viscosity of all fluids in inventory was measured using the Brookfield® Digital Viscometer Model DV-1 + to ensure the fluid was within the fluid manufacturer's product specifications and comparable to previous samples received. The pertinent characteristics of these fluids are given in Table 2.2. Note that some fluids received before the 2022-23 season were also tested for viscosity; for brevity, the information was not included in the table.

Table 2.2: Wind Tunnel Fluid Viscosity Information for 2024-25 Testing

Sample Name	Dilution	Batch #	Year Received	Receiving Qty (L)	2022-23			2023-24			2024-25		
					Measured Viscosity (cP)	Falling Ball Temp. (°C)	Falling Ball Time (mm:ss)	Measured Viscosity (cP)	Falling Ball Temp. (°C)	Falling Ball Time (mm:ss)	Measured Viscosity (cP)	Falling Ball Temp. (°C)	Falling Ball Time (mm:ss)
CHEMCO ChemR Nordik IV	100/0	271021-1	2021-22	500	66,400	20.6	0:54	69,700	20.2	0:52	71,700	19.8	1:11
JSC RCPNordix Defrost North 4	100/0	2	2021-22	500	4,060	20.2	0:07	3,920	20.1	0:05	3,620	19.9	0:07
AllClear ClearWing EG	100/0	ClearEG.WT.21.22 TAB21-CW0720	2021-22	400	45,000	20.3	0:08	50,500	20.4	0:07	50,000	20	0:19
AVIAFLUID AVIAFlight EG	100/0	AVIAFlight_EG_23.24 RU-11/EG-2023	2023-24	400	-	-	-	7,660	19.7	0:06	7,960	19.7	0:06
AVIAFLUID AVIAFlight PG	100/0	AVIAFlight_PG_23.24 RU-01/PG-2023	2023-24	300	-	-	-	41,500	20.4	1:38	40,000	20.5	1:29
Dow EG106	100/0	D268N9D000	2023-24	800	-	-	-	44,150	20.1	1:11	37,800	20.3	0:50
Cryotech Polar Guard® Advance	100/0	PGA231120PA	2023-24	340	-	-	-	15,200	20.2	0:23	15,200	20	0:23
ASGlobal 4Flite PG	100/0	4Flite_PG_23.24	2023-24	300	-	-	-	42,700	19.9	2:23	49,250	19.9	2:12
Kilfrost ABC-S Plus	100/0	ABC-S Plus_23.24/ P/5/1/24	2023-24	400	-	-	-	26,300	19.6	0:31	25,100	19.9	0:32
Cryotech Polar Guard® Advance	100/0	PGA231206PA	2023-24	280	-	-	-	16,600	20.1	0:25	14,400	20.1	0:22
Shaanxi Cleanway Cleansurface IV	100/0	24102801	2024-25	400	-	-	-	-	-	-	24,500	20.2	0:47
Chongqing Joba FW-IV	100/0	20241125	2024-25	280	-	-	-	-	-	-	46,400	20.3	0:14
Clariant MP IV LAUNCH PLUS	100/0	LAUNCHPLUS_WT_24.25	2024-25	1,000	-	-	-	-	-	-	16,080	20.8	0:23

2.10.1 Viscometer

Historically, viscosity measurements have been carried out using a Brookfield® viscometer (Model DV-1 + , shown in Photo 2.12) fitted with a recirculating fluid bath and small sample adapter. In recent years, on-site measurements have also been possible with the Stony Brook PDVdi-120 Falling Ball Viscometer (Photo 2.13) to obtain a quick verification of the fluid integrity. The falling ball tests are much faster and more convenient to perform compared to tests with the Brookfield® viscometer. The falling ball, however, does not provide the absolute value of viscosity but rather a time interval that is compared to historical samples to identify changes in viscosity.

2.10.2 Type II/III/IV Fluid Application Equipment

The Type II/III/IV fluids were stored outside the wind tunnel and were kept at ambient temperature. The fluids were poured rather than sprayed so that application would not change the fluid viscosity. This methodology was appropriate given the relatively small test area of the wing section and the goal of minimizing the amount of fluid flowing off the wing.

Type II/III/IV fluids are generally received in 20 L containers; however, some fluids are received in large 200 L barrels and larger 1000 L totes. The fluid is applied to the wing section by using smaller 2 L containers (see Photo 2.14). Approximately 16 L to 20 L of fluid were applied to the wing section for each test; less fluid was required for the less viscous Type III fluid. Due to the flat top surface of the thin high-performance wing, the thickened fluid did not easily settle and flow on the top surface. Therefore, the wing was tilted forward (by approximately 10°) for 1 minute following the end of fluid application to allow for the fluid to spread out evenly over the top surface of the wing.

2.10.3 Waste Fluid Collection

Applying the fluids by pouring minimized the amount of fluid falling off the wing. The NRC also fitted the wind tunnel with appropriate drainage tubes to collect spent fluid during the takeoff test runs, which allowed APS personnel to squeegee residual fluid on the tunnel floor directly into the drains. At the end of the testing period, the services of a waste removal company were employed to safely dispose of the waste glycol fluid.

2.11 Analysis Methodology

The following provides a brief description of the analysis methodology. More details on the analysis methodology can be found in TP 15232E (1).

Each ice pellet test was analysed in detail with the following objectives:

- Test parameters;
- Visual ratings at the start of the test;
- Visual ratings at rotation;
- 8° rotation lift loss; and
- Overall test status.

The evaluation grades for each criterion were “Good,” “Review,” or “Bad.” These grades were determined based on whether the criterion satisfied each test objective requirement. Figure 2.10 shows a summary of each test objective and criterion.

Several test parameters were evaluated, such as tunnel temperature before the start of the test, rate of precipitation, and exposure time of precipitation. These parameters were compared to the target parameters described in the test plan. The actual recorded ramp-up time was also evaluated and compared to the target ramp-up time to ensure representative flow-off results; this became less of an issue after 2011-12 with the use of the automated ramp-up system instead of the previous manual system.

2.11.1 Visual Ratings at the Start of the Test

During each of the tests conducted, visual contamination ratings were determined by three observers: one observer from the FAA and two observers from APS. The level of contamination present on the leading edge and trailing edge of the wing, as well as on the flap, was quantified using a scale of 1 to 5, with 5 being the worst-case scenario; partial numbers were sometimes assigned when cases were marginally above or below a specific rating.

The visual contamination rating criteria at the start of the test on both the leading and trailing edges must be equal to or less than 3 to pass. The flap must have a rating of 4 or less. For a review grade to be given, the leading and trailing edges must have a rating between 3 and 3.5, and the flap must have a rating between 4 and 4.5. Any rating greater than 3.5 on the leading and trailing edges is considered as a fail, while anything greater than 4.5 on the flap is considered as a fail.

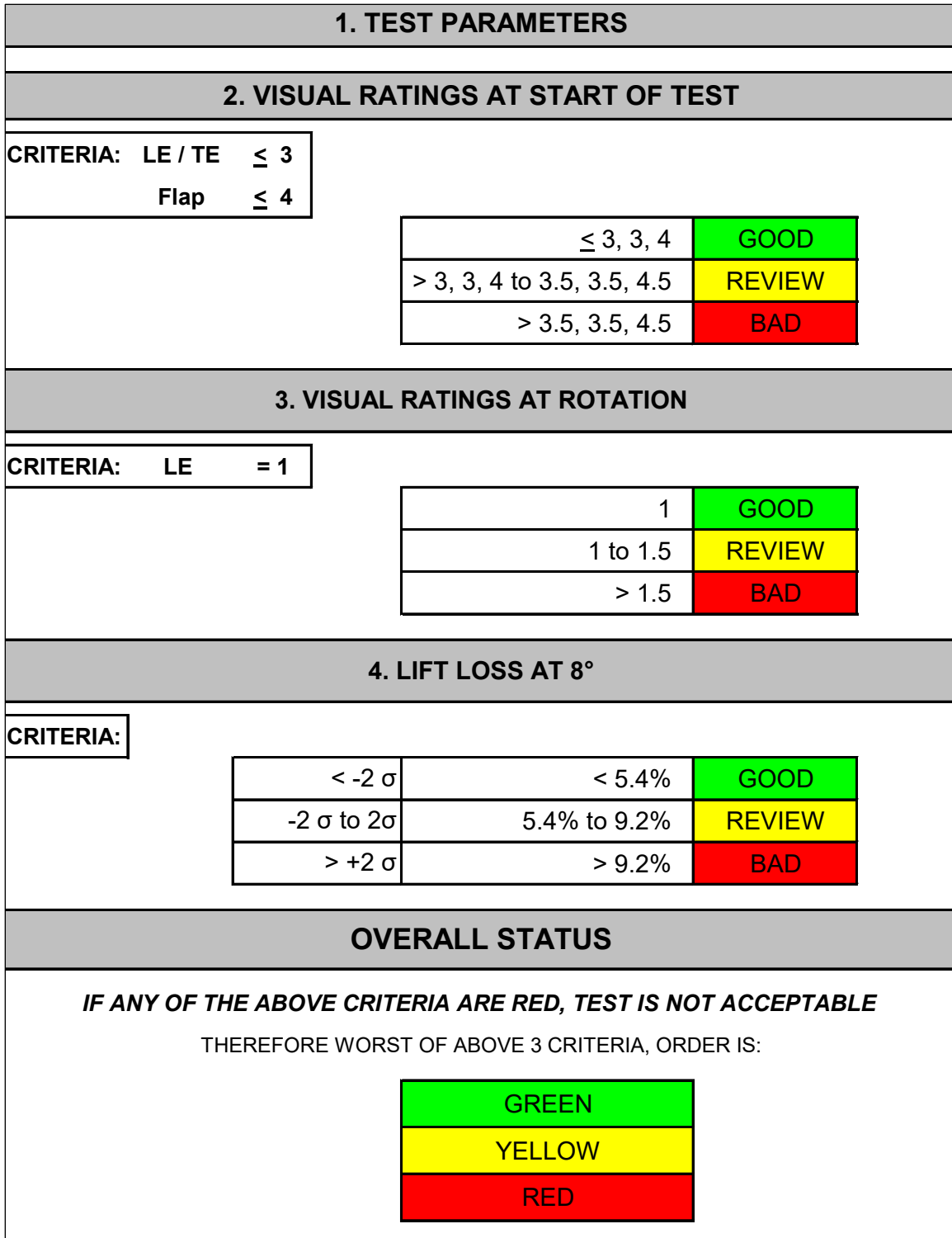


Figure 2.10: Ice Pellet Test Analysis Criteria

2.11.2 Visual Ratings at Rotation

The visual contamination rating criteria at the time of rotation on the leading edge must be equal to 1 or less to pass. For a review grade to be given, the leading edge must have a rating between 1 and 1.5. Any rating on the leading edge greater than 1.5 is considered as a fail.

2.11.3 Eight-Degree Rotation Lift Loss

To pass, the 8° rotation lift loss must be less than 5.4 percent. For a review grade to be given, the lift loss must be between 5.4 percent and 9.2 percent. Any lift loss greater than 9.2 percent is considered as a fail.

2.11.4 Overall Test Status

After all objectives were analysed, the overall status was given a “Good,” “Review,” or “Bad” evaluation. This provided an overall summary for each test. The overall status was determined by the worst-case scenario of any of the test objectives; if any of the criteria were given a “Bad” grade, the overall status would be “Bad,” and the test would be considered as a fail.

2.11.5 Dry Wing Calibration

To ensure the accuracy of the testing results, a dry wing calibration test was conducted at the start of each day. The dry wing test allowed the research team to ensure that the model aerodynamics did not change due to mechanical, communicative, or analytical errors. Dry wing tests were also conducted following any mechanical modification to the airfoil (i.e., after applying the ice phobic wing skins). The dry wing results demonstrated that the changes in dry wing performance were within the range of experimental error and did not indicate any repeatability issues with the model.

Photo 2.1: Outside View of the NRC Wind Tunnel Facility



Photo 2.2: Inside View of the NRC Wind Tunnel Test Section



Photo 2.3: Thin High-Performance Wing Section Used for Testing



Photo 2.4: Grid Markings on Thin High-Performance Wing Section

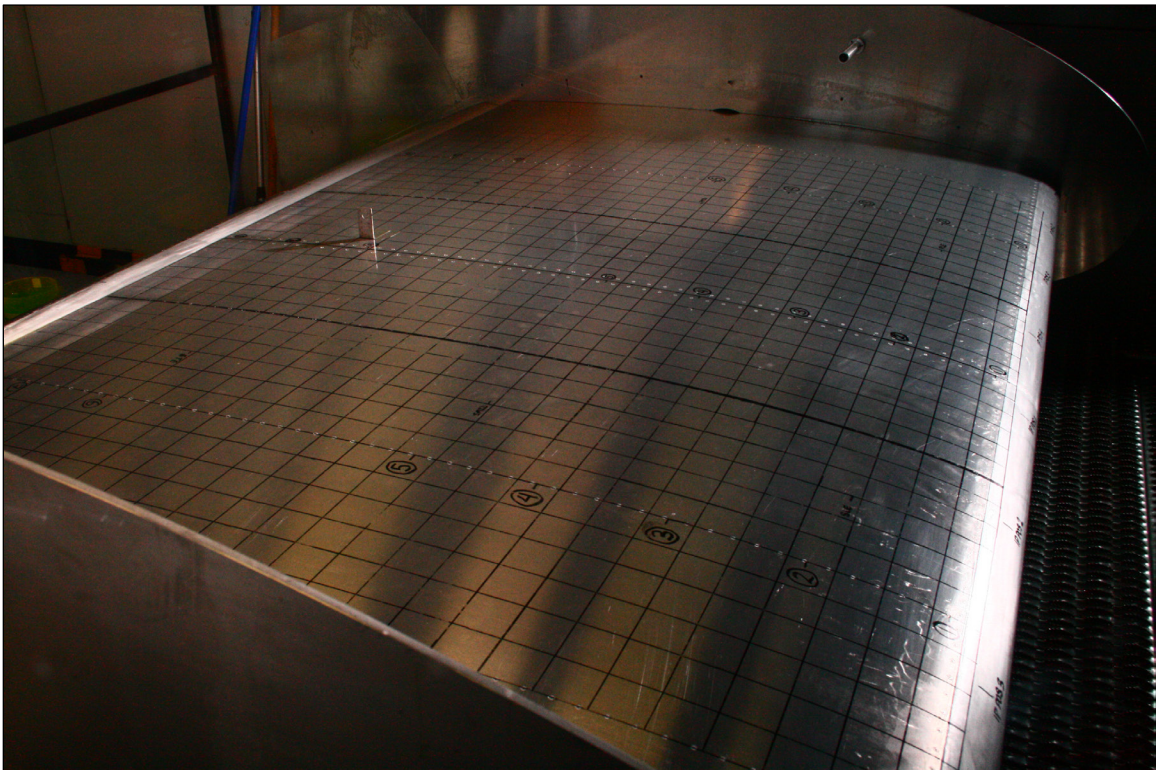


Photo 2.5: Refrigerated Truck Used for Manufacturing Ice Pellets



Photo 2.6: Calibrated Sieves Used to Obtain Desired Size Distribution



Photo 2.7: Ice Pellet Dispensers Operated by APS Personnel



Photo 2.8: Ceiling-Mounted Freezing Rain Sprayer

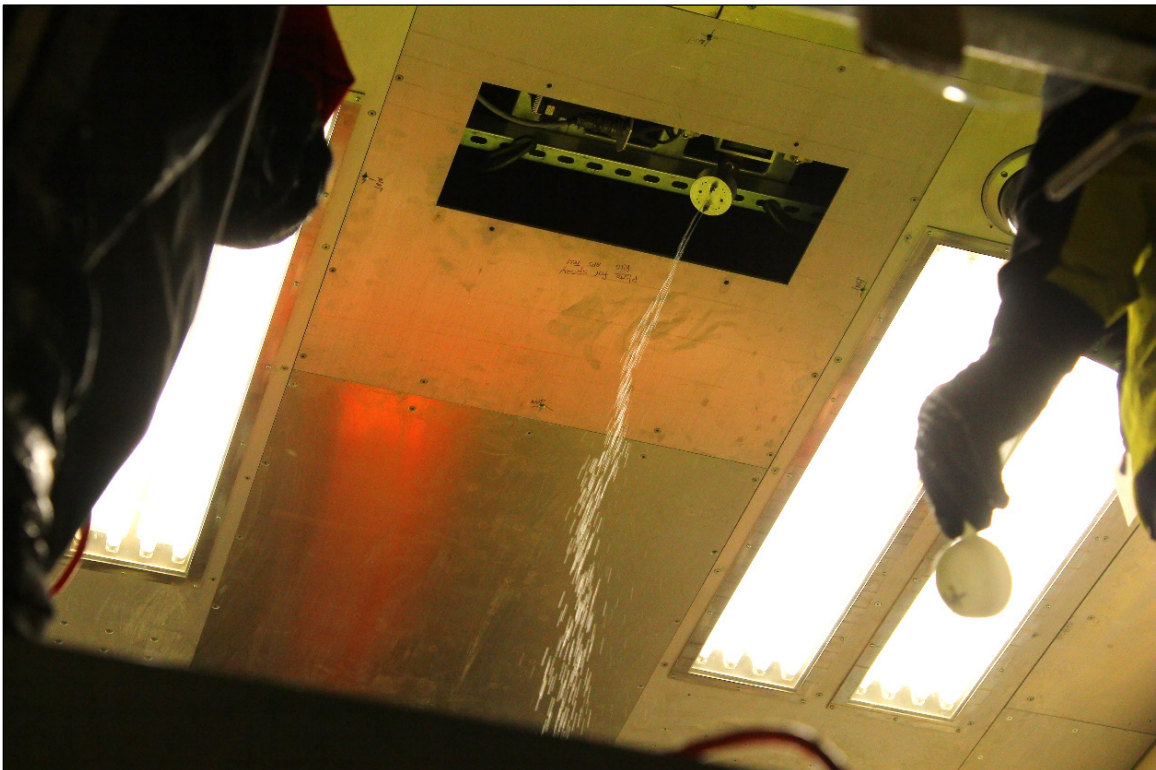


Photo 2.9: Wind Tunnel Setup for Flashes



Photo 2.10: Wind Tunnel Setup for Digital Cameras



Photo 2.11: 2024-25 Research Team



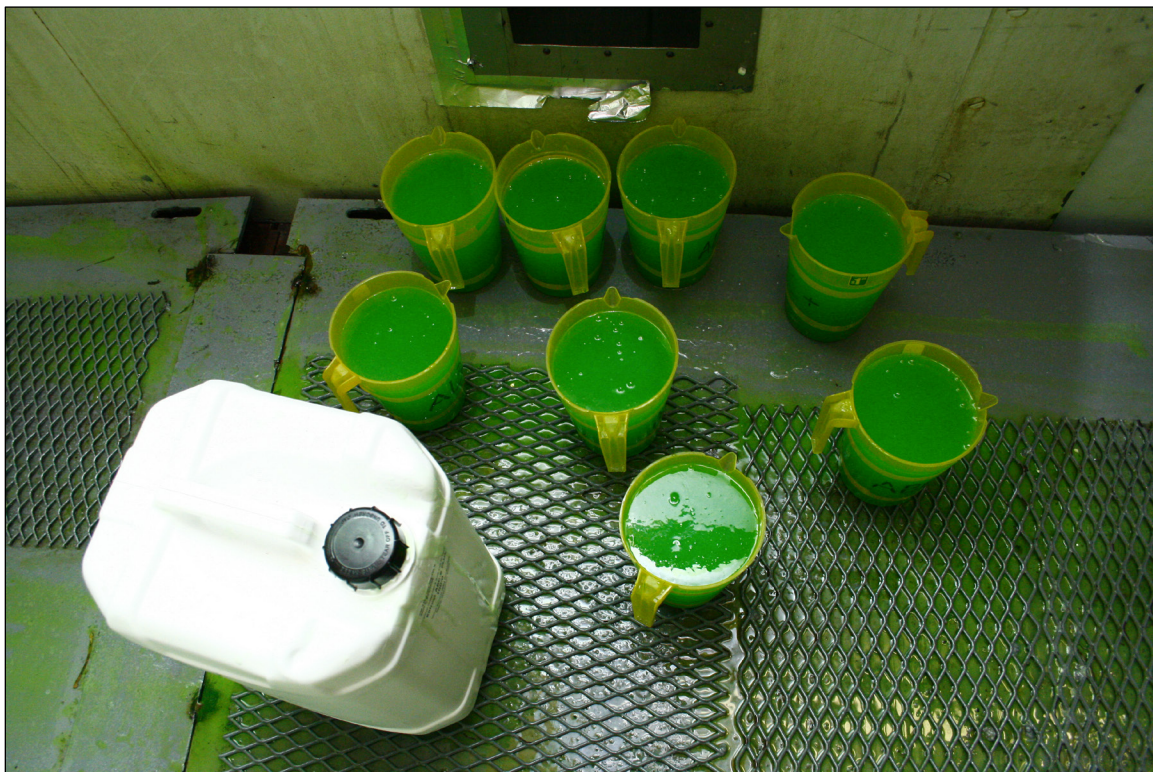
Photo 2.12: Brookfield® Digital Viscometer and Recirculating Bath



Photo 2.13: Stony Brook PDVdi-120 Falling Ball Viscometer



Photo 2.14: Fluid Pour Containers



This page intentionally left blank.

3. FULL-SCALE DATA COLLECTED

3.1 Test Log

A calendar of the tests conducted during the winter of 2024-25 can be found in Table 2.1. A detailed log of the tests conducted in the NRC IWT during the winter of 2024-25 is included in Appendix D, along with all other tests run with the thin high-performance wing model since 2009. This comprehensive historical log provides relevant information for each of the tests, as well as final values used for the data analysis. Each row contains data specific to one test. The following is a brief description of the column headings for the logs included in Appendix D.

<i>Test #:</i>	Exclusive number identifying each test run.
<i>Date:</i>	Date when the test was conducted.
<i>Test Plan #:</i>	The unique number identifying the test in the overall plan specific to the test year.
<i>Objective:</i>	Main objective of the test.
<i>Test Condition:</i>	Description of the simulated conditions for the test.
<i>Fluid Name:</i>	Aircraft anti-icing fluid used during the test.
<i>Rotation Angle:</i>	Maximum angle of rotation obtained during simulated takeoff run; began testing with a max 8° rotation angle and increased to 20° as testing progressed.
<i>Speed (kts):</i>	Maximum speed obtained during simulated takeoff run, recorded in knots.
<i>Flap Angle (0°, 20°):</i>	Positioning of the flap during the precipitation period; either 0° (retracted) or 20° (extended). <i>Note: Flap was always extended at 20° during the takeoff run.</i>
<i>Corrected for 3D Effects % Lift Loss at 8° CL vs. Dry CL:</i>	Percent lift loss calculated based on the comparison of the 8° lift coefficient during the test run versus the 8° dry wing average lift coefficient.

<i>Tunnel Temp. Before Test (°C):</i>	Static tunnel air temperature recorded just before the start of the simulated takeoff test, measured in degrees Celsius. <i>Note: This parameter was used as the actual test temperature for analysis.</i>
<i>OAT Before Test (°C):</i>	OAT recorded just before the start of the simulated takeoff test, measured in degrees Celsius. <i>Note: This is not an important parameter as "Tunnel Temp. Before Test" was used as the actual test temperature for analysis.</i>
<i>Avg. Wing Temp. Before Fluid Appl. (°C):</i>	The average of the wing temperatures just before the fluid was applied.
<i>Avg. Wing Temp. Before Test (°C):</i>	The average of the wing temperatures just before the test.
<i>XX Rate (g/dm²/h):</i>	Simulated freezing precipitation rate (or combination of different precipitation rates) for Ice Pellets (IP), Snow (SN), Freezing Rain (ZR), and Rain (R).
<i>Exposure Time (min.):</i>	Simulated precipitation period, recorded in minutes.

The visual contamination ratings are described below. Visual contamination ratings were typically reported as the average of the three observer ratings and rounded to the nearest decimal. The visual contamination ratings system is further described in Subsection 2.11.

<i>Visual Contamination Rating Before Takeoff (LE, TE, Flap):</i>	Visual contamination rating determined before the start of the simulated takeoff: <ol style="list-style-type: none">1. Contamination not very visible, fluid still clean;2. Contamination visible, but lots of fluid still present;3. Contamination visible, spots of bridging contamination;4. Contamination visible, lots of dry bridging present; and5. Contamination visible, adherence of contamination.
---	--

*Visual Contamination Rating
at Rotation (LE, TE, Flap):*

Visual contamination rating determined at the time of rotation:

1. Contamination not very visible, fluid still clean;
2. Contamination visible, but lots of fluid still present;
3. Contamination visible, spots of bridging contamination;
4. Contamination visible, lots of dry bridging present; and
5. Contamination visible, adherence of contamination.

*Visual Contamination Rating
After Takeoff (LE, TE, Flap):*

Visual contamination rating determined at the end of the test:

1. Contamination not very visible, fluid still clean;
2. Contamination visible, but lots of fluid still present;
3. Contamination visible, spots of bridging contamination;
4. Contamination visible, lots of dry bridging present; and
5. Contamination visible, adherence of contamination.

This page intentionally left blank.

4. VALIDATION TESTING FOR NEW-TO-MARKET TYPE IV FLUIDS

The Type IV fluid Ice Pellet Allowance Times are based on data collected using commercially available Type IV fluids. The Type IV fluid Ice Pellet Allowance Times guidance is generic; therefore, the allowance times must be conservative enough to be applicable to all Type IV fluids on the market.

As new fluids are developed and become commercially available, it is important to evaluate these fluids against the current allowance times to ensure the continued validity of the generic guidance. Due to the open-circuit nature of the wind tunnel test facility, it is not generally feasible to test in all of the conditions listed in the allowance time table in a given year. Therefore, systematic “spot checking” is used to identify any potential issues. Additionally, efforts are made to obtain data with all available fluids cooled close to their fluid LOUT; this further allows the aerodynamic effects of ice pellet contamination at colder temperatures to be determined.

To meet these requirements, testing was conducted during the winter of 2024-25 with the following Type IV EG and PG fluids:

- Chongqing Joba Chemical Co., Ltd FW-IV (EG);
- Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS (PG); and
- Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV (PG).

The following subsections will provide an overview of the analysis format and a summary of the results obtained for each of the fluids tested.

4.1 Allowance Time Table Analysis Format

For each fluid tested, a table has been included that provides a summary of the tests conducted. The results from the individual tests are included in a mock-up allowance time table indicating the current Ice Pellet Allowance Times as well as the individual test information in the respective cell. The individual test information has been presented in the below format.

- FFAA(BB)CC[DD]GGE
 - FF (shown in quotation marks) is the fluid name designation as follows:
 - Chongqing Joba Chemical Co., Ltd FW-IV – FW;
 - Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS – LP; and
 - Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV – C4.

- AA is the static tunnel ambient temperature recorded just before the start of the simulated takeoff test, measured in degrees Celsius and rounded to the closest degree.
- (BB) is the percent lift loss calculated based on the comparison of the 8° rotation lift coefficient during the test run versus the dry wing average lift coefficient.
- CC is the exposure time of the test in minutes.
- [DD] is the test number for referencing the data in the test logs.
- GG is the last two digits of the year of testing (i.e., 2024-25 is "25").
- E is the status of the testing, either "G" for good, "R" for review, or "B" for bad, as per the guidelines. The highlighting is in a corresponding green, yellow, or red colour. An additional colour, pink, was added for tests that failed due to the visual rating, which identified adherence on the flap at the start of the test with the flap configured down (in the takeoff position).
- The test information is included in the cell for which the temperature band best corresponds to the temperature recorded during the test.
- Tests that begin with a right or left-facing arrow (→ or ←) are also considered as acceptable validation tests for the temperature band to the right or left of where the test is listed.

The purpose of these tables is to provide a quick reference of the test results in relation to the current allowance times to better understand in which cells the times have been validated or where potential issues may be identified.

4.2 Chongqing Joba Chemical Co., Ltd FW-IV Testing Results

A total of 12 allowance time tests were conducted with Chongqing Joba Chemical Co., Ltd FW-IV fluid. Table 4.1 provides a summary of the validation tests (i.e., the exposure time of the test was equivalent to the current allowance times).

Of the tests conducted, eight were acceptable from both a visual and aerodynamic perspective. Three tests (#5, #21, and #27) fell into the "Review" category.

Test #5 demonstrated lift losses that were above the 5.4 percent lower limit (pass) but still below the 9.2 percent upper limit (fail) and were also acceptable from a visual perspective. The test temperature (-2°C) was also colder than the targeted allowance time condition of 0°C; therefore, these results were not considered to be of concern.

Tests #21 and #27 were flagged due to visual observation of some dry bridging of contamination on the leading edge before the takeoff runs. The aerodynamic results were still acceptable; therefore, those results were not considered problematic.

Finally, Test #18, run in Light Ice Pellets mixed with Light Freezing Rain, had “Bad” status due to the visual rating, which identified adherence on the flap at the start of the test after the fluid and contamination had been applied with the flap extended (in the takeoff position). Test #18 was not re-run as it is known that the visual condition would improve with the flap retracted during the contamination period (with adherence of contamination unlikely) and because the lift loss during the test run with the flap down was low.

Based on these results, the Type IV EG allowance times were validated for Chongqing Joba Chemical Co., Ltd FW-IV.

Table 4.1: Chongqing Joba Chemical Co., Ltd FW-IV Allowance Time Validation Tests

Precipitation Types or Combinations	Outside Air Temperature				
	Above 0°C (32°F and above)	0 to -5°C (32 to 23°F)	Below -5 to -10°C (Below 23 to 14°F)	Below -10 to -16°C (Below 14 to 3°F)	Below -16 to -22°C (Below 3 to -8°F)
Light Ice Pellets	70 minutes ➔	70 minutes FW-4(0.6)70(24)25G	70 minutes FW-10(0.6)70(39)25G	50 minutes	30 minutes
Light Ice Pellets mixed with Light Snow	50 minutes ➔	50 minutes FW-4(1.2)50(27)25R	30 minutes FW-10(1.4)30(40)25G	25 minutes FW-13(3.5)25(50)25G	Caution: No allowance times currently exist
Light Ice Pellets mixed with Light or Moderate Freezing Drizzle		40 minutes	30 minutes		
Light Ice Pellets mixed with Light or Moderate Drizzle	40 minutes				
Light Ice Pellets mixed with Light Freezing Rain		40 minutes FW-6(6.1)40(18)25B	30 minutes		
Light Ice Pellets mixed with Light Rain	40 minutes ➔				
Light Ice Pellets mixed with Light Rain and Light Snow	20 minutes FW-0(1.2)20(31)25G				
Light Ice Pellets mixed with Light Freezing Rain and Light Snow		20 minutes FW-3(2.2)20(74)20G			
Moderate Ice Pellets (or Small Hail)	35 minutes ➔	35 minutes ➔	35 minutes FW-10(1.4)35(21)35R	15 minutes	10 minutes
Moderate Ice Pellets (or Small Hail) mixed with Moderate Snow	25 minutes	25 minutes	15 minutes FW-8(2.0)15(38)25G	10 minutes	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Freezing Drizzle		20 minutes FW-5(3.1)20(67)25G	10 minutes		Caution: No allowance times currently exist
Moderate Ice Pellets (or Small Hail) mixed with Moderate Drizzle	20 minutes				
Moderate Ice Pellets (or Small Hail) mixed with Moderate Rain	15 minutes FW-2(7.2)15(5)25R				

4.3 Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS Testing Results

A total of 15 allowance time tests were conducted with Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS fluid. As this was a PG fluid, and it was expected that the fluid would perform well in certain target conditions, some tests were conducted for longer than the published allowance times. This served a dual purpose: validating the existing allowance times and potentially supporting the future expansion of the table for PG fluids.

Table 4.2 provides a summary of the tests conducted that served strictly as validation tests (i.e., the exposure time of the test was equivalent to the current allowance times).

Of the tests conducted, four were acceptable from both a visual and aerodynamic perspective. Six tests (#12, #41, #47, #59, #66, and #75) fell into the “Review” category.

The tests that had “Review” status generally were flagged due to visual ratings prior to the start of the test and/or lift losses that were above the 5.4 percent lower limit (pass) but still below the 9.2 percent upper limit (fail); however, in all cases the fluid and contamination were removed at the time of rotation. The lift losses recorded indicated that these tests could be considered acceptable.

Test #58 had “Bad” status due to the lift losses recorded; however, the test should have been conducted at a rotation speed of 115 knots instead of 100 knots (as the test temperature was below -10°C). It is expected that the increase in speed would have improved the performance; therefore, the failed test was not considered to be a valid data point. The test was re-run as #59 with the correct rotation speed of 115 knots, and the test result was acceptable.

Table 4.3 provides a summary of the tests conducted that served as expansion tests (i.e., the exposure time of the test exceeded the current allowance time). Three tests (#10, #20, and #32) demonstrated good potential for expansion given the review status based on lift losses that were above the 5.4 percent lower limit (pass) but still below the 9.2 percent upper limit (fail). One test (#9) in Light Ice Pellets mixed with Light or Moderate Drizzle was rated as “Bad,” indicating that a 60-minute targeted exposure time was not acceptable for this fluid and that a 50-minute exposure time (see Test #10) might be more appropriate.

Table 4.4 provides a consolidated summary of all the tests conducted. In general, the fluid met and exceeded the current allowance times. In the cases where the results had “Bad” status, a lower-than-required rotation speed was used or an expansion test exposure to contamination was the contributing factor. In the cases

where the results had “Review” status, the visual ratings prior to the start of the test and/or lift losses were above the 5.4 percent lower limit (pass) but still below the 9.2 percent upper limit (fail); however, the fluid and contamination were removed at the time of rotation. Therefore, these tests could be considered acceptable.

Based on these results, the Type IV PG allowance times were validated for Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS, and the results indicate good potential to increase the allowance times for PG fluids.

Table 4.2: Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS Allowance Time Validation Tests

Precipitation Types or Combinations	Outside Air Temperature				
	Above 0°C (32°F and above)	0 to -5°C (32 to 23°F)	Below -5 to -10°C (Below 23 to 14°F)	Below -10 to -16°C (Below 14 to 3°F)	Below -16 to -22°C (Below 3 to -8°F)
Light Ice Pellets	50 minutes ➔	50 minutes LP-4(3.5)50(6)25G	30 minutes LP-11(6.6)30(47)25R	30 minutes	20 minutes
Light Ice Pellets mixed with Light Snow	40 minutes ➔	40 minutes LP-4(5.3)40(25)25G	15 minutes LP-11(10.1)15(58)25B	15 minutes LP-13(7.3)15(59)25R	Caution: No allowance times currently exist
Light Ice Pellets mixed with Light or Moderate Freezing Drizzle		25 minutes	10 minutes		
Light Ice Pellets mixed with Light or Moderate Drizzle	25 minutes				
Light Ice Pellets mixed with Light Freezing Rain		25 minutes LP-7(5.1)25(19)25G	10 minutes		
Light Ice Pellets mixed with Light Rain	25 minutes				
Light Ice Pellets mixed with Light Rain and Light Snow	20 minutes				
Light Ice Pellets mixed with Light Freezing Rain and Light Snow		20 minutes LP-3(5.8)20(75)25R			
Moderate Ice Pellets (or Small Hail)	15 minutes	15 minutes	10 minutes	10 minutes	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Snow	15 minutes LP-2(3.8)15(12)25R	15 minutes ←	5 minutes	5 minutes	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Freezing Drizzle		10 minutes LP-5(6.9)10(66)25R	7 minutes LP-11(7.7)7(41)25R		
Moderate Ice Pellets (or Small Hail) mixed with Moderate Drizzle	10 minutes			Caution: No allowance times currently exist	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Rain	10 minutes LP-1(2.7)10(3)25G				

Table 4.3: Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS Allowance Time Expansion Tests

Precipitation Types or Combinations	Outside Air Temperature				
	Above 0°C (32°F and above)	0 to -5°C (32 to 23°F)	Below -5 to -10°C (Below 23 to 14°F)	Below -10 to -16°C (Below 14 to 3°F)	Below -16 to -22°C (Below 3 to -8°F)
Light Ice Pellets	50 minutes	50 minutes	30 minutes	30 minutes	20 minutes
Light Ice Pellets mixed with Light Snow	40 minutes	40 minutes	15 minutes	15 minutes	Caution: No allowance times currently exist
Light Ice Pellets mixed with Light or Moderate Freezing Drizzle		25 minutes	10 minutes		
Light Ice Pellets mixed with Light or Moderate Drizzle	25 minutes LP-1(6.7)50[10]25R LP-1(9.7)60[9]25E				
Light Ice Pellets mixed with Light Freezing Rain		25 minutes	10 minutes		
Light Ice Pellets mixed with Light Rain	25 minutes LP0(6.4)40[32]25R				
Light Ice Pellets mixed with Light Rain and Light Snow	20 minutes				
Light Ice Pellets mixed with Light Freezing Rain and Light Snow		20 minutes			
Moderate Ice Pellets (or Small Hail)	15 minutes	15 minutes	10 minutes LP-9(7.7)15[20]25R	10 minutes	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Snow	15 minutes	15 minutes	5 minutes	5 minutes	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Freezing Drizzle		10 minutes	7 minutes		
Moderate Ice Pellets (or Small Hail) mixed with Moderate Drizzle	10 minutes				Caution: No allowance times currently exist
Moderate Ice Pellets (or Small Hail) mixed with Moderate Rain	10 minutes				

Table 4.4: All Clariant Produkte GmbH Safewing MP IV LAUNCH PLUS Allowance Time Tests

Precipitation Types or Combinations	Outside Air Temperature				
	Above 0°C (32°F and above)	0 to -5°C (32 to 23°F)	Below -5 to -10°C (Below 23 to 14°F)	Below -10 to -16°C (Below 14 to 3°F)	Below -16 to -22°C (Below 3 to -8°F)
Light Ice Pellets	50 minutes ➔	50 minutes LP-4(3.5)50(6)25G	30 minutes LP-11(6.6)30(47)25R	30 minutes	20 minutes
Light Ice Pellets mixed with Light Snow	40 minutes ➔	40 minutes LP-4(5.3)40(25)25G	15 minutes LP-11(10.1)15(58)25B	15 minutes LP-13(7.3)15(59)25R	
Light Ice Pellets mixed with Light or Moderate Freezing Drizzle		25 minutes	10 minutes		
Light Ice Pellets mixed with Light or Moderate Drizzle	25 minutes LP-1(6.7)50(10)25R LP-1(9.7)60(9)25B				
Light Ice Pellets mixed with Light Freezing Rain		25 minutes LP-7(5.1)25(19)25G	10 minutes		Caution: No allowance times currently exist
Light Ice Pellets mixed with Light Rain	25 minutes LP0(6.4)40(32)25R				
Light Ice Pellets mixed with Light Rain and Light Snow	20 minutes (validated by freezing equivalent test)				
Light Ice Pellets mixed with Light Freezing Rain and Light Snow		20 minutes LP-3(5.8)20(75)25R			
Moderate Ice Pellets (or Small Hail)	15 minutes	15 minutes validated by test on right ➔	10 minutes LP-9(7.7)15(20)25R	10 minutes	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Snow	15 minutes LP-2(3.8)15(12)25R	15 minutes ←	5 minutes	5 minutes	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Freezing Drizzle		10 minutes LP-5(6.9)10(66)25R	7 minutes LP-11(7.7)7(41)25R		
Moderate Ice Pellets (or Small Hail) mixed with Moderate Drizzle	10 minutes				Caution: No allowance times currently exist
Moderate Ice Pellets (or Small Hail) mixed with Moderate Rain	10 minutes LP-1(2.7)10(3)25G				

4.4 Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV Testing Results

Seventeen allowance time tests were conducted in 2024-25 with Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV. Table 4.5 provides a summary of the tests conducted. The test data demonstrated higher-than-usual lift losses, which were not typical of the aerodynamic performance expected for a PG Type IV fluid. The points highlighted in red (failed tests) are of particular concern. All seven failed tests also had some residual fluid and contamination at the time of rotation that was visually observed.

Due to the seven failed wind tunnel tests, an additional exercise was conducted by TC and the FAA to evaluate the boundary layer displacement thickness (BLDT) performance of the fluid sample (in accordance with the SAE Aerospace Standard [AS] 5900) to better understand the source of the issue. The Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV fluid was tested in a “fluid-only” configuration at the IWT, and then the same batch of fluid was submitted for BLDT testing at the same temperature. The BLDT tests were conducted at six temperatures between -6°C and -30°C. Of these, three tests below -21°C exceeded the BLDT limit, indicating an issue with the submitted fluid batch.

TC and the FAA reached out to the manufacturer to investigate this issue further and to determine the actions moving forward. The investigation is ongoing at the time of writing this report.

Table 4.5: Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV Allowance Time Tests

Precipitation Types or Combinations and Applicable METAR Codes ⁶	Outside Air Temperature				
	Above 0°C ³ (32°F and above)	0 to -5°C ³ (32 to 23°F)	Below -5 to -10°C ³ (Below 23 to 14°F)	Below -10 to -16°C ⁴ (Below 14 to 3°F)	Below -16 to -22°C ^{4,5} (Below 3 to -8°F)
Light Ice Pellets	50 minutes ➔	50 minutes C4-6(7.2)50(16)25R	30 minutes ←	30 minutes C4-13(8.3)30(43)25R	20 minutes
Light Ice Pellets mixed with Light Snow	40 minutes ➔	40 minutes C4-3(7.2)40(26)25R	15 minutes C4-10(11.5)15(56)25B	15 minutes C4-14(10.9)15(51)25B	Caution: No allowance times currently exist
Light Ice Pellets mixed with Light or Moderate Freezing Drizzle		25 minutes Validated by test below (rain)	10 minutes		
Light Ice Pellets mixed with Light or Moderate Drizzle	25 minutes				
Light Ice Pellets mixed with Light Freezing Rain		25 minutes C4-6(6.6)25(17)25R	10 minutes C4-9(9.1)10(54)25R		
Light Ice Pellets mixed with Light Rain	25 minutes ➔				
Light Ice Pellets mixed with Light Rain and Light Snow	20 minutes C4-0(5.8)40(33)25R				
Light Ice Pellets mixed with Light Freezing Rain and Light Snow		20 minutes C4-3(5.8)20(73)25R			
Moderate Ice Pellets (or Small Hail)	15 minutes	15 minutes C4-3(8.4)25(28)25B	10 minutes	10 minutes C4-14(11.1)10(60)25B	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Snow	15 minutes Validated by test on right ➔	15 minutes C4-3(7.6)15(13)25R	5 minutes	5 minutes C4-13(10.7)5(61)25B	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Freezing Drizzle		10 minutes C4-5(8.7)10(65)25R	7 minutes C4-9(11.4)7(55)25B C4-11(11.4)7(42)25B		
Moderate Ice Pellets (or Small Hail) mixed with Moderate Drizzle	10 minutes				Caution: No allowance times currently exist
Moderate Ice Pellets (or Small Hail) mixed with Moderate Rain	10 minutes C4-2(4.0)10(4)25C				

This page intentionally left blank.

5. EXTENSION OF ALLOWANCE TIMES FOR EG AND PG FLUIDS

Type IV Ice Pellet Allowance Times guidance is developed based on data collected using commercially available Type IV fluids. Historically, Type IV EG and PG fluids have been grouped together; however, testing data has indicated that each type of fluid may have longer Ice Pellet Allowance Times in specific conditions as compared to the other. The industry requested that fluid-specific Ice Pellet Allowance Time Tables be evaluated to determine potentially longer allowance times specific to these fluids. As such, an analysis of historical data was conducted, and some expansion testing with newer-generation fluids was performed.

5.1 Analysis of EG Fluid Allowance Times

An analysis was conducted based on the fluids tested since 2009 with the RJ wing. The data has been reviewed, and details are included as part of Appendix D for reference (refer to Subsection 3.1 for heading descriptions). The detailed data for all EG tests conducted since 2009 with the RJ wing has been reviewed; Table 5.1 provides a summary of all data points, including those tested to the allowance time and those tested to exposure times longer than the current allowance time.

For Table 5.1, the individual test information has been presented in the below format.

- FFAA(BB)CC[DD]GGE
 - FF is the fluid name designation as follows:
 - AllClear ClearWing EG – CW;
 - CHEMCO ChemR EG IV – CC;
 - CHEMCO ChemR NORDIK IV – RN;
 - Chongqing Joba Chemical Co., Ltd FW-IV – FW;
 - Clariant Max Flight AVIA – CA (obsolete);
 - Clariant Safewing EG IV NORTH – CN;
 - Dow Chemical UCAR™ Endurance EG106 – DE;
 - JSC RCP Nordix Defrost EG IV – FR;
 - JSC RCP Nordix Defrost NORTH 4 – DN;
 - LNT E450 – LE (obsolete);
 - Newave Aerochemical FCY-EGIV – FC; and
 - AVIAFLUID AVIAFlight EG – AE.

- AA is the static tunnel ambient temperature recorded just before the start of the simulated takeoff test, measured in degrees Celsius and rounded to the closest degree.
- (BB) is the percent lift loss calculated based on the comparison of the 8° lift coefficient during the test run versus the dry wing average lift coefficient.
- CC is the exposure time of the test in minutes.
- [DD] is the test number for referencing the data in the test logs.
- GG is the last two digits of the year of testing (i.e., 2024-25 is "25").
- E is the status of the testing, either "G" for good, "R" for review, or "B" for bad, as per the guidelines. The highlighting is in a corresponding green, yellow, or red colour. The colour pink was added for tests that demonstrated adherence on the flap while configured with the flap extended. The tests highlighted in pink are expected to have achieved the status of "Review" or "Good" had the test been re-run with the flap configured in the retracted position. The colour blue was added for tests where the exposure time is shorter than the current allowance time (since some times were recently extended).
- The test information is included in the cell for which the temperature band best corresponds to the temperature recorded during the test.
- Tests that begin with a right or left-facing arrow (→ or ←) are also considered as acceptable validation tests for the temperature band to the right or left of where the test is listed.

Table 5.1: All EG Fluid Data Collected Since 2009 with RJ Wing

Precipitation Type	Outside Air Temperature					
	Above 0°C	0 to -5°C	Below -5 to -10°C	Below -10 to -16°C	Below -16°C	
Light Ice Pellets	70 minutes	70 minutes DE-4(0.9)50[22]10G CWO(1.4)50[10]21G FW-4(0.6)70[24]25G CN-5(0.8)70[19]20G RN-4(1.2)70[33]22G CA-5(1.3)70[103]21G CW-4(2.6)70[99]21G DN-3(0.9)90[34]22G FC-4(1.5)90[35]22G	70 minutes RN-10(2.1)30[64]22G CC-7(1.3)50[40]18G CC-9(1.8)50[31]18G CA-10(2.5)50[48]21G CW-8(2.7)50[49]21G FW-10(0.6)70[39]25G FC-9(0.8)70[103]22G DN-9(2.1)70[102]22G CC-7(2.2)70[57]21G DE-6(3.1)70[104]21G FR-6(3.3)70[58]21G AE-8(0.4)90[5]24G AE-8(1.1)90[69]24G	50 minutes DE-13(1.1)30[67]10G DE-11(1.6)30[51]11G CN-14(2.5)30[4]20G CC-13(2.6)30[16]18G FC-15(3.1)30[123]22G LE-15(5.8)30[10]16R DE-16(0.8)50[77]22G RN-15(1.6)50[47]22G CN-16(2.8)50[7]20G CW-16(3.6)50[83]22R FC-13(2.5)60[49]22G RN-11(1.6)70[101]22G DN-14(2.9)70[48]22G DE-12(2.2)90[49]25G	30 minutes DE-17(2.3)30[80]10G DE-23(3.2)30[27]11G CA-21(5.7)30[15]19R FR-22(6.7)30[17]19R CA-18(3.1)50[84]22G	
	50 minutes	50 minutes DE-3(1.2)40[23]10G CW-5(2.8)40[39]21G RN-4(0.6)50[72]22G DN-3(1.0)50[41]22G FW-4(1.2)50[27]25R CN-5(1.5)50[20]20G CA-3(2.3)50[72]21G AE-5(2.9)50[38]24G DE-4(3.2)50[71]21G CW-3(3.3)50[98]21R FR-3(3.4)50[97]21G CC-5(3.7)50[33]18R	30 minutes CC-8(2.5)15[12]18G LE-7(5.4)15[21]16G FW-10(1.4)30[40]25G AE-8(1.6)30[9]24G CA-9(3.4)30[62]21G DE-10(3.6)30[64]21G CW-9(4.9)30[63]21G	25 minutes DE-13(2.4)15[45]11G CN-15(2.8)15[5]20G CC-12(3.4)15[17]18G CA-14(4.3)15[41]19R FR-13(5.2)15[42]19G DE-14(2.7)25[78]11G FW-13(3.5)25[50]25G DE-14(1.9)30[14]20G RN-13(2.5)30[80]22G FC-11(3.1)30[66]22R CC-14(3.2)30[12]20G FR-15(3.4)30[16]20G DN-11(3.8)30[65]22G CN-14(4.0)30[89]22G DN-12(4.4)30[88]22G FC-13(4.5)30[90]22R CW-16(7.2)30[81]22R	0 minute DE-17(2.0)15[310]14G DE-18(4.1)15[311]14R	

Table 5.1: All EG Fluid Data Collected Since 2009 with RJ Wing (cont'd)

Precipitation Type	Outside Air Temperature					
	Above 0°C	0 to -5°C	Below -5 to -10°C	Below -10 to -16°C	Below -16°C	
Light Ice Pellets mixed with Freezing Drizzle	Note: Cells will be populated with adjacent (Below 0 to -5) times for 2025-26 onwards	40 minutes FR-2(3.9)40[91]21R CN-2(6.9)40[90]21R CW-2(7.8)40[92]21B CWO(3.7)60[132]24G	30 minutes CC-6(5.4)30[32]18R CA-10(5.6)30[79]21B CW-9(6.7)30[80]21B			
Light Ice Pellets mixed with Freezing Rain	Note: Cells will be populated with adjacent (Below 0 to -5) times for 2025-26 onwards	40 minutes DE-3(1.3)25[26A]10G LE-1(3.1)25[68]16G CWO(3.1)25[23]21B* DE-2(4.1)25[26]10B LE-0(4.3)25[76]16G CC-2(12.8)35[75]21B CC-3(2.3)40[76]21R CN-5(4.7)40[22]20B CW-2(6.5)40[73]21B AE-4(6.8)40[11]24B DN-4(7.6)40[127]22B CC-2(9.9)40[74]21B	30 minutes DE-7(1.2)10[98]10G CA-10(2.9)10[46]19G CC-8(3.2)10[8]18G FR-10(4.4)10[43]19G LE-8(4.9)10[20]16G CW-6(1.6)25[41]21G* CW-6(7.3)25[40]21B CN-10(5.1)30[65]21B CC-12(5.8)30[43]18B AE-11(5.9)30[22]24B CA-11(7.0)30[66]21B CC-11(7.5)30[67]21B RN-6(4.0)40[54]22B DN-7(4.5)40[55]22B FC-6(4.7)40[57]22B CA-8(5.8)40[59]21B FR-7(5.8)40[106]21B FW-6(6.1)40[18]25B CC-8(7.1)40[107]21B (old batch) DE-10(7.2)40[126]11B CC-9(8.0)40[108]21B			Caution: No allowance times currently exist
Light Ice Pellets mixed with Light Snow and Light Freezing Rain	Note: Cells will be populated with adjacent (Below 0 to -5) times for 2025-26 onwards	20 minutes FW-3(2.2)20[74]20G CWO(8.6)25[92]24B DE-4(5.3)25[135]11R RN-1(4.0)45[78]24B				
Light Ice Pellets mixed with Drizzle	40 minutes DN1(4.8)40[137]24B DE2(1.4)60[124]24G RN3(1.9)60[135]24G DN1(13.8)60[136]24B	Note: Cells will be populated with freezing equivalent (Below 0 to -5) times for 2025-26 onwards				
Light Ice Pellets mixed with Rain	40 minutes FR1(1.4)25[36]19G	Note: Cells will be populated with freezing equivalent (Below 0 to -5) times for 2025-26 onwards				

Table 5.1: All EG Fluid Data Collected Since 2009 with RJ Wing (cont'd)

Precipitation Type	Outside Air Temperature				
	Above 0°C	0 to -5°C	Below -5 to -10°C	Below -10 to -16°C	Below -16°C
Light Ice Pellets mixed with Light Rain and Light Snow	20 minutes FW0(1.2)20[31]25G CW2(1.2)20[96]24G DN2(2.6)25[95]24G DE1(1.3)25[118]11G AE2(2.2)35[84]24G CW1(1.2)35[91]24B AE2(5.0)45[83]24B DE1(6.5)45[77]24B CW2(12.5)45[90]24B	Note: Cells will be populated with freezing equivalent (Below 0 to -5) times for 2025-26 onwards			
Moderate Ice Pellets (or Small Hail)	35 minutes	35 minutes DE-4(0.8)25[21]10G DE-4(1.7)25[125]12G DE-4(1.8)25[124]12G CA-4(1.9)25[31]19G CW-5(2.0)25[38]21G FR-4(2.5)25[32]19G LE-2(3.3)25[69]16G DN-4(1.2)35[40]22G CN-5(1.3)35[21]20R CC-4(2.7)35[96]21R FR-4(3.2)35[95]21G FC-3(1.2)45[39]22R	35 minutes CC-10(1.9)10[13]18G AE-8(+0.6)25[10]24G FC-9(1.8)25[7]22G DN-8(1.9)25[6]22G DE-8(2.2)25[50]21G CC-10(2.3)25[42]18G CA-9(3.3)25[51]21G AE-6(0.5)35[67]24R RN-8(1.2)35[5]22G FW-10(1.4)35[21]35R DE-7(1.9)35[56]21G CA-6(2.1)35[55]21G CW-8(2.2)35[42]21R AE-9(0.7)45[6]24B	15 minutes CN-13(2.4)10[3]20G FC-16(2.5)10[122]22G CC-15(2.7)10[18]18G LE-15(6.4)10[13]16R RN-16(2.8)15[119]22R RN-16(2.5)20[118]22R CA-16(4.1)20[91]22R DE-15(1.1)25[13]20R CC-14(2.1)25[11]20R CN-16(2.2)25[6]20R FR-16(2.8)25[15]20G RN-16(3.1)25[11]22R FC-15(4.7)25[24]22R DN-16(4.9)25[23]22R	10 minutes DE-18(1.8)10[71]10G DE-21(3.1)10[26]11G RN-18(3.3)10[120]22G DN-17(5.3)10[121]22G CA-21(5.5)10[16]19R LE-17(6.0)10[11]16R FR-21(6.6)10[18]19R RN-17(2.9)20[85]22R CW-17(3.8)25[82]22B
Moderate Ice Pellets (or Small Hail) mixed with Moderate Snow	25 minutes	25 minutes RN-1(0.7)25[58]24G DN-1(0.7)25[61]24G CW-1(1.0)25[62]24R DE-1(0.1)30[57]24R	15 minutes RN-7(1.4)15[49]24G FW-8(2.0)15[38]25G AE-9(2.0)15[48]24G DN-9(2.7)15[53]24R CN-7(0.1)20[154]24G CW-7(2.2)20[153]24G DE-8(2.3)20[40]24G AE-9(4.3)20[47]24B	10 minutes DE-14(3.6)10[116]22G RN-15(4.0)10[113]22R CN-14(4.2)10[111]22G CW-15(8.3)10[93]22R DE-14(4.4)15[92]22R DN-13(5.2)15[110]22R	

Table 5.1: All EG Fluid Data Collected Since 2009 with RJ Wing (cont'd)

Precipitation Type	Outside Air Temperature				
	Above 0°C	0 to -5°C	Below -5 to -10°C	Below -10 to -16°C	Below -16°C
Moderate Ice Pellets (or Small Hail) mixed with Moderate Freezing Drizzle	Note: Cells will be populated with adjacent (Below 0 to -5) times for 2025-26 onwards	20 minutes CN-5(0.8)20[23]20G FW-5(3.1)20[67]25G CA-4(3.6)20[86]21G CW-3(7.1)20[88]21B CC-3(7.3)20[100]21R DE-4(7.4)25[87]21B	10 minutes CC-8(2.4)7[9]18G AE-9(1.2)10[28]24R RN-11(1.4)10[75]22G DE-10(2.6)10[81]21G CA-9(3.4)15[83]21G CN-9(4.0)15[82]21G FR-7(3.6)20[105]21R DN-10(3.7)20[76]22G AE-7(6.3)20[17]24B		
Moderate Ice Pellets (or Small Hail) mixed with Moderate Drizzle	20 minutes	Note: Cells will be populated with freezing equivalent (Below 0 to -5) times for 2025-26 onwards			Caution: No allowance times currently exist
Moderate Ice Pellets (or Small Hail) mixed with Rain	15 minutes CC-3(7.2)10[39]18B DE-1(2.1)12[21]21R* AE2(0.1)15[81]24R DE2(1.9)15[31]21G DE1(1.9)15[27]21G* CC2(2.3)15[26]21G* FR1(2.3)15[35]21R CA0(3.2)15[17]21G* FRO(5.4)15[18]21B* DE-1(5.9)15[20]21B* CN-1(6.7)15[22]21B* CW-1(7.1)15[14]21B* FW-2(7.2)15[5]25R DE-1(1.7)15[19]21B* CW2(1.0)20[32]21G FR1(1.6)20[34]21B DE2(1.9)20[30]21G FR1(2.3)20[33]21B CWO(13.0)20[13]21B*				

* Rate issue with sprayer scanner. Rain rate was about 20 percent higher than expected.
 - Flap up test.

5.1.1 EG Fluid Expansion Data

Testing conducted during the winter of 2024-25 added to the existing EG expansion data collected over multiple years, with a focus on Light Ice Pellets Below -10 to -16°C, which also applies to the -5 to -10°C temperature band. This is in addition to the recent year's expansion focus on Light Ice Pellets, Moderate Ice Pellets, and Light Ice Pellets mixed with Light Drizzle or Moderate Drizzle.

Based on the results obtained, each cell of the allowance time table was analysed to determine the potential for expansion. The basis for expansion could include the following:

- Running longer than the current allowance time with "Good" status;
- Running longer than the current allowance time with "Review" or "Bad" status that could be justified (i.e., flap down during exposure leading to bad visuals);
- Running to the current allowance time (or historical allowance time) with "Good" status indicating a margin for longer time; and
- Running to the current allowance time with "Review" or "Bad" status that could be justified (i.e., flap down during exposure leading to bad visuals), therefore indicating a margin for longer time.

The longest times supported by the data available were considered new potential allowance times. The following are some general guidelines followed when expanding times:

- Each of the cells contains at least three different fluid expansion tests;
- The cell data includes results from any potential "worst-case fluid";
- Cells contain data that may have "Review" status; these are borderline cases and, considering they are limited, should be acceptable; and
- Tests mixed with freezing precipitation may have "Bad" status tests due to the flap down configuration during the test, but had the test been conducted with the flap up in a properly nested configuration, the results would have improved significantly.

The results obtained demonstrate the potential for expansion of the allowance times in all three conditions: Light Ice Pellets, Moderate Ice Pellets, and Light Ice Pellets mixed with Light Drizzle or Moderate Drizzle. However, it was determined that additional data was needed to further substantiate the results obtained. As such, no changes were proposed to the allowance time guidance for 2025-26.

It is expected that testing will continue to add to the data set to support future allowance time expansion changes to the EG table.

5.2 Analysis of PG Fluid Allowance Times

An analysis was conducted based on the fluids tested since 2009 with the RJ wing and is summarized in Table 5.2. The data has been reviewed, and details are included as part of Appendix D for reference (refer to Subsection 3.1 for heading descriptions). For Table 5.2, the individual test information has been presented in the below format.

- FFAA(BB)CC[DD]GGE
 - FF is the fluid name designation as follows:
 - AllClear ClearWing ECO (2023-24) – WO;
 - AllClear ClearWing ECO (2021-22, Obsolete) – WE;
 - ASGlobal 4Flite PG – 4P;
 - AVIAFLUID AVIAFlight PG – AP;
 - Clariant Safewing MP IV LAUNCH – CL;
 - Clariant Safewing MP IV LAUNCH PLUS – LP;
 - Clariant Max Flight – MF (Obsolete);
 - Clariant Max Flight Sneg – MS (Obsolete);
 - Cryotech Polar Guard® Advance – CP;
 - Cryotech Polar Guard® Xtend (2021-22) – CX;
 - Cryotech Polar Guard® Xtend (2020-21, Obsolete) – XX;
 - ABAX ECOWING AD-49 – AD;
 - Inland Technologies ECO-SHIELD – ES;
 - JSC RCP Nordix Defrost ECO 4 – DF;
 - Kilfrost ABC-S Plus – SP;
 - Newave Aerochemical FCY 9311 – NF; and
 - Shaanxi Cleanway Cleansurface IV – C4.
 - AA is the static tunnel ambient temperature recorded just before the start of the simulated takeoff test, measured in degrees Celsius and rounded to the closest degree.
 - (BB) is the percent lift loss calculated based on the comparison of the 8° lift coefficient during the test run versus the dry wing average lift coefficient.
 - CC is the exposure time of the test in minutes.
 - [DD] is the test number for referencing the data in the test logs.
 - GG is the last two digits of the year of testing (i.e., 2024-25 is “25”).

- E is the status of the testing, either “G” for good, “R” for review, or “B” for bad, as per the guidelines. The highlighting is in a corresponding green, yellow, or red colour. The colour pink was added for tests that demonstrated adherence on the flap while configured with the flap extended. The tests highlighted in pink are expected to have achieved the status of “Review” or “Good” had the test been re-run with the flap configured in the retracted position. The colour blue was added for tests where the exposure time is shorter than the current allowance time (since some times were recently extended).
- The test information is included in the cell for which the temperature band best corresponds to the temperature recorded during the test.

Tests that begin with a right- or left-facing arrow (→ or ←) are also considered as acceptable validation tests for the temperature band to the right or left of where the test is listed.

Table 5.2: All PG Fluid Data Collected Since 2009 with RJ Wing

Precipitation Type	Outside Air Temperature				
	Above 0°C	0 to -5°C	Below -5 to -10°C	Below -10 to -16°C	Below -16°C
Light Ice Pellets	50 minutes	50 minutes LP-4(3.5)50[6]25G NF-3(3.5)50[63]16G CX-3(3.8)50[32]22G XX-2(4.0)50[5]21R CL-4(4.1)50[28]10G MF-5(4.5)50[165]13R CP-1(4.6)50[76]13G AD-4(4.8)50[129]11G WE-5(7.2)50[4]22R CP-2(1.4)90[107]24G	30 minutes ES-7(4.8)30[6]18G SP-8(5.6)30[96]10R AD-11(7.1)30[6]11R CX-9(7.1)30[104]22R XX-9(7.6)30[46]21R AP-10(8.0)30[26]24R CP-10(9.1)30[90]13R WO-9(9.4)30[27]24B WE-9(11.4)30[108]22B CL-6(3.6)50[28A]10G SP-7(4.5)50[9]10G AP-8(6.5)50[145]24R ES-8(6.5)50[41]18R C4-6(7.2)50[16]25R AP-7(8.0)50[4]24R WO-7(8.3)50[3]24R	30 minutes CX-14(6.5)30[28]22R ES-15(6.5)30[20]18R AD-16(6.5)30[159]13R LP-11(6.6)30[47]25R C4-13(8.3)30[43]25R WE-12(9.3)30[50]22B CP-13(9.8)30[100]13B XX-16(9.8)30[113]21B CP-11(9.5)50[48]25B	20 minutes AD-17(5.0)15[160]13R CX-20(8.3)20[19]22R WE-20(11.9)20[20]22B MS-20(7.1)30[13]19R MF-23(7.1)30[129]13R DF-21(8.8)30[14]19R CP-21(9.2)30[127]13R CX-17(9.4)30[13]22B
	4P1(2.1)90[112]24G SP1(2.7)90[111]24G				
Light Ice Pellets mixed with Light Snow	40 minutes	40 minutes NF-2(5.8)25[93]16R AD-5(7.5)25[171]13R CL-4(2.5)40[57A]10G CL-4(4.2)40[57]10G LP-4(5.3)40[25]25G AD-4(5.6)40[46]16R CX-5(5.9)40[73]22R SP-4(7.9)40[43]16R XX-4(7.1)40[6]21R AP-6(7.2)40[142]24R C4-3(7.2)40[26]25R NF-4(8.0)40[92]16R CP-5(8.7)40[5]16R WE-5(9)40[43]22R WO-5(9.3)40[68]24B	15 minutes SP-6(4.6)15[94]10G ES-6(5.0)15[11]18R NF-7(7.0)15[22]16R CX-8(7.6)15[8]22R DF-9(7.8)15[26]19R AP-9(8.0)15[29]24R MS-9(8.1)15[47]21R WE-11(9.2)15[67]22B XX-10(9.4)15[69]21B WO-9(9.8)15[31]24B MS-8(9.9)15[27]19B LP-11(10.1)15[58]25B C4-10(11.5)15[56]25B CP-7(6.4)25[87]13R SP-6(4.6)40[11]10G AP-7(9.0)40[39]24R	15 minutes ES-14(6.3)15[21]18R LP-13(7.3)15[59]25R CP-11(7.8)15[305]14R DF-16(7.9)15[40]19R CP-14(8.0)15[306]14R CP-15(8.0)15[304]14R XX-15(8.3)15[112]21R SP-16(8.4)15[82]11R MF-15(8.5)15[313]14R WE-11(9.2)15[67]22B C4-14(10.9)15[51]25B	No AT AD-19(7.1)10[315]14R CL-17(8.4)10[84]11R AD-20(8.4)15[314]14R CL-17(9.1)15[312]14R
	No tests.				

Table 5.2: All PG Fluid Data Collected Since 2009 with RJ Wing (cont'd)

Precipitation Type	Outside Air Temperature				
	Above 0°C	0 to -5°C	Below -5 to -10°C	Below -10 to -16°C	Below -16°C
Light Ice Pellets mixed with Light or Moderate Freezing Drizzle	Note: Cells will be populated with adjacent (Below 0 to -5) times for 2025-26 onwards	25 minutes AP-1(5.8)50[11]25R LP-1(6.7)50[10]25R 4P-2(6.9)60[138]24R LP-1(9.7)60[9]25B	10 minutes CP-7(5.0)30[156]24G SP-8(5.1)30[156]24G 4P-8(5.7)30[155]24R		Caution: No allowance times currently exist
Light Ice Pellets mixed with Light or Moderate Drizzle	25 minutes SP2(2.9)60[123]24G CP1(5.2)60[113]24G	Note: Cells will be populated with freezing equivalent (Below 0 to -5) times for 2025-26 onwards			
Light Ice Pellets mixed with Light Freezing Rain	Note: Cells will be populated with adjacent (Below 0 to -5) times for 2025-26 onwards	25 minutes NF-2(2.5)25[95]16G CX-3(3.0)25[126]22B MS-1(3.5)25[35]19G XXO(3.5)25[11]21G CL-3(3.8)25[59]10G NFO(4.1)25[75]16G AD-3(4.2)25[128]11R LP-7(5.1)25[19]25G SP-2(5.5)25[65]16B CP-1(5.8)25[66]16B AD-2(6.5)25[67]16B 4P-7(7.3)25[144]24R AP-5(7.6)25[12]24R WE-5(8.1)25[56]22B NF-2(8.4)25[64]16R NF-2(9.9)25[94]16B AP-1(5.8)40[34]25R 4P-1(5.7)40[106]24B	10 minutes ES-8(4.9)10[7]18G NF-9(6.3)10[19]16R SP-12(6.6)10[63]10R AP-11(6.8)10[23]24R XX-8(7.1)10[45]21R DF-13(7.1)10[48]19R MS-13(8.1)10[47]19R WO-11(9.0)10[20]24R C4-9(9.1)10[54]25R CP-7(5.0)25[148]24B SP-6(6.1)25[0]10R C4-6(6.6)25[17]25R AD-6(6.8)25[102]11R CX-7(6.8)25[58]22B WO-6(7.6)25[13]24B		
Light Ice Pellets mixed with Light Rain	25 minutes CL2(2.9)25[117]11G DF1(2.9)25[37]19G CP2(4.4)40[104]24B 4P-1(5.7)40[106]24B C40(5.8)40[33]25R LPO(6.4)40[32]25R SP1(6.3)50[105]24B	Note: Cells will be populated with freezing equivalent (Below 0 to -5) times for 2025-26 onwards			

Table 5.2: All PG Fluid Data Collected Since 2009 with RJ Wing (cont'd)

Precipitation Type	Outside Air Temperature				
	Above 0°C	0 to -5°C	Below -5 to -10°C	Below -10 to -16°C	Below -16°C
Light Ice Pellets mixed with Light Rain and Light Snow	20 minutes SP3(5.6)20[134]11R SP3(6.9)20[133]11R LA2(2.2)25[114]11G WO2(4.5)40[85]24G CP1(5.3)40[75]24B SP1(5.4)40[76]24B	Note: Cells will be populated with freezing equivalent (Below 0 to -5) times for 2025-26 onwards			
Light Ice Pellets mixed with Light Freezing Rain and Light Snow	Note: Cells will be populated with adjacent (Below 0 to -5) times for 2025-26 onwards	20 minutes CPO(2.8)20[74]24G CX-4(3.3)20[128]22B LP-3(5.8)20[75]25R C4-3(5.8)20[73]25R 4P-2(5.8)40[34]25R			
Moderate Ice Pellets (or Small Hail)	15 minutes XX1(3.7)15[9]21G	15 minutes SP-3(4.9)10[168]12G SP-3(5.7)10[169]12R XX-5(7.5)10[54]21R DF-3(3.5)15[33]19G CX-3(4.2)15[38]22G MS-3(4.5)15[34]19G 4P-1(4.6)15[139]24G CL-3(6.1)15[48]10R CL-3(6.1)15[49]10R CP-5(6.2)15[86]13R SP-4(6.3)15[163]13R AP-5(7.1)15[66]24R WO-4(8.2)15[65]24R WE-5(8.9)15[3]22R CPO(3.3)25[97]24G CL-5(5.1)25[131]11R CL-4(6.3)25[118]12R CL-4(7.4)25[119]12R CL-5(7.5)25[47]10B C4-3(8.4)25[28]25B CPO(4.6)30[114]24G SPO(4.7)30[98]24G 4P-2(6.1)30[100]24R WO-1(6.7)30[99]24R	10 minutes AD-7(4.9)10[154]13R SP-8(6.3)10[95]10R ES-8(6.9)10[34]18R AD-10(7.1)10[7]11R AP-9(8.1)10[30]24R CX-12(9.3)10[107]22B SP-12(9.9)10[58]12B WO-9(10.4)10[32]24B ES-7(5.6)15[3]18R 4P-8(7.4)15[146]24R SP-7(5.4)25[10]10R MF-6(6.9)25[132]11R CP-9(7.3)25[147]24R LP-9(7.7)15[20]25R	10 minutes AD-12(6.7)7[356]14R MF-11(5.1)10[36]114G MF-11(5.3)10[15B]11G CP-11(6.0)10[362]14R DF-13(6.3)10[23]19R CL-12(7.0)10[360]14R AD-14(7.2)10[357]14R MS-14(7.2)10[22]19R SP-11(7.3)10[359]14R MF-12(8.0)10[14]11R NF-16(8.5)10[14]16R MF-13(8.8)10[113A]113R CX-16(8.9)10[12]22R CL-16(9.0)10[331]14R CL-16(9.4)10[333]14B WE-13(9.4)10[26]22B C4-14(11.1)10[60]25B CP-15(6.7)15[69]22R	No AT CL-21[8.7]5[337]14R SP-21(6.6)7[338]14R MF-22(7.4)7[339]14R AD-22(5.4)10[134]13R CP-21(6.4)10[340]14R SP-20(6.6)10[121]13R MF-23(6.7)10[142]13R SP-23(6.8)10[141]13R CL-18(7.7)10[330]14R MF-23(8.1)10[130]13R CP-22(8.8)10[128]13R ES-17(8.8)10[22]18R CL-17(9.1)10[156]13R CP-17(9.2)10[149]13B CL-17(9.3)10[332]14B CL-20(9.4)10[336]14B CL-20(9.6)10[335]14B XX-17(9.9)10[116]21B CL-19(10.8)10[334]14B

Table 5.2: All PG Fluid Data Collected Since 2009 with RJ Wing (cont'd)

Precipitation Type	Outside Air Temperature				
	Above 0°C	0 to -5°C	Below -5 to -10°C	Below -10 to -16°C	Below -16°C
Moderate Ice Pellets (or Small Hail) mixed with Moderate Snow	15 minutes LP-2(3.8)15[12]25R C4-3(7.6)15[13]25R	15 minutes SP-3(6.7)7[40]16R AD-4(7.3)10[45]16R SP-4(7.5)10[41]16R CP-5(9.3)10[52]16B CP-1(3.1)15[59]24G CP-1(3.4)20[60]24G SP-2(8.0)20[108]24R	5 minutes CP-8(7.0)5[33]24R DC-8(6.9)7[51]24R SP-8(7.4)7[23]16R CP-8(9.4)7[37]16B CP-6(6.0)10[151]24R 4P-6(6.2)10[152]24R SP-7(7.3)10[70]24R SP-8(8.2)10[24]16R CP-9(8.2)10[41]24R DC-9(8.8)10[52]24R DC-7(9.3)10[50]24B CP-7(11.0)10[36]16B	5 minutes CP-15(7.6)5[117]22R MS-14(8.0)5[109]22R DC-15(8.5)5[112]22R MS-17(9.5)7[94]22B C4-13(10.7)5[61]25B	
Moderate Ice Pellets (or Small Hail) mixed with Moderate Freezing Drizzle	N/A	10 minutes AP-1(5.0)10[73]24G 4P-5(5.8)10[143]24R WO-1(6.1)10[56]24R XX-3(6.6)10[89]21R LP-5(6.9)10[66]25R C4-5(8.7)10[65]25R SP-3(6.1)15[42]16R AD-5(6.1)15[47]16R CP-5(8.2)15[53]16R	7 minutes ES-7(5.8)7[10]18R CX-10(5.9)7[74]22R LP-11(7.7)7[41]25R C4-9(11.4)7[55]25B C4-11(11.4)7[42]25B AP-9(6.9)10[18]24R CP-7(9.3)10[35]16B WO-10(9.5)10[19]24B		
Moderate Ice Pellets (or Small Hail) mixed with Moderate Drizzle	10 minutes No tests.	Note: Cells will be populated with freezing equivalent (Below 0 to -5) times for 2025-26 onwards			Caution: No allowance times currently exist
Moderate Ice Pellets (or Small Hail) mixed with Moderate Rain	10 minutes LP-1(2.7)10[3]25G XX0(2.8)10[12]21G AD-1(3.0)10[78]16G 4P2(3.6)10[88]24G C4-2(4.0)10[4]25G ES-2(4.7)10[38]18G WO2(4.9)10[82]24G CPO(5.2)15[81]16B SP1(6.7)15[82]16B ADO(7.8)15[79]16B NFO(8.4)15[80]16B AD-1(12.4)25[77]16B				

5.2.1 PG Fluid Expansion Data

Testing conducted during the winter of 2024-25 added to the existing PG expansion data collected over multiple years, with a focus on the following five conditions:

- Light Ice Pellets;
- Moderate Ice Pellets;
- Light Ice Pellets mixed with Light Drizzle or Moderate Drizzle;
- Light Ice Pellets mixed with Light Freezing Rain; and
- Light Ice Pellets mixed with Light Rain.

This is in addition to the recent year's expansion focus that also included Light Ice Pellets mixed with Light Freezing Drizzle or Moderate Freezing Drizzle, for a total of six conditions.

Based on the results obtained, each cell of the allowance time table was analysed to determine the potential for expansion. The basis for expansion could include the following:

- Running longer than the current allowance time with "Good" status;
- Running longer than the current allowance time with "Review" or "Bad" status that could be justified (i.e., flap down during exposure leading to bad visuals);
- Running to the current allowance time (or historical allowance time) with "Good" status indicating a margin for longer time; and
- Running to the current allowance time with "Review" or "Bad" status that could be justified (i.e., flap down during exposure leading to bad visuals), therefore indicating a margin for longer time.

The longest times supported by the data available were considered new potential allowance times. The following are some general guidelines followed when expanding times:

- Each of the cells contains at least three different fluid expansion tests;
- There does not appear to be any worse-performing fluid missing from the cell data that could represent the "worst-case fluid";
- Cells contain data that may have "Review" status; these are borderline cases and, considering they are limited, should be acceptable; and
- Tests mixed with freezing precipitation may have "Bad" status tests due to the flap down configuration during the test, but had the test been conducted with the flap up in a properly nested configuration, the results would have improved significantly.

The results obtained demonstrate potential for expansion of the allowance times in all six conditions: Light Ice Pellets, Moderate Ice Pellets, Light Ice Pellet mixed with Light Drizzle or Moderate Drizzle, Light Ice Pellets mixed with Light Freezing Rain, Light Ice Pellets mixed with Light Rain, and Light Ice Pellets mixed with Light Freezing Drizzle or Moderate Freezing Drizzle. However, it was determined that additional data was needed to further substantiate the results obtained. As such, no changes were proposed to the allowance time guidance for 2025-26.

It is expected that testing will continue to add to the data set to support future allowance time expansion changes to the EG table.

This page intentionally left blank.

6. EVALUATION OF NEW MIXED CONDITIONS

Over the years, the Ice Pellet Allowance Times have been expanded to include additional conditions, temperature ranges, and fluid types. The current tables include only conditions wherein sufficient data has been collected to substantiate the guidance provided to operators. There are still conditions where data is either limited or not available that could be suitable areas for the development of new guidance material to expand the operational envelope. In addition, new-generation fluids may have better performance capabilities and may justify an extension to existing times.

More recently, a METAR working group (MWG) consisting of TC, the FAA, APS, and the National Center for Atmospheric Research (NCAR) has been formed with the objective of improving the guidance available for operations in mixed conditions. Of the conditions being analysed, some are combinations including ice pellets and can sometimes contain two, three, or more precipitation types at a time. Aerodynamic data could support the development of guidance material for these specific conditions, and, as such, some limited exploratory testing was conducted.

Due to scheduling limitations of the 2024-25 wind tunnel test campaign and higher priority activities focused on ice pellet allowance time validation and expansion testing, no testing was conducted in new mixed conditions. As such, no new mixed condition changes were proposed for the 2025-26 HOT Guidelines.

This page intentionally left blank.

7. OTHER EXPLORATORY R&D INITIATIVES

The Ice Pellet Allowance Time research has helped to further develop and improve the IWT facility. As a result, this testing platform is now available for aerodynamic testing of aircraft ground de/anti-icing fluids with or without contamination in a full-scale format. The IWT has evolved into a multidisciplinary facility; however, it continues to be the primary source for the development and refinement of the ground deicing Ice Pellet Allowance Time guidance material.

Due to scheduling limitations of the 2024-25 wind tunnel test campaign and higher priority activities focused on ice pellet allowance time validation and expansion testing, exploratory research and development initiatives were very limited. Three exploratory tests were conducted to investigate the lift losses associated with snow conditions with PG fluids; however, due to procedural issues, the results were inconclusive, and therefore no data or conclusions are being presented.

This page intentionally left blank.

8. GENERAL CHANGES TO THE ALLOWANCE TIME TABLES

This section describes general changes made to the format and contents of the allowance time tables following editorial reviews and wind tunnel testing conducted during the winter of 2024-25.

8.1 Expansion of Allowance Times

No changes were proposed for the guidelines based on the limited ice pellet allowance time expansion data collected during the winter of 2024-25.

8.2 New Mixed Condition Allowance Times

No testing in new mixed conditions was performed during the winter of 2024-25; therefore, no changes to the guidelines were proposed.

8.3 Formatting and Editorial Changes

The following subsections describe the formatting and editorial changes being made to all allowance time tables for the 2025-26 HOT Guidelines publications.

8.3.1 Moderate Ice Pellets Mixed with Moderate Snow

A correction is required to the existing allowance times for both EG and PG fluids in Moderate Ice Pellets mixed with Moderate Snow conditions. The changes will result in allowance time increases and a new cell for both EG and PG fluids, providing better operational flexibility. The changes are summarized as follows:

- EG Fluids – Moderate Ice Pellets mixed with Moderate Snow:
 - Increase from 15 minutes to 25 minutes in the “0 to -5°C” condition;
 - Increase from 10 minutes to 15 minutes in the “Below -5°C to -10°C” condition; and
 - New cell with a 10-minute allowance time for the “Below -10°C to -16°C” condition.
- PG Fluids – Moderate Ice Pellets mixed with Moderate Snow:
 - Increase from 5 minutes to 15 minutes in the “0 to -5°C” condition; and
 - New cell with a 5-minute allowance time for the “Below -10°C to -16°C” condition.

8.3.2 List of Fluids Validated for Use with Allowance Times

Starting with the 2024-25 HOT Guidelines, TC and the FAA included a list of fluids validated for use with the current allowance times. TC/FAA previously provided a grace period for a fluid to be tested after going to market; however, this grace period has been removed for the 2025-26 winter and going forward.

For the 2025-26 HOT Guidelines, the following five previously listed fluids will have the status changed to “Fluid has not been validated”:

- ALAB International PROFLIGHT EG4;
- ALAB International PROFLIGHT PG4;
- Inland Technologies Inc. ECO-SHIELD;
- MKD DevO Chemicals COREICEPHOB TYPE-IV PG; and
- Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV.

In addition, the following new-to-market fluids will also be listed as “Fluid has not been validated” until successfully tested:

- AFLRUS LLC Green Flo Type 4;
- Newave Aerochemical Co., Ltd. FCY-EGIV PLUS;
- Xinjiang Zhongtian Liyang Aviation Clearice-IV;
- AllClear Systems LLC Clear IV Flight; and
- ESSPO CHEMICALS D.O.O. Nordwing PG4.

9. CONCLUSIONS

These conclusions were derived from the testing conducted during the winter of 2024-25.

9.1 Validation Testing for New-to-Market Type IV Fluids

Two new-to-market fluids and one previously existing fluid were tested during the winter of 2024-25.

The results obtained validated the current Type IV allowance times for use with the following fluids:

- Chongqing Joba Chemical Co., Ltd – FW-IV; and
- Clariant Produkte GmbH – Safewing MP IV LAUNCH PLUS.

Based on the results obtained, Shaanxi Cleanway Aviation Chemical Co., Ltd Cleansurface IV did not meet the requirements for validation. TC and the FAA reached out to the manufacturer to investigate this issue further and to determine the actions moving forward. The investigation is ongoing at the time of writing this report.

9.2 Expansion of EG and PG Allowance Times

Additional testing focused on collecting data to support expanding the allowance times for EG and PG fluids. The results obtained demonstrate potential for further expansion of the Type IV EG and PG allowance times; however, it was determined that additional data was needed to further substantiate the results obtained. As such, no changes were proposed to the allowance time guidance for 2025-26.

9.3 New Mixed Condition Allowance Times

No testing in new mixed conditions was performed during the winter of 2024-25; therefore, no changes to the guidelines were proposed.

9.4 Other Exploratory R&D Initiatives

Three exploratory tests were conducted to investigate the lift losses associated with snow conditions with PG fluids; however, due to procedural issues, the results were inconclusive, and therefore no data or conclusions are being presented.

9.5 Changes to Ice Pellet Allowance Time Guidance

A correction is required to the existing allowance times for both EG and PG fluids in Moderate Ice Pellets mixed with Moderate Snow conditions. The changes will result in allowance time increases and a new cell for both EG and PG fluids, providing better operational flexibility.

The TC and FAA list of fluids validated for use with the current allowance times will be updated to reflect the status of the fluids that have been successfully tested.

10. RECOMMENDATIONS

The following recommendations were compiled based on the work conducted during the winter of 2024-25 and based on consultations with TC and the FAA.

10.1 Changes to Ice Pellet Allowance Time Guidance

The updated Winter 2025-26 Type III allowance time table is shown in Table 10.1 for TC and Table 10.2 for the FAA. The EG and PG Type IV tables for the winter of 2025-26 are shown in Table 10.3 and Table 10.4 for TC and in Table 10.5 and Table 10.6 for the FAA. It should be noted that the 76 percent adjusted tables were also published by TC and the FAA for those operations where flaps and slats are deployed prior to de/anti-icing; however, these tables have not been included in this report for brevity.

Table 10.1: 2025-26 TC Type III Ice Pellet Allowance Time Table

Transport Canada Holdover Time Guidelines			Winter 2025-2026	
TABLE 51: ALLOWANCE TIMES FOR SAE TYPE III FLUIDS^{1,2}				
Precipitation Types or Combinations and Applicable METAR Codes ⁴	Outside Air Temperature			
	Above 0°C (Above 32°F)	0 to -5°C (32 to 23°F)	Below -5 to -10°C (Below 23 to 14°F)	Below -10°C ³ (Below 14°F)
Light Ice Pellets (or Small Hail) ^{5,6} -PL	10 minutes	10 minutes	10 minutes	Caution: No allowance times currently exist
Light Ice Pellets (or Small Hail) ^{5,6} Mixed with Light Snow -PLSN, -SNPL	10 minutes	10 minutes	10 minutes	
Light Ice Pellets (or Small Hail) ^{5,6} Mixed with Light, Moderate or Heavy Freezing Drizzle -PLFZDZ, -FZDZPL, FZDZPL, +FZDZPL		7 minutes	5 minutes	
Light Ice Pellets (or Small Hail) ^{5,6} Mixed with Light, Moderate or Heavy Drizzle -PLDZ, -DZPL, DZPL, +DZPL	7 minutes			
Light Ice Pellets (or Small Hail) ^{5,6} Mixed with Light Freezing Rain -PLFZRA, -FZRAPL		7 minutes	5 minutes	
Light Ice Pellets (or Small Hail) ^{5,6} Mixed with Light Rain -PLRA, -RAPL	7 minutes			
Moderate Ice Pellets (or Small Hail) ^{5,6} PL	5 minutes	5 minutes	5 minutes	

NOTES

- 1 These allowance times are for use with undiluted (100/0) fluids applied unheated on aircraft with rotation speeds of 100 knots or greater. To use the allowance times in this table, ensure the fluid being used is listed in the List of Fluids Validated for Use with Allowance Times (Table 50).
- 2 Takeoff is allowed up to 90 minutes after start of fluid application if the precipitation stops at or before the allowance time expires and does not restart. Takeoff is not permitted if the OAT decreases during the 90 minutes in conditions of light ice pellets mixed with either: light, moderate or heavy freezing drizzle; light, moderate or heavy drizzle; light freezing rain; or light rain.
- 3 Ensure that the lowest operational use temperature (LOUT) is respected.
- 4 Applicable METAR codes include only Ice Pellet conditions (i.e., PL). While allowance times can be used when Small Hail is reported instead of Ice Pellets, the corresponding METAR codes for Small Hail are not listed in the table.
- 5 The reporting of Small Hail by METAR varies by country, which can result in different HOTs or allowance times when the same METAR code is used in different regions. For details, refer to the section regarding Hail, Small Hail, Ice Pellets, Snow Grains and Snow Pellets in TP 14052E - *Guidelines for Aircraft Ground Icing Operations*.
- 6 If the METAR does not report an intensity for small hail, use the "moderate ice pellets or small hail" allowance times. If the METAR reports an intensity with small hail, the condition with the equivalent intensity can be used, e.g. if light small hail is reported, the "light ice pellets" allowance times can be used. This also applies in mixed conditions, e.g. if light small hail mixed with light snow is reported, use the "light ice pellets mixed with light snow" allowance times.

CAUTIONS

- The cautions that apply to the allowance times in the table above can be found on page 63.

Original Issue	Page 65 of 87	August 12, 2025
----------------	---------------	-----------------

Table 10.2: 2025-26 FAA Type III Ice Pellet Allowance Time Table

FAA Holdover Time Guidelines		Winter 2025-2026		
TABLE 51: ALLOWANCE TIMES FOR SAE TYPE III FLUIDS^{1,2}				
Precipitation Types or Combinations and Applicable METAR Codes⁴	Outside Air Temperature			
	Above 0 °C (Above 32 °F)	0 to -5 °C (32 to 23 °F)	Below -5 to -10 °C (Below 23 to 14 °F)	Below -10 °C³ (Below 14 °F)
Light Ice Pellets (or Small Hail^{5,6}) -PL	10 minutes	10 minutes	10 minutes	Caution: No allowance times currently exist
Light Ice Pellets (or Small Hail^{5,6}) Mixed with Light Snow -PLSN, -SNPL	10 minutes	10 minutes	10 minutes	
Light Ice Pellets (or Small Hail^{5,6}) Mixed with Light, Moderate or Heavy Freezing Drizzle -PLFZDZ, -FZDZPL, FZDZPL, +FZDZPL		7 minutes	5 minutes	
Light Ice Pellets (or Small Hail^{5,6}) Mixed with Light, Moderate or Heavy Drizzle -PLDZ, -DZPL, DZPL, +DZPL	7 minutes			
Light Ice Pellets (or Small Hail^{5,6}) Mixed with Light Freezing Rain -PLFZRA, -FZRAPL		7 minutes	5 minutes	
Light Ice Pellets (or Small Hail^{5,6}) Mixed with Light Rain -PLRA, -RAPL	7 minutes			
Moderate Ice Pellets (or Small Hail^{5,6}) PL	5 minutes	5 minutes	5 minutes	

NOTES

- 1 These allowance times are for use with undiluted (100/0) fluids applied unheated on aircraft with rotation speeds of 100 knots or greater. To use the allowance times in this table, ensure the fluid being used is listed in the List of Fluids Validated for Use with Allowance Times (Table 50).
- 2 Takeoff is allowed up to 90 minutes after start of fluid application if the precipitation stops at or before the allowance time expires and does not restart. Takeoff is not permitted if the OAT decreases during the 90 minutes in conditions of light ice pellets mixed with either: light, moderate or heavy freezing drizzle; light, moderate or heavy drizzle; light freezing rain; or light rain.
- 3 Ensure that the lowest operational use temperature (LOUT) is respected.
- 4 Applicable METAR codes include only Ice Pellet conditions (i.e., PL). While allowance times can be used when Small Hail is reported instead of Ice Pellets, the corresponding METAR codes for Small Hail are not listed in the table.
- 5 The reporting of Small Hail by METAR varies by country, which can result in different HOTS or allowance times when the same METAR code is used in different regions. For details, refer to the *METAR Codes and Holdover or Allowance Times Used by Country* table in the *FAA Ground Deicing Program General Information Document*.
- 6 If the METAR does not report an intensity for small hail, use the "moderate ice pellets or small hail" allowance times. If the METAR reports an intensity with small hail, the condition with the equivalent intensity can be used, e.g. if light small hail is reported, the "light ice pellets" allowance times can be used. This also applies in mixed conditions, e.g. if light small hail mixed with light snow is reported, use the "light ice pellets mixed with light snow" allowance times.

CAUTIONS

- The cautions that apply to the allowance times in the table above can be found on page 63.

Original Issue	Page 65 of 87	August 12, 2025
----------------	---------------	-----------------

Table 10.3: 2025-26 TC Type IV EG Ice Pellet Allowance Time Table

Transport Canada Holdover Time Guidelines		Winter 2025-2026			
TABLE 52: ALLOWANCE TIMES FOR SAE TYPE IV ETHYLENE GLYCOL (EG) FLUIDS^{1,2}					
Precipitation Types or Combinations and Applicable METAR Codes⁵	Outside Air Temperature				
	Above 0°C³ (Above 32°F)	0 to -5°C³ (32 to 23°F)	Below -5 to -10°C³ (Below 23 to 14°F)	Below -10 to -16°C³ (Below 14 to 3°F)	Below -16 to -22°C^{3,4} (Below 3 to -8°F)
Light Ice Pellets (or Small Hail^{6,7}) -PL	70 minutes	70 minutes	70 minutes	50 minutes	30 minutes
Light Ice Pellets (or Small Hail^{6,7}) Mixed with Light Snow -PLSN, -SNPL	50 minutes	50 minutes	30 minutes	25 minutes	Caution: No allowance times currently exist
Light Ice Pellets (or Small Hail^{6,7}) Mixed with Light, Moderate or Heavy Freezing Drizzle -PLFZDZ, -FZDZPL, FZDZPL, +FZDZPL		40 minutes	30 minutes		
Light Ice Pellets (or Small Hail^{6,7}) Mixed with Light, Moderate or Heavy Drizzle -PLDZ, -DZPL, DZPL, +DZPL	40 minutes				
Light Ice Pellets (or Small Hail^{6,7}) Mixed with Light Freezing Rain -PLFZRA, -FZRAPL		40 minutes	30 minutes		
Light Ice Pellets (or Small Hail^{6,7}) Mixed with Light Rain -PLRA, -RAPL	40 minutes				
Light Ice Pellets (or Small Hail^{6,7}) Mixed with Light Freezing Rain and Light Snow -PLFZRASN, -PLSNFZRA, -FZRAPLSN, -FZRASNPL, -SNPLFZRA, -SNFZRAPL		20 minutes			
Light Ice Pellets (or Small Hail^{6,7}) Mixed with Light Rain and Light Snow -PLRASN, -PLSNRA, -RAPLSN, -RASNPL, -SNPLRA, -SNRAPL	20 minutes				
Moderate Ice Pellets (or Small Hail^{6,7}) PL	35 minutes	35 minutes	35 minutes	15 minutes	10 minutes
Moderate Ice Pellets (or Small Hail^{6,7}) Mixed with Moderate Snow PLSN, SNPL	25 minutes	25 minutes	15 minutes	10 minutes	
Moderate Ice Pellets (or Small Hail^{6,7}) Mixed with Light, Moderate or Heavy Freezing Drizzle PLFZDZ		20 minutes	10 minutes		
Moderate Ice Pellets (or Small Hail^{6,7}) Mixed with Light, Moderate or Heavy Drizzle PLDZ	20 minutes				Caution: No allowance times currently exist
Moderate Ice Pellets (or Small Hail^{6,7}) Mixed with Moderate Rain PLRA, RAPL	15 minutes				

NOTES

- The notes that apply to the allowance times in the table above can be found on page 67.

CAUTIONS

- The cautions that apply to the allowance times in the table above can be found on page 63.

Original Issue
Page 66 of 87
August 12, 2025

Table 10.4: 2025-26 TC Type IV PG Ice Pellet Allowance Time Table

Transport Canada Holdover Time Guidelines		Winter 2025-2026				
TABLE 53: ALLOWANCE TIMES FOR SAE TYPE IV PROPYLENE GLYCOL (PG) FLUIDS^{1,2}						
Precipitation Types or Combinations and Applicable METAR Codes⁶	Outside Air Temperature					
	Above 0°C³ (Above 32°F)	0 to -5°C³ (32 to 23°F)	Below -5 to -10°C³ (Below 23 to 14°F)	Below -10 to -16°C⁴ (Below 14 to 3°F)	Below -16 to -22°C^{4,5} (Below 3 to -8°F)	
Light Ice Pellets (or Small Hail^{7,8}) -PL	50 minutes	50 minutes	30 minutes	30 minutes	20 minutes	
Light Ice Pellets (or Small Hail^{7,8}) Mixed with Light Snow -PLSN, -SNPL	40 minutes	40 minutes	15 minutes	15 minutes	Caution: No allowance times currently exist	
Light Ice Pellets (or Small Hail^{7,8}) Mixed with Light, Moderate or Heavy Freezing Drizzle -PLFZDZ, -FZDZPL, FZDZPL, +FZDZPL		25 minutes	10 minutes			
Light Ice Pellets (or Small Hail^{7,8}) Mixed with Light, Moderate or Heavy Drizzle -PLDZ, -DZPL, DZPL, +DZPL	25 minutes					
Light Ice Pellets (or Small Hail^{7,8}) Mixed with Light Freezing Rain -PLFZRA, -FZRAPL		25 minutes	10 minutes			
Light Ice Pellets (or Small Hail^{7,8}) Mixed with Light Rain -PLRA, -RAPL	25 minutes					
Light Ice Pellets (or Small Hail^{7,8}) Mixed with Light Freezing Rain and Light Snow -PLFZRASN, -PLSNFZRA, -FZRAPLSN, -FZRASNPL, -SNPLFZRA, -SNFZRAPL		20 minutes				
Light Ice Pellets (or Small Hail^{7,8}) Mixed with Light Rain and Light Snow -PLRASN, -PLSNRA, -RAPLSN, -RASNPL, -SNPLRA, -SNRAPL	20 minutes					
Moderate Ice Pellets (or Small Hail^{7,8}) PL	15 minutes	15 minutes	10 minutes	10 minutes		
Moderate Ice Pellets (or Small Hail^{7,8}) Mixed with Moderate Snow PLSN, SNPL	15 minutes	15 minutes	5 minutes	5 minutes		
Moderate Ice Pellets (or Small Hail^{7,8}) Mixed with Light, Moderate or Heavy Freezing Drizzle PLFZDZ		10 minutes	7 minutes			
Moderate Ice Pellets (or Small Hail^{7,8}) Mixed with Light, Moderate or Heavy Drizzle PLDZ	10 minutes				Caution: No allowance times currently exist	
Moderate Ice Pellets (or Small Hail^{7,8}) Mixed with Moderate Rain PLRA, RAPL	10 minutes					

NOTES

- The notes that apply to the allowance times in the table above can be found on page 69.

CAUTIONS

- The cautions that apply to the allowance times in the table above can be found on page 63.

Table 10.5: 2025-26 FAA Type IV EG Ice Pellet Allowance Time Table

FAA Holdover Time Guidelines		Winter 2025-2026				
TABLE 52: ALLOWANCE TIMES FOR SAE TYPE IV ETHYLENE GLYCOL (EG) FLUIDS^{1,2}						
Precipitation Types or Combinations and Applicable METAR Codes ⁵	Outside Air Temperature					
	Above 0 °C ³ (Above 32 °F)	0 to -5 °C ³ (32 to 23 °F)	Below -5 to -10 °C ³ (Below 23 to 14 °F)	Below -10 to -16 °C ³ (Below 14 to 3 °F)	Below -16 to -22 °C ^{3,4} (Below 3 to -8 °F)	
Light Ice Pellets (or Small Hail ^{6,7}) -PL	70 minutes	70 minutes	70 minutes	50 minutes	30 minutes	
Light Ice Pellets (or Small Hail ^{6,7}) Mixed with Light Snow -PLSN, -SNPL	50 minutes	50 minutes	30 minutes	25 minutes		Caution: No allowance times currently exist
Light Ice Pellets (or Small Hail ^{6,7}) Mixed with Light, Moderate or Heavy Freezing Drizzle -PLFZDZ, -FZDZPL, FZDZPL, +FZDZPL		40 minutes	30 minutes			
Light Ice Pellets (or Small Hail ^{6,7}) Mixed with Light, Moderate or Heavy Drizzle -PLDZ, -DZPL, DZPL, +DZPL	40 minutes					
Light Ice Pellets (or Small Hail ^{6,7}) Mixed with Light Freezing Rain -PLFZRA, -FZRAPL		40 minutes	30 minutes			
Light Ice Pellets (or Small Hail ^{6,7}) Mixed with Light Rain -PLRA, -RAPL	40 minutes					
Light Ice Pellets (or Small Hail ^{6,7}) Mixed with Light Freezing Rain and Light Snow -PLFZRASN, -PLSNFZRA, -FZRAPLSN, -FZRASNPL, -SNPLFZRA, -SNFZRAPL		20 minutes				
Light Ice Pellets (or Small Hail ^{6,7}) Mixed with Light Rain and Light Snow -PLRASN, -PLSNRA, -RAPLSN, -RASNPL, -SNPLRA, -SNRAPL	20 minutes					
Moderate Ice Pellets (or Small Hail ^{6,7}) PL	35 minutes	35 minutes	35 minutes	15 minutes	10 minutes	
Moderate Ice Pellets (or Small Hail ^{6,7}) Mixed with Moderate Snow PLSN, SNPL	25 minutes	25 minutes	15 minutes	10 minutes		Caution: No allowance times currently exist
Moderate Ice Pellets (or Small Hail ^{6,7}) Mixed with Light, Moderate or Heavy Freezing Drizzle PLFZDZ		20 minutes	10 minutes			
Moderate Ice Pellets (or Small Hail ^{6,7}) Mixed with Light, Moderate or Heavy Drizzle PLDZ	20 minutes					
Moderate Ice Pellets (or Small Hail ^{6,7}) Mixed with Moderate Rain PLRA, RAPL	15 minutes					

NOTES

- The notes that apply to the allowance times in the table above can be found on page 67.

CAUTIONS

- The cautions that apply to the allowance times in the table above can be found on page 63.

Table 10.6: 2025-26 FAA Type IV PG Ice Pellet Allowance Time Table

FAA Holdover Time Guidelines		Winter 2025-2026				
TABLE 53: ALLOWANCE TIMES FOR SAE TYPE IV PROPYLENE GLYCOL (PG) FLUIDS^{1,2}						
Precipitation Types or Combinations and Applicable METAR Codes ⁶	Outside Air Temperature					
	Above 0 °C ³ (Above 32 °F)	0 to -5 °C ³ (32 to 23 °F)	Below -5 to -10 °C ³ (Below 23 to 14 °F)	Below -10 to -16 °C ⁴ (Below 14 to 3 °F)	Below -16 to -22 °C ^{4,5} (Below 3 to -8 °F)	
Light Ice Pellets (or Small Hail ^{7,8}) -PL	50 minutes	50 minutes	30 minutes	30 minutes	20 minutes	
Light Ice Pellets (or Small Hail ^{7,8}) Mixed with Light Snow -PLSN, -SNPL	40 minutes	40 minutes	15 minutes	15 minutes		Caution: No allowance times currently exist
Light Ice Pellets (or Small Hail ^{7,8}) Mixed with Light, Moderate or Heavy Freezing Drizzle -PLFZDZ, -FZDZPL, FZDZPL, +FZDZPL		25 minutes	10 minutes			
Light Ice Pellets (or Small Hail ^{7,8}) Mixed with Light, Moderate or Heavy Drizzle -PLDZ, -DZPL, DZPL, +DZPL	25 minutes					
Light Ice Pellets (or Small Hail ^{7,8}) Mixed with Light Freezing Rain -PLFZRA, -FZRAPL		25 minutes	10 minutes			
Light Ice Pellets (or Small Hail ^{7,8}) Mixed with Light Rain -PLRA, -RAPL	25 minutes					
Light Ice Pellets (or Small Hail ^{7,8}) Mixed with Light Freezing Rain and Light Snow -PLFZRASN, -PLSNFZRA, -FZRAPLSN, -FZRASNPL, -SNPLFZRA, -SNFZRAPL		20 minutes				
Light Ice Pellets (or Small Hail ^{7,8}) Mixed with Light Rain and Light Snow -PLRASN, -PLSNRA, -RAPLSN, -RASNPL, -SNPLRA, -SNRAPL	20 minutes					
Moderate Ice Pellets (or Small Hail ^{7,8}) PL	15 minutes	15 minutes	10 minutes	10 minutes		
Moderate Ice Pellets (or Small Hail ^{7,8}) Mixed with Moderate Snow PLSN, SNPL	15 minutes	15 minutes	5 minutes	5 minutes		
Moderate Ice Pellets (or Small Hail ^{7,8}) Mixed with Light, Moderate or Heavy Freezing Drizzle PLFZDZ		10 minutes	7 minutes			
Moderate Ice Pellets (or Small Hail ^{7,8}) Mixed with Light, Moderate or Heavy Drizzle PLDZ	10 minutes					Caution: No allowance times currently exist
Moderate Ice Pellets (or Small Hail ^{7,8}) Mixed with Moderate Rain PLRA, RAPL	10 minutes					

NOTES

- The notes that apply to the allowance times in the table above can be found on page 69.

CAUTIONS

- The cautions that apply to the allowance times in the table above can be found on page 63.

Original Issue
Page 68 of 87
August 12, 2025

10.2 Future Research

This subsection describes higher-priority areas of possible future wind tunnel testing and research. These areas have been determined based on consultations with TC, the FAA, and NASA, as well as on industry discussions, and, as such, they may not be directly linked to the research described in this report. These areas have been listed below for ease of reference and to maintain continuity in the year-to-year reporting.

10.2.1 Substantiation of Ice Pellet Allowance Times with New Fluids

Testing should continue to investigate different Type III and Type IV fluids to further substantiate the Ice Pellet Allowance Times. Testing should consider new fluids or fluids previously tested but with limited or incomplete data.

10.2.2 Allowance Time Expansion and New Mixed Conditions

The recent Type IV EG and PG expansion work has indicated that there is still potential to expand the allowance times; however, additional data is required to support the preliminary data collected to date. In addition, historical testing has shown that the allowance times for Type III fluids are conservative and have room for expansion.

New mixed conditions should also continue to be explored, and the conditions to be targeted should be coordinated with the efforts of the MWG, which has identified mixed conditions of interest based on frequency of occurrence and operational impact.

10.2.3 Testing with the NASA LS-0417 Wing Section to Support Development of Type III Mid-Speed Allowance Times

The extensive work conducted with the thin high-performance wing section has led to the development of a methodology for evaluating aerodynamic performance based on a lift loss scaling between the model results and the AS5900 aerodynamic acceptance test. It is recommended that the same methodology be used to develop a lift loss correlation for the LS-0417 wing section, which is better suited for the development of mid-speed Type III allowance times. This methodology is now feasible as the AS5900 standard has been updated to include a new mid-speed ramp, which is better suited for these types of tests. Once a correlation has been developed, the Type III high-speed allowance times should be validated using the LS-0417 wing section and mid-speed ramp. Heated fluid tests should also be considered.

10.2.4 Ensuring Adequate Validation Testing of New Fluids

As the allowance time tables continue to develop to include new conditions and additional temperature ranges, it is important to ensure that future validation testing with new fluids captures a representative cross section of these conditions. Validation testing is conducted in a subset of conditions; the allowance times are generic, so this process is satisfactory and provides a “first alert” if a fluid may be underperforming, in which case further action would be required. Given the growing complexity of the allowance time tables, consideration should be given to increasing the overall number of validation tests to include the newly added conditions and to capturing the most restrictive conditions, such as colder temperatures.

This page intentionally left blank.

REFERENCES

1. Ruggi, M., *Wind Tunnel Trials to Examine Anti-Icing Fluid Flow-Off Characteristics and to Support the Development of Ice Pellet Allowance Times, Winters 2009-10 to 2012-13*, APS Aviation Inc., Transportation Development Centre, Montreal, November 2013, TP 15232E, 1044.

This page intentionally left blank.

APPENDIX A

**TRANSPORT CANADA
STATEMENT OF WORK EXCERPT –
AIRCRAFT & ANTI-ICING FLUID WINTER TESTING 2024-25**

**TRANSPORT CANADA
STATEMENT OF WORK EXCERPT –
AIRCRAFT & ANTI-ICING FLUID WINTER TESTING 2024-25**

12. Wind Tunnel Testing – Ice Pellet Allowance Time Testing

Note: The NRC facility costs associated with manufacturing test models and testing at M-46 are not included in this task and are dealt directly with TC through a M.O.U. agreement with NRC.

- a) Coordinate with staff of NRC M-46 for scheduling and to organize any modifications to the wind tunnel, model, or related equipment. Review fluid requirements and request fluid samples from fluid manufacturers.
- b) Develop a procedure and test plan and coordinate with the NRC staff that operates the PIWT.
- c) Perform pre-testing activities including the preparation of equipment, purchasing of equipment, training of personnel, and transportation and setup of equipment.
- d) Perform ten days of wind tunnel tests with the RJ research model. Testing objectives can include:
 - i. Validation of the existing Type IV fluid allowance times for use with the newly certified anti-icing fluids, or with fluids for which data is lacking;
 - ii. Further development of the PG-specific and EG-specific allowance time tables to be able to benefit from potentially longer times; and
 - iii. Evaluation of new allowance time conditions, including new mixed icing conditions and triplicate conditions.

The typical procedure is described as follows, but may be modified to address specific testing objectives. Prior to starting each test event, correlation testing is required to calibrate the TC model, and to demonstrate repeatability. Wind tunnel tests will be performed with ethylene glycol and propylene glycol anti-icing fluids at below freezing temperatures; Type I deicing fluids may also be considered. Tests will simulate low-speed or high-speed takeoff runs. During contaminated test runs, a baseline fluid only case may be run immediately before, or after the contaminated test run to provide a direct correlation of the results. High resolution photos will be taken of the fluid motion. The testing team will collect, among other things, the following data during the tests: type and amount of fluid applied, type and rate of contamination applied, and extent of fluid contamination prior to the test run.

- e) Analyse data.
- f) Report the findings and prepare presentation material for the SAE G-12 meeting.

This page intentionally left blank.

APPENDIX B

PROCEDURE:

**WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM
AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET
PRECIPITATION CONDITIONS**

301351

PROCEDURE:

**WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM
AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET
PRECIPITATION CONDITIONS**

Winter 2024-25

Prepared for:


**Transport Canada
Programs Group Innovation Centre**


In cooperation with:

**Federal Aviation Administration
William J. Hughes Technical Center**

**Transport Canada
Civil Aviation**

**Federal Aviation Administration
Flight Standards – Air Carrier Operations**

Prepared by: Marco Ruggi 

Reviewed by: John D'Avirro 



December 13, 2024
Final Version 1.0

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Winter 2024-25

1. BACKGROUND

In 2005-06, the inability of operators to release aircraft in ice pellet conditions led Transport Canada (TC) and the Federal Aviation Administration (FAA) to begin a research campaign to develop allowance times for these conditions. Developing holdover times (HOTs) was not feasible due to the properties of the ice pellets; they remain embedded in the fluid and take long to dissolve as compared to snow which is immediately absorbed and dissolved. Research was initiated by live aircraft testing with the National Research Council Canada (NRC) Falcon 20 in Ottawa, Ontario, and later evolved to testing in a more controlled environment with the NRC 3 m x 6 m Icing Wind Tunnel (IWT) also in Ottawa, Ontario.

Early testing in 2005-06 with the Falcon 20 primarily used visual observations to evaluate fluid flow-off. During the Falcon 20 work the wing was anti-iced, exposed to contamination, and aborted takeoff runs were performed allowing researchers on-board to observe and evaluate the fluid flow-off. Testing in 2006-07 began in the IWT allowing aerodynamic data to be used for evaluating fluid flow-off performance. The IWT also allowed for a more controlled environment less susceptible to the elements.

The work continued each year, and the test methods and equipment improved allowing for real-time data analysis, better repeatability, and overall greater confidence in the results. The work conducted by TC/FAA was presented by APS Aviation Inc. (APS) to the SAE International (SAE) G-12 Aerodynamic Working Group (AWG) and HOT Committee yearly since 2006. Additional presentations were also given at the AWG in May 2012 and May 2013 by the National Aeronautics and Space Administration (NASA) and the NRC, which focused on the extensive calibration and characterization work performed with a generic thin high-performance airfoil. This work also helped increase confidence in how the data were used to help support TC/FAA rulemaking. A detailed account of the more recent work conducted is included in the TC report, TP 15232E, *Wind Tunnel Trials to Examine Anti-Icing Fluid Flow-Off Characteristics and to Support the Development of Ice Pellet Allowance Times, Winters 2009-10 to 2012-13*.

The ice pellet allowance time research has helped further develop and improve the IWT facility. As a result, a new medium is now available for aerodynamic testing of aircraft ground icing fluids with or without contamination in a full-scale format.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Several other ground deicing projects have been ongoing as a result of industry requests and are expected to continue. The IWT has evolved into a multidisciplinary facility; however, it continues to be the primary source for the development and further refinement of the ground deicing ice pellet allowance time guidance material. Research at the IWT with and without ice pellets has continued on a yearly or bi-yearly basis and is performed by APS, with support from the NRC, on behalf of TC/FAA.

For the Winter 2024-25, testing will continue the development of ice pellet allowance times.

2. OBJECTIVES AND TIMING

The following describes the objectives and timing of the research. Ten days of testing with the thin high-performance regional jet (RJ) wing section are being planned based on TC/FAA funding resources.

2.1 Type IV Allowance Time Validation Testing

The objective of this testing is to conduct aerodynamic testing with a thin high-performance RJ wing section to:

- Substantiate the current Type IV ice pellet allowance times with new fluids and at temperatures close to the lowest operational use temperature (LOUT).

To satisfy this objective, a thin high-performance wing section (Figure 2.1) will be subjected to a series of tests in the NRC IWT. The dimensions indicated are in inches. This wing section was constructed by the NRC in 2009 specifically for the conduct of these tests following extensive consultations with an airframe manufacturer to ensure a representative thin high-performance design.

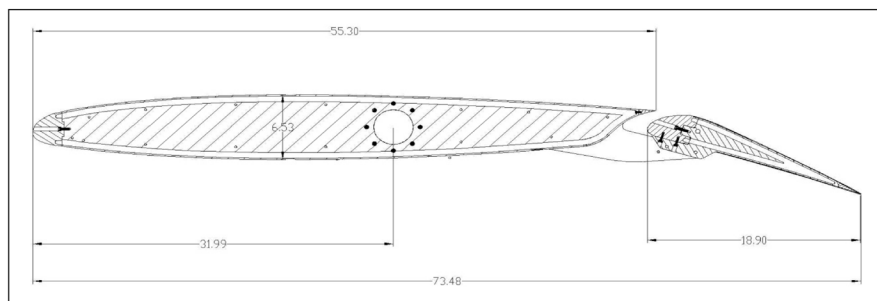


Figure 2.1: Thin High-Performance Wing Section

APS/Library/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

2.2 Type IV Allowance Time Expansion for Ethylene Glycol Fluids

The objective of this testing is to conduct aerodynamic testing with a thin high-performance airfoil to:

- Expand the current Type IV ice pellet allowance times for ethylene glycol (EG) fluids.

To satisfy this objective, a thin high-performance wing section (described in Subsection 2.1 and shown in Figure 2.1) will be subjected to a series of tests in the NRC IWT.

2.3 Type IV Allowance Time Expansion for Propylene Glycol Fluids

The objective of this testing is to conduct aerodynamic testing with a thin high-performance airfoil to:

- Expand the current Type IV ice pellet allowance times for propylene glycol (PG) fluids.

To satisfy this objective, a thin high-performance wing section (described in Subsection 2.1 and shown in Figure 2.1) will be subjected to a series of tests in the NRC IWT.

2.4 General Allowance Time Expansion

The objective of this testing is to conduct aerodynamic testing with a thin high-performance airfoil to:

- Expand the current allowance times to include new temperature bands and new conditions.

To satisfy this objective, a thin high-performance wing section (described in Subsection 2.1 and shown in Figure 2.1) will be subjected to a series of tests in the NRC IWT.

2.5 Timing

Ten days of testing will be conducted to support "Ice Pellet Allowance Time Testing" (Subsection 2.1, 2.2, 2.3, and 2.4) based on the available TC/FAA funding resources.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLETT PRECIPITATION CONDITIONS

At the time of writing this procedure, it is expected that testing with the RJ model (details described in a separate procedure) will start on January 12, 2025. An option for a “slip week” will be available in the event that temperatures are unfavorable for testing, in which case testing will be delayed by one week, see Table 2.1 for details.

Testing will be conducted during overnight periods (9:00 pm to 5:00 am), with the exception of the weeks of setup days which will be from 8:00 am to 4:00 pm. The weekends are likely not possible for testing, but will be considered only if deemed necessary. The first two hours or more of the first day will be dedicated to setup and calibration of the rain sprayer and ice pellet and snow dispensers; time permitting testing will begin as per the test plan.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 2.1: Test Calendar

Week of	Sun	Mon	Tue	Wed	Thurs	Fri	Sat
08-Dec-24		NRC Install and Shakedown	NRC Install and Shakedown	APS Setup	APS Setup	Backup APS Setup Day	
15-Dec-24							
22-Dec-24			Christmas Eve	Christmas			
29-Dec-24			New Years Eve	New Years			
05-Jan-25			Cold Weather "Slip Week" Decision Deadline				
12-Jan-25	RJ Allowance Time Testing	RJ Allowance Time Testing	RJ Allowance Time Testing	RJ Allowance Time Testing	RJ Allowance Time Testing		
19-Jan-25	RJ Allowance Time Testing	RJ Allowance Time Testing	RJ Allowance Time Testing	RJ Allowance Time Testing	RJ Allowance Time Testing		
26-Jan-25	Slip Week 1	Slip Week 1	Slip Week 1	Slip Week 1	Slip Week 1		
02-Feb-25	Slip Week 2 (if possible)	Slip Week 2 (if possible)	Slip Week 2 (if possible)	Slip Week 2 (if possible)	Slip Week 2 (if possible)		

Legend

NRC CRM Install and Shakedown	NRC installation of CRM and shakedown runs
Holidays	Holiday shutdown
Cold Weather "Slip Week" Decision Deadline	Deadline to make decision on start and end dates of testing program to optimize cold weather testing.
APS Setup	APS setup and training an fluid management
RJ Allowance Time Testing	Ice pellet allowance time and related testing. 10 days.
Slip Week	Optional weeks to start program earlier or later to optimize expected weather for cold testing.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

3. TEST PLAN

The NRC wind tunnel is an open circuit tunnel. The temperature inside the wind tunnel is dependent on the outside air temperature (OAT). Prior to testing, the weather should be monitored to ensure proper temperatures for testing.

Representative Type I/II/III/IV propylene and ethylene fluids in Neat form (standard mix or 10-degree buffer for Type I) shall be evaluated against their uncontaminated performance.

A preliminary list of test objectives is shown in Table 3.1 (objectives #0-5 will be attempted unless indicated otherwise by TC/FAA directive). It should be noted that the order in which the tests will be carried out will depend on weather conditions and TC/FAA directive. Note that if more fluids are submitted for validation testing, this will take precedence over other objectives. A detailed test matrix (subject to change) is shown in Table 3.2. As some of this testing is exploratory, changes to the test plan may be made at the time of testing and will be confirmed by TC/FAA.

NOTE: The numbering of the test runs will be done in a sequential order starting with number 1.

Table 3.1: Preliminary List of Testing Objectives for Wind Tunnel Testing

#	Category	Objective	Target Temperature	Total # tests	Total # days	Priority	Comments
0	General	Setup, calibration, and tear down	any	0	1.0	1	Yes
1	Validation	New Fluids x6 (PROFLIGHT EG, PROFLIGHT PG, 4Flite EG, FW-IV, COREICEPHOB TYPE-IV PG, Cleansurface IV)	any	30	5	1	Expect 2 of 5
2	Validation	Outstanding Old Fluids (Launch Plus, ECO-Shield)	any	0	0.0	1	Expect 0 of 2
3	EG Expansion	EG Expansion (Priority is below -16°C, but potential at warmer temps. also)	any	4	0.8	2	Expect about 4 tests
4	PG Expansion	PG Expansion (all temps.)	any	12	2.4	2	Expect about 12 tests
5	METAR	Triplicate Conditions (continuation)	any	2	0.3	3	Expect about 2 tests
6	IP Expansion	New temperatures, conditions, etc., for allowance times, i.e., moderate snow mixed with ice pellets	any	2	0.3	3	Expect about 2 tests
7	ZD Mixed Conditions	Expansion for ZD vs ZR mixed conditions	any	2	0.3	3	Expect about 2 tests
				52	10		

APS/Library/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
PO01	Baseline	1	Dry Wing	8	100	any	none	-	-	-	-	-	1	@start of day
PO02	Baseline	1	Dry Wing	22	80	any	none	-	-	-	-	-	1	@start of day
PO03	Type IV Validation and New Fluids	1	IP-	8	100	>0	FW-IV	25	-	-	-	70	2	
PO04	Type IV Validation and New Fluids	1	IP- / SN-	8	100	>0	FW-IV	25	10	-	-	50	2	
PO05	Type IV Validation and New Fluids	1	IP- / D	8	100	>0	FW-IV	25	-	-	13	40	2	
PO06	Type IV Validation and New Fluids	1	IP- / R-	8	100	>0	FW-IV	25	-	-	25	40	2	
PO07	Type IV Validation and New Fluids	1	IP- / R- / SN-	8	100	>0	FW-IV	25	10	-	25	20	2	
PO08	Type IV Validation and New Fluids	1	IP Mod	8	100	>0	FW-IV	75	-	-	-	35	2	
PO09	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	>0	FW-IV	75	25	-	-	25	1	
PO10	Type IV Validation and New Fluids	1	IP Mod/D	8	100	>0	FW-IV	75	-	13	-	20	2	
PO11	Type IV Validation and New Fluids	1	IP Mod / R	8	100	>0	FW-IV	75	-	-	75	15	1	
PO12	Type IV Validation and New Fluids	1	IP-	8	100	>-5	FW-IV	25	-	-	-	70	2	
PO13	Type IV Validation and New Fluids	1	IP- / SN-	8	100	>-5	FW-IV	25	10	-	-	50	1	
PO14	Type IV Validation and New Fluids	1	IP- / ZD	8	100	>-5	FW-IV	25	-	13	-	40	2	
PO15	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	>-5	FW-IV	25	-	25	-	40	1	
PO16	Type IV Validation and New Fluids	1	IP- / ZR- / SN-	8	100	>-5	FW-IV	25	10	-	25	20	1	
PO17	Type IV Validation and New Fluids	1	IP Mod	8	100	>-5	FW-IV	75	-	-	-	35	2	
PO18	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	>-5	FW-IV	75	25	-	-	15	1	
PO19	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	>-5	FW-IV	75	-	13	-	20	1	
PO20	Type IV Validation and New Fluids	1	IP-	8	100	-5 to -10	FW-IV	25	-	-	-	70	1	
PO21	Type IV Validation and New Fluids	1	IP- / SN-	8	100	-5 to -10	FW-IV	25	10	-	-	30	1	
PO22	Type IV Validation and New Fluids	1	IP- / ZD	8	100	-5 to -10	FW-IV	25	-	13	-	30	2	
PO23	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	-5 to -10	FW-IV	25	-	25	-	30	1	
PO24	Type IV Validation and New Fluids	1	IP Mod	8	100	-5 to -10	FW-IV	75	-	-	-	35	1	
PO25	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	-5 to -10	FW-IV	75	25	-	-	10	1	
PO26	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	-5 to -10	FW-IV	75	-	13	-	10	1	

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P027	Type IV Validation and New Fluids	1	IP-	8	100	-10 to -16	FW-IV	25	-	-	-	50	1	
P028	Type IV Validation and New Fluids	1	IP- / SN-	8	100	-10 to -16	FW-IV	25	10	-	-	25	1	
P029	Type IV Validation and New Fluids	1	IP Mod	8	100	-10 to -16	FW-IV	75	-	-	-	15	1	
P030	Type IV Validation and New Fluids	1	IP-	8	100	-16 to -22	FW-IV	25	-	-	-	30	1	
P031	Type IV Validation and New Fluids	1	IP Mod	8	100	-16 to -22	FW-IV	75	-	-	-	10	1	
P032	Type IV Validation and New Fluids	1	IP-	8	100	< -22	FW-IV	25	-	-	-	0	1	No AT exists currently
P033	Type IV Validation and New Fluids	1	IP Mod	8	100	< -22	FW-IV	75	-	-	-	0	1	No AT exists currently
P034	Type IV Validation and New Fluids	1	Fluid Only	8	100	> -5	FW-IV	-	-	-	-	-	2	Baseline Test
P035	Type IV Validation and New Fluids	1	Fluid Only	8	100	-5 to -10	FW-IV	-	-	-	-	-	1	Baseline Test
P036	Type IV Validation and New Fluids	1	Fluid Only	8	100	-10 to -16	FW-IV	-	-	-	-	-	2	Baseline Test
P037	Type IV Validation and New Fluids	1	Fluid Only	8	100	-16 to -22	FW-IV	-	-	-	-	-	1	Baseline Test
P038	Type IV Validation and New Fluids	1	Fluid Only	8	100	< -22	FW-IV	-	-	-	-	-	1	Baseline Test
P039	Type IV Validation and New Fluids	1	IP-	8	100	> 0	Cleansurface IV	25	-	-	-	50	2	
P040	Type IV Validation and New Fluids	1	IP- / SN-	8	100	> 0	Cleansurface IV	25	10	-	-	40	2	
P041	Type IV Validation and New Fluids	1	IP- / D	8	100	> 0	Cleansurface IV	25	-	-	13	25	2	
P042	Type IV Validation and New Fluids	1	IP- / R-	8	100	> 0	Cleansurface IV	25	-	-	25	25	2	
P043	Type IV Validation and New Fluids	1	IP- / R- / SN-	8	100	> 0	Cleansurface IV	25	10	-	25	20	2	
P044	Type IV Validation and New Fluids	1	IP Mod	8	100	> 0	Cleansurface IV	75	-	-	-	15	2	
P045	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	> 0	Cleansurface IV	75	25	-	-	15	1	
P046	Type IV Validation and New Fluids	1	IP Mod/D	8	100	> 0	Cleansurface IV	75	-	13	-	10	2	
P047	Type IV Validation and New Fluids	1	IP Mod / R	8	100	> 0	Cleansurface IV	75	-	-	75	10	1	
P048	Type IV Validation and New Fluids	1	IP-	8	100	> -5	Cleansurface IV	25	-	-	-	50	1	
P049	Type IV Validation and New Fluids	1	IP- / SN-	8	100	> -5	Cleansurface IV	25	10	-	-	40	1	
P050	Type IV Validation and New Fluids	1	IP- / ZD	8	100	> -5	Cleansurface IV	25	-	13	-	25	2	
P051	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	> -5	Cleansurface IV	25	-	25	-	25	1	
P052	Type IV Validation and New Fluids	1	IP- / ZR- / SN-	8	100	> -5	Cleansurface IV	25	10	-	25	20	1	

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P053	Type IV Validation and New Fluids	1	IP Mod	8	100	> -5	Cleansurface IV	75	-	-	-	15	1	
P054	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	> -5	Cleansurface IV	75	25	-	-	5	2	
P055	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	> -5	Cleansurface IV	75	-	13	-	10	1	
P056	Type IV Validation and New Fluids	1	IP-	8	100	-5 to -10	Cleansurface IV	25	-	-	-	30	2	
P057	Type IV Validation and New Fluids	1	IP- / SN-	8	100	-5 to -10	Cleansurface IV	25	10	-	-	15	2	
P058	Type IV Validation and New Fluids	1	IP- / ZD	8	100	-5 to -10	Cleansurface IV	25	-	13	-	10	2	
P059	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	-5 to -10	Cleansurface IV	25	-	25	-	10	1	
P060	Type IV Validation and New Fluids	1	IP Mod	8	100	-5 to -10	Cleansurface IV	75	-	-	-	10	2	
P061	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	-5 to -10	Cleansurface IV	75	25	-	-	5	1	
P062	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	-5 to -10	Cleansurface IV	75	-	13	-	7	1	
P063	Type IV Validation and New Fluids	1	IP-	8	115	-10 to -16	Cleansurface IV	25	-	-	-	30	1	115 knts for PG
P064	Type IV Validation and New Fluids	1	IP- / SN-	8	115	-10 to -16	Cleansurface IV	25	10	-	-	15	1	115 knts for PG
P065	Type IV Validation and New Fluids	1	IP Mod	8	115	-10 to -16	Cleansurface IV	75	-	-	-	10	1	115 knts for PG
P066	Type IV Validation and New Fluids	1	IP-	8	115	-16 to -22	Cleansurface IV	25	-	-	-	20	1	115 knts for PG
P067	Type IV Validation and New Fluids	1	IP Mod	8	115	-16 to -22	Cleansurface IV	75	-	-	-	0	2	115 knts for PG. No AT exist
P068	Type IV Validation and New Fluids	1	IP-	8	115	< -22	Cleansurface IV	25	-	-	-	0	1	115 knts for PG. No AT exist
P069	Type IV Validation and New Fluids	1	IP Mod	8	115	< -22	Cleansurface IV	75	-	-	-	0	2	115 knts for PG. No AT exist
P070	Type IV Validation and New Fluids	1	Fluid Only	8	100	> -5	Cleansurface IV	-	-	-	-	-	2	Baseline Test
P071	Type IV Validation and New Fluids	1	Fluid Only	8	100	-5 to -10	Cleansurface IV	-	-	-	-	-	1	Baseline Test
P072	Type IV Validation and New Fluids	1	Fluid Only	8	100	-10 to -16	Cleansurface IV	-	-	-	-	-	2	Baseline Test
P073	Type IV Validation and New Fluids	1	Fluid Only	8	100	-16 to -22	Cleansurface IV	-	-	-	-	-	1	Baseline Test
P074	Type IV Validation and New Fluids	1	Fluid Only	8	100	< -22	Cleansurface IV	-	-	-	-	-	1	Baseline Test
P075	Type IV Validation and New Fluids	1	IP-	8	100	> 0	LAUNCH PLUS	25	-	-	-	50	2	
P076	Type IV Validation and New Fluids	1	IP- / SN-	8	100	> 0	LAUNCH PLUS	25	10	-	-	40	2	
P077	Type IV Validation and New Fluids	1	IP- / D	8	100	> 0	LAUNCH PLUS	25	-	-	13	25	2	
P078	Type IV Validation and New Fluids	1	IP- / R-	8	100	> 0	LAUNCH PLUS	25	-	-	25	25	2	

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P079	Type IV Validation and New Fluids	1	IP- / R- / SN-	8	100	>0	LAUNCH PLUS	25	10	-	25	20	2	
P080	Type IV Validation and New Fluids	1	IP Mod	8	100	>0	LAUNCH PLUS	75	-	-	-	15	2	
P081	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	>0	LAUNCH PLUS	75	25	-	-	15	1	
P082	Type IV Validation and New Fluids	1	IP Mod/D	8	100	>0	LAUNCH PLUS	75	-	13	-	10	2	
P083	Type IV Validation and New Fluids	1	IP Mod / R	8	100	>0	LAUNCH PLUS	75	-	-	75	10	1	
P084	Type IV Validation and New Fluids	1	IP-	8	100	>-5	LAUNCH PLUS	25	-	-	-	50	1	
P085	Type IV Validation and New Fluids	1	IP- / SN-	8	100	>-5	LAUNCH PLUS	25	10	-	-	40	1	
P086	Type IV Validation and New Fluids	1	IP- / ZD	8	100	>-5	LAUNCH PLUS	25	-	13	-	25	2	
P087	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	>-5	LAUNCH PLUS	25	-	25	-	25	1	
P088	Type IV Validation and New Fluids	1	IP- / ZR- / SN-	8	100	>-5	LAUNCH PLUS	25	10	-	25	20	1	
P089	Type IV Validation and New Fluids	1	IP Mod	8	100	>-5	LAUNCH PLUS	75	-	-	-	15	1	
P090	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	>-5	LAUNCH PLUS	75	25	-	-	5	2	
P091	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	>-5	LAUNCH PLUS	75	-	13	-	10	1	
P092	Type IV Validation and New Fluids	1	IP-	8	100	-5 to -10	LAUNCH PLUS	25	-	-	-	30	2	
P093	Type IV Validation and New Fluids	1	IP- / SN-	8	100	-5 to -10	LAUNCH PLUS	25	10	-	-	15	2	
P094	Type IV Validation and New Fluids	1	IP- / ZD	8	100	-5 to -10	LAUNCH PLUS	25	-	13	-	10	2	
P095	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	-5 to -10	LAUNCH PLUS	25	-	25	-	10	1	
P096	Type IV Validation and New Fluids	1	IP Mod	8	100	-5 to -10	LAUNCH PLUS	75	-	-	-	10	2	
P097	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	-5 to -10	LAUNCH PLUS	75	25	-	-	5	1	
P098	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	-5 to -10	LAUNCH PLUS	75	-	13	-	7	1	
P099	Type IV Validation and New Fluids	1	IP-	8	115	-10 to -16	LAUNCH PLUS	25	-	-	-	30	1	115 knts for PG
P100	Type IV Validation and New Fluids	1	IP- / SN-	8	115	-10 to -16	LAUNCH PLUS	25	10	-	-	15	1	115 knts for PG
P101	Type IV Validation and New Fluids	1	IP Mod	8	115	-10 to -16	LAUNCH PLUS	75	-	-	-	10	1	115 knts for PG
P102	Type IV Validation and New Fluids	1	IP-	8	115	-16 to -22	LAUNCH PLUS	25	-	-	-	20	1	115 knts for PG
P103	Type IV Validation and New Fluids	1	IP Mod	8	115	-16 to -22	LAUNCH PLUS	75	-	-	-	0	2	115 knts for PG. No AT exist
P104	Type IV Validation and New Fluids	1	IP-	8	115	<-22	LAUNCH PLUS	25	-	-	-	0	1	115 knts for PG. No AT exist

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P105	Type IV Validation and New Fluids	1	IP Mod	8	115	< -22	LAUNCH PLUS	75	-	-	-	0	2	115 knts for PG. No AT exist
P106	Type IV Validation and New Fluids	1	Fluid Only	8	100	> -5	LAUNCH PLUS	-	-	-	-	-	2	Baseline Test
P107	Type IV Validation and New Fluids	1	Fluid Only	8	100	-5 to -10	LAUNCH PLUS	-	-	-	-	-	1	Baseline Test
P108	Type IV Validation and New Fluids	1	Fluid Only	8	100	-10 to -16	LAUNCH PLUS	-	-	-	-	-	2	Baseline Test
P109	Type IV Validation and New Fluids	1	Fluid Only	8	100	-16 to -22	LAUNCH PLUS	-	-	-	-	-	1	Baseline Test
P110	Type IV Validation and New Fluids	1	Fluid Only	8	100	< -22	LAUNCH PLUS	-	-	-	-	-	1	Baseline Test
P111	Type IV Validation and New Fluids	1	IP-	8	100	> 0	COREICEPHOB IV	25	-	-	-	50	2	
P112	Type IV Validation and New Fluids	1	IP- / SN-	8	100	> 0	COREICEPHOB IV	25	10	-	-	40	2	
P113	Type IV Validation and New Fluids	1	IP- / D	8	100	> 0	COREICEPHOB IV	25	-	-	13	25	2	
P114	Type IV Validation and New Fluids	1	IP- / R-	8	100	> 0	COREICEPHOB IV	25	-	-	25	25	2	
P115	Type IV Validation and New Fluids	1	IP- / R- / SN-	8	100	> 0	COREICEPHOB IV	25	10	-	25	20	2	
P116	Type IV Validation and New Fluids	1	IP Mod	8	100	> 0	COREICEPHOB IV	75	-	-	-	15	2	
P117	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	> 0	COREICEPHOB IV	75	25	-	-	15	1	
P118	Type IV Validation and New Fluids	1	IP Mod/D	8	100	> 0	COREICEPHOB IV	75	-	13	-	10	2	
P119	Type IV Validation and New Fluids	1	IP Mod / R	8	100	> 0	COREICEPHOB IV	75	-	-	75	10	1	
P120	Type IV Validation and New Fluids	1	IP-	8	100	> -5	COREICEPHOB IV	25	-	-	-	50	1	
P121	Type IV Validation and New Fluids	1	IP- / SN-	8	100	> -5	COREICEPHOB IV	25	10	-	-	40	1	
P122	Type IV Validation and New Fluids	1	IP- / ZD	8	100	> -5	COREICEPHOB IV	25	-	13	-	25	2	
P123	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	> -5	COREICEPHOB IV	25	-	25	-	25	1	
P124	Type IV Validation and New Fluids	1	IP- / ZR- / SN-	8	100	> -5	COREICEPHOB IV	25	10	-	25	20	1	
P125	Type IV Validation and New Fluids	1	IP Mod	8	100	> -5	COREICEPHOB IV	75	-	-	-	15	1	
P126	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	> -5	COREICEPHOB IV	75	25	-	-	5	2	
P127	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	> -5	COREICEPHOB IV	75	-	13	-	10	1	
P128	Type IV Validation and New Fluids	1	IP-	8	100	-5 to -10	COREICEPHOB IV	25	-	-	-	30	2	
P129	Type IV Validation and New Fluids	1	IP- / SN-	8	100	-5 to -10	COREICEPHOB IV	25	10	-	-	15	2	
P130	Type IV Validation and New Fluids	1	IP- / ZD	8	100	-5 to -10	COREICEPHOB IV	25	-	13	-	10	2	

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P131	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	-5 to -10	COREICEPHOB IV	25	-	25	-	10	1	
P132	Type IV Validation and New Fluids	1	IP Mod	8	100	-5 to -10	COREICEPHOB IV	75	-	-	-	10	2	
P133	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	-5 to -10	COREICEPHOB IV	75	25	-	-	5	1	
P134	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	-5 to -10	COREICEPHOB IV	75	-	13	-	7	1	
P135	Type IV Validation and New Fluids	1	IP-	8	115	-10 to -16	COREICEPHOB IV	25	-	-	-	30	1	115 knts for PG
P136	Type IV Validation and New Fluids	1	IP- / SN-	8	115	-10 to -16	COREICEPHOB IV	25	10	-	-	15	1	115 knts for PG
P137	Type IV Validation and New Fluids	1	IP Mod	8	115	-10 to -16	COREICEPHOB IV	75	-	-	-	10	1	115 knts for PG
P138	Type IV Validation and New Fluids	1	IP-	8	115	-16 to -22	COREICEPHOB IV	25	-	-	-	20	1	115 knts for PG
P139	Type IV Validation and New Fluids	1	IP Mod	8	115	-16 to -22	COREICEPHOB IV	75	-	-	-	0	2	115 knts for PG. No AT exist
P140	Type IV Validation and New Fluids	1	IP-	8	115	< -22	COREICEPHOB IV	25	-	-	-	0	1	115 knts for PG. No AT exist
P141	Type IV Validation and New Fluids	1	IP Mod	8	115	< -22	COREICEPHOB IV	75	-	-	-	0	2	115 knts for PG. No AT exist
P142	Type IV Validation and New Fluids	1	Fluid Only	8	100	> -5	COREICEPHOB IV	-	-	-	-	-	2	Baseline Test
P143	Type IV Validation and New Fluids	1	Fluid Only	8	100	-5 to -10	COREICEPHOB IV	-	-	-	-	-	1	Baseline Test
P144	Type IV Validation and New Fluids	1	Fluid Only	8	100	-10 to -16	COREICEPHOB IV	-	-	-	-	-	2	Baseline Test
P145	Type IV Validation and New Fluids	1	Fluid Only	8	100	-16 to -22	COREICEPHOB IV	-	-	-	-	-	1	Baseline Test
P146	Type IV Validation and New Fluids	1	Fluid Only	8	100	< -22	COREICEPHOB IV	-	-	-	-	-	1	Baseline Test
P147	Type IV Validation and New Fluids	1	IP-	8	100	> 0	4Flite EG	25	-	-	-	70	2	
P148	Type IV Validation and New Fluids	1	IP- / SN-	8	100	> 0	4Flite EG	25	10	-	-	50	2	
P149	Type IV Validation and New Fluids	1	IP- / D	8	100	> 0	4Flite EG	25	-	-	13	40	2	
P150	Type IV Validation and New Fluids	1	IP- / R-	8	100	> 0	4Flite EG	25	-	-	25	40	2	
P151	Type IV Validation and New Fluids	1	IP- / R- / SN-	8	100	> 0	4Flite EG	25	10	-	25	20	2	
P152	Type IV Validation and New Fluids	1	IP Mod	8	100	> 0	4Flite EG	75	-	-	-	35	2	
P153	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	> 0	4Flite EG	75	25	-	-	25	1	
P154	Type IV Validation and New Fluids	1	IP Mod/D	8	100	> 0	4Flite EG	75	-	13	-	20	2	
P155	Type IV Validation and New Fluids	1	IP Mod / R	8	100	> 0	4Flite EG	75	-	-	75	15	1	
P156	Type IV Validation and New Fluids	1	IP-	8	100	> -5	4Flite EG	25	-	-	-	70	2	

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P157	Type IV Validation and New Fluids	1	IP- / SN-	8	100	> -5	4Flite EG	25	10	-	-	50	1	
P158	Type IV Validation and New Fluids	1	IP- / ZD	8	100	> -5	4Flite EG	25	-	13	-	40	2	
P159	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	> -5	4Flite EG	25	-	25	-	40	1	
P160	Type IV Validation and New Fluids	1	IP- / ZR- / SN-	8	100	> -5	4Flite EG	25	10	-	25	20	1	
P161	Type IV Validation and New Fluids	1	IP Mod	8	100	> -5	4Flite EG	75	-	-	-	35	2	
P162	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	> -5	4Flite EG	75	25	-	-	15	1	
P163	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	> -5	4Flite EG	75	-	13	-	20	1	
P164	Type IV Validation and New Fluids	1	IP-	8	100	-5 to -10	4Flite EG	25	-	-	-	70	1	
P165	Type IV Validation and New Fluids	1	IP- / SN-	8	100	-5 to -10	4Flite EG	25	10	-	-	30	1	
P166	Type IV Validation and New Fluids	1	IP- / ZD	8	100	-5 to -10	4Flite EG	25	-	13	-	30	2	
P167	Type IV Validation and New Fluids	1	IP- / ZR-	8	100	-5 to -10	4Flite EG	25	-	25	-	30	1	
P168	Type IV Validation and New Fluids	1	IP Mod	8	100	-5 to -10	4Flite EG	75	-	-	-	35	1	
P169	Type IV Validation and New Fluids	1	IP Mod / SN	8	100	-5 to -10	4Flite EG	75	25	-	-	10	1	
P170	Type IV Validation and New Fluids	1	IP Mod/ZD	8	100	-5 to -10	4Flite EG	75	-	13	-	10	1	
P171	Type IV Validation and New Fluids	1	IP-	8	100	-10 to -16	4Flite EG	25	-	-	-	50	1	
P172	Type IV Validation and New Fluids	1	IP- / SN-	8	100	-10 to -16	4Flite EG	25	10	-	-	25	1	
P173	Type IV Validation and New Fluids	1	IP Mod	8	100	-10 to -16	4Flite EG	75	-	-	-	15	1	
P174	Type IV Validation and New Fluids	1	IP-	8	100	-16 to -22	4Flite EG	25	-	-	-	30	1	
P175	Type IV Validation and New Fluids	1	IP Mod	8	100	-16 to -22	4Flite EG	75	-	-	-	10	1	
P176	Type IV Validation and New Fluids	1	IP-	8	100	< -22	4Flite EG	25	-	-	-	0	1	No AT exists currently
P177	Type IV Validation and New Fluids	1	IP Mod	8	100	< -22	4Flite EG	75	-	-	-	0	1	No AT exists currently
P178	Type IV Validation and New Fluids	1	Fluid Only	8	100	> -5	4Flite EG	-	-	-	-	-	2	Baseline Test
P179	Type IV Validation and New Fluids	1	Fluid Only	8	100	-5 to -10	4Flite EG	-	-	-	-	-	1	Baseline Test
P180	Type IV Validation and New Fluids	1	Fluid Only	8	100	-10 to -16	4Flite EG	-	-	-	-	-	2	Baseline Test
P181	Type IV Validation and New Fluids	1	Fluid Only	8	100	-16 to -22	4Flite EG	-	-	-	-	-	1	Baseline Test
P182	Type IV Validation and New Fluids	1	Fluid Only	8	100	< -22	4Flite EG	-	-	-	-	-	1	Baseline Test

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P183	EG Type IV Expansion	2	IP-	8	100	>0	EG106	25	-	-	-	90	2	Current AT is 70 min
P184	EG Type IV Expansion	2	IP- / SN-	8	100	>0	EG106	25	10	-	-	60	2	Current AT is 50 min
P185	EG Type IV Expansion	2	IP- / D	8	100	>0	EG106	25	-	-	13	70	2	Current AT is 40 min
P186	EG Type IV Expansion	2	IP- / R-	8	100	>0	EG106	25	-	-	25	60	2	Current AT is 40 min
P187	EG Type IV Expansion	2	IP- / R- / SN-	8	100	>0	EG106	25	10	-	25	40	2	Current AT is 20 min
P188	EG Type IV Expansion	2	IP Mod	8	100	>0	EG106	75	-	-	-	45	2	Current AT is 35 min
P189	EG Type IV Expansion	2	IP Mod / SN	8	100	>0	EG106	75	25	-	-	30	1	Current AT is 25 min
P190	EG Type IV Expansion	2	IP Mod/D	8	100	>0	EG106	75	-	13	-	30	2	Current AT is 20 min
P191	EG Type IV Expansion	2	IP Mod / R	8	100	>0	EG106	75	-	-	75	20	1	Current AT is 15 min
P192	EG Type IV Expansion	2	IP-	8	100	>-5	EG106	25	-	-	-	90	2	Current AT is 70 min
P193	EG Type IV Expansion	2	IP- / SN-	8	100	>-5	EG106	25	10	-	-	60	1	Current AT is 50 min
P194	EG Type IV Expansion	2	IP- / ZD	8	100	>-5	EG106	25	-	13	-	60	2	Current AT is 40 min
P195	EG Type IV Expansion	2	IP- / ZR-	8	100	>-5	EG106	25	-	25	-	50	1	Current AT is 40 min
P196	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	>-5	EG106	25	10	-	25	40	1	Current AT is 20 min
P197	EG Type IV Expansion	2	IP Mod	8	100	>-5	EG106	75	-	-	-	45	2	Current AT is 35 min
P198	EG Type IV Expansion	2	IP Mod / SN	8	100	>-5	EG106	75	25	-	-	20	1	Current AT is 15 min
P199	EG Type IV Expansion	2	IP Mod/ZD	8	100	>-5	EG106	75	-	13	-	30	1	Current AT is 20 min
P200	EG Type IV Expansion	2	IP-	8	100	-5 to -10	EG106	25	-	-	-	90	1	Current AT is 70 min
P201	EG Type IV Expansion	2	IP- / SN-	8	100	-5 to -10	EG106	25	10	-	-	40	1	Current AT is 30 min
P202	EG Type IV Expansion	2	IP- / ZD	8	100	-5 to -10	EG106	25	-	13	-	40	2	Current AT is 30 min
P203	EG Type IV Expansion	2	IP- / ZR-	8	100	-5 to -10	EG106	25	-	25	-	40	1	Current AT is 30 min
P204	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	-5 to -10	EG106	25	10	-	25	40	1	No AT exists currently
P205	EG Type IV Expansion	2	IP Mod	8	100	-5 to -10	EG106	75	-	-	-	45	1	Current AT is 35 min
P206	EG Type IV Expansion	2	IP Mod / SN	8	100	-5 to -10	EG106	75	25	-	-	15	1	Current AT is 10 min
P207	EG Type IV Expansion	2	IP Mod/ZD	8	100	-5 to -10	EG106	75	-	13	-	20	1	Current AT is 10 min
P208	EG Type IV Expansion	2	IP-	8	100	-10 to -16	EG106	25	-	-	-	70	1	Current AT is 50 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P209	EG Type IV Expansion	2	IP- / SN-	8	100	-10 to -16	EG106	25	10	-	-	35	1	Current AT is 25 min
P210	EG Type IV Expansion	2	IP Mod	8	100	-10 to -16	EG106	75	-	-	-	25	1	Current AT is 15 min
P211	EG Type IV Expansion	2	IP-	8	100	-16 to -22	EG106	25	-	-	-	50	1	Current AT is 30 min
P212	EG Type IV Expansion	2	IP- / SN-	8	100	-16 to -22	EG106	25	10	-	-	35	1	No AT exists currently
P213	EG Type IV Expansion	2	IP Mod	8	100	-16 to -22	EG106	75	-	-	-	20	1	Current AT is 10 min
P214	EG Type IV Expansion	2	IP-	8	100	< -22	EG106	25	-	-	-	50	1	No AT exists currently
P215	EG Type IV Expansion	2	IP Mod	8	100	< -22	EG106	75	-	-	-	20	1	No AT exists currently
P216	EG Type IV Expansion	2	IP-	8	100	> 0	AVIAFlight EG	25	-	-	-	90	2	Current AT is 70 min
P217	EG Type IV Expansion	2	IP- / SN-	8	100	> 0	AVIAFlight EG	25	10	-	-	60	2	Current AT is 50 min
P218	EG Type IV Expansion	2	IP- / D	8	100	> 0	AVIAFlight EG	25	-	-	13	70	2	Current AT is 40 min
P219	EG Type IV Expansion	2	IP- / R-	8	100	> 0	AVIAFlight EG	25	-	-	25	60	2	Current AT is 40 min
P220	EG Type IV Expansion	2	IP- / R- / SN-	8	100	> 0	AVIAFlight EG	25	10	-	25	40	2	Current AT is 20 min
P221	EG Type IV Expansion	2	IP Mod	8	100	> 0	AVIAFlight EG	75	-	-	-	45	2	Current AT is 35 min
P222	EG Type IV Expansion	2	IP Mod / SN	8	100	> 0	AVIAFlight EG	75	25	-	-	30	1	Current AT is 25 min
P223	EG Type IV Expansion	2	IP Mod/D	8	100	> 0	AVIAFlight EG	75	-	13	-	30	2	Current AT is 20 min
P224	EG Type IV Expansion	2	IP Mod / R	8	100	> 0	AVIAFlight EG	75	-	-	75	20	1	Current AT is 15 min
P225	EG Type IV Expansion	2	IP-	8	100	> -5	AVIAFlight EG	25	-	-	-	90	2	Current AT is 70 min
P226	EG Type IV Expansion	2	IP- / SN-	8	100	> -5	AVIAFlight EG	25	10	-	-	60	1	Current AT is 50 min
P227	EG Type IV Expansion	2	IP- / ZD	8	100	> -5	AVIAFlight EG	25	-	13	-	60	2	Current AT is 40 min
P228	EG Type IV Expansion	2	IP- / ZR-	8	100	> -5	AVIAFlight EG	25	-	25	-	50	1	Current AT is 40 min
P229	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	> -5	AVIAFlight EG	25	10	-	25	40	1	Current AT is 20 min
P230	EG Type IV Expansion	2	IP Mod	8	100	> -5	AVIAFlight EG	75	-	-	-	45	2	Current AT is 35 min
P231	EG Type IV Expansion	2	IP Mod / SN	8	100	> -5	AVIAFlight EG	75	25	-	-	20	1	Current AT is 15 min
P232	EG Type IV Expansion	2	IP Mod/ZD	8	100	> -5	AVIAFlight EG	75	-	13	-	30	1	Current AT is 20 min
P233	EG Type IV Expansion	2	IP-	8	100	-5 to -10	AVIAFlight EG	25	-	-	-	90	1	Current AT is 70 min
P234	EG Type IV Expansion	2	IP- / SN-	8	100	-5 to -10	AVIAFlight EG	25	10	-	-	40	1	Current AT is 30 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P235	EG Type IV Expansion	2	IP- / ZD	8	100	-5 to -10	AVIAFlight EG	25	-	13	-	40	2	Current AT is 30 min
P236	EG Type IV Expansion	2	IP- / ZR-	8	100	-5 to -10	AVIAFlight EG	25	-	25	-	40	1	Current AT is 30 min
P237	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	-5 to -10	AVIAFlight EG	25	10	-	25	40	1	No AT exists currently
P238	EG Type IV Expansion	2	IP Mod	8	100	-5 to -10	AVIAFlight EG	75	-	-	-	45	1	Current AT is 35 min
P239	EG Type IV Expansion	2	IP Mod / SN	8	100	-5 to -10	AVIAFlight EG	75	25	-	-	15	1	Current AT is 10 min
P240	EG Type IV Expansion	2	IP Mod/ZD	8	100	-5 to -10	AVIAFlight EG	75	-	13	-	20	1	Current AT is 10 min
P241	EG Type IV Expansion	2	IP-	8	100	-10 to -16	AVIAFlight EG	25	-	-	-	70	1	Current AT is 50 min
P242	EG Type IV Expansion	2	IP- / SN-	8	100	-10 to -16	AVIAFlight EG	25	10	-	-	35	1	Current AT is 25 min
P243	EG Type IV Expansion	2	IP Mod	8	100	-10 to -16	AVIAFlight EG	75	-	-	-	25	1	Current AT is 15 min
P244	EG Type IV Expansion	2	IP-	8	100	-16 to -22	AVIAFlight EG	25	-	-	-	50	1	Current AT is 30 min
P245	EG Type IV Expansion	2	IP- / SN-	8	100	-16 to -22	AVIAFlight EG	25	10	-	-	35	1	No AT exists currently
P246	EG Type IV Expansion	2	IP Mod	8	100	-16 to -22	AVIAFlight EG	75	-	-	-	20	1	Current AT is 10 min
P247	EG Type IV Expansion	2	IP-	8	100	< -22	AVIAFlight EG	25	-	-	-	50	1	No AT exists currently
P248	EG Type IV Expansion	2	IP Mod	8	100	< -22	AVIAFlight EG	75	-	-	-	20	1	No AT exists currently
P249	EG Type IV Expansion	2	IP-	8	100	> 0	ClearWing EG	25	-	-	-	90	2	Current AT is 70 min
P250	EG Type IV Expansion	2	IP- / SN-	8	100	> 0	ClearWing EG	25	10	-	-	60	2	Current AT is 50 min
P251	EG Type IV Expansion	2	IP- / D	8	100	> 0	ClearWing EG	25	-	-	13	70	2	Current AT is 40 min
P252	EG Type IV Expansion	2	IP- / R-	8	100	> 0	ClearWing EG	25	-	-	25	60	2	Current AT is 40 min
P253	EG Type IV Expansion	2	IP- / R- / SN-	8	100	> 0	ClearWing EG	25	10	-	25	40	2	Current AT is 20 min
P254	EG Type IV Expansion	2	IP Mod	8	100	> 0	ClearWing EG	75	-	-	-	45	2	Current AT is 35 min
P255	EG Type IV Expansion	2	IP Mod / SN	8	100	> 0	ClearWing EG	75	25	-	-	30	1	Current AT is 25 min
P256	EG Type IV Expansion	2	IP Mod/D	8	100	> 0	ClearWing EG	75	-	13	-	30	2	Current AT is 20 min
P257	EG Type IV Expansion	2	IP Mod / R	8	100	> 0	ClearWing EG	75	-	-	75	20	1	Current AT is 15 min
P258	EG Type IV Expansion	2	IP-	8	100	> -5	ClearWing EG	25	-	-	-	90	2	Current AT is 70 min
P259	EG Type IV Expansion	2	IP- / SN-	8	100	> -5	ClearWing EG	25	10	-	-	60	1	Current AT is 50 min
P260	EG Type IV Expansion	2	IP- / ZD	8	100	> -5	ClearWing EG	25	-	13	-	60	2	Current AT is 40 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P261	EG Type IV Expansion	2	IP- / ZR-	8	100	> -5	ClearWing EG	25	-	25	-	50	1	Current AT is 40 min
P262	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	> -5	ClearWing EG	25	10	-	25	40	1	Current AT is 20 min
P263	EG Type IV Expansion	2	IP Mod	8	100	> -5	ClearWing EG	75	-	-	-	45	2	Current AT is 35 min
P264	EG Type IV Expansion	2	IP Mod / SN	8	100	> -5	ClearWing EG	75	25	-	-	20	1	Current AT is 15 min
P265	EG Type IV Expansion	2	IP Mod/ZD	8	100	> -5	ClearWing EG	75	-	13	-	30	1	Current AT is 20 min
P266	EG Type IV Expansion	2	IP-	8	100	-5 to -10	ClearWing EG	25	-	-	-	90	1	Current AT is 70 min
P267	EG Type IV Expansion	2	IP- / SN-	8	100	-5 to -10	ClearWing EG	25	10	-	-	40	1	Current AT is 30 min
P268	EG Type IV Expansion	2	IP- / ZD	8	100	-5 to -10	ClearWing EG	25	-	13	-	40	2	Current AT is 30 min
P269	EG Type IV Expansion	2	IP- / ZR-	8	100	-5 to -10	ClearWing EG	25	-	25	-	40	1	Current AT is 30 min
P270	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	-5 to -10	ClearWing EG	25	10	-	25	40	1	No AT exists currently
P271	EG Type IV Expansion	2	IP Mod	8	100	-5 to -10	ClearWing EG	75	-	-	-	45	1	Current AT is 35 min
P272	EG Type IV Expansion	2	IP Mod / SN	8	100	-5 to -10	ClearWing EG	75	25	-	-	15	1	Current AT is 10 min
P273	EG Type IV Expansion	2	IP Mod/ZD	8	100	-5 to -10	ClearWing EG	75	-	13	-	20	1	Current AT is 10 min
P274	EG Type IV Expansion	2	IP-	8	100	-10 to -16	ClearWing EG	25	-	-	-	70	1	Current AT is 50 min
P275	EG Type IV Expansion	2	IP- / SN-	8	100	-10 to -16	ClearWing EG	25	10	-	-	35	1	Current AT is 25 min
P276	EG Type IV Expansion	2	IP Mod	8	100	-10 to -16	ClearWing EG	75	-	-	-	25	1	Current AT is 15 min
P277	EG Type IV Expansion	2	IP-	8	100	-16 to -22	ClearWing EG	25	-	-	-	50	1	Current AT is 30 min
P278	EG Type IV Expansion	2	IP- / SN-	8	100	-16 to -22	ClearWing EG	25	10	-	-	35	1	No AT exists currently
P279	EG Type IV Expansion	2	IP Mod	8	100	-16 to -22	ClearWing EG	75	-	-	-	20	1	Current AT is 10 min
P280	EG Type IV Expansion	2	IP-	8	100	< -22	ClearWing EG	25	-	-	-	50	1	No AT exists currently
P281	EG Type IV Expansion	2	IP Mod	8	100	< -22	ClearWing EG	75	-	-	-	20	1	No AT exists currently
P282	EG Type IV Expansion	2	IP-	8	100	> 0	ChemR NORDIK IV	25	-	-	-	90	2	Current AT is 70 min
P283	EG Type IV Expansion	2	IP- / SN-	8	100	> 0	ChemR NORDIK IV	25	10	-	-	60	2	Current AT is 50 min
P284	EG Type IV Expansion	2	IP- / D	8	100	> 0	ChemR NORDIK IV	25	-	-	13	70	2	Current AT is 40 min
P285	EG Type IV Expansion	2	IP- / R-	8	100	> 0	ChemR NORDIK IV	25	-	-	25	60	2	Current AT is 40 min
P286	EG Type IV Expansion	2	IP- / R- / SN-	8	100	> 0	ChemR NORDIK IV	25	10	-	25	40	2	Current AT is 20 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P287	EG Type IV Expansion	2	IP Mod	8	100	>0	ChemR NORDIK IV	75	-	-	-	45	2	Current AT is 35 min
P288	EG Type IV Expansion	2	IP Mod / SN	8	100	>0	ChemR NORDIK IV	75	25	-	-	30	1	Current AT is 25 min
P289	EG Type IV Expansion	2	IP Mod/D	8	100	>0	ChemR NORDIK IV	75	-	13	-	30	2	Current AT is 20 min
P290	EG Type IV Expansion	2	IP Mod / R	8	100	>0	ChemR NORDIK IV	75	-	-	75	20	1	Current AT is 15 min
P291	EG Type IV Expansion	2	IP-	8	100	>-5	ChemR NORDIK IV	25	-	-	-	90	2	Current AT is 70 min
P292	EG Type IV Expansion	2	IP- / SN-	8	100	>-5	ChemR NORDIK IV	25	10	-	-	60	1	Current AT is 50 min
P293	EG Type IV Expansion	2	IP- / ZD	8	100	>-5	ChemR NORDIK IV	25	-	13	-	60	2	Current AT is 40 min
P294	EG Type IV Expansion	2	IP- / ZR-	8	100	>-5	ChemR NORDIK IV	25	-	25	-	50	1	Current AT is 40 min
P295	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	>-5	ChemR NORDIK IV	25	10	-	25	40	1	Current AT is 20 min
P296	EG Type IV Expansion	2	IP Mod	8	100	>-5	ChemR NORDIK IV	75	-	-	-	45	2	Current AT is 35 min
P297	EG Type IV Expansion	2	IP Mod / SN	8	100	>-5	ChemR NORDIK IV	75	25	-	-	20	1	Current AT is 15 min
P298	EG Type IV Expansion	2	IP Mod/ZD	8	100	>-5	ChemR NORDIK IV	75	-	13	-	30	1	Current AT is 20 min
P299	EG Type IV Expansion	2	IP-	8	100	-5 to -10	ChemR NORDIK IV	25	-	-	-	90	1	Current AT is 70 min
P300	EG Type IV Expansion	2	IP- / SN-	8	100	-5 to -10	ChemR NORDIK IV	25	10	-	-	40	1	Current AT is 30 min
P301	EG Type IV Expansion	2	IP- / ZD	8	100	-5 to -10	ChemR NORDIK IV	25	-	13	-	40	2	Current AT is 30 min
P302	EG Type IV Expansion	2	IP- / ZR-	8	100	-5 to -10	ChemR NORDIK IV	25	-	25	-	40	1	Current AT is 30 min
P303	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	-5 to -10	ChemR NORDIK IV	25	10	-	25	40	1	No AT exists currently
P304	EG Type IV Expansion	2	IP Mod	8	100	-5 to -10	ChemR NORDIK IV	75	-	-	-	45	1	Current AT is 35 min
P305	EG Type IV Expansion	2	IP Mod / SN	8	100	-5 to -10	ChemR NORDIK IV	75	25	-	-	15	1	Current AT is 10 min
P306	EG Type IV Expansion	2	IP Mod/ZD	8	100	-5 to -10	ChemR NORDIK IV	75	-	13	-	20	1	Current AT is 10 min
P307	EG Type IV Expansion	2	IP-	8	100	-10 to -16	ChemR NORDIK IV	25	-	-	-	70	1	Current AT is 50 min
P308	EG Type IV Expansion	2	IP- / SN-	8	100	-10 to -16	ChemR NORDIK IV	25	10	-	-	35	1	Current AT is 25 min
P309	EG Type IV Expansion	2	IP Mod	8	100	-10 to -16	ChemR NORDIK IV	75	-	-	-	25	1	Current AT is 15 min
P310	EG Type IV Expansion	2	IP-	8	100	-16 to -22	ChemR NORDIK IV	25	-	-	-	50	1	Current AT is 30 min
P311	EG Type IV Expansion	2	IP- / SN-	8	100	-16 to -22	ChemR NORDIK IV	25	10	-	-	35	1	No AT exists currently
P312	EG Type IV Expansion	2	IP Mod	8	100	-16 to -22	ChemR NORDIK IV	75	-	-	-	20	1	Current AT is 10 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P313	EG Type IV Expansion	2	IP-	8	100	< -22	ChemR NORDIK IV	25	-	-	-	50	1	No AT exists currently
P314	EG Type IV Expansion	2	IP Mod	8	100	< -22	ChemR NORDIK IV	75	-	-	-	20	1	No AT exists currently
P315	EG Type IV Expansion	2	IP-	8	100	> 0	Defrost North 4	25	-	-	-	90	2	Current AT is 70 min
P316	EG Type IV Expansion	2	IP- / SN-	8	100	> 0	Defrost North 4	25	10	-	-	60	2	Current AT is 50 min
P317	EG Type IV Expansion	2	IP- / D	8	100	> 0	Defrost North 4	25	-	-	13	70	2	Current AT is 40 min
P318	EG Type IV Expansion	2	IP- / R-	8	100	> 0	Defrost North 4	25	-	-	25	60	2	Current AT is 40 min
P319	EG Type IV Expansion	2	IP- / R- / SN-	8	100	> 0	Defrost North 4	25	10	-	25	40	2	Current AT is 20 min
P320	EG Type IV Expansion	2	IP Mod	8	100	> 0	Defrost North 4	75	-	-	-	45	2	Current AT is 35 min
P321	EG Type IV Expansion	2	IP Mod / SN	8	100	> 0	Defrost North 4	75	25	-	-	30	1	Current AT is 25 min
P322	EG Type IV Expansion	2	IP Mod/D	8	100	> 0	Defrost North 4	75	-	13	-	30	2	Current AT is 20 min
P323	EG Type IV Expansion	2	IP Mod / R	8	100	> 0	Defrost North 4	75	-	-	75	20	1	Current AT is 15 min
P324	EG Type IV Expansion	2	IP-	8	100	> -5	Defrost North 4	25	-	-	-	90	2	Current AT is 70 min
P325	EG Type IV Expansion	2	IP- / SN-	8	100	> -5	Defrost North 4	25	10	-	-	60	1	Current AT is 50 min
P326	EG Type IV Expansion	2	IP- / ZD	8	100	> -5	Defrost North 4	25	-	13	-	60	2	Current AT is 40 min
P327	EG Type IV Expansion	2	IP- / ZR-	8	100	> -5	Defrost North 4	25	-	25	-	50	1	Current AT is 40 min
P328	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	> -5	Defrost North 4	25	10	-	25	40	1	Current AT is 20 min
P329	EG Type IV Expansion	2	IP Mod	8	100	> -5	Defrost North 4	75	-	-	-	45	2	Current AT is 35 min
P330	EG Type IV Expansion	2	IP Mod / SN	8	100	> -5	Defrost North 4	75	25	-	-	20	1	Current AT is 15 min
P331	EG Type IV Expansion	2	IP Mod/ZD	8	100	> -5	Defrost North 4	75	-	13	-	30	1	Current AT is 20 min
P332	EG Type IV Expansion	2	IP-	8	100	-5 to -10	Defrost North 4	25	-	-	-	90	1	Current AT is 70 min
P333	EG Type IV Expansion	2	IP- / SN-	8	100	-5 to -10	Defrost North 4	25	10	-	-	40	1	Current AT is 30 min
P334	EG Type IV Expansion	2	IP- / ZD	8	100	-5 to -10	Defrost North 4	25	-	13	-	40	2	Current AT is 30 min
P335	EG Type IV Expansion	2	IP- / ZR-	8	100	-5 to -10	Defrost North 4	25	-	25	-	40	1	Current AT is 30 min
P336	EG Type IV Expansion	2	IP- / ZR- / SN-	8	100	-5 to -10	Defrost North 4	25	10	-	25	40	1	No AT exists currently
P337	EG Type IV Expansion	2	IP Mod	8	100	-5 to -10	Defrost North 4	75	-	-	-	45	1	Current AT is 35 min
P338	EG Type IV Expansion	2	IP Mod / SN	8	100	-5 to -10	Defrost North 4	75	25	-	-	15	1	Current AT is 10 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P339	EG Type IV Expansion	2	IP Mod/ZD	8	100	-5 to -10	Defrost North 4	75	-	13	-	20	1	Current AT is 10 min
P340	EG Type IV Expansion	2	IP-	8	100	-10 to -16	Defrost North 4	25	-	-	-	70	1	Current AT is 50 min
P341	EG Type IV Expansion	2	IP- / SN-	8	100	-10 to -16	Defrost North 4	25	10	-	-	35	1	Current AT is 25 min
P342	EG Type IV Expansion	2	IP Mod	8	100	-10 to -16	Defrost North 4	75	-	-	-	25	1	Current AT is 15 min
P343	EG Type IV Expansion	2	IP-	8	100	-16 to -22	Defrost North 4	25	-	-	-	50	1	Current AT is 30 min
P344	EG Type IV Expansion	2	IP- / SN-	8	100	-16 to -22	Defrost North 4	25	10	-	-	35	1	No AT exists currently
P345	EG Type IV Expansion	2	IP Mod	8	100	-16 to -22	Defrost North 4	75	-	-	-	20	1	Current AT is 10 min
P346	EG Type IV Expansion	2	IP-	8	100	< -22	Defrost North 4	25	-	-	-	50	1	No AT exists currently
P347	EG Type IV Expansion	2	IP Mod	8	100	< -22	Defrost North 4	75	-	-	-	20	1	No AT exists currently
P348	PG Type IV Expansion	2	IP-	8	100	> 0	Polar Guard Advance	25	-	-	-	90	2	70-90. Current AT is 50 min
P349	PG Type IV Expansion	2	IP- / SN-	8	100	> 0	Polar Guard Advance	25	10	-	-	50	2	Current AT is 40 min
P350	PG Type IV Expansion	2	IP- / D	8	100	> 0	Polar Guard Advance	25	-	-	13	70	2	30-60. Current AT is 25 min
P351	PG Type IV Expansion	2	IP- / R-	8	100	> 0	Polar Guard Advance	25	-	-	25	50	2	30-50. Current AT is 25 min
P352	PG Type IV Expansion	2	IP- / R- / SN-	8	100	> 0	Polar Guard Advance	25	10	-	25	40	2	Current AT is 20 min
P353	PG Type IV Expansion	2	IP Mod	8	100	> 0	Polar Guard Advance	75	-	-	-	30	2	25-35. Current AT is 15 min
P354	PG Type IV Expansion	2	IP Mod / SN	8	100	> 0	Polar Guard Advance	75	25	-	-	20	1	Current AT is 15 min
P355	PG Type IV Expansion	2	IP Mod/D	8	100	> 0	Polar Guard Advance	75	-	13	-	15	2	15-20. Current AT is 10 min
P356	PG Type IV Expansion	2	IP Mod / R	8	100	> 0	Polar Guard Advance	75	-	-	75	15	1	Current AT is 10 min
P357	PG Type IV Expansion	2	IP-	8	100	> -5	Polar Guard Advance	25	-	-	-	90	1	70-90. Current AT is 50 min
P358	PG Type IV Expansion	2	IP- / SN-	8	100	> -5	Polar Guard Advance	25	10	-	-	50	1	Current AT is 40 min
P359	PG Type IV Expansion	2	IP- / ZD	8	100	> -5	Polar Guard Advance	25	-	13	-	60	2	30-60. Current AT is 25 min
P360	PG Type IV Expansion	2	IP- / ZR-	8	100	> -5	Polar Guard Advance	25	-	25	-	40	1	30-40. Current AT is 25 min
P361	PG Type IV Expansion	2	IP- / ZR- / SN-	8	100	> -5	Polar Guard Advance	25	10	-	25	40	1	Current AT is 20 min
P362	PG Type IV Expansion	2	IP Mod	8	100	> -5	Polar Guard Advance	75	-	-	-	30	1	25-35. Current AT is 15 min
P363	PG Type IV Expansion	2	IP Mod / SN	8	100	> -5	Polar Guard Advance	75	25	-	-	10	2	Current AT is 5 min
P364	PG Type IV Expansion	2	IP Mod/ZD	8	100	> -5	Polar Guard Advance	75	-	13	-	15	1	15-20. Current AT is 10 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P365	PG Type IV Expansion	2	IP-	8	100	-5 to -10	Polar Guard Advance	25	-	-	-	90	2	50-90. Current AT is 30 min
P366	PG Type IV Expansion	2	IP- / SN-	8	100	-5 to -10	Polar Guard Advance	25	10	-	-	20	2	Current AT is 15 min
P367	PG Type IV Expansion	2	IP- / ZD	8	100	-5 to -10	Polar Guard Advance	25	-	13	-	30	2	20-30. Current AT is 10 min
P368	PG Type IV Expansion	2	IP- / ZR-	8	100	-5 to -10	Polar Guard Advance	25	-	25	-	25	1	20-30. Current AT is 10 min
P369	PG Type IV Expansion	2	IP- / ZR- / SN-	8	100	-5 to -10	Polar Guard Advance	25	10	-	25	40	1	No AT exists currently
P370	PG Type IV Expansion	2	IP Mod	8	100	-5 to -10	Polar Guard Advance	75	-	-	-	25	2	15-25. Current AT is 10 min
P371	PG Type IV Expansion	2	IP Mod / SN	8	100	-5 to -10	Polar Guard Advance	75	25	-	-	10	1	Current AT is 5 min
P372	PG Type IV Expansion	2	IP Mod/ZD	8	100	-5 to -10	Polar Guard Advance	75	-	13	-	10	1	Current AT is 7 min
P373	PG Type IV Expansion	2	IP-	8	115	-10 to -16	Polar Guard Advance	25	-	-	-	40	1	Current AT is 30 min. 115 knts
P374	PG Type IV Expansion	2	IP- / SN-	8	115	-10 to -16	Polar Guard Advance	25	10	-	-	20	1	Current AT is 15 min. 115 knts
P375	PG Type IV Expansion	2	IP Mod	8	115	-10 to -16	Polar Guard Advance	75	-	-	-	15	1	Current AT is 10 min. 115 knts
P376	PG Type IV Expansion	2	IP-	8	115	-16 to -22	Polar Guard Advance	25	-	-	-	30	1	Current AT is 20 min. 115 knts
P377	PG Type IV Expansion	2	IP- / SN-	8	115	-16 to -22	Polar Guard Advance	25	10	-	-	10	1	115 knts for PG. No AT exist
P378	PG Type IV Expansion	2	IP Mod	8	115	-16 to -22	Polar Guard Advance	75	-	-	-	10	2	115 knts for PG. No AT exist
P379	PG Type IV Expansion	2	IP-	8	115	< -22	Polar Guard Advance	25	-	-	-	10	1	115 knts for PG. No AT exist
P380	PG Type IV Expansion	2	IP Mod	8	115	< -22	Polar Guard Advance	75	-	-	-	5	2	115 knts for PG. No AT exist
P381	PG Type IV Expansion	2	IP-	8	100	> 0	ABC-S Plus	25	-	-	-	90	2	70-90. Current AT is 50 min
P382	PG Type IV Expansion	2	IP- / SN-	8	100	> 0	ABC-S Plus	25	10	-	-	50	2	Current AT is 40 min
P383	PG Type IV Expansion	2	IP- / D	8	100	> 0	ABC-S Plus	25	-	-	13	70	2	30-60. Current AT is 25 min
P384	PG Type IV Expansion	2	IP- / R-	8	100	> 0	ABC-S Plus	25	-	-	25	50	2	30-50. Current AT is 25 min
P385	PG Type IV Expansion	2	IP- / R- / SN-	8	100	> 0	ABC-S Plus	25	10	-	25	40	2	Current AT is 20 min
P386	PG Type IV Expansion	2	IP Mod	8	100	> 0	ABC-S Plus	75	-	-	-	30	2	25-35. Current AT is 15 min
P387	PG Type IV Expansion	2	IP Mod / SN	8	100	> 0	ABC-S Plus	75	25	-	-	20	1	Current AT is 15 min
P388	PG Type IV Expansion	2	IP Mod/D	8	100	> 0	ABC-S Plus	75	-	13	-	15	2	15-20. Current AT is 10 min
P389	PG Type IV Expansion	2	IP Mod / R	8	100	> 0	ABC-S Plus	75	-	-	75	15	1	Current AT is 10 min
P390	PG Type IV Expansion	2	IP-	8	100	> -5	ABC-S Plus	25	-	-	-	90	1	70-90. Current AT is 50 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P391	PG Type IV Expansion	2	IP- / SN-	8	100	> -5	ABC-S Plus	25	10	-	-	50	1	Current AT is 40 min
P392	PG Type IV Expansion	2	IP- / ZD	8	100	> -5	ABC-S Plus	25	-	13	-	60	2	30-60, Current AT is 25 min
P393	PG Type IV Expansion	2	IP- / ZR-	8	100	> -5	ABC-S Plus	25	-	25	-	40	1	30-40, Current AT is 25 min
P394	PG Type IV Expansion	2	IP- / ZR- / SN-	8	100	> -5	ABC-S Plus	25	10	-	25	40	1	Current AT is 20 min
P395	PG Type IV Expansion	2	IP Mod	8	100	> -5	ABC-S Plus	75	-	-	-	30	1	25-35, Current AT is 15 min
P396	PG Type IV Expansion	2	IP Mod / SN	8	100	> -5	ABC-S Plus	75	25	-	-	10	2	Current AT is 5 min
P397	PG Type IV Expansion	2	IP Mod/ZD	8	100	> -5	ABC-S Plus	75	-	13	-	15	1	15-20, Current AT is 10 min
P398	PG Type IV Expansion	2	IP-	8	100	-5 to -10	ABC-S Plus	25	-	-	-	90	2	50-90, Current AT is 30 min
P399	PG Type IV Expansion	2	IP- / SN-	8	100	-5 to -10	ABC-S Plus	25	10	-	-	20	2	Current AT is 15 min
P400	PG Type IV Expansion	2	IP- / ZD	8	100	-5 to -10	ABC-S Plus	25	-	13	-	30	2	20-30, Current AT is 10 min
P401	PG Type IV Expansion	2	IP- / ZR-	8	100	-5 to -10	ABC-S Plus	25	-	25	-	25	1	20-30, Current AT is 10 min
P402	PG Type IV Expansion	2	IP- / ZR- / SN-	8	100	-5 to -10	ABC-S Plus	25	10	-	25	40	1	No AT exists currently
P403	PG Type IV Expansion	2	IP Mod	8	100	-5 to -10	ABC-S Plus	75	-	-	-	25	2	15-25, Current AT is 10 min
P404	PG Type IV Expansion	2	IP Mod / SN	8	100	-5 to -10	ABC-S Plus	75	25	-	-	10	1	Current AT is 5 min
P405	PG Type IV Expansion	2	IP Mod/ZD	8	100	-5 to -10	ABC-S Plus	75	-	13	-	10	1	Current AT is 7 min
P406	PG Type IV Expansion	2	IP-	8	115	-10 to -16	ABC-S Plus	25	-	-	-	40	1	Current AT is 30 min, 115 knts
P407	PG Type IV Expansion	2	IP- / SN-	8	115	-10 to -16	ABC-S Plus	25	10	-	-	20	1	Current AT is 15min, 115 knts
P408	PG Type IV Expansion	2	IP Mod	8	115	-10 to -16	ABC-S Plus	75	-	-	-	15	1	Current AT is 10min, 115 knts
P409	PG Type IV Expansion	2	IP-	8	115	-16 to -22	ABC-S Plus	25	-	-	-	30	1	Current AT is 20 min, 115 knts
P410	PG Type IV Expansion	2	IP- / SN-	8	115	-16 to -22	ABC-S Plus	25	10	-	-	10	1	115 knts for PG. No AT exist
P411	PG Type IV Expansion	2	IP Mod	8	115	-16 to -22	ABC-S Plus	75	-	-	-	10	2	115 knts for PG. No AT exist
P412	PG Type IV Expansion	2	IP-	8	115	< -22	ABC-S Plus	25	-	-	-	10	1	115 knts for PG. No AT exist
P413	PG Type IV Expansion	2	IP Mod	8	115	< -22	ABC-S Plus	75	-	-	-	5	2	115 knts for PG. No AT exist
P414	PG Type IV Expansion	2	IP-	8	100	> 0	4Flite PG	25	-	-	-	90	2	70-90, Current AT is 50 min
P415	PG Type IV Expansion	2	IP- / SN-	8	100	> 0	4Flite PG	25	10	-	-	50	2	Current AT is 40 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P416	PG Type IV Expansion	2	IP- / D	8	100	>0	4Flite PG	25	-	-	13	70	2	30-60. Current AT is 25 min
P417	PG Type IV Expansion	2	IP- / R-	8	100	>0	4Flite PG	25	-	-	25	50	2	30-50. Current AT is 25 min
P418	PG Type IV Expansion	2	IP- / R- / SN-	8	100	>0	4Flite PG	25	10	-	25	40	2	Current AT is 20 min
P419	PG Type IV Expansion	2	IP Mod	8	100	>0	4Flite PG	75	-	-	-	30	2	25-35. Current AT is 15 min
P420	PG Type IV Expansion	2	IP Mod / SN	8	100	>0	4Flite PG	75	25	-	-	20	1	Current AT is 15 min
P421	PG Type IV Expansion	2	IP Mod/D	8	100	>0	4Flite PG	75	-	13	-	15	2	15-20. Current AT is 10 min
P422	PG Type IV Expansion	2	IP Mod / R	8	100	>0	4Flite PG	75	-	-	75	15	1	Current AT is 10 min
P423	PG Type IV Expansion	2	IP-	8	100	>-5	4Flite PG	25	-	-	-	90	1	70-90. Current AT is 50 min
P424	PG Type IV Expansion	2	IP- / SN-	8	100	>-5	4Flite PG	25	10	-	-	50	1	Current AT is 40 min
P425	PG Type IV Expansion	2	IP- / ZD	8	100	>-5	4Flite PG	25	-	13	-	60	2	30-60. Current AT is 25 min
P426	PG Type IV Expansion	2	IP- / ZR-	8	100	>-5	4Flite PG	25	-	25	-	40	1	30-40. Current AT is 25 min
P427	PG Type IV Expansion	2	IP- / ZR- / SN-	8	100	>-5	4Flite PG	25	10	-	25	40	1	Current AT is 20 min
P428	PG Type IV Expansion	2	IP Mod	8	100	>-5	4Flite PG	75	-	-	-	30	1	25-35. Current AT is 15 min
P429	PG Type IV Expansion	2	IP Mod / SN	8	100	>-5	4Flite PG	75	25	-	-	10	2	Current AT is 5 min
P430	PG Type IV Expansion	2	IP Mod/ZD	8	100	>-5	4Flite PG	75	-	13	-	15	1	15-20. Current AT is 10 min
P431	PG Type IV Expansion	2	IP-	8	100	-5 to -10	4Flite PG	25	-	-	-	90	2	50-90. Current AT is 30 min
P432	PG Type IV Expansion	2	IP- / SN-	8	100	-5 to -10	4Flite PG	25	10	-	-	20	2	Current AT is 15 min
P433	PG Type IV Expansion	2	IP- / ZD	8	100	-5 to -10	4Flite PG	25	-	13	-	30	2	20-30. Current AT is 10 min
P434	PG Type IV Expansion	2	IP- / ZR-	8	100	-5 to -10	4Flite PG	25	-	25	-	25	1	20-30. Current AT is 10 min
P435	PG Type IV Expansion	2	IP- / ZR- / SN-	8	100	-5 to -10	4Flite PG	25	10	-	25	40	1	No AT exists currently
P436	PG Type IV Expansion	2	IP Mod	8	100	-5 to -10	4Flite PG	75	-	-	-	25	2	15-25. Current AT is 10 min
P437	PG Type IV Expansion	2	IP Mod / SN	8	100	-5 to -10	4Flite PG	75	25	-	-	10	1	Current AT is 5 min
P438	PG Type IV Expansion	2	IP Mod/ZD	8	100	-5 to -10	4Flite PG	75	-	13	-	10	1	Current AT is 7 min
P439	PG Type IV Expansion	2	IP-	8	115	-10 to -16	4Flite PG	25	-	-	-	40	1	Current AT is 30 min. 115 knts
P440	PG Type IV Expansion	2	IP- / SN-	8	115	-10 to -16	4Flite PG	25	10	-	-	20	1	Current AT is 15 min. 115 knts
P441	PG Type IV Expansion	2	IP Mod	8	115	-10 to -16	4Flite PG	75	-	-	-	15	1	Current AT is 10 min. 115 knts

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P442	PG Type IV Expansion	2	IP-	8	115	-16 to -22	4Flite PG	25	-	-	-	30	1	Current AT is 20 min, 115 knts
P443	PG Type IV Expansion	2	IP- / SN-	8	115	-16 to -22	4Flite PG	25	10	-	-	10	1	115 knts for PG. No AT exist
P444	PG Type IV Expansion	2	IP Mod	8	115	-16 to -22	4Flite PG	75	-	-	-	10	2	115 knts for PG. No AT exist
P445	PG Type IV Expansion	2	IP-	8	115	< -22	4Flite PG	25	-	-	-	10	1	115 knts for PG. No AT exist
P446	PG Type IV Expansion	2	IP Mod	8	115	< -22	4Flite PG	75	-	-	-	5	2	115 knts for PG. No AT exist
P447	PG Type IV Expansion	2	IP-	8	100	> 0	AVIAFlight PG	25	-	-	-	90	2	70-90. Current AT is 50 min
P448	PG Type IV Expansion	2	IP- / SN-	8	100	> 0	AVIAFlight PG	25	10	-	-	50	2	Current AT is 40 min
P449	PG Type IV Expansion	2	IP- / D	8	100	> 0	AVIAFlight PG	25	-	-	13	70	2	30-60. Current AT is 25 min
P450	PG Type IV Expansion	2	IP- / R-	8	100	> 0	AVIAFlight PG	25	-	-	25	50	2	30-50. Current AT is 25 min
P451	PG Type IV Expansion	2	IP- / R- / SN-	8	100	> 0	AVIAFlight PG	25	10	-	25	40	2	Current AT is 20 min
P452	PG Type IV Expansion	2	IP Mod	8	100	> 0	AVIAFlight PG	75	-	-	-	30	2	25-35. Current AT is 15 min
P453	PG Type IV Expansion	2	IP Mod / SN	8	100	> 0	AVIAFlight PG	75	25	-	-	20	1	Current AT is 15 min
P454	PG Type IV Expansion	2	IP Mod/D	8	100	> 0	AVIAFlight PG	75	-	13	-	15	2	15-20. Current AT is 10 min
P455	PG Type IV Expansion	2	IP Mod / R	8	100	> 0	AVIAFlight PG	75	-	-	75	15	1	Current AT is 10 min
P456	PG Type IV Expansion	2	IP-	8	100	> -5	AVIAFlight PG	25	-	-	-	90	1	70-90. Current AT is 50 min
P457	PG Type IV Expansion	2	IP- / SN-	8	100	> -5	AVIAFlight PG	25	10	-	-	50	1	Current AT is 40 min
P458	PG Type IV Expansion	2	IP- / ZD	8	100	> -5	AVIAFlight PG	25	-	13	-	60	2	30-60. Current AT is 25 min
P459	PG Type IV Expansion	2	IP- / ZR-	8	100	> -5	AVIAFlight PG	25	-	25	-	40	1	30-40. Current AT is 25 min
P460	PG Type IV Expansion	2	IP- / ZR- / SN-	8	100	> -5	AVIAFlight PG	25	10	-	25	40	1	Current AT is 20 min
P461	PG Type IV Expansion	2	IP Mod	8	100	> -5	AVIAFlight PG	75	-	-	-	30	1	25-35. Current AT is 15 min
P462	PG Type IV Expansion	2	IP Mod / SN	8	100	> -5	AVIAFlight PG	75	25	-	-	10	2	Current AT is 5 min
P463	PG Type IV Expansion	2	IP Mod/ZD	8	100	> -5	AVIAFlight PG	75	-	13	-	15	1	15-20. Current AT is 10 min
P464	PG Type IV Expansion	2	IP-	8	100	-5 to -10	AVIAFlight PG	25	-	-	-	90	2	50-90. Current AT is 30 min
P465	PG Type IV Expansion	2	IP- / SN-	8	100	-5 to -10	AVIAFlight PG	25	10	-	-	20	2	Current AT is 15 min
P466	PG Type IV Expansion	2	IP- / ZD	8	100	-5 to -10	AVIAFlight PG	25	-	13	-	30	2	20-30. Current AT is 10 min
P467	PG Type IV Expansion	2	IP- / ZR-	8	100	-5 to -10	AVIAFlight PG	25	-	25	-	25	1	20-30. Current AT is 10 min

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 3.2: Proposed Test Plan for Testing with the RJ Wing (cont'd)

Test Plan #	Objective	Objective Priority	Test Condition	Rotation Angle	Ramp (s/kts)	Target OAT (°C)	Fluid	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time	Test Priority	Comment
P468	PG Type IV Expansion	2	IP- / ZR- / SN-	8	100	-5 to -10	AVIAFlight PG	25	10	-	25	40	1	No AT exists currently
P469	PG Type IV Expansion	2	IP Mod	8	100	-5 to -10	AVIAFlight PG	75	-	-	-	25	2	15-25. Current AT is 10 min
P470	PG Type IV Expansion	2	IP Mod / SN	8	100	-5 to -10	AVIAFlight PG	75	25	-	-	10	1	Current AT is 5 min
P471	PG Type IV Expansion	2	IP Mod/ZD	8	100	-5 to -10	AVIAFlight PG	75	-	13	-	10	1	Current AT is 7 min
P472	PG Type IV Expansion	2	IP-	8	115	-10 to -16	AVIAFlight PG	25	-	-	-	40	1	Current AT is 30 min. 115 knts
P473	PG Type IV Expansion	2	IP- / SN-	8	115	-10 to -16	AVIAFlight PG	25	10	-	-	20	1	Current AT is 15min. 115 knts
P474	PG Type IV Expansion	2	IP Mod	8	115	-10 to -16	AVIAFlight PG	75	-	-	-	15	1	Current AT is 10min. 115 knts
P475	PG Type IV Expansion	2	IP-	8	115	-16 to -22	AVIAFlight PG	25	-	-	-	30	1	Current AT is 20 min. 115 knts
P476	PG Type IV Expansion	2	IP- / SN-	8	115	-16 to -22	AVIAFlight PG	25	10	-	-	10	1	115 knts for PG. No AT exist
P477	PG Type IV Expansion	2	IP Mod	8	115	-16 to -22	AVIAFlight PG	75	-	-	-	10	2	115 knts for PG. No AT exist
P478	PG Type IV Expansion	2	IP-	8	115	< -22	AVIAFlight PG	25	-	-	-	10	1	115 knts for PG. No AT exist
P479	PG Type IV Expansion	2	IP Mod	8	115	< -22	AVIAFlight PG	75	-	-	-	5	2	115 knts for PG. No AT exist
P480	New AT Conditions	3	TBD	8	100	TBD	** Ethylene EG Fluid	TBD	TBD	TBD	TBD	TBD	1	No AT exists currently
P481	New AT Conditions	3	TBD	8	100	TBD	*Propylene PG Fluid	TBD	TBD	TBD	TBD	TBD	1	No AT exists currently

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

4. PRE-TESTING SETUP ACTIVITIES

The activities to be performed for planning and preparation, on the first day of testing, and prior to each testing day thereafter, have been detailed in a list included in Attachment 1.

5. DATA FORMS

The following data forms are required for the wind tunnel tests:

- Attachment 2: General Form;
- Attachment 3: Wing Temperature, Fluid Thickness and Fluid Brix Form;
- Attachment 4: Example Ice Pellet Dispensing Form;
- Attachment 5: Example Snow Dispensing Form;
- Attachment 6: Example Snow Dispensing Form (Manual Method);
- Attachment 7: Visual Evaluation Rating Form;
- Attachment 8: Fluid Receipt Form (Electronic Form); and
- Attachment 9: Log of Fluid Sample Bottles.

When and how the data forms will be used is described throughout Section 6.

6. PROCEDURE

The following subsections describe the tasks to be performed during each test conducted. It should be noted that some subsections (i.e., fluid application and contamination application) will be omitted depending on the objective of the test.

A rating system based on aerodynamic and visual observation data has been developed for fluid and contamination tests, and will be filled out by the on-site experts when applicable. The overall rating will provide insight into the severity of the conditions observed. A test failure (failure to adequately shed the fluid at time of rotation) shall be determined by the on-site experts based on residual contamination.

6.1 Initial Test Conditions Survey

- Record ambient conditions of the test (Attachment 2); and
- Record wing temperature (Attachment 3).

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

6.2 Fluid Application (Pour)

- Hand pour 20 L of anti-icing fluid over the test area (fluid can be poured directly out of pails or transferred into smaller 3 L jugs);
- Record fluid application times and quantities (Attachment 2);
- Let fluid settle for 5-minutes (as the wing section is relatively flat, last winter it required tilting the wing for 1-minute to enable fluid to be uniform);
- Measure fluid thickness at pre-determined locations on the wing (Attachment 3);
- Record wing temperature (Attachment 3);
- Measure fluid Brix value (Attachment 3);
- Photograph and videotape the appearance of the fluid on the wing; and
- Begin the time-lapse camera to gather photos of the precipitation application phase.

Note: At the request of TC/FAA, a standard aluminum test plate can be positioned on the wing to run a simultaneous endurance time test.

6.3 Application of Precipitation

The types of precipitation that can be generated include the following:

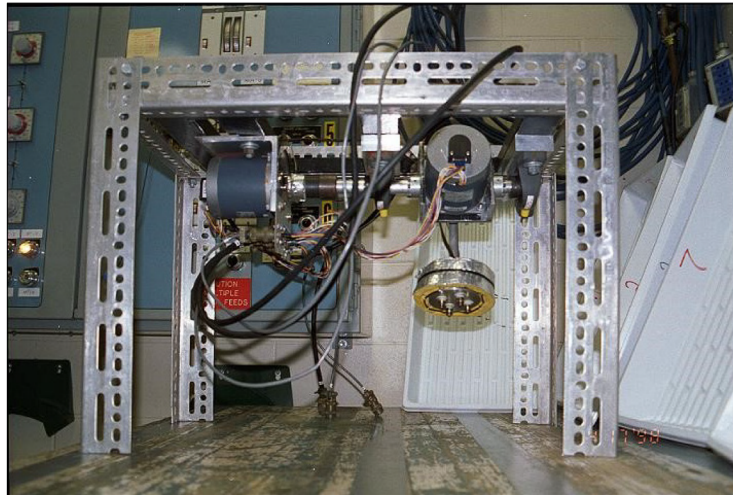
- ZR – 25 g/dm²/h;
- R – 25 g/dm²/h;
- R – 75 g/dm²/h;
- ZD – 5 g/dm²/h;
- ZD – 13 g/dm²/h;
- SN – 10 g/dm²/h;
- SN – 25 g/dm²/h;
- IP – 25 g/dm²/h; and
- IP – 75 g/dm²/h.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

6.3.1 Rain, Freezing Rain, Drizzle, and Freezing Drizzle

Freezing precipitation such as rain, freezing rain, drizzle, and freezing drizzle are simulated using an NRC developed sprayer assembly providing a large scan area and appropriate spray uniformity over the test area. The scanner consists of a horizontal main shaft supported by two bearings. The actual spray head assembly is shaft-mounted on a rotating scanner, so that one scan covers a lateral running strip of the test area. A stepper motor is synchronized to index the relative angle of the spray head between scans along an axis perpendicular to the scan axis. This provides two axes of rotation, essentially an x-y plane; one along each axis. Each scan is consecutively indexed to complete the precipitation coverage of the test bed area. This defines one cycle of the spray unit. The scan rate, index angle, and the number of scans per cycle are adjusted, along with the fluid delivery pressures (water and air) to obtain appropriate droplet sizes and precipitation rates. The sprayer system uses compressed air and distilled water to produce freezing rain. The temperature of the water is controlled and is kept just above freezing temperature to produce freezing rain. To produce rain, the temperature of the water is raised until the precipitation no longer freezes on the test surfaces. The sprayer assembly is shown in Photo 6.1.

Photo 6.1: Sprayer Assembly



APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

6.3.2 Ice Pellet/Snow Dispenser Calibration and Setup

Calibration work was performed during the winter of 2007-08 on the modified ice pellet/snow dispensers prior to testing with the Falcon 20. The purpose of this calibration work was to attain the dispenser's distribution footprint for both ice pellets and snow. A series of tests were performed in various conditions:

- Ice Pellets, Low Winds (0 to 5 km/h);
- Ice Pellets, Moderate Winds (10 km/h);
- Snow, Low Wind (0 to 5 km/h); and
- Snow, Moderate Wind (10 km/h).

These tests were conducted using 121 collection pans, each measuring 6 x 6 inches, over an area 11 x 11 feet. Pre-measured amounts of ice pellets/snow were dispersed over this area and the amount collected by each pan was recorded. A distribution footprint of the dispenser was attained and efficiency for the dispenser was computed.

6.3.3 Dispensing Ice Pellets/Snow for Wind Tunnel Tests

Using the results from these calibration tests, a decision was made to use two dispensers on each of the leading and trailing edges of wing; each of the four dispensers are moved to four different positions along each edge during the dispensing process. Figure 6.1, Figure 6.2, and Figure 6.3 demonstrate the setup of the dispensers in relation to the wing. Attachment 4 and Attachment 5 display the data sheets that will be used during testing in the wind tunnel. These data sheets will provide all the necessary information related to the amount of ice pellets/snow needed, effective rates, and dispenser positions. During the winter of 2009-10, snow was also dispensed manually using sieves. This technique was used when higher rates of precipitation were required (for heavy snow) or when winds in the tunnel made dispensing difficult. The efficiency of this technique was estimated at 90 percent based on how much of the precipitation made it onto the wing and a form to be used for this dispensing process along with dispensing instructions is included in Attachment 6.

Note: Dispensing forms should be filled out and saved for each run and pertinent information shall be included in the general form (Attachment 2). Any comments regarding dispensing activities should be documented directly on the form.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

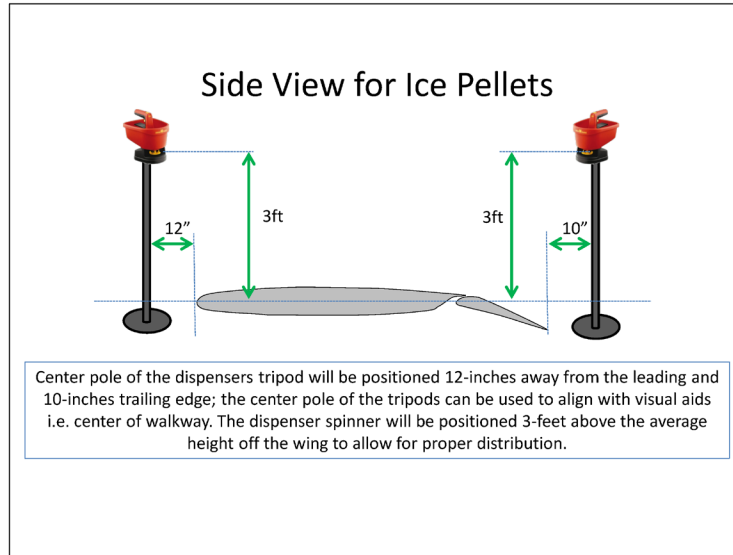


Figure 6.1: Side View of Positioning of Dispensers Relative to the Wing – Ice Pellets

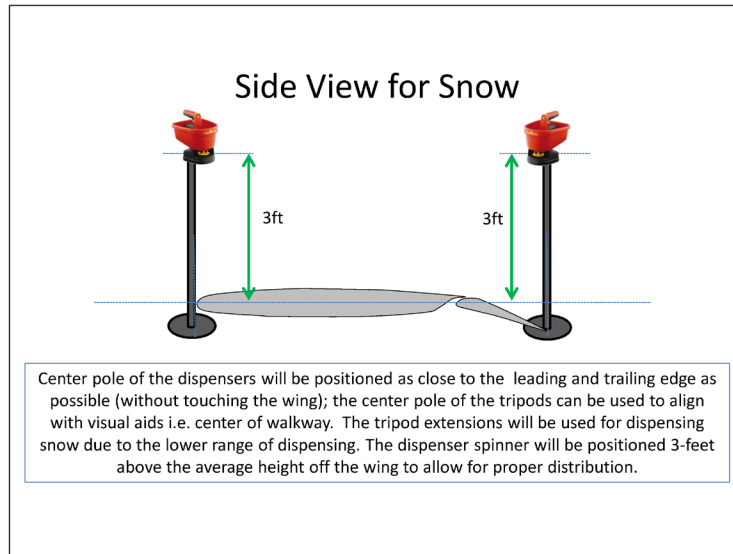


Figure 6.2: Side View of Positioning of Dispenser Relative to the Wing – Snow

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

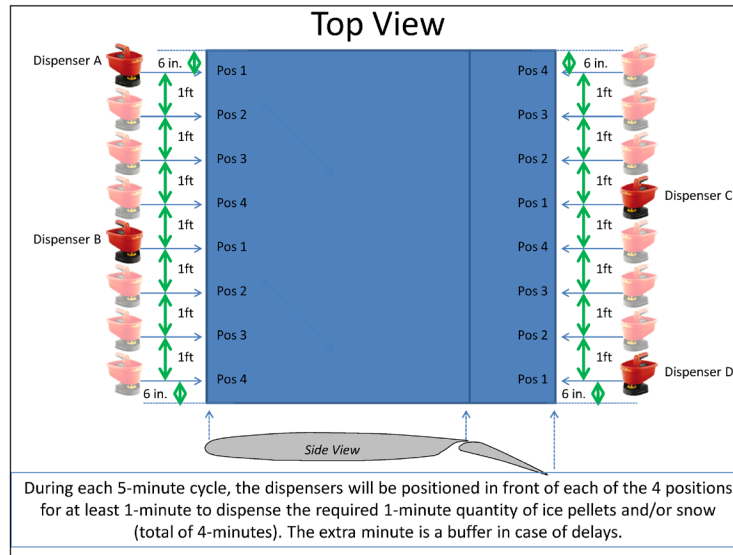


Figure 6.3: Top View of Positioning of Dispenser Relative to the Wing

6.3.4 New Ice Pellets/Snow Dispensing Systems for 2014 Onwards

Simulated ice pellets are distributed over a test surface using an ice pellet pitcher. The original ice pellet pitcher (Yardworks) was a modified hand-held fertilizer dispenser. The rate of precipitation was controlled with the speed of rotation of the motor, as well as the size of the opening of the dispenser reservoir drop feeder.

In the winter of 2012-13, seed spreaders historically modified and used for applying ice pellets during wind tunnel and flat plate testing, were no longer available as the manufacturer stopped production of the model. A new replacement seed spreader system (Wolf Garten) was found which is similar (but not identical). Some calibration work was required to demonstrate an equivalency in the two systems; testing was conducted at the NRC Climatic Engineering Facility (CEF) prior to the wind tunnel testing to verify the distribution of the historical system versus the new replacement system the details of which are included in the TC report, TP 15230E, *Aircraft Ground Icing General Research Activities During the 2012-13 Winter*.

The data collected demonstrated that the new system is very similar to old system; some small variation was present in distribution within the footprint, but equivalent efficiency on the overall footprint. Based on this, it was concluded that for ice pellets, the new system can be used as a direct replacement. For snow, the new system was more efficient; therefore, a reduction of 10 percent should be used for the snow mass requested.

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Comparative wind tunnel testing was conducted in the winter of 2013-14 to further validate the equivalency of the systems, the details of which are included in the TC report, TP 15274E, *Exploratory Wind Tunnel Aerodynamic Research Examination of Contaminated Anti-Icing Fluid Flow-Off Characteristics Winter 2013-14*. The results indicated that the differences in recorded lift losses were generally very small (less than 1.3 percent) when comparing back-to-back tests with no bias towards one system or the other. The differences were even smaller when looking at the average of the four comparative sequential tests (Test #330 to #337) which was 0.1 percent. In addition, the tests were visually evaluated to verify that the distribution of the ice pellets was similar, further supporting the similarity in aerodynamic results between the two dispenser systems.

In general, the wind tunnel results further supported the original distribution equivalency work conducted during the winter of 2012-13 and demonstrated that the new generation dispensers are suitable replacements for the older model dispensers.

6.4 Prior to Engines-On Wind Tunnel Test

- Measure fluid thickness at the pre-determined locations on the wing (Attachment 3);
- Measure fluid Brix value (Attachment 3);
- Record wing temperatures (Attachment 3);
- Record start time of test (Attachment 2); and
- Fill out visual evaluation rating form (Attachment 7).

Note: To minimize the measurement time post precipitation, temperature should be measured 5 minutes before the end of precipitation, thickness measured 3 minutes before the end of precipitation, and Brix measured when the precipitation ends. Also, consideration has been given to reducing the number of measurements that are taken for this phase (i.e., locations 2 and 5 only).

6.5 During Wind Tunnel Test

- Take still pictures and video the behaviour of the fluid on the wing during the takeoff run, capturing any movement of fluid/contamination;
- Fill out visual evaluation rating form at the time of rotation (Attachment 7); and
- Record wind tunnel operation start and stop times.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

6.6 After the Wind Tunnel Test

- Measure fluid thickness at the pre-determined locations on the wing (Attachment 3);
- Measure fluid Brix value (Attachment 3);
- Record wing temperatures (Attachment 3);
- Observe and record the status of the fluid/contamination (Attachment 3);
- Fill out visual evaluation rating form (Attachment 7);
- Obtain lift data (Excel file) from NRC; and
- Update APS test log with pertinent information.

6.7 Fluid Sample Collection for Viscosity Testing

Two L of each fluid to be tested are to be collected. The fluid receipt form (Attachment 8) should be completed indicating quantity of fluid and date received. Any samples extracted for viscosity purposes should be documented in the fluid receipt form (Attachment 8); however, an additional form (Attachment 9) is available if required. A falling ball viscosity test should be performed to have a reference available if on site testing is required to confirm fluid viscosity before testing.

6.8 At the End of Each Test Session

If required, APS personnel will collect the waste solution. At the end of the testing period, NRC will arrange for a glycol recovery service provider to safely dispose of the waste glycol fluid.

6.9 Camera Setup

It is anticipated that the camera setup will be similar to the setup used during the winter of 2023-24 and will include Digital Single-Lens Reflex (DSLR) cameras and video cameras. Modifications may be necessary and will be dealt with on site. The flashes will be positioned on the control-room side of the tunnel, and the cameras will be positioned on the opposite side. The final positioning of the cameras and flashes should be documented to identify any deviation from the previous year's setup.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

In addition, a web-streaming or closed-circuit television (CCTV) camera system will be used to allow participants to view the tests remotely. The video data from the system will be saved and used as a backup.

6.10 Demonstration of a Typical Wind Tunnel Test Sequence

Table 6.1 demonstrates a typical Wind Tunnel test sequence of activities, assuming the test starts at 10:30:00. Figure 6.4 demonstrates a typical wind tunnel run timeline.

Table 6.1: Typical Wind Tunnel Test

TIME	TASK
10:30:00	START OF TEST. ALL EQUIPMENT READY.
10:30:00	- Record test conditions.
10:35:00	- Prepare wing for fluid application (clean wing, etc.).
10:45:00	- Measure wing temperature.
	- Ensure clean wing for fluid application.
10:50:00	- Pour fluid over test area.
11:00:00	- Measure Brix, thickness, and wing temperature.
	- Photograph test area.
11:05:00	- Apply contamination over test area. (i.e., 30 min)
11:35:00	- Measure Brix, thickness, and wing temperature.
	- Photograph test area.
11:40:00	- Clear area and start wind tunnel.
11:55:00	- Wind tunnel stopped.
12:05:00	- Measure Brix, thickness, and wing temperature.
	- Photograph test area.
	- Record test observations.
12:35:00	END OF TEST.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

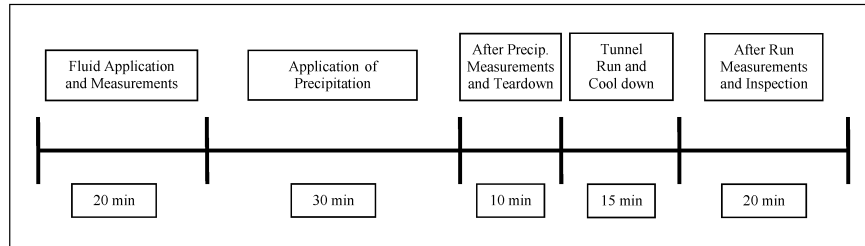


Figure 6.4: Typical Wind Tunnel Run Timeline

6.11 Procedures for Testing Objectives

Details for the testing objectives have been included in the following attachments:

- Attachment 10: Procedure – Dry Wing Performance;
- Attachment 11: Procedure – Type IV Ice Pellet Allowance Time Validation with New Fluids;
- Attachment 12: Procedure – Development of EG Specific Ice Pellet Allowance Time Table;
- Attachment 13: Procedure – Development of PG Specific Ice Pellet Allowance Time Table; and
- Attachment 14: Procedure – General Allowance Time Expansion.

7. EQUIPMENT

Equipment to be employed is shown in Table 7.1. Note that crossed off items will not be required for the testing season but have been left in the list for continuity.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 7.1: Equipment List

EQUIPMENT	STATUS	EQUIPMENT	STATUS
General Support and Testing Equipment		Camera Equipment (non-exhaustive list)	
20L clean containers (if expecting totes)		DSLR cameras x 3 + lenses etc. (2 suitcases)	
Barrel Opener (if expecting barrels)		Flood Lights x 2	
Bell Router		Godox flashes x 2	
Black Shelving Unit for rate pans (or plastic)		Ipad's x 2 for remote viewing Osmos	
Blow Horns x 2		Magnets and mounting equipment	
Blue Protective Face Masks x 2 boxes		Manfroto arms and mounts suitcase	
Brixometer x 3		Osmo/GoPro Cameras + accessories	
Electrical tape x 2		Photography laptop with mouse/charger	
Exacto Knives x 2		Remote camera system (See SM for details)	
Extension cords 2x steel reel, 4x flat reel, 6x 25ft, 4 retracting 50ft, 6 power bars,			
Eye protection x 40			
Falling Ball Viscometer		Ice Pellets Fabrication Equipment	
Fluid pouring pitchers (2L, labelled) x 144		Adherence Probes Kit	
Fluids (ORDER and SHIP to Montreal)		Blenders x 12 in good condition	
Fridge for personnel x 1		Clips x 6	
Funnels (1 big + 1 small)		Folding tables (5 large, 5 small)	
Gloves - black (thermal layer) x 12		Ice bags	
Gloves - cotton (about 300 pairs)		Ice bags storage freezer x 3	
Gloves - latex (about 400 pairs)		Ice pellet box supports for railing x4	
Grid Section + Location docs for RJ marking		Ice Pellet control wires, boxes, and deflectors	
Hand Sanitizer (x3 larger jugs/dispensers)		Ice pellets dispensers x 12	
Hard water chemicals x 3 premixes		Ice pellets Styrofoam containers x40	
Horse and tap for fluid barrel x all		Measuring cups (1L + 1cup/smaller)	
Hot Hands		Ohaus 30KG scale	
Inclinometer (yellow level) x 2		Refrigerated Truck	
Isopropyl 99% x 40L		Rubber Mats x 4	
Large and small tape measure		Sieves (solid base, 1.4 mm, 4 mm) x 3 each	
Large Sharpies for Grid Section		Stands for ice pellets dispensing devices x 6	
Long Ruler for marking wing x 2		Tarps x 2	
Marker for waste x 2 (magnum)		Wooden Spoons	
Ohaus Weigh Scale x1			
Paper towel (blue shop towel) x 100		Freezing Rain Equipment	
Personal Clothing for APS YUL team		Rates laptop (use BB's or bring an extra one)	
Pots and Sous Vide for Type I x 2		NRC Freezing rain sprayer (NRC provided)	
Protective yellow rubber clothing (all)		Rubber suction feet for wooden boards x8	
Red Thermoses for Type III Transport		White plastic rate pans (4 sets)	
Sample bottles for viscosity (x6)		Wooden boards for rate pans (x4)	
Sandpaper Kit Aero			
Sartorius Weigh Scale x 2		Office Equipment	
Scrapers x 5		Laptops (MR, MR2, BB, PK) with accessories	
Shep Vae		APS tuques x 10	
Speed tape x 1 small		Calculators x 3	
Squeegees (5 small + all large floor)		Clip boards x 8	
Starlink		Data Forms	
Stop Watches x 4		Dry eraser markers	
Temp Sensor Cover Foam		Envelopes (9x12) x box	
Temperature probes: immersion x 3		File box x 2	
Temperature probes: surface x 3		Hard drive with all WT Photos	
Test Plate x 1		New blank SSD Hard Drives x 2	
Thermometer for Reefer Truck		Pencils + sharpies/markers	
Thickness Gauges (5 small, 5 big)		Projector for laptop	
Velcro Ties		Scissors	
Vise grip + rubber opener for containers		Small 90° aluminum ruler for wing	
Walkie Talkies x 12 (8+4)		Test Procedures x 4, printer paper	
		YOW employee contracts	

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Table 7.1: Equipment List (cont'd)

EQUIPMENT	STATUS	EQUIPMENT	STATUS
Waste buckets 5 gallon with lids x2			
Water (2 x 18L) for hard water		V-Stub Gear	
Whatmans Paper and conversion charts		Motorized backpack sprayer for Fluids/ZR x5	
		Calibration pans and stand (if needed)	
		Little Giant Step ladders x2 (4 available)	
		Folding horse work table x2	

8. FLUIDS

Mid-viscosity samples of EG and PG IV fluid will be used in the wind tunnel tests. Although the number of tests conducted will be determined based on the results obtained, the fluid quantities available are shown in Table 8.1. Eight fluids were solicited for submission for validation and expansion testing; however, it is expected that up to four will be submitted. Fluid application will be performed by pouring the fluid (rather than spraying) to reduce any shearing to the fluid.

Table 8.1: Fluid Available for Wind Tunnel Tests

ON ORDER				
Manufacturer	Fluid Name	EG/PG	Quantity (L)	Project
ALAB International	PROFLIGHT EG4	EG	0	Validation and Expansion
ALAB International	PROFLIGHT PG4	PG	0	Validation and Expansion
ASGlobal	4Flite EG	EG	500	Validation and Expansion
MKS DevO Chemicals	COREICEPHOB TYPE-IV PG	EG	500	Validation and Expansion
Shaanxi Cleanway Aviation Chemical Co., Ltd	Cleansurface IV	PG	400	Validation and Expansion
Chongqing Joba Chemical Co.,Ltd	FW-IV	EG	280	Validation and Expansion
Clariant Produkte (Deutschland) GmbH	Safewing MP IV LAUNCH PLUS	PG	500	Validation and Expansion
Inland Technologies	ECO-SHIELD®	PG	0	Validation and Expansion
			Total	2180

IN STOCK LARGE QUANTITIES				
Manufacturer	Fluid Name		Quantity (L)	Project
Dow	EG106	EG	840	Wind Tunnel
Cryotech	Polar Guard Advance	PG	280	Wind Tunnel
Kilfrost	ABC-S Plus	PG	200	Mixed Icing/Wind Tunnel
AVIAFLUID INTERNATIONAL	AVIAFlight EG	EG	185	Wind Tunnel
ASGlobal	4Flite PG	PG	180	Wind Tunnel
AllClear	ClearWing EG	EG	110	Mixed Icing/Wind Tunnel
CHEMCO Inc.	ChemR NORDIK IV	EG	110	Wind Tunnel
Dow	PG ADF Concentrate	TI	120	Mixed Icing/Wind Tunnel
JSC RCP Nordix	Defrost North 4	EG	80	Wind Tunnel
Cryotech	Polar Guard Advance	PG	50	Wind Tunnel
AVIAFLUID INTERNATIONAL	AVIAFlight PG	PG	30	Wind Tunnel
			Total	2165

APS/Library/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

9. PERSONNEL

Three APS staff members are required for the tests at the NRC IWT. Six additional APS persons will be required (local from Ottawa) to assist with the preparation and application of fluids and contamination. One additional APS person (local from Ottawa) will be required to coordinate the photography and videography. Table 9.1 demonstrates the personnel required and their associated tasks.

Fluid and ice pellets applications will be performed by APS personnel at the NRC wind tunnel. NRC personnel will operate the NRC wind tunnel and operate the freezing rain/drizzle sprayer (if requested).

Table 9.1: Personnel List

Wind Tunnel Personnel List	
Person	Responsibility
John D’Avirro (JD)	Director (participating remotely)
Marco Ruggi (MR)	Lead Engineer and Project Coordinator
Marc Quesnel (MQ)	Data documentation (forms, logs, camera setup, etc.) / Ice Manufacturing Manager
Benjamin Bernier (BB)	Data Collection / Fluid Manager (inventory and application) / YOW Pers. Manager
APS Local Ottawa Personnel	
Photo 1	Photography / Camera Documentation
Steve Baker (STB)	Ottawa Staff Lead / Fluids / Ice Manufacturing / Dispensing / General Support
David Beils (DB)	Ottawa Staff Assistant Lead / Fluids / Ice Manufacturing / Dispensing / General Support
YOW 1	Fluids / Ice Manufacturing / Dispensing
YOW 2	Fluids / Ice Manufacturing / Dispensing
YOW 3	Fluids / Ice Manufacturing / Dispensing
YOW 4	Ice Manufacturing

NRC Aerospace Research Centre Contacts

- Pete Forsyth: (343) 551-0032.
- Cory Bates: (613) 913-9720.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

10. SAFETY

- A safety briefing will be done on the first day of testing;
- Personnel should be familiar with NRC emergency procedures i.e., DO NOT CALL 9-1-1, instead call the NRC Emergency Center as they will contact and direct the necessary services;
- All personnel must be familiar with the Material Safety Data Sheets (MSDS) for fluids;
- Prior to operating the wind tunnel, loose objects should be removed from the vicinity;
- When wind tunnel is operating, ensure that ear plugs are worn if necessary and personnel keep safe distances;
- When working on ladders, ensure equipment is stable;
- Canadian Standards Association (CSA) approved footwear and appropriate clothing for frigid temperatures are to be worn by all personnel;
- Safety eyewear must be worn at all times when operating in the test section;
- Caution should be taken when walking in the test section due to slippery floors, and dripping fluid from the wing section;
- If fluid comes into contact with skin, rinse hands under running water;
- If fluid comes into contact with eyes, flush with the portable eye wash station; and
- Personnel must ensure they follow the protocols for working extended hours.

A separate safety training may be required by NRC that staff will be required to complete prior to the start of testing. Details will be provided by NRC.

Personnel must operate in accordance with the "Testing Safety Recommendations" and must follow the protocols for "Extended Work Hours Protocol for APS Personnel." These documents are included in the "APS Office Policies & Procedures," which is made available to all APS staff.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Attachment 1: Task List for Setup and Actual Tests

No.	Task	Person	Status
Planning and Preparation			
1	Develop test plan and detailed matrix	MR	
2	Send fluid request letters to manufacturers	MR	
3	Develop/update procedure and deliver to stakeholders	MR/JS	
4	Co-ordinate with NRC staff re. equipment, start dates, setup, etc.	MR	
5	Ensure fluid is received and sampled	MR	
6	Arrange for hotel accommodations for APS personnel	JS	
7	Arrange truck rental	JS	
8	Arrange for ice and freezer delivery	JS	
9	Order walkie talkies	JS	
10	Organize packing and personnel travel to Ottawa	MR	
11	Hire YOW personnel	CB/AG	
12	Complete contract for YOW personnel	FDL	
13	Co-ordinate with APS photographer	MR	
14	Ensure availability of freezing rain sprayer equipment	MR	
15	Prepare and Arrange Office Materials for YOW	CB/AG	
16	Prepare Data forms and procedure	CB/AG	
17	Prepare historical photo hard drives and new ones	MR/CB	
18	Prepare Test Log and Merge Historical Logs for Reference	CB/AG	
19	Update (as necessary) fluid viscosity log, and have available	AG	
20	Finalize and complete list of equipment/materials required	MR/ALL	
21	Prepare Labels for 20L containers for WT and prepare labels for pitchers	CB/AG	
22	Prepare and Arrange Site Equipment for YOW	BA/CB	
23	Ensure proper functioning of ice pellet dispenser equipment	BA/MR	
24	Purchase, and label fluid pouring pitchers	BA/AG	
25	Review IP/ZR/SN dispersal techniques and location	CB/BB/MR	
26	Update IP/SN Order Form (if necessary)	CB/BB/MR	
27	Check weather prior to finalizing test dates and Day vs. Night Shift, Start Time	MR/JD	
28	Complete purchase list and shopping	BA	
29	Conduct pre-trip to collect fluid samples	BA/CB	
30	Verify viscosity with Brookfield and Falling Ball at APS office	AG/CB	
31	Pack and leave YUL for YOW	APS	
32	Complete NRC safety course for all personnel	MR	
33	Ensure all staff have appropriate CSA footwear and eyewear	MR	
34	Renew Transport Canada NIR Trucking Information	FDL	
35	Update the tool crib with new materials and check	BA/SD	
36	Ensure internet (Starlink or Bell) is registered and ready to go	BA	
Setup Day			
37	General safety briefing and update on testing	APS/NRC/YOW	
38	Unload Truck and organize equipment in lower, middle, or office area	APS	
39	Verify and Organize Fluid Received (labels and fluid receipt forms)	BB	
40	Confirm ice and freezer delivery	BB	
41	Setup general office and testing equipment, confirm printer and projector avail	CB	
42	Setup rate station (if necessary)	CB	
43	Setup IP/SN manufacturing material in reefer truck	STB	
44	Test and prepare IP dispensing equipment	STB	
45	Train IP making personnel (ongoing)	STB/YOW	
46	Co-ordinate fabrication of ice pellets/snow	CB/STB	
47	Start IP manufacturing	STB	
48	Mark wing (only if requested)	CB	
49	Setup Still and Video and CCTV Cameras	SN/YOW	
50	Verify photo and video angles, resolution, etc., and document new locations	SN/MR/CB	
Testing Day 1			
51	Safety Briefing & Training (APS/YOW)	MR	
52	IP/SN/ZR Calibration (if necessary)	BB/CB/MR	
53	Train IP making personnel (ongoing)and continue IP manufacturing	STB/YOW	
54	Dry Run of tests with APS and NRC (if necessary)	APS/NRC	
55	Start Testing (Dry wing tests may be possible while setup occurs)	APS/NRC	
Each Testing Day			
56	Check with NRC the status of the testing site, tunnel, weather, etc.	MR	

APS/Library/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

No.	Task	Person	Status
57	Deicide personnel requirements for following day for 24hr notice	MR	
58	Prepare equipment and fluid to be used for test	BB	
59	Manufacture ice pellets	STB/YOW	
60	Prepare photography equipment	SN	
61	Prepare data forms for test	CB	
62	Conduct tests based on test plan	APS	
63	Modify test plan based on results obtained	TC/FAA/JD/MR	
64	Update ice pellet, snow, raw ice, and fluid Inventory (end of day)	CB/YOW	
65	Update fluid Inventory (5 container left warning)	BB/STB	
66	Update Test Log and Test Plan (ongoing and end of day)	CB/MR	
Post Testing			
67	Determine BLDT testing requirements (if required)	MR	
68	Document remaining fluid inventory and store accordingly	BB	
69	Copy photos and videos to multi-year hard drives	SN/MR/AG	
70	Copy all working files(logs, plans, analysis, etc.) to server	CB	
71	Scan/File WT Data Forms	CB/AG	
72	Finalize Wind Tunnel log	CB	

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Attachment 2: General Form

GENERAL FORM (EVERY TEST)			
DATE: _____	FLUID APPLIED: _____	RUN # (Plan #): _____	
AIR TEMPERATURE (°C) BEFORE TEST: _____	AIR TEMPERATURE (°C) AFTER TEST: _____		
TUNNEL TEMPERATURE (°C) BEFORE TEST: _____	TUNNEL TEMPERATURE (°C) AFTER TEST: _____		
WIND TUNNEL START TIME: _____	PROJECTED SPEED (S/KTS): _____		
ROTATION ANGLE: _____	EXTRA RUN INFO: _____		
FLAP SETTING (20°, 0°): _____			
<input type="checkbox"/> Check if additional notes provided on a separate sheet			
FLUID APPLICATION			
Actual start time: _____	Actual End Time: _____		
Fluid Brx: _____	Amount of Fluid (L): _____		
Fluid Temperature (°C): _____	Fluid Application Method: _____	POUR	
ICE PELLETS APPLICATION (if applicable)			
Actual start time: _____	Actual End Time: _____		
Rate of Ice Pellets Applied (g/dm ² /h): _____	Ice Pellets Size (mm): _____	1.4 - 4.0 mm	
Exposure Time: _____			
Total IP Required per Dispenser: _____			
FREEZING RAIN/DRIZZLE APPLICATION (if applicable)			
Actual start time: _____	Actual End Time: _____		
Rate of Precipitation Applied (g/dm ² /h): _____	Droplet Size (mm): _____		
Exposure Time: _____	Needle: _____		
	Flow: _____		
	Pressure: _____		
SNOW APPLICATION (if applicable)			
Actual start time: _____	Actual End Time: _____		
Rate of Snow Applied (g/dm ² /h): _____	Snow Size (mm): _____	<1.4 mm	
Exposure Time: _____	Method: <input type="checkbox"/> Dispenser <input type="checkbox"/> Sieve		
Total SN Required per Dispenser: _____			
COMMENTS			

MEASUREMENTS BY: _____		HANDWRITTEN BY: _____	

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Attachment 3: Wing Temperature, Fluid Thickness and Fluid Brix Form

FLUID THICKNESS, TEMPERATURE AND BRUX FORM

Date: _____ Run: _____

WING TEMPERATURE (Taken From NRC Logger)					FLUID BRUX				FLUID THICKNESS (mil)				CYCLE TRACKING					
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	total	time
T2					2				1				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins	
T5					8				2				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins	
TU					Flap				3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins	
Time:					Time:				4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins	
									5				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins	
									6				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins	
									7				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins	
									8				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins	
									Flap				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins	
									Time:				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins	
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins	

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE

Flap

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE

Flap

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
Wing Position 6: Approximately 30 cm from trailing edge;
Wing Position 7: Approximately 15 cm from trailing edge;
Wing Position 8: Approximately 2.5 cm from trailing edge; and
Wing Position 9: Midway up the flap
Underside: Approximately 40 cm up from the leading edge stagnation point.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Attachment 4: Example Ice Pellet Dispensing Form

WING TRAILING EDGE

← 8 ft = 24.4 dm →

DISPENSER #3								DISPENSER #4							
1 ←	1ft	→ 2	1ft	→ 3	1ft	→ 4		1 ←	1ft	→ 2	1ft	→ 3	1ft	→ 4	
14.9	16.5	18.2	17.4	18.5	17.6	18.5	17.6	18.5	17.6	18.5	17.6	17.2	17.2	16.3	13.3
20.3	24.1	26.2	26.4	27.3	26.9	27.5	26.9	27.5	26.9	27.5	26.9	26.9	25.8	24.2	18.6
20.3	25.4	27.4	28.7	29.0	29.4	29.0	29.4	29.0	29.4	29.0	29.3	28.3	27.7	24.4	19.3
19.1	23.8	25.6	25.6	29.2	29.6	29.3	29.6	29.3	29.6	29.3	29.5	28.6	27.4	24.3	19.2
18.8	23.5	27.2	27.9	29.4	28.8	29.5	28.8	29.5	28.8	29.5	28.8	28.7	26.8	24.1	18.5
18.4	24.0	26.9	28.7	29.0	29.6	29.1	29.6	29.1	29.6	29.1	29.4	28.4	27.2	23.5	18.5
18.5	23.5	27.2	28.4	29.4	29.1	29.6	29.1	29.6	29.1	29.6	29.0	28.7	26.9	24.0	18.4
18.5	24.1	26.8	28.7	28.8	29.5	28.8	29.5	28.8	29.5	28.8	29.4	27.9	27.2	23.5	18.8
19.2	24.3	27.4	28.6	29.5	29.3	29.6	29.3	29.6	29.3	29.6	29.2	25.6	25.6	23.8	18.1
19.3	24.4	27.7	28.3	29.3	29.0	29.4	29.0	29.4	29.0	29.4	29.0	28.7	27.4	25.4	20.3
18.6	24.2	25.8	26.9	27.5	26.9	27.5	26.9	27.5	26.9	27.5	27.3	26.4	26.2	24.1	20.3
13.3	16.3	17.2	17.2	17.6	18.5	17.6	18.5	17.6	18.5	17.6	18.5	17.4	18.2	16.5	14.9
DISPENSER #2								DISPENSER #1							
	4 ←	1ft	→ 3	1ft	→ 2	1ft	→ 1	4 ←	1ft	→ 3	1ft	→ 2	1ft	→ 1	

WING LEADING EDGE

Precipitation Type Date Run #

* **Field to be manipulated**

Target Rate	25	g/dm ² /h
Duration	5	minutes

Footprint Rate	25	g/dm ² /h
Stdev of Rate (+/-)	5	g/dm ² /h

IP needed per 5min	
In each position	81 g
In each Dispenser	323 g

IP needed for entire test	
Total amount of IP in Each Dispenser	323 g
Total Amount IP Needed for Entire Test	1291 g

1. Enter "Date" and "Run #".

2. Manipulate desired "Target Rate" for test event.

3. Manipulate desired "Duration" for test event.

4. Prepare "Total Amount of IP Needed for Entire Test" in grams.

5. Prepare 4 boxes for "Total Amount of IP in Each Dispenser" in grams. (Each Dispenser must be emptied at 5-minute intervals.)

6. Dictate amount of IP needed "In each Position" in grams. (Each Position must be emptied at approximately 1-minute intervals.)

7. Once a Position is emptied of its contents (1-minute intervals), move the Dispenser 1-foot to the left.

8. Once a Dispenser has completed its cycle at Position #4, start next cycle at Position #4 and move 1-Foot to the right at (1-minute intervals). (e.g: Position #1 -> Pos #2 -> Pos #3 -> Pos #4 -> Pos #4 -> Pos #3 -> Pos #2 -> Pos #1 -> Pos #1...)

NOTE:

- Leading Edge (LE): Centre Pole of the Dispenser Stands must be 1-foot (12 inches) from the Leading Edge (LE)
- Trailing Edge (TE): Centre Pole of the Dispenser Stands must be 10-inches from the Trailing Edge (TE) Flap.
- Dispenser Spinner must be 3-feet above the average height of the wing.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Attachment 5: Example Snow Dispensing Form

WING TRAILING EDGE																																																																																																																																																																																																																																																																																																																																																																						
← 8 ft = 24.4 dm →																																																																																																																																																																																																																																																																																																																																																																						
6 ft = 18.3 dm	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="8" style="background-color: #00FFFF;">DISPENSOR #3</th> <th colspan="8" style="background-color: #FF00FF;">DISPENSOR #4</th> </tr> <tr> <th>1</th><th>← 1ft →</th><th>2</th><th>← 1ft →</th><th>3</th><th>← 1ft →</th><th>4</th><th></th> <th>1</th><th>← 1ft →</th><th>2</th><th>← 1ft →</th><th>3</th><th>← 1ft →</th><th>4</th> </tr> </thead> <tbody> <tr><td>23.1</td><td></td><td>24.6</td><td></td><td>27.2</td><td></td><td>25.5</td><td></td><td>27.4</td><td></td><td>25.5</td><td></td><td>27.4</td><td></td><td>25.4</td><td></td><td>26.6</td><td></td><td>19.7</td></tr> <tr><td>27.1</td><td></td><td>35.5</td><td></td><td>34.9</td><td></td><td>36.7</td><td></td><td>35.1</td><td></td><td>36.7</td><td></td><td>35.1</td><td></td><td>36.7</td><td></td><td>35.0</td><td></td><td>33.9</td><td></td><td>29.8</td></tr> <tr><td>24.6</td><td></td><td>39.4</td><td></td><td>36.4</td><td></td><td>41.4</td><td></td><td>36.8</td><td></td><td>41.5</td><td></td><td>36.8</td><td></td><td>41.5</td><td></td><td>36.8</td><td></td><td>41.1</td><td></td><td>35.5</td><td></td><td>35.2</td></tr> <tr><td>14.4</td><td></td><td>26.3</td><td></td><td>25.3</td><td></td><td>28.6</td><td></td><td>25.7</td><td></td><td>28.7</td><td></td><td>25.7</td><td></td><td>28.7</td><td></td><td>25.7</td><td></td><td>28.7</td><td></td><td>25.6</td><td></td><td>24.7</td><td></td><td>24.3</td></tr> <tr><td>8.8</td><td></td><td>15.2</td><td></td><td>16.4</td><td></td><td>17.4</td><td></td><td>17.0</td><td></td><td>17.6</td><td></td><td>17.2</td><td></td><td>17.6</td><td></td><td>17.2</td><td></td><td>17.6</td><td></td><td>17.0</td><td></td><td>17.2</td><td></td><td>15.9</td><td></td><td>14.2</td></tr> <tr><td>6.1</td><td></td><td>9.4</td><td></td><td>10.6</td><td></td><td>11.2</td><td></td><td>11.1</td><td></td><td>11.4</td><td></td><td>11.2</td><td></td><td>11.4</td><td></td><td>11.2</td><td></td><td>11.4</td><td></td><td>11.3</td><td></td><td>11.0</td><td></td><td>10.9</td><td></td><td>9.8</td><td></td><td>7.9</td></tr> <tr><td>7.9</td><td></td><td>9.8</td><td></td><td>10.9</td><td></td><td>11.0</td><td></td><td>11.3</td><td></td><td>11.2</td><td></td><td>11.4</td><td></td><td>11.2</td><td></td><td>11.4</td><td></td><td>11.2</td><td></td><td>11.1</td><td></td><td>11.2</td><td></td><td>10.6</td><td></td><td>9.4</td><td></td><td>6.1</td></tr> <tr><td>14.2</td><td></td><td>15.9</td><td></td><td>17.2</td><td></td><td>17.0</td><td></td><td>17.6</td><td></td><td>17.2</td><td></td><td>17.6</td><td></td><td>17.2</td><td></td><td>17.6</td><td></td><td>17.2</td><td></td><td>17.0</td><td></td><td>17.4</td><td></td><td>16.4</td><td></td><td>15.2</td><td></td><td>8.8</td></tr> <tr><td>24.3</td><td></td><td>24.7</td><td></td><td>28.4</td><td></td><td>25.6</td><td></td><td>28.7</td><td></td><td>25.7</td><td></td><td>28.7</td><td></td><td>25.7</td><td></td><td>28.7</td><td></td><td>25.7</td><td></td><td>28.7</td><td></td><td>25.7</td><td></td><td>28.6</td><td></td><td>25.3</td><td></td><td>26.3</td><td></td><td>14.4</td></tr> <tr><td>35.2</td><td></td><td>35.5</td><td></td><td>41.1</td><td></td><td>36.7</td><td></td><td>41.5</td><td></td><td>36.8</td><td></td><td>41.5</td><td></td><td>36.8</td><td></td><td>41.5</td><td></td><td>36.8</td><td></td><td>41.5</td><td></td><td>36.8</td><td></td><td>41.4</td><td></td><td>36.4</td><td></td><td>39.4</td><td></td><td>24.6</td></tr> <tr><td>29.8</td><td></td><td>33.9</td><td></td><td>36.3</td><td></td><td>35.0</td><td></td><td>36.7</td><td></td><td>35.1</td><td></td><td>36.7</td><td></td><td>35.1</td><td></td><td>36.7</td><td></td><td>35.1</td><td></td><td>36.7</td><td></td><td>35.1</td><td></td><td>36.7</td><td></td><td>34.9</td><td></td><td>35.5</td><td></td><td>27.1</td></tr> <tr><td>19.7</td><td></td><td>26.6</td><td></td><td>25.4</td><td></td><td>27.4</td><td></td><td>25.5</td><td></td><td>27.4</td><td></td><td>25.5</td><td></td><td>27.4</td><td></td><td>25.5</td><td></td><td>27.4</td><td></td><td>25.5</td><td></td><td>27.4</td><td></td><td>25.5</td><td></td><td>27.2</td><td></td><td>24.8</td><td></td><td>23.1</td></tr> </tbody> </table>	DISPENSOR #3								DISPENSOR #4								1	← 1ft →	2	← 1ft →	3	← 1ft →	4		1	← 1ft →	2	← 1ft →	3	← 1ft →	4	23.1		24.6		27.2		25.5		27.4		25.5		27.4		25.4		26.6		19.7	27.1		35.5		34.9		36.7		35.1		36.7		35.1		36.7		35.0		33.9		29.8	24.6		39.4		36.4		41.4		36.8		41.5		36.8		41.5		36.8		41.1		35.5		35.2	14.4		26.3		25.3		28.6		25.7		28.7		25.7		28.7		25.7		28.7		25.6		24.7		24.3	8.8		15.2		16.4		17.4		17.0		17.6		17.2		17.6		17.2		17.6		17.0		17.2		15.9		14.2	6.1		9.4		10.6		11.2		11.1		11.4		11.2		11.4		11.2		11.4		11.3		11.0		10.9		9.8		7.9	7.9		9.8		10.9		11.0		11.3		11.2		11.4		11.2		11.4		11.2		11.1		11.2		10.6		9.4		6.1	14.2		15.9		17.2		17.0		17.6		17.2		17.6		17.2		17.6		17.2		17.0		17.4		16.4		15.2		8.8	24.3		24.7		28.4		25.6		28.7		25.7		28.7		25.7		28.7		25.7		28.7		25.7		28.6		25.3		26.3		14.4	35.2		35.5		41.1		36.7		41.5		36.8		41.5		36.8		41.5		36.8		41.5		36.8		41.4		36.4		39.4		24.6	29.8		33.9		36.3		35.0		36.7		35.1		36.7		35.1		36.7		35.1		36.7		35.1		36.7		34.9		35.5		27.1	19.7		26.6		25.4		27.4		25.5		27.4		25.5		27.4		25.5		27.4		25.5		27.4		25.5		27.2		24.8		23.1
	DISPENSOR #3								DISPENSOR #4																																																																																																																																																																																																																																																																																																																																																													
	1	← 1ft →	2	← 1ft →	3	← 1ft →	4		1	← 1ft →	2	← 1ft →	3	← 1ft →	4																																																																																																																																																																																																																																																																																																																																																							
	23.1		24.6		27.2		25.5		27.4		25.5		27.4		25.4		26.6		19.7																																																																																																																																																																																																																																																																																																																																																			
	27.1		35.5		34.9		36.7		35.1		36.7		35.1		36.7		35.0		33.9		29.8																																																																																																																																																																																																																																																																																																																																																	
	24.6		39.4		36.4		41.4		36.8		41.5		36.8		41.5		36.8		41.1		35.5		35.2																																																																																																																																																																																																																																																																																																																																															
	14.4		26.3		25.3		28.6		25.7		28.7		25.7		28.7		25.7		28.7		25.6		24.7		24.3																																																																																																																																																																																																																																																																																																																																													
	8.8		15.2		16.4		17.4		17.0		17.6		17.2		17.6		17.2		17.6		17.0		17.2		15.9		14.2																																																																																																																																																																																																																																																																																																																																											
	6.1		9.4		10.6		11.2		11.1		11.4		11.2		11.4		11.2		11.4		11.3		11.0		10.9		9.8		7.9																																																																																																																																																																																																																																																																																																																																									
	7.9		9.8		10.9		11.0		11.3		11.2		11.4		11.2		11.4		11.2		11.1		11.2		10.6		9.4		6.1																																																																																																																																																																																																																																																																																																																																									
	14.2		15.9		17.2		17.0		17.6		17.2		17.6		17.2		17.6		17.2		17.0		17.4		16.4		15.2		8.8																																																																																																																																																																																																																																																																																																																																									
	24.3		24.7		28.4		25.6		28.7		25.7		28.7		25.7		28.7		25.7		28.7		25.7		28.6		25.3		26.3		14.4																																																																																																																																																																																																																																																																																																																																							
	35.2		35.5		41.1		36.7		41.5		36.8		41.5		36.8		41.5		36.8		41.5		36.8		41.4		36.4		39.4		24.6																																																																																																																																																																																																																																																																																																																																							
	29.8		33.9		36.3		35.0		36.7		35.1		36.7		35.1		36.7		35.1		36.7		35.1		36.7		34.9		35.5		27.1																																																																																																																																																																																																																																																																																																																																							
	19.7		26.6		25.4		27.4		25.5		27.4		25.5		27.4		25.5		27.4		25.5		27.4		25.5		27.2		24.8		23.1																																																																																																																																																																																																																																																																																																																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="8" style="background-color: #FFD700;">DISPENSOR #2</th> <th colspan="8" style="background-color: #FFD700;">DISPENSOR #1</th> </tr> <tr> <th>4</th><th>← 1ft →</th><th>3</th><th>← 1ft →</th><th>2</th><th>← 1ft →</th><th>1</th><th></th> <th>4</th><th>← 1ft →</th><th>3</th><th>← 1ft →</th><th>2</th><th>← 1ft →</th><th>1</th> </tr> </thead> </table>	DISPENSOR #2								DISPENSOR #1								4	← 1ft →	3	← 1ft →	2	← 1ft →	1		4	← 1ft →	3	← 1ft →	2	← 1ft →	1																																																																																																																																																																																																																																																																																																																																							
DISPENSOR #2								DISPENSOR #1																																																																																																																																																																																																																																																																																																																																																														
4	← 1ft →	3	← 1ft →	2	← 1ft →	1		4	← 1ft →	3	← 1ft →	2	← 1ft →	1																																																																																																																																																																																																																																																																																																																																																								
WING LEADING EDGE																																																																																																																																																																																																																																																																																																																																																																						

Precipitation Type	Snow	Date		Run #	
--------------------	------	------	--	-------	--

* **Field to be manipulated**

Target Rate	25	g/dm ² /h
Duration	5	minutes
Footprint Rate	25	g/dm ² /h
Stdev of Rate	10	g/dm ² /h



Snow needed per 5 minutes		
In each position	84	76
In each Dispenser	336	305

1. Enter "Date" and "Run #".
2. Manipulate desired "Target Rate" for test event.
3. Manipulate desired "Duration" for test event.
4. Prepare "Total Amount of Snow Needed for Entire Test" in grams.
5. Prepare 4 boxes for "Total Amount of Snow in Each Dispenser" in grams. (Each Dispenser must be emptied at 5-minute intervals.)
6. Dictate amount of Snow needed "In each Position" in grams. (Each Position must be emptied at approximately 1-minute intervals.)
7. Once a Position is emptied of its contents (1-minute intervals), move the Dispenser 1-foot to the left.
8. Once a Dispenser has completed its cycle at Position #4, start next cycle at Position #4 and move 1-Foot to the right at (1-minute intervals).

(e.g. Position #1 -> Pos #2 -> Pos #3 -> Pos #4 -> Pos #4 -> Pos #3 -> Pos #2 -> Pos #1 -> Pos #1...)

NOTE:

- Leading Edge (LE): Centre Pole of the Dispenser Stands must be 1-foot (12 inches) from the Leading Edge (LE)
- Trailing Edge (TE): Centre Pole of the Dispenser Stands must be 10-inches from the Trailing Edge (TE) Flap. The use of Dispenser Stand Extension is needed.
- Height of the Stand must be 4-feet from bottom of the dispenser

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Attachment 6: Example Snow Dispensing Form (Manual Method)

Precipitation Type	Sifted Snow	Date	Run #
--------------------	-------------	------	-------

*** Field to be manipulated**

Target Rate	25	g/dm ² /h
Duration	5	minutes

Footprint Rate	25	g/dm ² /h
Stdev of Rate	10	g/dm ² /h

Snow needed per 5 minutes

In each position	66	
In each Dispenser	265	

Snow needed for entire test

In each Dispenser	265	
Total Amount Snow Needed for Entire Test	1062	

1. Enter "Run #".
2. Manipulate desired "Target Rate" for test event.
3. Manipulate desired "Duration" for test event.
4. Prepare "Total Amount of Snow Needed for Entire Test" in grams.
5. Prepare 4 boxes for "Total Amount of Snow in Each Dispenser" in grams. (Each Dispenser must be emptied at 5-minute intervals.)
6. Dictate amount of Snow needed "In each Position" in grams. (Each Position must be emptied at approximately 1-minute intervals.)
7. Once a Position is emptied of its contents (1-minute intervals), move the Dispenser 1-foot to the left.
8. Once a Dispenser has completed its cycle at Position #4, start next cycle at Position #4 and move 1-Foot to the right at (1-minute intervals). (e.g: Position #1 -> Pos #2 -> Pos #3 -> Pos #4 -> Pos #4 -> Pos #3 -> Pos #2 -> Pos #1 -> Pos #1...)

- Since dispensing is done using a sieve, the percentage of snow loss is reduced. This efficiency is estimated at 90%, as per visual analysis in 2009-10.

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Attachment 7: Visual Evaluation Rating Form

VISUAL EVALUATION RATING OF CONDITION OF WING

Date: _____ Run Number: _____

Ratings:

- 1 - Contamination not very visible, fluid still clean.
- 2 - Contamination is visible, but lots of fluid still present
- 3 - Contamination visible, spots of bridging contamination
- 4 - Contamination visible, lots of dry bridging present
- 5 - Contamination visible, adherence of contamination

Note: Ratings can include decimals i.e. 1.4 or 3.5

Before Take-off Run

Area	Visual Severity Rating (1-5)	
Leading Edge		>3 = Review, >3.5=Bad
Trailing Edge		>3 = Review, >3.5=Bad
Flap		>4 = Review, >4.5=Bad

At Rotation

Area	Visual Severity Rating (1-5)	Expected Lift Loss (%)
Leading Edge		>1= Review >1.5 = Bad >5.4 = Review >9.2 = Bad
Trailing Edge		
Flap		

After Take-off Run

Area	Visual Severity Rating (1-5)
Leading Edge	
Trailing Edge	
Flap	

Additional Observations:

OBSERVER: _____

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Attachment 8: Fluid Receipt Form (Electronic Form)

FORM 1
GENERAL FORM FOR RECEIVING FLUID

Receiving Location: APS Site Other: _____ **Date of Receipt:** _____

Fluid Characteristics: Type: _____ Colour: _____ **Date of Production:** _____

Manufacturer: _____ **Batch #:** _____

Fluid Name: _____ **Project Task:** _____

Fluid Quantities / Fluid Brix / Falling Ball Info:

Fluid Dilution: _____	Fluid Dilution: _____	Fluid Dilution: _____
Fluid Code: _____	Fluid Code: _____	Fluid Code: _____
Fluid Quantity: _____ x _____ L = _____ L	Fluid Quantity: _____ x _____ L = _____ L	Fluid Quantity: _____ x _____ L = _____ L
Fluid Brix: _____ °	Fluid Brix: _____ °	Fluid Brix: _____ °
Falling Ball Time: _____ (mm:ss:cs)	Falling Ball Time: _____ (mm:ss:cs)	Falling Ball Time: _____ (mm:ss:cs)
Falling Ball Temp: _____ °C	Falling Ball Temp: _____ °C	Falling Ball Temp: _____ °C
Sample from Container #: _____ of _____	Sample from Container #: _____ of _____	Sample from Container #: _____ of _____

Sample Collection: HOT Fluids: Extract 3 L 100 / 75 / 50 and 2 L Type I
Other Fluids: Extract 2 L 100 / 75 / 50 / Type I

Sample Distribution: Viscosity: 1 L 100 / 75 / 50 to third party or in-house for testing
WSET: 1 L 100 / 75 / 50 / Type I to AMIL for WSET (HOT samples only)
Office: 1 L 100 / 75 / 50 / Type I to be retained in office

Photo Documentation: (take photos of all that apply)

Palette (as received) 100/0 MFR Fluid Label 75/25 MFR Fluid Label 50/50 MFR Fluid Label Type I MFR Fluid Label

Additional Info/Notes: (additional information included on fluid containers, paperwork received, etc.)

Received by: _____ Date: _____ Verified by: _____

Fluid Receipt Form (Dec 2019)

WIND TUNNEL TESTS TO EXAMINE FLUID REMOVED FROM AIRCRAFT DURING TAKEOFF WITH MIXED ICE PELLET PRECIPITATION CONDITIONS

Attachment 9: Log of Fluid Sample Bottles

<i>Date of Extraction</i>	<i>Fluid and Dilution</i>	<i>Batch #</i>	<i>Sample Source (i.e. drum)</i>	<i>Falling Ball Fluid Temp (°C)</i>	<i>Falling Ball Time (sec)</i>	<i>Comments</i>

APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Final Version 1.0/Wind Tunnel 2024-25 Final Version 1.0.docx
Final Version 1.0, December 24

Attachment 10: Procedure – Dry Wing Performance

Background

A significant amount of work has been done in conjunction with NASA and NRC to calibrate and characterize the wind tunnel and airfoil model during the last two winter seasons. This work has further increased the confidence in the data produced; however, ongoing verification is necessary to identify potential changes in the system performance.

Objective

Verify that clean model aerodynamic data agree with the data acquired in previous years with the same model. Given the various issues with repeatability and angle of attack offsets in the past, this is an important step prior to fluids testing.

Methodology

- Ensure the wing is clean and dry.
- Conduct a dry wing test using the regular takeoff profile.
- Conduct a dry wing test using a takeoff profile with rotation to stall.
- Compare lift performance to historical data.
- Address potential discrepancies accordingly.

Test Plan

This testing should be conducted at the start of each testing day.

Attachment 11: Procedure – Type IV Ice Pellet Allowance Time Validation with New Fluids

Background

The Type IV ice pellet allowance times are conservative, generic guidance developed based on data collected using commercially available Type IV fluids. As new fluids are developed and become commercially available, it is important to evaluate these fluids against the current allowance times to ensure the validity of the generic guidance. Systematic “spot-checking” is used to identify any potential issues. In addition, testing is recommended with all fluids available to obtain data close to the fluid LOUT to determine the aerodynamic effects of ice pellet contamination at these colder temperatures.

Objective

To evaluate newly commercialized Type IV fluids against the existing allowance times, and to collect data close to the fluid LOUT.

Methodology

- Conduct testing with any new commercially available Type IV fluids in each of the cells of the ice pellet allowance times table.
- Record lift data, visual observations, and manually collected data.
- Adjust testing plan accordingly based on aerodynamic data collected.
- Weather permitting, conduct testing close to the fluid LOUT (-25 to -30°C) with appropriate conditions to address data gaps.

Test Plan

5.0 days of testing are planned.

Attachment 12: Procedure – Expansion of EG Specific Ice Pellet Allowance Time Table***Background***

Type IV Ice Pellet Allowance Times guidance is developed based on data collected using commercially available Type IV fluids. Historically, Type IV PG and EG fluids have been grouped together; however, testing data has indicated that each type of fluid may have longer Ice Pellet Allowance Times in specific conditions as compared to the other. As of the winter of 2021-22, the Type IV allowance times were split to include separate EG and PG tables, and the EG fluids benefited from longer allowance time based on the data collected. Additional research over the next years led to additional expansion of the allowance times for EG fluids.

The recent Type IV EG expansion work has indicated that there is still potential to expand the allowance times in all conditions, and particularly below -16°C; however, additional data is required to support the preliminary data collected to date.

Objective

To conduct testing to support the further development of the EG Type IV fluid ice pellet allowance time table.

Methodology

- Determine what EG data exists and any potential data gaps which need to be filled. Focus should be on conditions below -10°C and any recently expanded conditions that still have potential for further expansion.
- Conduct testing with commercially available EG Type IV fluids in each of the cells of the ice pellet allowance times table, as required.
- Record lift data, visual observations, and manually collected data.
- Adjust testing plan accordingly based on aerodynamic data collected.

Test Plan

0.8 days of testing is planned.

Attachment 13: Procedure – Expansion of PG Specific Ice Pellet Allowance Time Table***Background***

Type IV Ice Pellet Allowance Times guidance is developed based on data collected using commercially available Type IV fluids. Historically, Type IV PG and EG fluids have been grouped together; however, testing data has indicated that each type of fluid may have longer Ice Pellet Allowance Times in specific conditions as compared to the other. As of the winter of 2021-22, the Type IV allowance times were split to include separate EG and PG tables, and the EG fluids benefited from longer allowance time based on the data collected.

The recent Type IV PG data collected has indicated a good potential for longer allowance times, but there was limited data available in several of the cells in consideration. As such, a more significant data set is required before changes can be considered.

Objective

To conduct testing to support the further development of the PG Type IV fluid ice pellet allowance time table.

Methodology

- Determine what PG data exists and any potential data gaps which need to be filled. Focus should be on conditions below -10°C and any recently expanded conditions that still have potential for further expansion.
- Conduct testing with commercially available PG Type IV fluids in each of the cells of the ice pellet allowance times table, as required.
- Record lift data, visual observations, and manually collected data.
- Adjust testing plan accordingly based on aerodynamic data collected.

Test Plan

2.4 days of testing is planned.

Attachment 14: Procedure – New Allowance Times and General Expansion

Background

Over the years, the ice pellet allowance times have been expanded to include additional conditions, temperature ranges, and fluid types. The current tables are a reflection of the conditions whereby sufficient data was collected to substantiate the guidance provided to operators. There are still conditions where data is either limited or not available that could be suitable areas for development of new guidance material to expand the operational envelope, especially in mixed icing conditions. In addition, new generation fluids may have better performance capabilities and may justify an extension to existing times.

Objective

To conduct testing to support the general expansion of the ice pellet allowance time guidance material to include additional conditions, temperature ranges, and fluid types.

Methodology

- Review historical data to determine which conditions, temperature ranges, and fluid types to target as potential candidates for expansion.
- Conduct testing with commercially available Type IV fluids in each of the cells of the ice pellet allowance times table, as required.
- Consider testing with Type II fluids to target the development of a standalone table.
- Consider testing in conditions identified by the METAR working group.
- Record lift data, visual observations, and manually collected data.
- Adjust testing plan accordingly based on aerodynamic data collected.

Test Plan

0.9 days of testing is planned.

This page intentionally left blank.

APPENDIX C

**HIGH-SPEED TESTING 2024-25 FLUID THICKNESS, TEMPERATURE, AND
BRIX DATA FORMS**

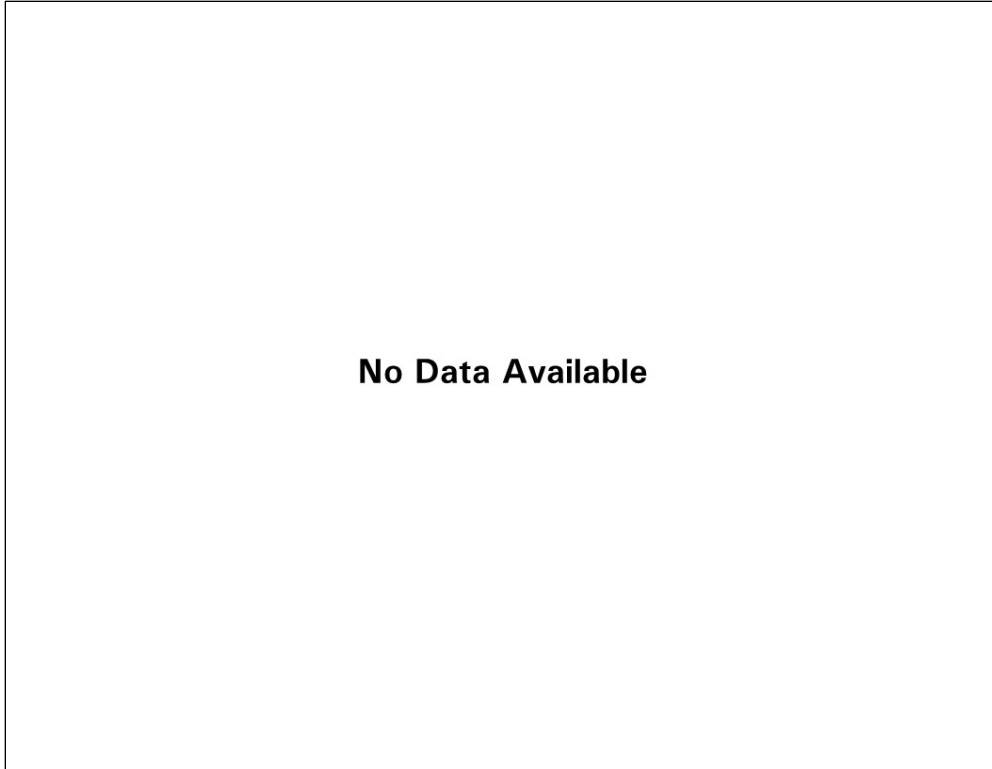


Figure C1: Run #1

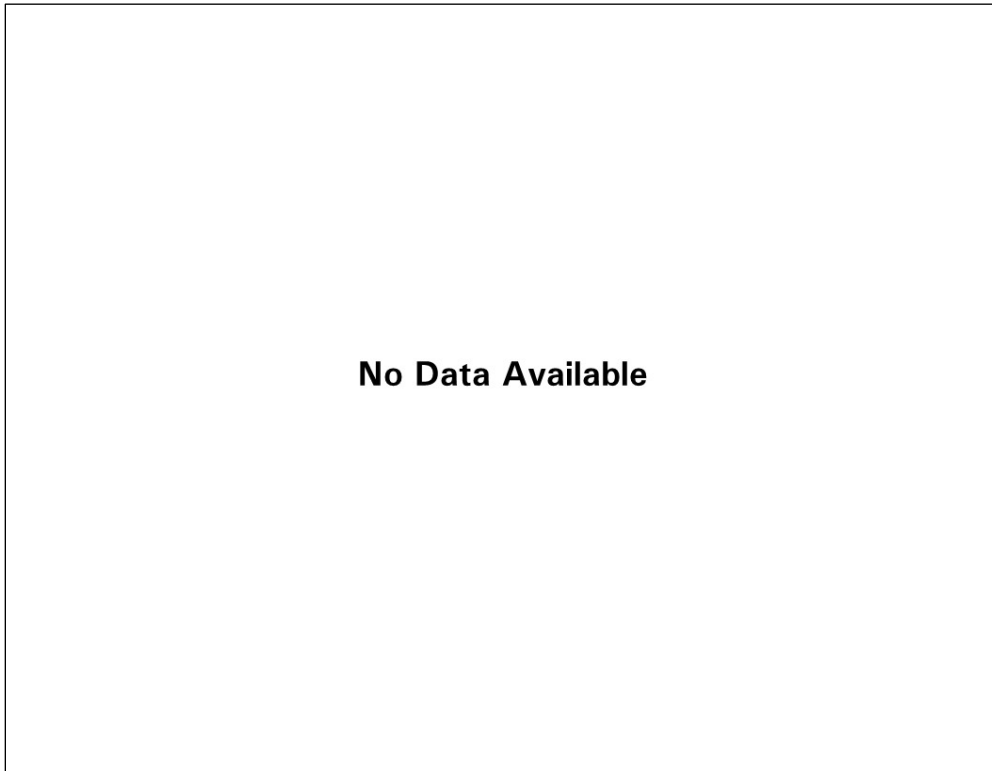


Figure C2: Run #2

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 13, 2025 Run: 5 (P011)

WING TEMPERATURE (Taken From NRC Logger)				FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING					
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	time
T2	-0.7	-2.4	-7.2	-4.6	2	36.75	15.5	-	1				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5 mins
T5	-0.8	-2.5	-7.4	-4.2	8	/	16.75	20	2	119	65	<1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	10 mins
TU	-2.1	-2.1	-4.4	-4.5	Flap	/	9.5	-	3				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	15 mins
Time:	1:56	2:02	2:27	2:40	Time:	2:06	2:26	2:46	4				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20 mins
									5	142	200	<3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	25 mins
									6				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	30 mins
									7				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	35 mins
									8	134	80	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	40 mins
									Flap	40	200	<1	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	45 mins
									Time:	2:06	2:27		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	50 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Observer: BB/MQ

https://starloggroup.sherpoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%2024-25/Procedures/Wind%20Turnin/Supporting%20Data/Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C5: Run #5

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 13, 2025 Run: 6 (P084)

WING TEMPERATURE (Taken From NRC Logger)				FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING					
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	time
T2	-1.8	-2.1	-6.7	-4.6	2	36.25	18.5	21.25	1				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5 mins
T5	-0.7	-2.3	-7.0	-4.2	8	/	17.75	23.75	2	80	158	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	10 mins
TU	-2.4	-2.5	-4.8	-4.5	Flap	/	10	21.5	3				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	15 mins
Time:	3:02	3:08	4:03	4:15	Time:	3:10	4:04	4:21	4				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20 mins
									5	134	200	6	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	25 mins
									6				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	30 mins
									7				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	35 mins
									8	104	158	11	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	40 mins
									Flap	30	134/44	3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	45 mins
									Time:	3:11	4:04	4:21	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	50 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Observer: _____

https://starloggroup.sherpoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%2024-25/Procedures/Wind%20Turnin/Supporting%20Data/Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C6: Run #6

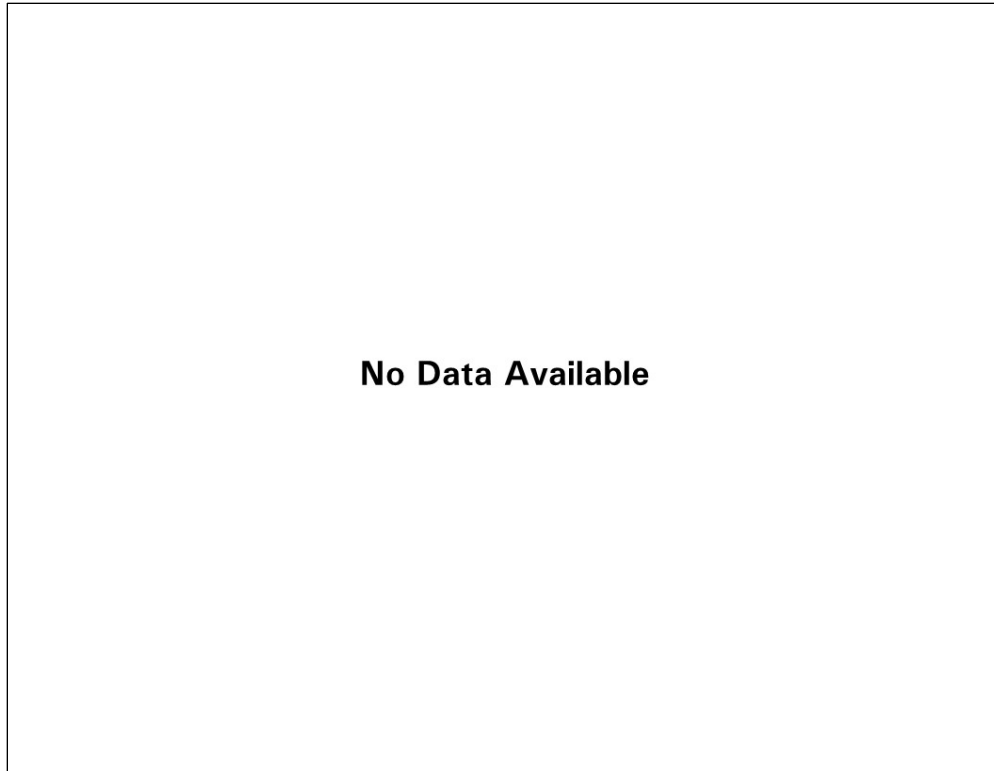


Figure C7: Run #7

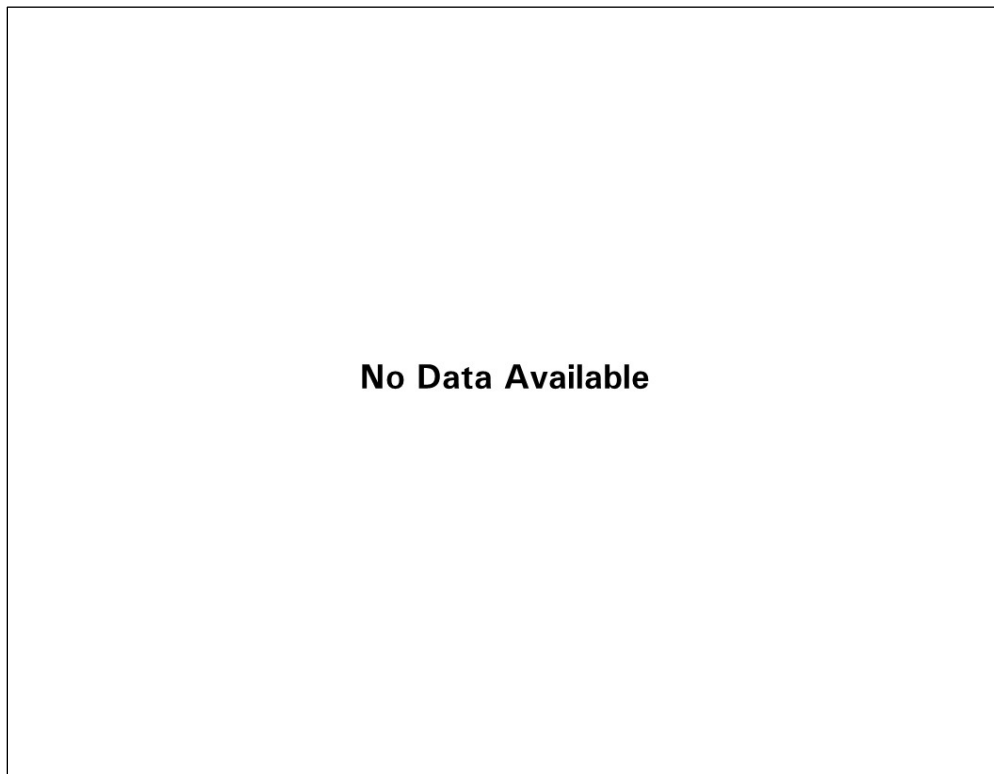


Figure C8: Run #8

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 13, 2025 Run: #9 (E1)

WING TEMPERATURE (Taken From NRC Logger)			
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application / After Takeoff Run
T2	0.2	-1.0	-4.1 / -1.2
T5	0.1	-0.9	-3.4 / -0.7
TU	-0.4	-0.7	-1.3 / -1.6
Time:	21:21	21:27	22:36 / 22:57

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36	14	<1
8	/	14.25	20.5
Flap	/	/	-
Time:	21:30	22:38	22:59

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	150	1
3			
4			
5	127	250	1
6			
7			
8	112	200	11
Flap	30	158	150
Time:	21:30	22:38	22:59

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

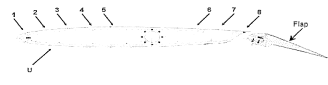
Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap.
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

OBSERVER: BB/MQ

https://staronrmp.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wing%20Tunnel/Supporting%20Data/Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C9: Run #9

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 14, 2025 Run: 10 (E2)

WING TEMPERATURE (Taken From NRC Logger)			
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application / After Takeoff Run
T2	-0.9	-0.7	-4.5 / -2.2
T5	-0.2	-0.3	-3.6 / -1.8
TU	-1.3	-1.2	-2.44 / -2.3
Time:	23:13	23:21	00:20 / 00:34

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.25	12.25	-
8	/	10.5	20
Flap	/	-	-
Time:	23:21	00:20	00:41

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	150	<1
3			
4			
5	127	250	6
6			
7			
8	104	158	10
Flap	28	134	110
Time:	23:21	00:20	00:41

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap.
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

OBSERVER: BB/MQ

https://staronrmp.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%2024-25/Procedures/Wing%20Tunnel/Supporting%20Data/Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C10: Run #10

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 14, 2025 Run: 11 (P449)

WING TEMPERATURE (Taken From NRC Logger)				FLUID BRIX				FLUID THICKNESS (mil)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After fluid Application	After Precip Application	After Takeoff Run
T2	-1.0	-1.9	-4.6	-2.5	2	36.75	18.25	-	1			
T5	-0.5	-1.6	-3.5	-2.1	8		14.75	27.5	2	119	127	< 1
TU	-1.9	-1.8	-2.6	-3.0	Flap			21.25	3			
Time:	01:01	01:08	02:07	02:27	Time:	01:12	02:07	02:27	4			
									5	134	300	4
									6			
									7			
									8	112	150	14
									Flap	30	158.5	4
									Time:	01:12	02:07	02:27

Wing and Plate Condition Before the Takeoff Run Time:

TRAILING EDGE	
8	
7	
6	
5	
4	
3	
2	
1	
LEADING EDGE	

Comments:

Wing and Plate Condition After the Takeoff Run Time:

TRAILING EDGE	
8	
7	
6	
5	
4	
3	
2	
1	
LEADING EDGE	

Comments:

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
Wing Position 6: Approximately 30 cm from trailing edge;
Wing Position 7: Approximately 15 cm from trailing edge;
Wing Position 8: Approximately 2.5 cm from trailing edge; and
Wing Position 9: Midway up the flap.
Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments:

Observer: BB/MQ

https://starongroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C11: Run #11

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 14, 2025 Run: 12 (P081)

WING TEMPERATURE (Taken From NRC Logger)				FLUID BRIX				FLUID THICKNESS (mil)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After fluid Application	After Precip Application	After Takeoff Run
T2	-2.0	-2.2	-9.0	-4.1	2	35.75	13.5	24.5	1			
T5	-1.2	-2.1	-8.3	-3.7	8		16.25	23.25	2	96	200.5	2
TU	-2.4	-2.4	-4.4	-3.8	Flap		9.5	22.5	3			
Time:	02:49	02:55	03:25	03:34	Time:	02:58	03:24	03:34	4			
									5	127	200	7
									6			
									7			
									8	112	158	11
									Flap	28	200.5	5
									Time:	02:54	03:24	03:34

Wing and Plate Condition Before the Takeoff Run Time:

TRAILING EDGE	
8	
7	
6	
5	
4	
3	
2	
1	
LEADING EDGE	

Comments:

Wing and Plate Condition After the Takeoff Run Time:

TRAILING EDGE	
8	
7	
6	
5	
4	
3	
2	
1	
LEADING EDGE	

Comments:

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
Wing Position 6: Approximately 30 cm from trailing edge;
Wing Position 7: Approximately 15 cm from trailing edge;
Wing Position 8: Approximately 2.5 cm from trailing edge; and
Wing Position 9: Midway up the flap.
Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments:

Test ran longer because rate w/ cap was given for snow instead of rate 2.5

Observer: BB/MQ

https://starongroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C12: Run #12

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 14, 2025 Run: 13 (P045)

WING TEMPERATURE (Taken From NRC Logger)			
Wing Position	Before Fluid Application	After Fluid Application	After Takeoff Run
T2	-2.5	-2.9	-4.7
T5	-1.8	-2.8	-4.0
TU	-3.1	-3.0	-4.1
Time:	03:51	03:58	04:20

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	30.75	15.75	23.5
8	/	20.75	25.0
Flap	/	15.25	25.25
Time:	04:20	04:20	04:35

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	96	300.5	7
3			
4			
5	127	200	12
6			
7			
8	112	200.5	12
Flap	26	158.5	9
Time:	04:00	04:20	04:35

CYCLE TRACKING				
1	2	3	4	Time
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	10 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	15 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	25 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Undercar: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

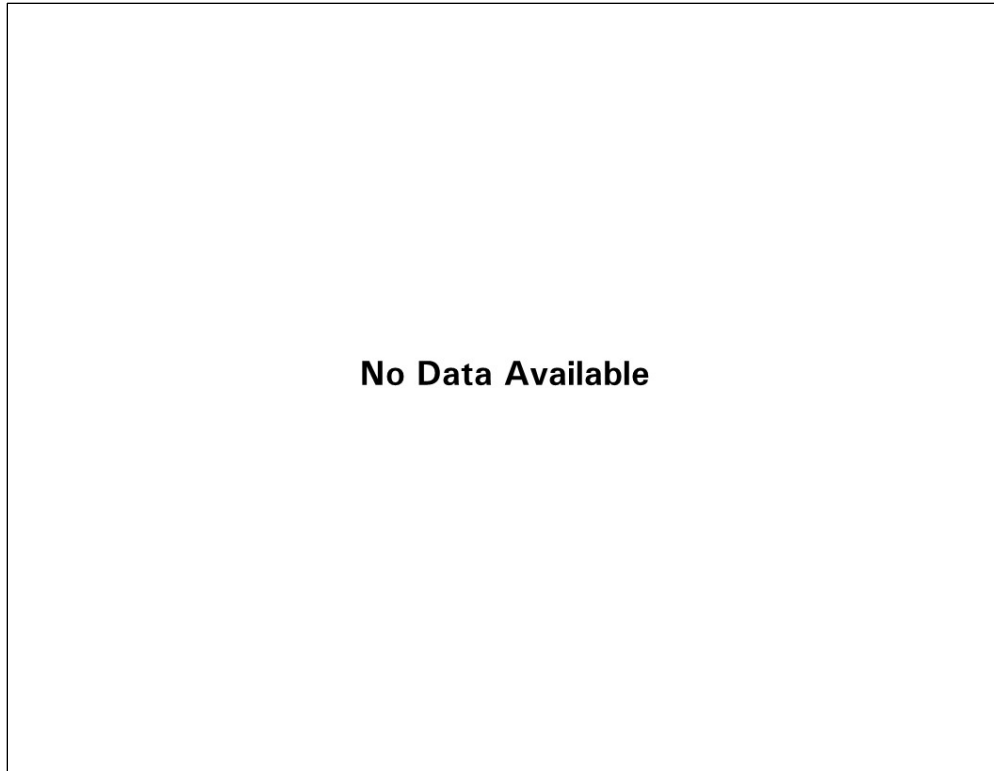
OBSERVER: BB/MQ

https://starlingroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Reports/Win/Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20v.0

Figure C13: Run #13

No Data Available

Figure C14: Run #14



No Data Available

Figure C15: Run #15

FLUID THICKNESS, TEMPERATURE AND BRUX FORM

Date: Jan 14, 2025 Run: 16 (P048)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
TZ	-4.0	-3.34	-8.6	-7.4
TS	-3.7	-3.31	-8.3	-7.2
TU	-4.6	-4.63	-7.1	-7.1
Time:	21:07	21:19	22:09	22:21

FLUID BRUX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	38.5	20.75	26.25
8	✓	17.5	27.25
Flap	✓	15.25	26.0
Time:	21:17	22:10	22:25

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	158	8
3			
4			
5	119	200	11
6			
7			
8	96	158	9
Flap	30	200/51	9
Time:	21:17	22:10	22:25

CYCLE TRACKING																				
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Wing and Plate Condition Before the Takeoff Run

Time: _____

TRAILING EDGE	
Flap	8
7	
6	
5	
4	
3	
2	
1	

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run

Time: _____

TRAILING EDGE	
Flap	8
7	
6	
5	
4	
3	
2	
1	

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.

Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.

Wing Position 6: Approximately 25 cm from trailing edge.

Wing Position 7: Approximately 15 cm from trailing edge.

Wing Position 8: Approximately 2.5 cm from trailing edge, and

Wing Position 9: Midway up the flap.

Undercarriage: Approximately 48 cm up from the leading edge stagnation point.

General Comments: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

OBSERVER: BB/MG

https://elabgroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Proceedings/Wind%20Tunnel/Supporting%20Data/Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brux%20Form%20Version%201.0

Figure C16: Run #16

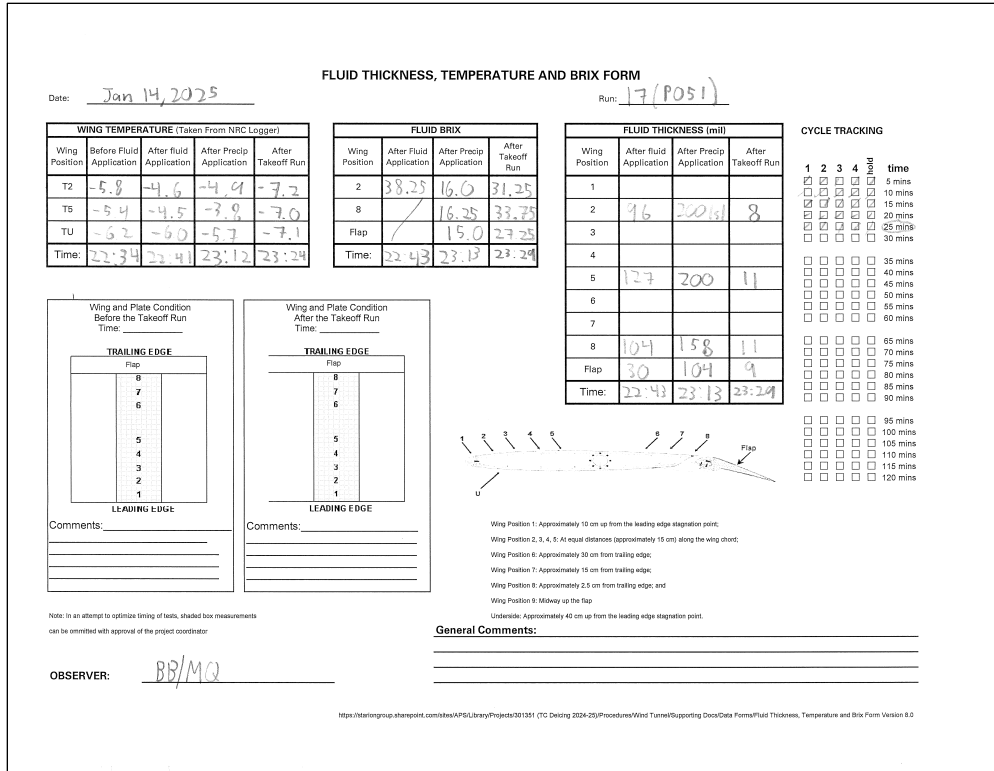


Figure C17: Run #17

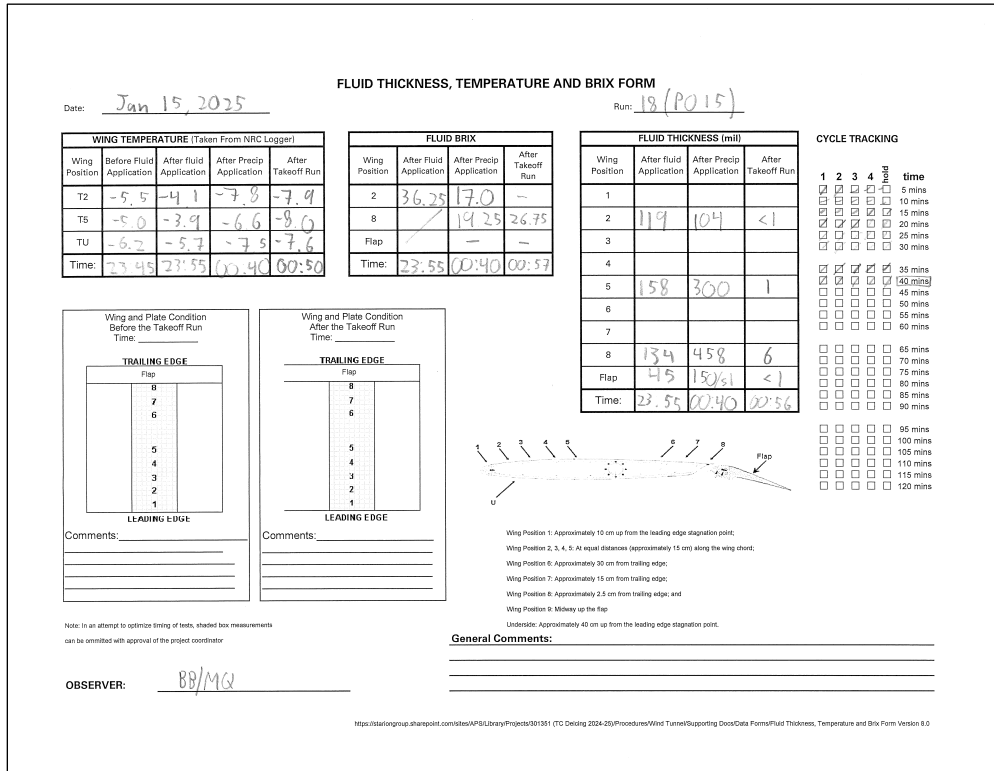


Figure C18: Run #18

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 15, 2025 Run: 19 (P087)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run
T2	-6.6	-5.3	-6.5	-8.6
T5	-6.4	-5.3	-5.2	-8.4
TU	-7.4	-7.3	-7.6	-8.1
Time:	01:15	01:25	01:56	02:06

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	26.5	17.75	28.0
8	/	23.0	31.0
Flap	/	17.5	25.75
Time:	01:25	01:56	02:12

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	96	200/s	8
3			
4			
5	142	250	11
6			
7			
8	119	158	8
Flap	30	134/s	5
Time:	01:25	01:56	2:12

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE	
Flap	
8	
7	
6	
5	
4	
3	
2	
1	
LEADING EDGE	

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE	
Flap	
8	
7	
6	
5	
4	
3	
2	
1	
LEADING EDGE	

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Observer: BB/MQ

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

[https://starlogroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC Deicing 2024-25/Procedures/Wind Tunnel/Supporting Data/Forms/Fluid Thickness, Temperature and Brix Form Version 8.0](https://starlogroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0)

Figure C19: Run #19

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 15, 2025 Run: 20 (P089)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run
T2	-7.9	-6.3	-12.7	-9.3
T5	-7.7	-6.0	-11.0	-8.9
TU	-8.2	-8.1	-9.1	-9.2
Time:	2:24	2:29	2:50	3:01

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.75	25.25	26.5
8	/	26.75	28
Flap	/	24.5	27.25
Time:	02:33	2:51	3:06

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	96	200/s	5
3			
4			
5	142	200	11
6			
7			
8	119	158	14
Flap	35	150/s	8
Time:	2:33	2:51	3:06

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE	
Flap	
8	
7	
6	
5	
4	
3	
2	
1	
LEADING EDGE	

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE	
Flap	
8	
7	
6	
5	
4	
3	
2	
1	
LEADING EDGE	

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Observer: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

[https://starlogroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC Deicing 2024-25/Procedures/Wind Tunnel/Supporting Data/Forms/Fluid Thickness, Temperature and Brix Form Version 8.0](https://starlogroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0)

Figure C20: Run #20

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 15, 2025 Run: 21 (P024)

Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
T2	-8.3	-6.6	-4.4	-4.2
TS	-7.8	-6.4	-3.4	-4.7
TU	-8.7	-6.7	-1.4	-4.7
Time:	3:21	3:27	4:08	4:18

Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.5	24.75	-
8	/	21.75	24.0
Flap	/	-	26.75
Time:	3:31	4:08	4:24

Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
1			
2	119	200/6	<1
3			
4			
5	158	300	7
6			
7			
8	130	150	8
Flap	45	250/6	2
Time:	3:31	4:08	4:24

1	2	3	4	time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap.
 Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

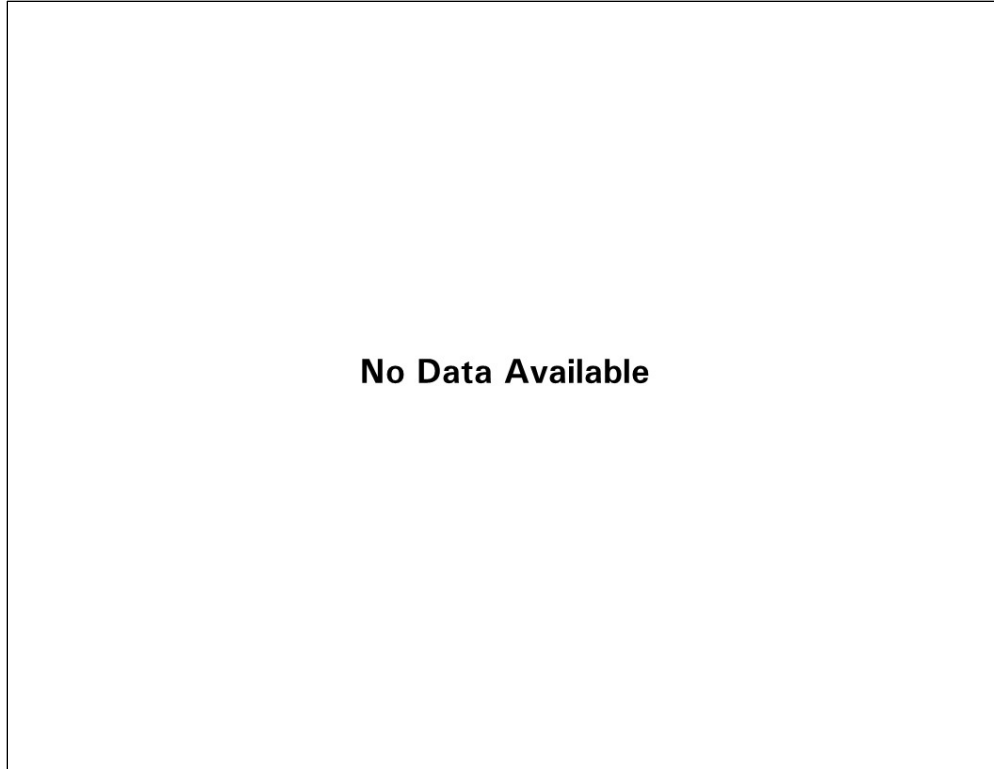
Observer: BB/MQ

https://sharepoint.com/sites/APSLibrary/Projects/301351/TC/Deicing/2024-25/Procedures/Wind Tunnel/Supporting Docs/Data Forms/Fluid Thickness, Temperature and Brx Form Version 8.0

Figure C21: Run #21

No Data Available

Figure C22: Run #22



No Data Available

Figure C23: Run #23

FLUID THICKNESS, TEMPERATURE AND BRUX FORM

Date: Jan 15, 2023 Run: 24 (P012)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run
T2	-4.5	-5.1	-10.6	-7.6
T5	-4.2	-4.7	-10.4	-7.5
TU	-4.6	-4.6	-8.7	-7.3
Time:	21:07	21:12	22:28	22:38

FLUID BRUX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.75	17.5	-
8	19.0	19.5	-
Flap	-	26.5	-
Time:	21:17	22:24	22:42

FLUID THICKNESS (mil)			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
1			
2	119	96	<1
3			
4			
5	159	300	<1
6			
7			
8	134	127	8
Flap	40	104/61	1
Time:	21:17	22:24	22:42

CYCLE TRACKING

1	2	3	4	5	6	7	8	9	Flap	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
Wing Position 6: Approximately 30 cm from trailing edge.
Wing Position 7: Approximately 15 cm from trailing edge.
Wing Position 8: Approximately 2.5 cm from trailing edge; and
Wing Position 9: Midway up the flap.
Undercarriage: Approximately 42 cm up from the leading edge stagnation point.

General Comments: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

OBSERVER: BB/MQ

C:\external\quartz\Downloads\Fuild Thickness, Temperature and Brux Form Version 8.0

Figure C24: Run #24

FLUID THICKNESS, TEMPERATURE AND BRUX FORM

Date: Jan 15, 2025 Run: 25 (P085)

WING TEMPERATURE (Taken From NRC Logger)			
Wing Position	Before Fluid Application	After Fluid Application	After Takeoff Run
T2	-5.1	-4.9	-9.5
T5	-4.4	-4.7	-8.7
TU	-5.9	-5.4	-7.0
Time:	22:54	23:03	23:47

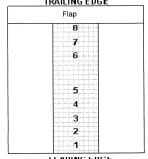
FLUID BRUX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.25	19.0	25.5
8	/	21.0	23.0
Flap	/	11.5	24.5
Time:	23:02	23:46	00:00

FLUID THICKNESS (mil)			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
1			
2	96	250/si	8
3			
4			
5	134	250	10
6			
7			
8	119	158	12
Flap	35	150/si	7
Time:	23:03	23:47	00:00

CYCLE TRACKING				
1	2	3	4	Time
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	10 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	15 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	25 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	30 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	35 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	40 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	45 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	50 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	55 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	60 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	65 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	70 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	75 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	80 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	85 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	90 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	95 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	100 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	105 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	110 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	115 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE

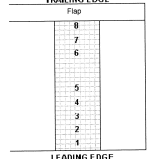


LEADING EDGE

Comments: _____

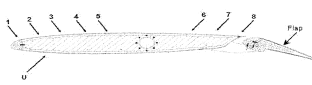
Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE



LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap.
 Undercar: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Observer: BB/MQ

C:\Users\hotel\guest\Downloads\Fluid Thickness, Temperature and Brux Form Version 8.0

Figure C25: Run #25

FLUID THICKNESS, TEMPERATURE AND BRUX FORM

Date: Jan 16, 2025 Run: 26 (P049)

WING TEMPERATURE (Taken From NRC Logger)			
Wing Position	Before Fluid Application	After Fluid Application	After Takeoff Run
T2	-4.2	-5.0	-8.5
T5	-3.4	-5.0	-8.0
TU	-4.6	-4.5	-6.6
Time:	00:12	00:16	00:14

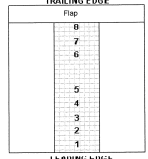
FLUID BRUX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	37.25	18.25	25.25
8	/	15.5	23.0
Flap	/	13.75	24.25
Time:	00:21	1:04	1:19

FLUID THICKNESS (mil)			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
1			
2	80	300	8
3			
4			
5	112	200	11
6			
7			
8	104	158	20
Flap	30	158/si	11
Time:	00:21	1:04	1:19

CYCLE TRACKING				
1	2	3	4	Time
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	5 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	10 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	15 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	20 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	25 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	30 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	35 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	40 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	45 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	50 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	55 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	60 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	65 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	70 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	75 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	80 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	85 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	90 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	95 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	100 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	105 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	110 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	115 mins
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE

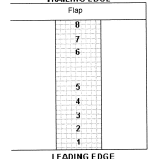


LEADING EDGE

Comments: _____

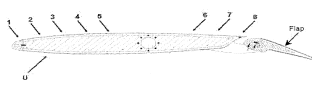
Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE



LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap.
 Undercar: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Observer: BB/MQ

C:\Users\hotel\guest\Downloads\Fluid Thickness, Temperature and Brux Form Version 8.0

Figure C26: Run #26

FLUID THICKNESS, TEMPERATURE AND BRUX FORM

Date: Jan 16, 2025 Run: 27 (P03)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
T2	-4.3	-4.6	-10.2	-7.6
T5	-3.6	-4.6	-10.6	-7.5
TU	-5.0	-4.9	-8.0	-7.2
Time:	1:31	1:38	2:36	2:45

FLUID BRUX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.25	11.25	-
8	/	15.75	21.0
Flap	/	8.0	-
Time:	1:41	2:36	2:50

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	17	250/61	<1
3			
4			
5	124	300	1
6			
7			
8	142	150	1
Flap	35	209/61	<1
Time:	1:41	2:36	2:50

CYCLE TRACKING					
1	2	3	4	5	time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run

Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run

Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap
 Underside: Approximately 40 cm up from the leading edge stagnation point.

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

OBSERVER: BB/MQ

C:\Users\winif\OneDrive\Downloads\Fluid Thickness, Temperature and Brux Form Version 8.0

Figure C27: Run #27

FLUID THICKNESS, TEMPERATURE AND BRUX FORM

Date: Jan 16, 2025 Run: 28 (E3)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
T2	-4.5	-5.1	-10.4	-6.7
T5	-3.5	-4.9	-9.9	-6.4
TU	-5.1	-4.9	-7.0	-6.4
Time:	3:11	3:16	3:47	3:55

FLUID BRUX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	38.5	15.25	28.0
8	/	22.0	26.25
Flap	/	15	26.5
Time:	3:20	3:48	4:04

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	90	259/61	6
3			
4			
5	127	300/61	14
6			
7			
8	96	200/61	11
Flap	28	200/61	7
Time:	3:20	3:48	4:04

CYCLE TRACKING					
1	2	3	4	5	time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run

Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run

Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap
 Underside: Approximately 40 cm up from the leading edge stagnation point.

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

OBSERVER: BB/MQ

https://nrlgroup.sharepoint.com/sites/APSLibrary/Projects/201151/TC%20Deicing%202024-25/Procedures/Wing%20Turn/Supporting%20Docs/Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brux%20Form%20Version%208.0

Figure C28: Run #28

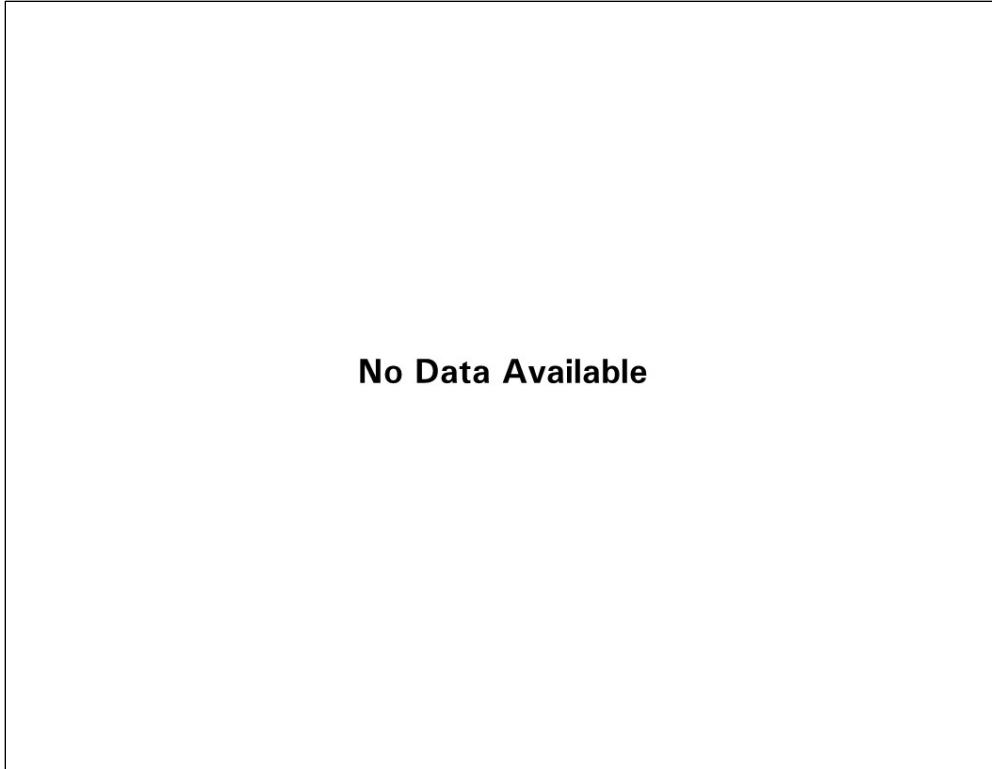


Figure C29: Run #29

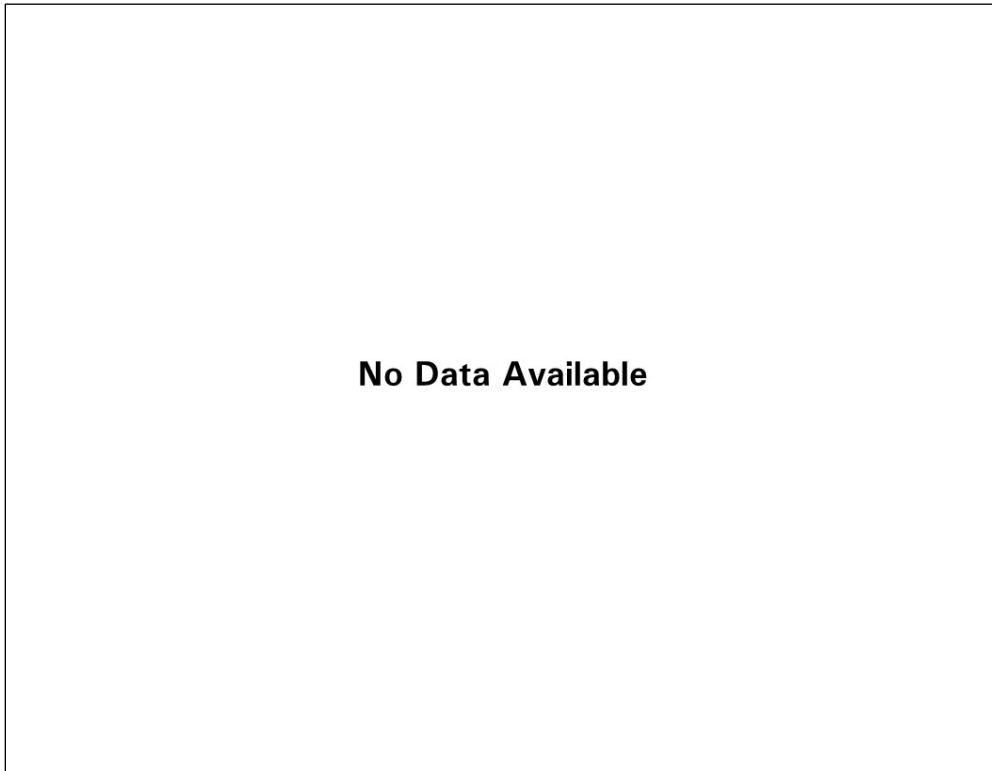


Figure C30: Run #30

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 17, 2025 Run: 35 (p418)

WING TEMPERATURE (Taken From NRC Logger)			
Wing Position	Before Fluid Application	After Fluid Application	After Takeoff Run
T2	-2.2	-3.1	-4.8
T5	-1.4	-3.1	-4.8
TU	-2.7	-2.6	-4.4
Time:	3:20	3:27	4:18

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.0	14.75	-
8	-	15.75	23.5
Flap	-	-	21.75
Time:	3:32	4:19	4:32

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	112	112	<1
3			
4			
5	142	250	9
6			
7			
8	112	158	11
Flap	29	158/2	7
Time:	3:32	4:19	4:32

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 25 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap.
 Inlet side: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

OBSERVER: BB/MQ

https://testgroup.sherpoint.com/test/APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wind Tunnel/Supporting Docs/Data Forms/Fluid Thickness, Temperature and Brix Form Version 2.0

Figure C35: Run #35

No Data Available

Figure C36: Run #36

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 19, 2025 Run: 39 (P020)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run
T2	-10.1	-7.8	-12.4	-12.2
T5	-9.2	-7.1	-12.4	-12.1
TU	-10.1	-9.6	-11.1	-11.4
Time:	22:11	22:17	23:33	23:41

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.75	19.5	-
8	/	19.25	23.5
Flap	/	13.0	26.15
Time:	22:22	23:33	23:46

FLUID THICKNESS (mil)			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
1			
2	112	119	<1
3			
4			
5	158	308	7
6			
7			
8	158	134	11
Flap	40	159/61	1
Time:	22:22	23:33	23:46

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Underwing: Approximately 40 cm up from the leading edge stagnation point.

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator

Observer: BB/MO

https://airlogsup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%2024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%200.0

Figure C39: Run #39

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 20, 2025 Run: 40 (P021)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run
T2	-9.7	-8.5	-14.4	-13.3
T5	-9.1	-7.9	-13.8	-13.0
TU	-10.4	-10.2	-11.7	-12.3
Time:	23:56	00:04	00:41	0:50

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.75	20.0	-
8	/	24.25	25.0
Flap	/	10.5	25.25
Time:	0:07	0:41	0:55

FLUID THICKNESS (mil)			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
1			
2	119	127	<1
3			
4			
5	158	250	6
6			
7			
8	158	142	11
Flap	40	127/61	3
Time:	0:07	0:41	00:55

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Underwing: Approximately 40 cm up from the leading edge stagnation point.

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator

Observer: BB/MO

https://airlogsup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%2024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%200.0

Figure C40: Run #40

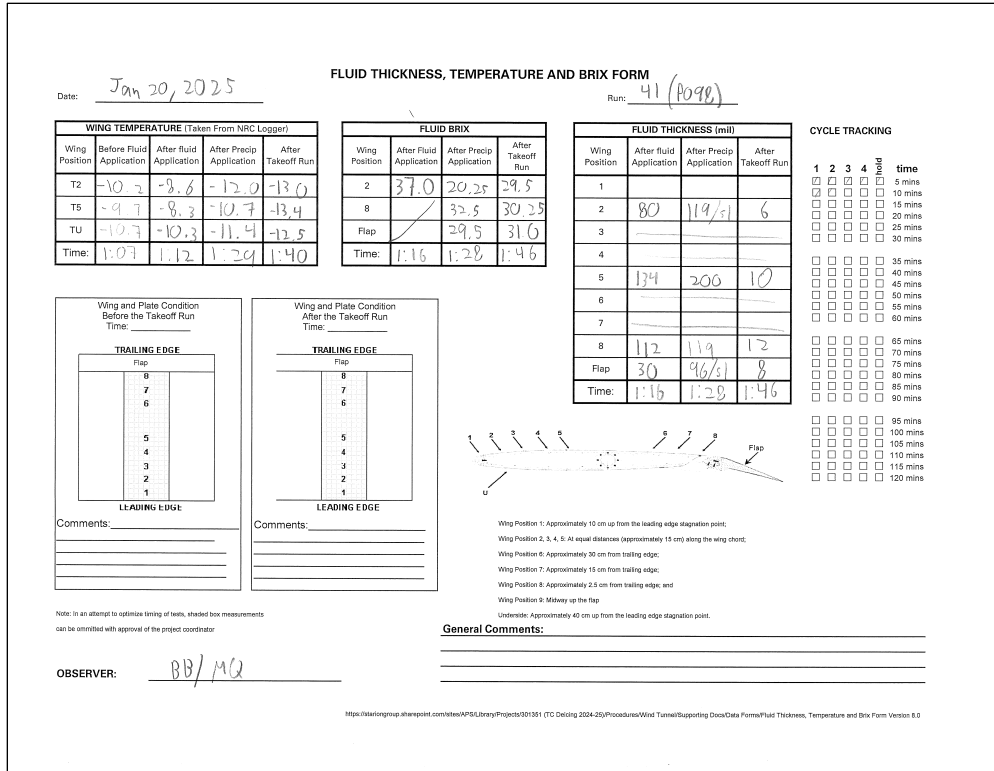


Figure C41: Run #41

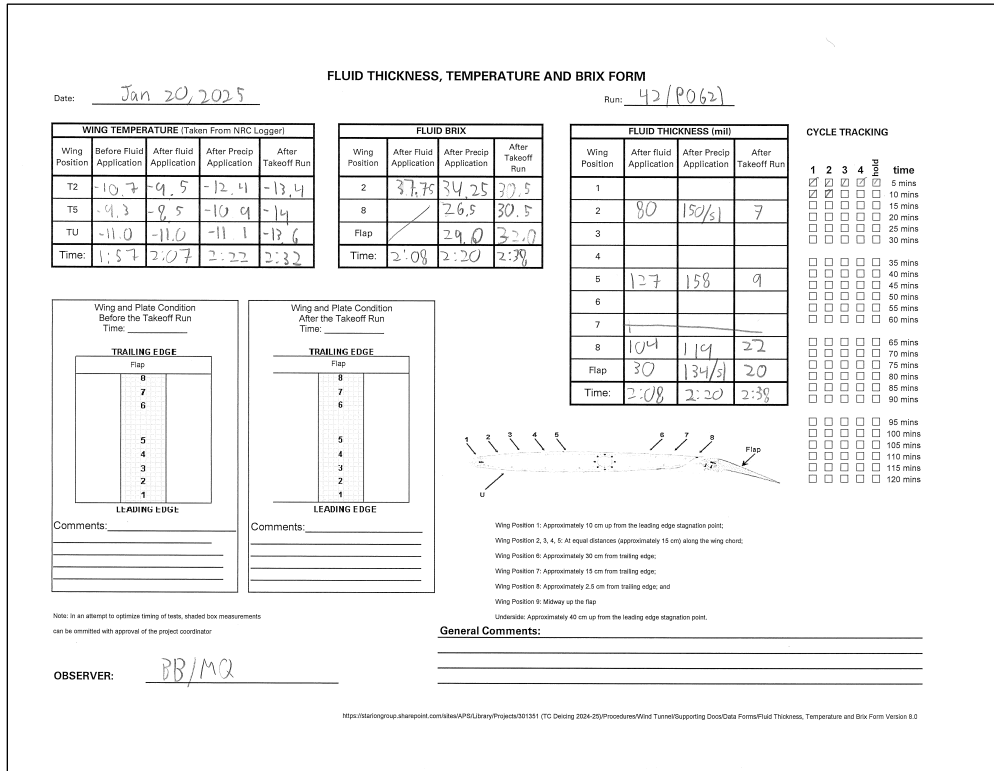


Figure C42: Run #42

1P - -15/-15

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 20, 2025 Run: 43 (P063)

WING TEMPERATURE (Taken From NRC Logger)					FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	Time
T2	-11.4	-10.2	-13.8	-14.4	2	39.5	24.75	29.5	1				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
T5	-11.1	-8.9	-13.3	-14.8	8	/	30.0	32.5	2	80	142	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
TU	-11.7	-11.6	-12.7	-14.1	Flap	/	25.0	32.75	3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
Time:	3:03	3:08	3:43	3:53	Time:	3:12	3:43	4:01	4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
									5	119	158	7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
									6				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
									7				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
									8	96	127	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
									Flap	30	142/1	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
									Time:	3:12	3:43	4:01	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap.
 Underlid: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

OBSERVER: BB/ML

https://starlinggroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data/Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C43: Run #43

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 20, 2025 Run: 44 (R072)

WING TEMPERATURE (Taken From NRC Logger)					FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	Time
T2	-12.3	-11.1	/	-13.4	2	39.5	/	/	1				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
T5	-11.9	-10.4	/	-14.7	8	/	/	/	2	80		7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
TU	-12.9	-12.7	/	-14.0	Flap	/	/	/	3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
Time:	4:10	4:17		4:27	Time:	4:18			4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
									5	127		12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
									6				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
									7				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
									8	104		18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
									Flap	28		7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
									Time:	4:18		4:31	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap.
 Underlid: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

OBSERVER: _____

https://starlinggroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data/Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C44: Run #44

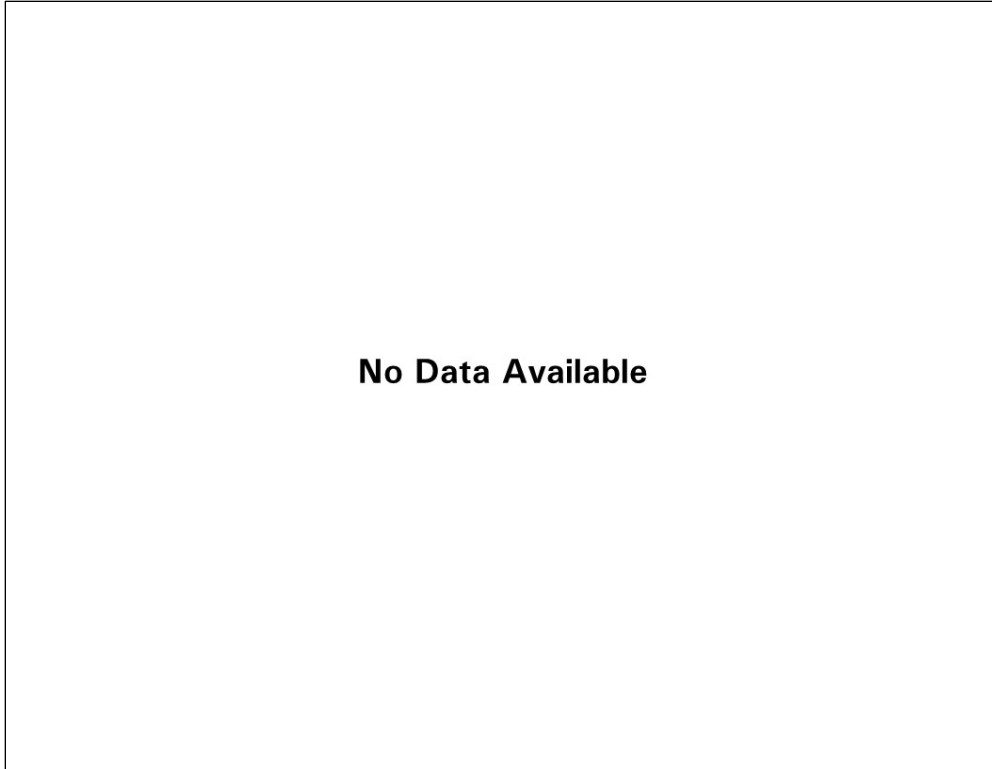


Figure C45: Run #45

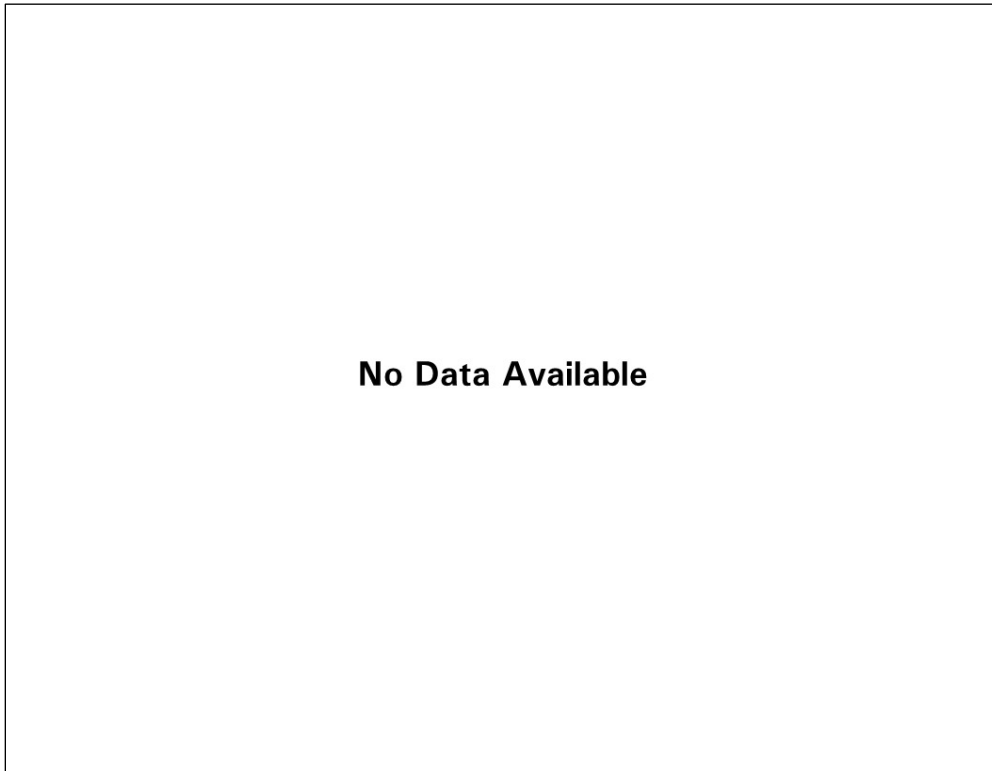


Figure C46: Run #46

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 20, 2025 Run: 47 (P099)

WING TEMPERATURE (Taken From NRC Logger)					FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	total time
T2	-10.7	-11.1	-13.0	-15.2	2	37.25	24.0	24.75	1				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
T5	-9.6	-10.4	-12.4	-15.2	8	/	27.5	29.5	2	80	134	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
TU	-10.8	-11.2	-11.8	-14.2	Flap	/	21.0	27.5	3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
Time:	21:15	21:23	21:54	22:04	Time:	21:24	21:55	22:11	4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
									5	119	200	8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
									6				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
									7				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
									8	104	172	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
									Flap	26	127/si	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
									Time:	21:24	21:55	22:11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Underline: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator

OBSERVER: BB/MG

https://starlogroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data/Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C47: Run #47

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 21, 2025 Run: 48 (P365)

WING TEMPERATURE (Taken From NRC Logger)					FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	total time
T2	-10.4	-11.1	-12.3	-15.5	2	37.25	22.75	24.0	1				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
T5	-9.8	-10.8	-11.8	-15.3	8	/	22.0	22.25	2	80	127	12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
TU	-11.7	-11.8	-11.8	-15.2	Flap	/	17.75	25.75	3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
Time:	22:33	22:40	23:35	23:44	Time:	22:42	22:34	23:52	4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
									5	95	200	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
									6				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
									7				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
									8	80	134	11	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
									Flap	20	158/si	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
									Time:	22:42	22:34	23:52	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Underline: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator

OBSERVER: BB/MG

https://starlogroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data/Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C48: Run #48

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 21, 2025 Run: 49 (P200)

WING TEMPERATURE (Taken From NRC Logger)					FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	Time
T2	-11.6	-11	-12.5	-14.4	2	32.25	14.0	-	1				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
T5	-10.7	-10.5	-13.7	-14.3	8	/	18.75	21.5	2	119	158/61	<1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
TU	-12.0	-11.7	-13.5	-13.9	Flap	/	11.0	23.5	3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
Time:	0:10	0:20	1:52	2:01	Time:	0:21	1:52	2:07	4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
									5	134	250	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
									6				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
									7				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
									8	112	127	5	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
									Flap	20	250/3	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
									Time:	0:21	1:52	2:07	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE	
Flap	Wing
8	
7	
6	
5	
4	
3	
2	
1	

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE	
Flap	Wing
8	
7	
6	
5	
4	
3	
2	
1	

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

OBSERVER: BB/MQ

https://airwinggroup.ahepoint.com/htw/APSLibrary/Projects/301351 (TC Deicing 2024-25)/Procedures/Wing Tunnel/Supporting Docs/Data Forms/Fluid Thickness, Temperature and Brix Form Version 8.0

Figure C49: Run #49

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 21, 2025 Run: 50 (P028)

WING TEMPERATURE (Taken From NRC Logger)					FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	Time
T2	-12.2	-12.5	-16.7	-15.0	2	36.5	18.5	-	1				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
T5	-11.4	-12.2	-15.1	-14.5	8	/	23.25	23.25	2	80	119	<1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
TU	-13.0	-12.9	-13.99	-14.2	Flap	/	14.25	28.0	3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
Time:	2:36	2:42	3:12	3:22	Time:	2:45	3:13	3:27	4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
									5	114	200	2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
									6				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
									7				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
									8	127	134	6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
									Flap	30	104/3	1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
									Time:	2:45	3:13	3:27	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
													<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE	
Flap	Wing
8	
7	
6	
5	
4	
3	
2	
1	

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE	
Flap	Wing
8	
7	
6	
5	
4	
3	
2	
1	

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

OBSERVER: BB/MQ

C:\Users\h0161\OneDrive\Fluid Thickness, Temperature and Brix Form Version 8.0

Figure C50: Run #50

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jun 21, 2025 Run: 51 (PO64)

WING TEMPERATURE (Taken From NRC Logger)			
Wing Position	Before Fluid Application	After fluid Application	After Precip Application
T2	-13.0	-12.2	-15.4
T5	-12.0	-11.6	-13.4
TU	-13.6	-13.5	-13.8
Time:	3:41	3:49	4:07

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	38.75	27.75	30.75
8		32.0	30.5
Flap		25.25	32.5
Time:	3:50	4:08	4:22

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	119	10
3			
4			
5	119	158	12
6			
7			
8	112	119	22
Flap	30	127/31	14
Time:	3:50	4:08	4:22

Wing and Plate Condition Before the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

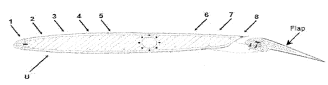
Wing and Plate Condition After the Takeoff Run
Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap
 Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

CYCLE TRACKING

1	2	3	4	5	time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

OBSERVER: BB/MQ

C:\Users\whit\quest\Downloads\Fluid Thickness, Temperature and Brix Form Version 8.0

Figure C51: Run #51

No Data Available

Figure C52: Run #52

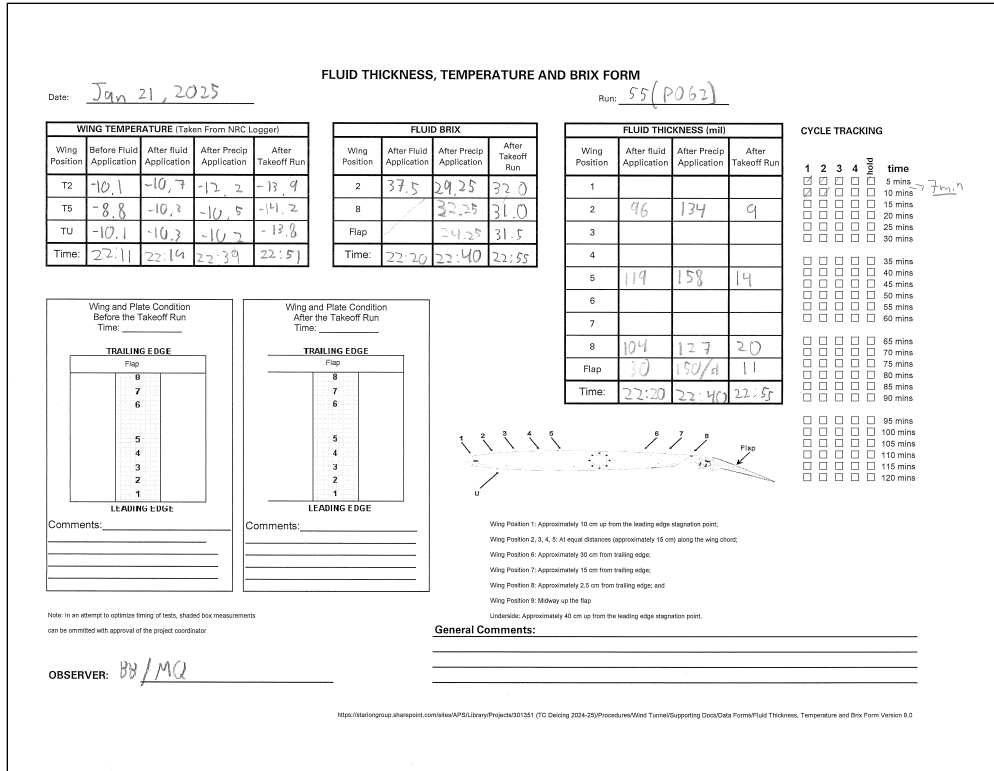


Figure C55: Run #55

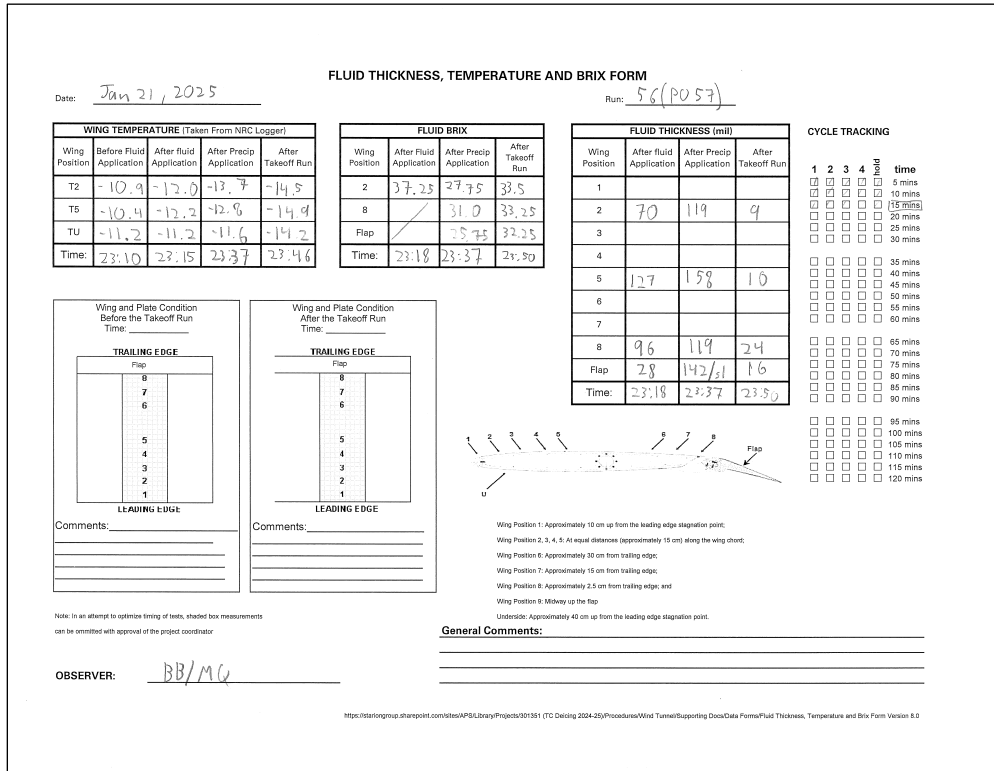


Figure C56: Run #56

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 22, 2025 Run: 57 (P071)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run
T2	-12.2	-13.1		-13.9
TS	-11.9	-12.9		-14.0
TU	-12.6	-12.3		-13.2
Time:	23:57	00:02		00:15

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	37.5		39.5
8			
Flap			
Time:	00:05		0:19

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80		9
3			
4			
5	127		10
6			
7			
8	96		18
Flap	26		9
Time:	00:05		0:19

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Underline: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator

OBSERVER: BB/MG

https://starloggroup.sharepoint.com/sites/APSLibrary/Project/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C57: Run #57

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 22, 2025 Run: 58 (P093)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run
T2	-11.3	-12.6	-14.4	-14.1
TS	-11.1	-12.6	-13.3	-14.3
TU	-11.2	-11.0	-13.1	-13.6
Time:	00:35	00:40	1:01	1:12

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.5	20.5	
8		28.75	
Flap		22.0	
Time:	0:43	1:02	

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	127	
3			
4			
5	119	158	
6			
7			
8	96	134	
Flap	26	150/61	
Time:	0:44	1:02	

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

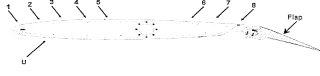
Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

Flap
8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Underline: Approximately 40 cm up from the leading edge stagnation point.

General Comments: Wing was cleaned before post measurements were taken.

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator

OBSERVER: BB/MG

https://starloggroup.sharepoint.com/sites/APSLibrary/Project/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C58: Run #58

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 22, 2025 Run: 54 (R93)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
T2	-12.1	-12.3	-15.3	-14.8
T5	-11.2	-11.4	-13.7	-14.9
TU	-12.3	-12.3	-12.7	-14.1
Time:	1:34	1:44	2:01	2:11

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.75	25.25	29.75
8		25.75	28.5
Flap		24.25	30.75
Time:	1:43	2:01	2:16

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	119	6
3			
4			
5	119	158	7
6			
7			
8	96	134	18
Flap	24	46/51	7
Time:	1:43	2:01	2:16

CYCLE TRACKING					
1	2	3	4	5	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

General Comments:

OBSERVER: BB/MG

https://starlinggroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C59: Run #59

IP #00 - 15/12

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 22, 2025 Run: 60 (R05)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
T2	-12.7	-13.3	-16.6	-15.1
T5	-12.4	-12.6	-15.3	-15.1
TU	-13.7	-13.6	-14.1	-14.4
Time:	2:35	2:39	2:57	3:05

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	37.75	34.25	31.75
8		32	31.75
Flap		29	33.5
Time:	2:44	2:56	3:10

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	158/51	8
3			
4			
5	127	200	8
6			
7			
8	80	134	10
Flap	28	158/51	9
Time:	2:44	2:56	3:10

CYCLE TRACKING					
1	2	3	4	5	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

General Comments:

OBSERVER: BB/MG

https://starlinggroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wind%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C60: Run #60

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 22, 2025 Run: 61(X2)

WING TEMPERATURE (Taken From NRC Logger)					FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	Time
T2	-12.0	-13.2	-16.5	-15.3	2	37.5	23.5	31.0	1				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
T5	-12.6	-12.0	-14.3	-14.4	8	/	34.5	29.75	2	80	119	10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
TU	-12.9	-12.9	-13.3	-14.9	Flap	/	25.5	34.0	3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
Time:	3:30	3:35	3:47	3:58	Time:	3:34	3:48	4:01	4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
									5	127	159	9	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
									6				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
									7	82			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
									8	96	119	20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
									Flap	22	142/1	14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
									Time:	3:39	3:48	4:01	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap.
 Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Observer: BB/MQ

https://airwinggroup.sharepoint.com/sites/APSL/Lists/Projects/301351/TC%20Deicing%202024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C61: Run #61

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 22, 2025 Run: 62(P108)

WING TEMPERATURE (Taken From NRC Logger)					FLUID BRIX				FLUID THICKNESS (mil)				CYCLE TRACKING				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	Wing Position	After Fluid Application	After Precip Application	After Takeoff Run	1	2	3	4	Time
T2	-13.0	-13.2	/	-15.5	2	37	/	38.5	1				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
T5	-12.5	-13.2	/	-15.3	8	/	/	/	2	65		4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
TU	-13.9	-13.8	/	-14.8	Flap	/	/	/	3				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
Time:	4:12	4:19	/	4:24	Time:	4:20	/	4:32	4				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
									5	104		7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
									6				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
									7				<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
									8	80		10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
									Flap	18		7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
									Time:	4:20		4:32	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap.
 Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Observer: BB/MQ

https://airwinggroup.sharepoint.com/sites/APSL/Lists/Projects/301351/TC%20Deicing%202024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C62: Run #62

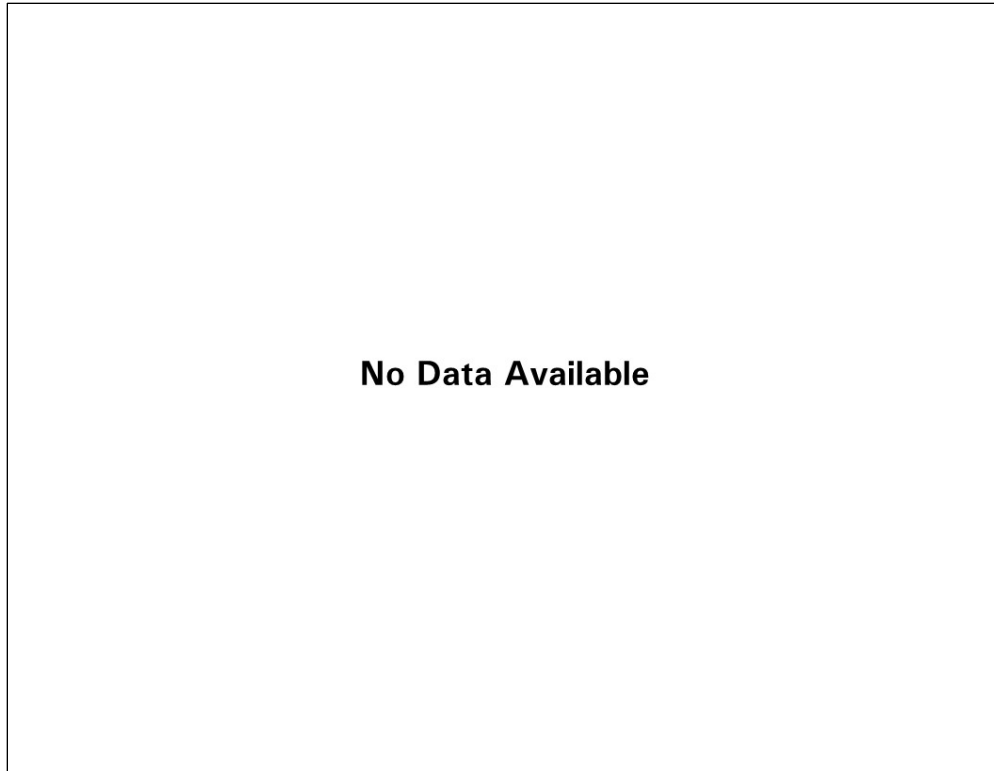


Figure C63: Run #63

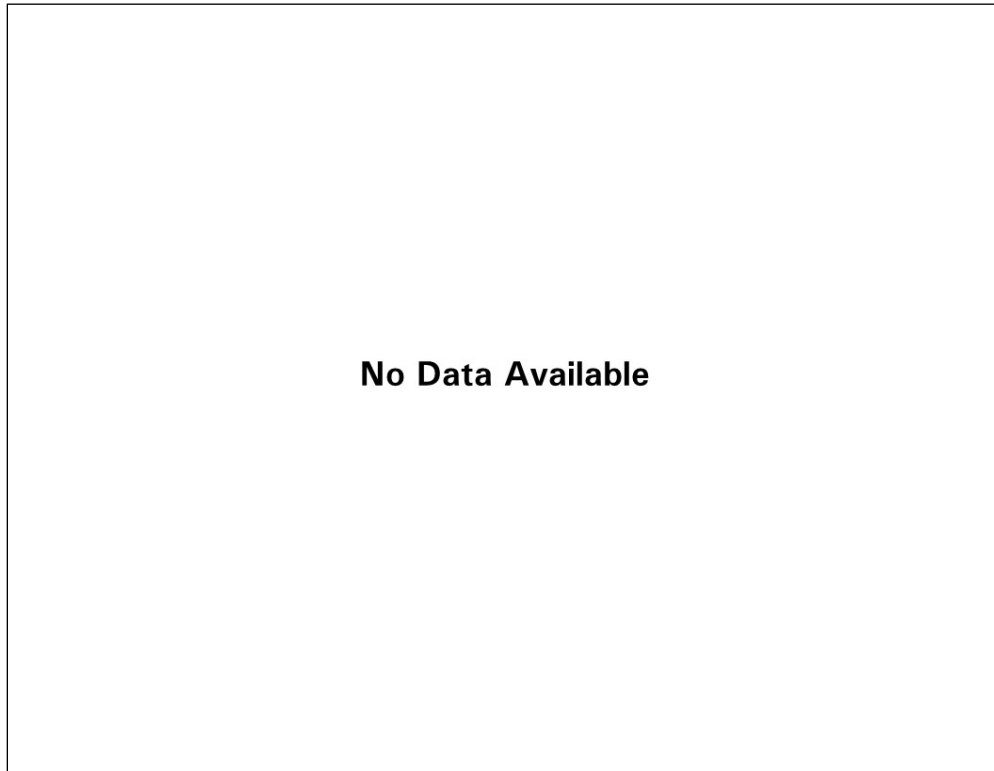


Figure C64: Run #64

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 23, 2025 Run: 67 (P019)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
T2	-7.4	-9.0	-13.5	-10.4
T5	-6.5	-8.7	-12.0	-10.2
TU	-7.6	-7.7	-9.4	-10.0
Time:	23:18	23:25	23:52	00:04

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.75	20.5	-
8	/	24.0	25.75
Flap	/	20.75	-
Time:	23:28	23:52	0:09

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	119	150/61	<1
3			
4			
5	158	250	6
6			
7			
8	127	150/61	12
Flap	40	134/61	<1
Time:	23:28	23:52	0:09

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap.
 Underflap: Approximately 40 cm up from the leading edge stagnation point.

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

Observer: BB/MQ

https://starlogsup.sherpoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C67: Run #67

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 23, 2025 Run: 68 (E6)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
T2	-6.8	-9.7	-10.7	-9.7
T5	-5.9	-8.8	-9.1	-10.2
TU	-7.5	-7.8	-8.7	-9.5
Time:	0:25	0:32	1:12	1:22

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	37.75	16.0	27.25
8	/	15.25	24.25
Flap	/	13.25	20.0
Time:	0:34	1:12	1:26

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	119/61	8
3			
4			
5	127	158	10
6			
7			
8	96	158/61	20
Flap	28	158/61	7
Time:	0:34	1:12	1:26

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____


Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____



Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap.
 Underflap: Approximately 40 cm up from the leading edge stagnation point.

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

Observer: BB/MQ

https://starlogsup.sherpoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C68: Run #68

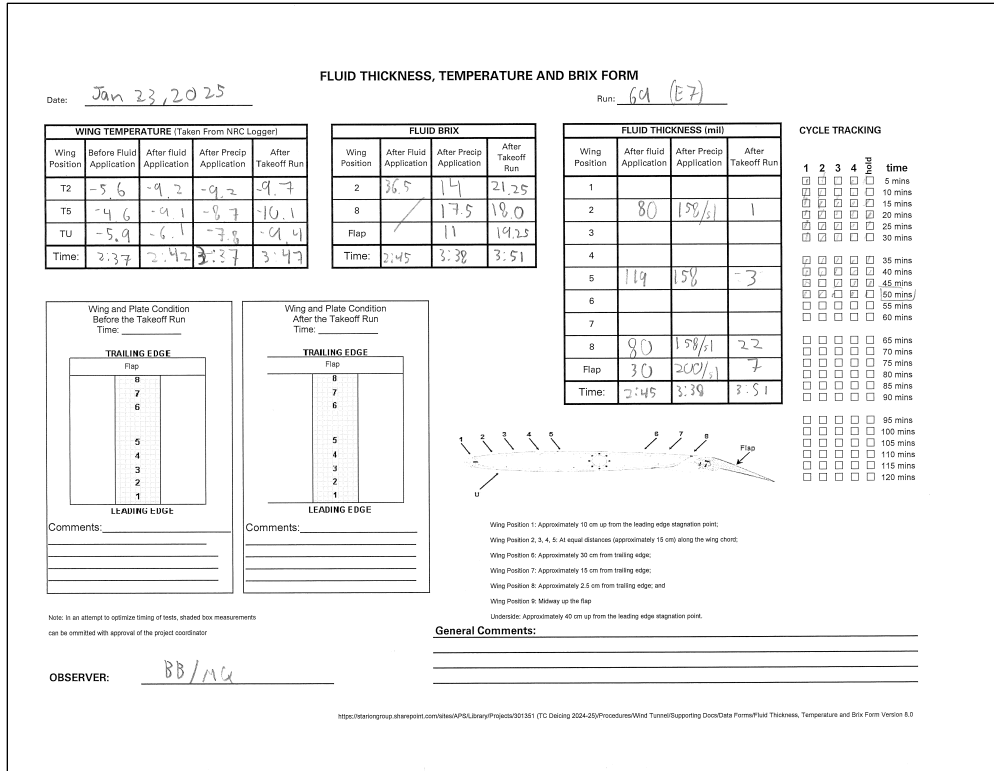


Figure C69: Run #69

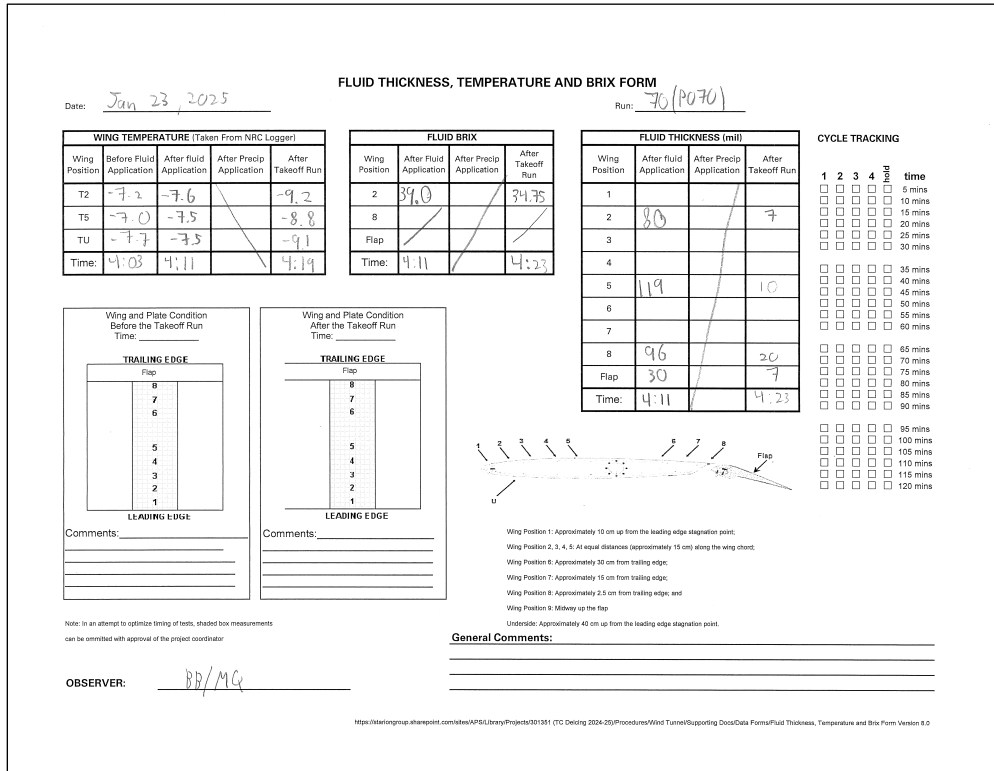


Figure C70: Run #70

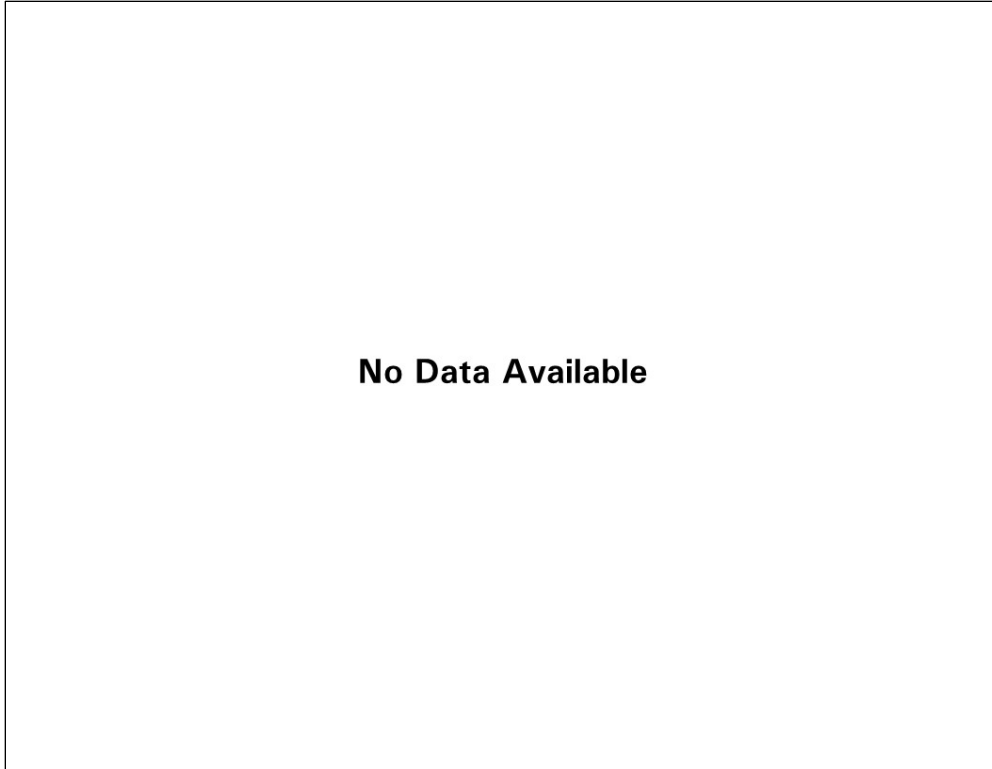


Figure C71: Run #71

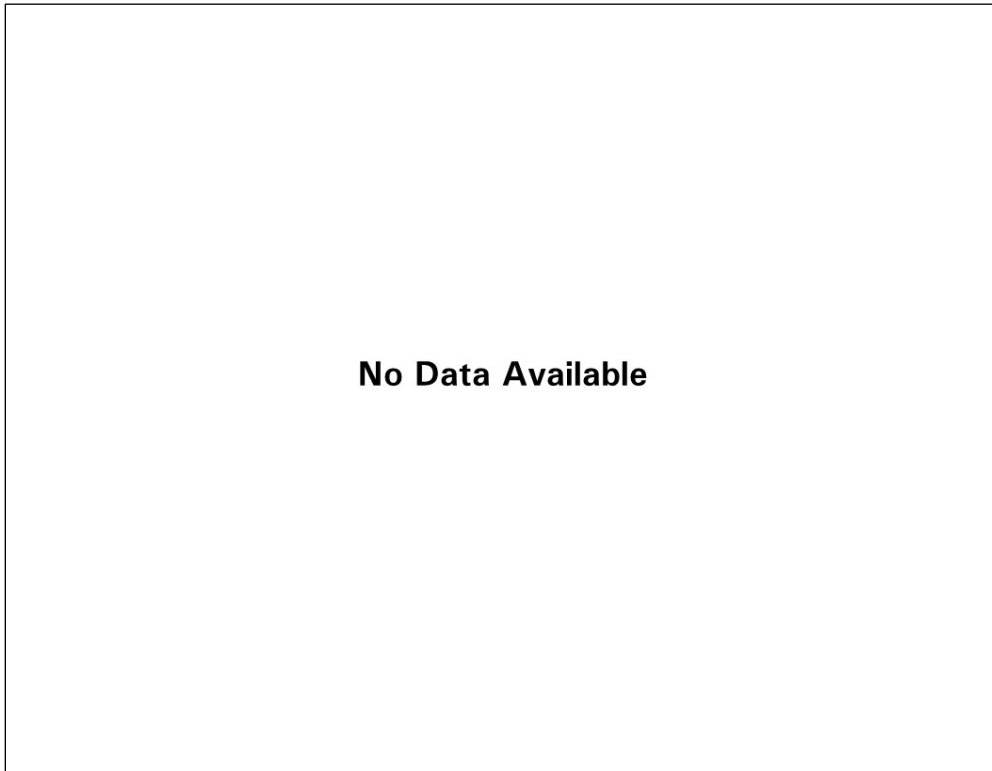


Figure C72: Run #72

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 23, 2025 Run: 73 (P052)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run
T2	-2.79	-5.9	-5.6	-6.2
T5	-2.4	-6.0	-4.7	-6.3
TU	-2.69	-3.3	-4.4	-6.1
Time:	20:56	21:02	21:30	21:40

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	39.5	18.25	28.25
8	/	16.5	33
Flap	/	14.5	26.5
Time:	21:04	21:30	21:51

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	159	8
3			
4			
5	134	200	12
6			
7			
8	112	158/51	16
Flap	30	112	7
Time:	21:04	21:30	21:51

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap.
 Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

OBSERVER: BB/MG

https://ntarstgroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C73: Run #73

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 23, 2025 Run: 74 (P016)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After Fluid Application	After Precip Application	After Takeoff Run
T2	-4.3	-5.4	-9.1	-7.6
T5	-3.8	-5.7	-8.0	-7.3
TU	-4.6	-4.8	-6.1	-7.0
Time:	22:13	22:22	22:48	22:54

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.75	14.75	-
8	/	17.75	26.25
Flap	/	10.25	26.0
Time:	22:22	22:48	23:03

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	119	119	<1
3			
4			
5	158	250	4
6			
7			
8	134	142	7
Flap	40	65/51	1
Time:	22:22	22:48	23:03

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point.
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord.
 Wing Position 6: Approximately 30 cm from trailing edge.
 Wing Position 7: Approximately 15 cm from trailing edge.
 Wing Position 8: Approximately 2.5 cm from trailing edge, and
 Wing Position 9: Midway up the flap.
 Underside: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

Note: In an attempt to optimize timing of tests, shaded box measurements can be omitted with approval of the project coordinator.

OBSERVER: BB/MG

https://ntarstgroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%2024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%206.0

Figure C74: Run #74

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 23 2025 Run: 75 (P088)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
T2	-5.1	-5.8	-6.5	-8.1
T5	-4.9	-5.3	-5.5	-8.1
TU	-4.6	-5.3	-6.0	-7.6
Time:	23:10	23:25	23:51	00:01

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.0	17.25	26.5
8	/	21.0	28.0
Flap	/	15.25	21.0
Time:	23:27	23:52	0:06

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	80	150/51	6
3			
4			
5	112	200	7
6			
7			
8	119	158	11
Flap	35	70/51	10
Time:	23:27	23:52	00:06

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

OBSERVER: _____

https://starforgroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%202024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C75: Run #75

FLUID THICKNESS, TEMPERATURE AND BRIX FORM

Date: Jan 24 2025 Run: 76 (E8)

WING TEMPERATURE (Taken From NRC Logger)				
Wing Position	Before Fluid Application	After fluid Application	After Precip Application	After Takeoff Run
T2	-5.9	-7.5	-10.8	-10
T5	-5.5	-7.3	-9.0	-10.3
TU	-6.2	-6.3	-8.2	-9.9
Time:	0:33	00:39	1:19	1:28

FLUID BRIX			
Wing Position	After Fluid Application	After Precip Application	After Takeoff Run
2	36.75	16.75	22.5
8	/	14.0	21.0
Flap	/	14.5	22.25
Time:	0:42	1:20	

FLUID THICKNESS (mil)			
Wing Position	After fluid Application	After Precip Application	After Takeoff Run
1			
2	96	119	6
3			
4			
5	113	158	9
6			
7			
8	112	150/51	40
Flap	30	96/51	49
Time:	0:42	1:20	

CYCLE TRACKING				
1	2	3	4	Time
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	5 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	15 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	20 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	30 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	35 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	45 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	55 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	60 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	65 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	70 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	75 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	80 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	85 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	90 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	95 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	100 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	105 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	110 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	115 mins
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	120 mins

Wing and Plate Condition Before the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing and Plate Condition After the Takeoff Run Time: _____

TRAILING EDGE

8
7
6
5
4
3
2
1

LEADING EDGE

Comments: _____

Wing Position 1: Approximately 10 cm up from the leading edge stagnation point;
 Wing Position 2, 3, 4, 5: At equal distances (approximately 15 cm) along the wing chord;
 Wing Position 6: Approximately 30 cm from trailing edge;
 Wing Position 7: Approximately 15 cm from trailing edge;
 Wing Position 8: Approximately 2.5 cm from trailing edge; and
 Wing Position 9: Midway up the flap
 Undercarriage: Approximately 40 cm up from the leading edge stagnation point.

General Comments: _____

OBSERVER: BB/MG

https://starforgroup.sharepoint.com/sites/APSLibrary/Projects/301351/TC%20Deicing%2024-25/Procedures/Wing%20Tunnel/Supporting%20Data%20Forms/Fluid%20Thickness,%20Temperature%20and%20Brix%20Form%20Version%208.0

Figure C76: Run #76

APPENDIX D

**2009-25 LOG OF TESTS CONDUCTED WITH THIN HIGH-PERFORMANCE
WING SECTION – RJ WING**

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
09-10	0	07-Jan-10	P008	IP Validation	IP- / ZR-	ABC-S Plus	8	100	20	6.06	-6.1	-6.9	-6.1	-6	25	-	25	-	25	25	2	2	4	1	1	3.7	1	1	1
09-10	1	07-Jan-10	P008B	Baseline	Fluid Only	ABC-S Plus	8	100	20	4.59	-5.7	-6.6	-4.9	-4.6	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	2	07-Jan-10	E2	Baseline	Dry Wing	none	8	100	20	1.03	-4.9	-6.5	-4.5	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-10	3	11-Jan-10	E3	Baseline	Dry Wing	none	14	100	20	-0.08	N/A	-7.1	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-10	4	11-Jan-10	E4	Baseline	Fluid Only	ABC-S Plus	14	100	20	2.35	-6.6	-6.4	-5.5	-5.4	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	5	11-Jan-10	P011	IP Validation	IP- / SN-	ABC-S Plus	14	100	20	1.83	-4.8	-5.5	-4.3	-6.7	25	10	-	-	25	25	2	2	3	1	1.5	1.8	1	1	1
09-10	6	11-Jan-10	E1	Flap Failure	IP- / ZR-	none	20	100	20	-	-4.2	-4.5	N/A	N/A	Applied by Hand 23	-	Applied by Hand 28	-	20	20	1	1	5	1	1	5	1	1	5
09-10	7	12-Jan-10	E6	Double Fluid	Fluid Only	ABC-S Plus	13	100	20	1.82	-9.7	-12	N/A	-9.1	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	8	12-Jan-10	E6B	Baseline	Fluid Only	ABC-S Plus	13	100	20	-	-8.8	-11.8	-7.6	-7.9	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	9	13-Jan-10	P002	IP Validation	IP-	ABC-S Plus	8	100	20	4.49	-7	-11.1	-4	-8.5	25	-	-	-	50	50	2	2	3	1	1.8	1.8	1	1	1
09-10	11	13-Jan-10	P035	IP Expansion	IP- / SN-	ABC-S Plus	8	100	20	4.55	-5.9	-10.2	-4.4	-8.1	25	10	-	-	40	40	3	2.3	4	1	1.8	2.5	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
09-10	12	13-Jan-10	E7	Baseline	Fluid Only	ABC-S Plus	13	100	20	2.36	-5.9	-10.4	-4.9	-5.8	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
09-10	13	14-Jan-10	P038	IP Expansion	IP- / SN	ABC-S Plus	8	100	20	6.10	-4.6	-9.3	-4.8	-7.9	25	25	-	-	20	3	2	3.5	1	1.8	2.7	1	1	1	
09-10	14	14-Jan-10	P038A	IP Expansion	IP- / SN	ABC-S Plus	8	100	20	5.55	-4.4	-9.3	-4.3	-8.1	25	25	-	-	15	2.2	2	2.8	1	1.5	1.5	1	1	1	
09-10	15	14-Jan-10	P014	IP Validation	IP- / SN	ABC-S Plus	8	100	20	4.81	-4.3	-9	-3.7	-5.8	25	25	-	-	10	1.8	2	2.7	1	1.3	1.7	1	1	1	
09-10	16	14-Jan-10	P014A	IP Validation	IP- / SN	ABC-S Plus	8	100	20	5.51	-4.2	-8.7	-4.1	-4.7	25	25	-	-	5	1.4	1.7	1.8	1	1	1.3	1	1	1	
09-10	17	14-Jan-10	E8	Baseline	Fluid Only	ABC-S Plus	8	100	20	4.96	-3.9	-8.4	-3.7	-4.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
09-10	18	14-Jan-10	E8A	Baseline	Fluid Only	ABC-S Plus	12	100	20	-	-2.5	-2	-1	-3.5	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
09-10	19	14-Jan-10	E8B	Baseline	Fluid Only	ABC-S Plus	8	100	20	-1.61	-2.1	-5.7	N/A	N/A	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
09-10	20	20-Jan-10	P041	IP Expansion	IP- / R Mod	ABC-S Plus	8	100	20	-	2.9	0.3	3.7	1.1	25	-	-	75	40	1 (3.7)	1 (4)	1	1	1	1	Did Not Rotate	Did Not Rotate	Did Not Rotate	
09-10	22	20-Jan-10	P001	IP Validation	IP-	EG106	8	100	20	0.86	-4.1	-6.8	-4.3	-8.5	25	-	-	-	50	1.8	2	4	1	1	1	1	1	1	
09-10	23	20-Jan-10	P034	IP Expansion	IP- / SN-	EG106	8	100	20	1.15	-3.2	-6	-3.4	-9	25	10	-	-	40	2.3	2.2	4	1	1.2	1.5	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
09-10	24	21-Jan-10	P037	IP Expansion	IP- / SN	EG106	8	100	20	1.25	-3.7	-6.1	-3.7	N/A	25	25	-	-	20	2.5	1.8	4	1	1.2	1	1	1	1
09-10	25	21-Jan-10	E9	Baseline	Fluid Only	EG106	8	100	20	2.01	-4	-5.9	-3.7	-3.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	26	21-Jan-10	P007	IP Validation	IP- / ZR-	EG106	8	100	20	4.14	-1.9	-5.8	-3.1	-6.2	25	-	25	-	25	2.2	1.7	4.7	1	1	4	1	1	3.5
09-10	27	21-Jan-10	E10	Baseline	Fluid Only	ABC-S Plus	6	100	20	-	-3.5	-6.2	-3.3	-3.7	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	28	21-Jan-10	P003	IP Validation	IP-	Launch	8	100	20	4.08	-4.2	-7.1	-1.1	-3.6	25	-	-	-	50	2	2	3.7	1	1.7	2	1	1	1
09-10	29	21-Jan-10	E11	Baseline	Fluid Only	Launch	8	100	20	4.71	-4.8	-8.5	-3.2	-3.9	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	30	21-Jan-10	E12	Baseline	Fluid Only	Launch	6	100	20	-	-6.8	-8.8	-5	-5.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	31	22-Jan-10	P072	Type III HS	IP-	2031 - Cold	8	100	20	5.76	-7	-9	-5.8	-6.8	25	-	-	-	10	2.2	2	3	1	2	2.2	1	1	1.7
09-10	32	22-Jan-10	E13	Type III HS	Fluid Only	2031 - Cold	8	100	20	4.63	-6.7	-9.5	-5.2	-5.8	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	33	22-Jan-10	P060	Type III HS	IP-	2031 - Hot	8	100	20	4.17	-5.4	-10.4	-4.9	-3.7	25	-	-	-	10	2	2	2.8	1	1	1.7	1	1	1
09-10	34	22-Jan-10	E14	Type III HS	Fluid Only	2031 - Hot	8	100	20	3.22	-5.4	-9.3	-5.8	16.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
09-10	35	22-Jan-10	P075	Type III HS	IP- / SN-	2031 - Cold	8	100	20	5.23	-6.2	-9.3	-3.9	-7	25	10	-	-	10	2	2.2	3	1	2	2	1	1	1.1
09-10	36	22-Jan-10	P063	Type III HS	IP- / SN-	2031 - Hot	8	100	20	4.44	-4.6	-9.1	-5	0.5	25	10	-	-	10	2.2	2.2	3.1	1.3	1.1	1.7	1.2	1	1
09-10	37	22-Jan-10	P112	Heavy Snow	SN	2031 - Cold	8	100	20	4.47	-0.9	-5.6	0.4	-1.3	-	25	-	-	10	2	2	3	1	1	1.5	1	1	1
09-10	38	22-Jan-10	P113	Heavy Snow	S++	2031 - Cold	8	100	20	4.77	-2.5	-5.6	-1	-3	-	50	-	-	5	1.7	1.7	3	1	1	2	1	1	1
09-10	39	22-Jan-10	P114	Heavy Snow	S++	2031 - Cold	8	100	20	5.01	-2.9	-8.1	-1.8	-4.6	-	50	-	-	7.5	3	2.7	3	1	1.2	1.5	1	1	1
09-10	40	23-Jan-10	P114A	Heavy Snow	S++	2031 - Cold	8	100	20	7.11	-3.1	-9.3	-1.8	-7.4	-	50	-	-	15	4	2	4	1.5	2.3	3.8	1.2	1.7	3.8
09-10	41	23-Jan-10	P067	Type III HS	IP-	2031 - Cold	8	100	20	2.72	-6.1	-9	-4.2	-8.6	25	-	-	-	20	2.3	2.3	3	1	1.25	1.3	1	1	1
09-10	42	23-Jan-10	P055	Type III HS	IP-	2031 - Hot	8	100	20	4.39	-5.8	-10.4	-5.9	-4.1	25	-	-	-	20	2.3	2.3	2.7	1.2	1.7	2	1.3	1.2	1.2
09-10	43	23-Jan-10	P067	Type III HS	IP-	2031 - Cold	8	100	20	2.44	-7.7	-9.3	-5.3	-8.1	25	-	-	-	10	3.7	4	4	1	1	1	1	1	1
09-10	44	23-Jan-10	P040	IP Expansion	IP- / R Mod	EG106	8	100	20	28.25	-0.8	-8	-4.8	-1.2	25	-	-	75	40	5	4.5	5	5	5	5	5	5	5
09-10	45	23-Jan-10	P127	Roughness	IP- / R Mod	EG106	13	100	20	25.54	-6	-8	N/A	N/A	Applied In Run 44(P40)	-	-	Applied In Run 44(P40)	-	5	5	5	5	5	5	5	5	5

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
09-10	46	23-Jan-10	E15	Baseline	Dry Wing	none	15	100	20	1.73	-3.5	-8.6	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-10	50	24-Jan-10	P121	Runway Deicer	ZR	Safeway + Launch	8	100	20	4.81	-0.6	-8.8	-4.9	-0.8	-	-	25	-	53	P:2 SB:1.7	P:1 SB:1.7	P:4.7 SB:3.3	P:3.7 SB:2.3	P:3.7 SB:2.3	P:3.7 SB:2.3	P:5 SB:1	P:5 SB:1	P:5 SB:1.3	
09-10	51	27-Jan-10	P118	SN w/ No Fluid	None	Dry - Warm Wing	8	100	20	21.44	-0.5	-1.5	-0.2	-0.4	-	Applied Using Sieves	-	-	20	4.5	4.5	4.5	4.8	4.8	4.8	4.8	4.8	4.8	
09-10	52	27-Jan-20	E17	SN w/ No Fluid	R/SN	Dry - Warm Wing	8	100	20	20.10	-0.2	-2.1	-0.5	-0.4	-	Applied In Run 51 (P118)	-	100	24	5	5	5	5	5	5	5	5	5	
09-10	53	27-Jan-10	E18	Baseline	Fluid Only	ABC-S Plus	8	100	20	3.38	-1.9	-2.7	-0.4	-0.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
09-10	54	27-Jan-10	E19	Baseline	Fluid Only	Launch	8	100	20	3.30	-2.2	-3.6	-0.6	-0.8	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
09-10	55	27-Jan-10	E20	Baseline	Fluid Only	EG106	8	100	20	1.73	-2.6	-4.2	-0.8	-0.9	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
09-10	56	27-Jan-10	P040A	IP Validation	IP- / R Mod	EG106	8	100	20	2.63	-1.1	-5.7	-1.3	-4.3	25	-	-	75	25	1.8	2	4.7	1	1	5	1	1	5	
09-10	57	27-Jan-10	P036	IP Expansion	IP- / SN-	Launch	8	100	20	4.19	-3.6	-5.5	-3.2	-5.4	25	10	-	-	40	2.7	2.6	4	1	1.7	2.8	1	1	1.3	
09-10	49	24-Jan-10	P006A	IP Validation	IP Mod	Launch	8	100	0	6.10	-3.1	-8.5	-4.1	-8.8	75	-	-	-	15	2.7	2.8	3	1	1.5	1.8	1	1	1	
09-10	20	13-Jan-21	P171	EG Type IV Expansion	IP Mod / R	EG106	8	100	0	5.90	-0.61	-0.2	-0.2	-4.3	92	-	-	75	15	2.5	2.4	5	1	1	1	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
09-10	60	28-Jan-10	E21	Baseline	Fluid Only	Launch	8	100	20	4.35	-2.8	-4.9	-2.8	-1.9	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	61	28-Jan-10	P126	65 vs 80	Fluid Only	Launch	8	80	20	8.28	-2.3	-5.1	-2.1	-2.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	62	28-Jan-10	P126	65 vs 80	Fluid Only	Launch	8	65	20	8.84	-3.4	-5.7	-3.6	-2.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	63	28-Jan-10	P023	IP Validation	IP- / ZR-	ABC-S Plus	8	100	20	6.63	-12.3	-14.2	-11.4	-10.8	25	-	25	-	10	2.3	2.3	3.2	1.2	2	2.3	1	1.2	1.2
09-10	64	28-Jan-10	E22	Baseline	Fluid Only	ABC-S Plus	8	100	20	4.21	-13.4	-15	-12	-11.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	65	29-Jan-10	P017/ P029	IP Validation	IP-	ABC-S Plus	8	100	20	7.98	-13.7	-16.9	-11.4	-13.9	25	-	-	-	30	2.8	2.8	4	1.2	2	2.2	1	1.7	1.7
09-10	66	29-Jan-10	P017A/ P029A	IP Validation	IP-	ABC-S Plus	8	100	20	7.35	-13.6	-18.3	-13.6	-14.2	25	-	-	-	20	2.2	2	3.2	1.2	2	2.5	1	1.3	1.7
09-10	67	29-Jan-10	P016	IP Validation	IP-	EG106	8	100	20	1.06	-12.6	-19.3	-14.7	-15	25	-	-	-	30	2.2	2.2	3.2	1	1.5	1.8	1	1	1.2
09-10	68	29-Jan-10	P018/ P030	IP Validation	IP-	Launch	8	100	20	8.65	-16.6	-20.3	-14.7	-16.4	25	-	-	-	30	3	2.5	3.7	1.3	2	2.2	1	1.8	2
09-10	69	29-Jan-10	P018A/ P30A	IP Validation	IP-	Launch	8	100	20	8.58	-17.8	-20.6	-16.7	-16.6	25	-	-	-	15	2.8	2.5	3.5	1.3	2	2.7	1	1	1.8
09-10	70	29-Jan-10	E23	Baseline	Fluid Only	Launch	8	100	20	4.11	-17.9	-20.9	-16.8	-15.8	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
09-10	48	24-Jan-10	P006A	IP Validation	IP Mod	Launch	8	100	20	6.14	-2.7	-8.7	-2.5	-8.5	75	-	-	-	15	2	2.8	4	1	1.7	1.8	1	1	1
09-10	75	30-Jan-10	E24	Baseline	Fluid Only	EG106	8	100	20	3.25	-18.1	-22.3	-16.6	-16.9	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	76	30-Jan-10	E25	Baseline	Fluid Only	ABC-S Plus	8	100	20	4.88	-17.9	-22.6	-16.9	-17.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	77	30-Jan-10	P050	IP Expansion	IP- / SN-	ABC-S Plus	8	100	20	8.81	-14.1	-22.4	-15.4	-16.1	25	10	-	-	10	2.8	2.7	3.7	1.7	2	2.8	1	1.67	1.5
09-10	78	30-Jan-10	P050A	IP Expansion	IP- / SN-	ABC-S Plus	8	100	20	7.48	-16	-22.5	-15.9	-14.9	25	10	-	-	5	2.3	2.2	3	1.4	2	2.7	1	1.2	1.5
09-10	79	30-Jan-10	P049	IP Expansion	IP- / SN-	EG106	8	100	20	3.16	-14.8	-22.7	-16.2	-15.7	25	10	-	-	10	2.2	2	2.5	1	1.5	2	1	1	1
09-10	80	30-Jan-10	P028	IP Validation	IP-	EG106	8	100	20	2.31	-17	-22.9	-16.7	-18.5	25	-	-	-	30	2.5	2.2	3	1	1.25	1.7	1	1	1
09-10	81	30-Jan-10	P052	IP Expansion	IP- / SN	EG106	8	100	20	3.19	-17.3	-22.9	-16.5	-17.1	25	25	-	-	5	1.8	2	2.3	1	1.5	2	1	1	1
09-10	82	30-Jan-10	P053	IP Expansion	IP- / SN	ABC-S Plus	8	100	20	8.24	-15.8	-22.9	-17	-16	25	25	-	-	5	2.5	2.2	3.2	1.5	1.5	1.8	1.1	1.7	1.8
09-10	83	31-Jan-10	P109	Heavy Snow	SN	EG106	8	100	20	1.14	-4.2	-6.2	-3.9	-7	-	25	-	-	40	2.4	2.2	4	1	1.2	1.3	1	1	1.3
09-10	84	31-Jan-10	P111	Heavy Snow	S++	EG106	8	100	20	2.26	-6.2	-7.5	-4.2	-9.5	-	50	-	-	30	3	2.3	4	1	1.7	1.9	1	1.2	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
09-10	85	01-Feb-10	P110	Heavy Snow	S++	EG106	8	100	20	1.37	-6.8	-8.8	-5.6	-10.8	-	50	-	-	20	2.6	2.3	4	1	1.5	1.9	1	1	1
09-10	86	01-Feb-10	P103	Heavy Snow	SN	ABC-S Plus	8	100	20	11.53	-8.5	-13.2	-8.9	-11.5	-	25	-	-	60	3.7	2.9	4	1.5	2.2	3.5	1.2	1.8	3
09-10	87	01-Feb-10	P104	Heavy Snow	S++	ABC-S Plus	8	100	20	12.11	-11.6	-15	-10	-14.3	-	50	-	-	30	3.7	2.9	4	1.7	2.2	3.2	1.2	1.8	2.3
09-10	88	01-Feb-10	P104A	Heavy Snow	S++	ABC-S Plus	8	100	20	7.99	-12.6	-15.8	-12.1	-14	-	50	-	-	10	2	2	2.8	1.5	2	2	1.3	1.5	1.5
09-10	89	01-Feb-10	P117	SN w/ No Fluid	None	Dry - Cold Wing	8	100	20	3.75	-12.7	-16.5	-13.3	N/A	-	50	-	-	Approx 7	4	4	4	3.6	1	3.5	3.7	1	3.5
09-10	90	01-Feb-10	P104B	Heavy Snow	S++	ABC-S Plus	8	100	20	5.16	-2.2	-9.8	-5.3	-8.3	-	50	-	-	10	2.3	2.2	2.2	1.1	1.5	1.7	1	1	1
09-10	91	01-Feb-10	P104C	Heavy Snow	S++	ABC-S Plus	8	100	20	7.91	-3.8	-10.8	-7.3	-11	-	50	-	-	30	2.8	2.7	3.7	1.5	2.2	2.7	1	1.8	2.3
09-10	92	01-Feb-10	P103A	Heavy Snow	SN	ABC-S Plus	8	100	20	7.56	-4.7	-12.4	-5.8	-10.3	-	25	-	-	60	2.5	2.3	3.8	1.5	2	2.7	1	1.7	1.8
09-10	93	02-Feb-10	P121A	Runway Deicer	ZR	Safeway + ABC-S Plus	8	100	20	5.59	-1.4	-12.6	-7.7	-3.3	-	-	25-50	-	96	P:4.5 SB:1	P:4.5 SB:1	P:5 SB:5	P:5 SB:2.3	P:5 SB:1	P:5 SB:5	P:5 SB:2.5	P:5 SB:1.2	P:5 SB:5
09-10	94	02-Feb-10	P026	IP Validation	IP- / SN-	ABC-S Plus	8	100	20	4.60	-6.3	-12.9	-7.1	-9.7	25	10	-	-	15	2.5	2	2.8	1	1.8	2	1	1	1
09-10	96	02-Feb-10	P017	IP Validation	IP-	ABC-S Plus	8	100	20	5.63	-7.6	-13.4	-8.9	-10.7	25	-	-	-	30	2.3	2	3	1	2	2	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
09-10	97	02-Feb-10	P047	IP Expansion	IP- / SN	ABC-S Plus	8	100	20	5.10	-8.3	-13.9	-9.1	-10.1	25	25	-	-	10	2.9	2.3	3	1.3	1.8	2.5	1	1	1.2
09-10	98	02-Feb-10	P022	IP Validation	IP- / ZR-	EG106	8	100	20	1.20	-6.7	-14.1	-9.5	-8.4	25	-	25	-	10	2	2	2.5	1	1	1.3	1	1	1
09-10	99	03-Feb-10	P129	Ice Phobic	ZR	ABC-S Plus	8	100	20	4.11	-4	-12.2	-2.9	-2.3	-	-	50	-	115	N:5 B:5 P:5	N:5 B:5 P:5	N:5 B:5 P:5	N:5 B:5 P:5	N:5 B:5 P:5	N:5 B:5 P:5	N:5 B:5 P:5	N:5 B:5 P:5	N:5 B:5 P:5
09-10	100	03-Feb-10	E26	Baseline	Fluid Only	EG106	8	100	20	2.04	-6.3	-11.9	-7.4	-8.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	101	03-Feb-10	E27	Baseline	Fluid Only	Launch	8	100	20	4.79	-7.6	-11.9	-7	-8.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	102	03-Feb-10	P125	ZR/SN	ZR/ SN	Type I Octaflo	8	100	20	15.01	-5.5	-11.8	-8.2	-1.3	-	25	25	-	4	3.3	3.3	4.3	5	5	5	5	5	5
09-10	103	03-Feb-10	P125A	LZR / SN	ZR/ SN	Type I Octaflo	8	100	20	2.70	-4.6	-11.9	-6.7	-3.7	-	-	25	-	8	5	4.7	5	5	5	5	5	5	5
09-10	104	03-Feb-10	P121B	Runway Deicer	ZR	Safeway + ABC-S Plus	8	100	20	8.48	-1.8	-11.8	-8.4	-2.1	-	-	25	-	83	P:5 SB:1	P:5 SB:1	P:5 SB:5	P:5 SB:1. 8	P:5 SB:1. 3	P:5 SB:4. 3	P:5 SB:1. 8	P:5 SB:1. 2	P:5 SB:3. 8
09-10	134	09-Feb-11	E18A	IP/ZR/SN	IP/ZR/SN	ABC-S Plus	8	100	0	5.56	-2.5	-8.8	-1.4	-4.6	25	25	25	-	20	2.3	2.5	2.7	1	1.6	1.9	1	1	1
09-10	18A	14-Jan-10	E8A	Baseline	Fluid Only	ABC-S Plus	8	100	20	0.83	-1.8	-5.7	-0.9	-2.9	-	-	-	-	-	1	1	1	1	1	1	1	1	1
09-10	58	28-Jan-10	P039	IP Expansion	IP- / SN	Launch	8	100	0	4.66	-3.1	-5.1	-4.1	-6.8	25	25	-	-	20	2.8	2.6	3	1	1.5	2	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
09-10	59	28-Jan-10	P009	IP Validation	IP- / ZR-	Launch	8	100	0	3.84	-3.3	-4.7	-2.2	-4.6	25	-	25	-	25	2	2	2.2	1	1.3	1.5	1	1	1
09-10	45A	23-Jan-10	P127	Roughness	IP- / R Mod	EG106	15	100	20	25.57	-6.1	-8.3	N/A	N/A	Applied In Run 44(P40)	-	-	Applied In Run 44(P40)	-	-	-	-	-	-	-	-	-	-
09-10	45B	23-Jan-10	P127	Roughness	IP- / R Mod	EG106	15	100	20	20.33	-4.1	-8.5	N/A	N/A	Applied In Run 44(P40)	-	-	Applied In Run 44(P40)	-	-	-	-	-	-	-	-	-	-
09-10	52A	27-Jan-10	E17	SN w/ No Fluid	None	none	15	100	20	17.52	-2	-2.2	N/A	N/A	-	-	-	-	-	5	5	5	5	5	5	5	5	5
09-10	28A	21-Jan-10	P003	IP Validation	IP-	Launch	8	100	0	3.55	-5.5	-9.1	-3.8	-7.4	25	-	-	-	50	2	2	2.7	1	1.5	2	1	1	1
09-10	56A	27-Jan-10	P040A	IP Expansion	IP- / R Mod	EG106	8	100	0	2.61	-1.4	-6.2	-3.2	-2.4	25	-	-	75	25	1.8	2.2	3	1	1	4.3	1	1	4.3
09-10	6A	11-Jan-10	E1	Flap Failure	IP- / ZR-	none	12	100	20	-	-4.6	-4.7	N/A	N/A	-	-	-	-	-	-	-	-	-	-	-	-	-	-
09-10	6B	12-Jan-10	E1	Flap Failure	IP- / ZR-	none	13	100	20	15.80	-10.3	-11	N/A	N/A	Applied by Hand 13	-	Applied by Hand 11.2	-	20	1	1	5	1	1	5	1	1	5
09-10	6C	12-Jan-10	E1	Flap Failure	IP- / ZR-	none	13	100	20	2.53	-10.3	-11.6	N/A	N/A	-	-	-	-	-	1	1	5	1	1	5	1	1	5
09-10	21	20-Jan-10	P004	IP Validation	IP Mod	EG106	8	100	20	0.82	-3.6	-5.9	N/A	-10.1	75	-	-	-	25	2	2.2	4	1	1	1.2	1	1	1
09-10	47	24-Jan-10	P006	IP Validation	IP Mod	Launch	8	100	20	7.50	-4.9	-8.7	-5.8	-10.1	75	-	-	-	25	3.7	3.8	4	1	1.7	2.5	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
09-10	10A	13-Jan-10	P005	IP Validation	IP Mod	ABC-S Plus	8	100	20	0.73	-5.6	-10	-6.8	-10.1	75	-	-	-	25	2	2.8	2.7	1	1.8	2	1	1	1	
09-10	10B	13-Jan-10	P005	IP Validation	IP Mod	ABC-S Plus	8	100	20	6.40	-6.2	-10.7	-5.3	-11.1	75	-	-	-	25	2.2	3	3	1	2	2	1	1	1.2	
09-10	10	13-Jan-10	P005	IP Validation	IP Mod	ABC-S Plus	8	100	20	5.40	-7.4	-10.6	-5.6	-10.5	75	-	-	-	25	2	3	4	1	2	2	1	1	1	
09-10	95	02-Feb-10	P020	IP Validation	IP Mod	ABC-S Plus	8	100	20	6.27	-8.1	-12.9	-8.5	-10.4	75	-	-	-	10	2.2	2	2.8	1	1.7	2	1	1	1	
09-10	71	29-Jan-10	P019/ P031	IP Validation	IP Mod	EG106	8	100	20	1.81	-17.7	-21.4	-16.6	-17.2	75	-	-	-	10	2.3	2.3	2.8	1	1.3	1.8	1	1	1.2	
09-10	72	29-Jan-10	P020/ P032	IP Validation	IP Mod	ABC-S Plus	8	100	20	8.85	-18	-21.8	-16.1	-17.6	75	-	-	-	10	2.8	2.5	3.8	1.2	2	2.8	1	1.25	1.7	
09-10	73	29-Jan-10	P020A	IP Validation	IP Mod	ABC-S Plus	8	100	20	3.82	-18.2	-21.9	-15.6	-17.4	75	-	-	-	5	2.2	2.2	3.4	1.2	2	2.5	N/A	N/A	N/A	
09-10	74	29-Jan-10	P021A	IP Validation	IP Mod	Launch	8	100	20	9.20	-18.5	-22.2	-16.8	-17.4	75	-	-	-	5	2.7	2.3	3.2	1.5	2	2.8	1	1.5	1.9	
10-11	1	18-Jan-11	P003	Dry Wing	None	None	8	100	20	-1.41	-6.9	-8.6	N/A	N/A	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-11	2	18-Jan-11	P003A	Dry Wing	None	None	8	115	20	-0.56	-5.9	-8.6	N/A	N/A	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10-11	3	18-Jan-11	P003B	Dry Wing	None	None	16	100	20	-1.13	-4.6	-8.6	N/A	N/A	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	4	18-Jan-11	P144	Type III HS (COLD)	IP-	2031 - Cold	8	100	20	-	-4.9	-7.7	-4.2	-5.1	25	-	-	-	10	2.3	2.3	3.5	1	1	1.5	1	1	1
10-11	5	19-Jan-11	P060	Baseline (BLDT)	Fluid Only	AD-49	8	100	20	-	-10.3	-12.3	-9.2	-8.5	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	6	19-Jan-11	P015	Type IV Fluid Val.	IP-	AD-49	8	100	20	7.10	-10.9	-12.6	-8.8	-8.4	25	-	-	-	30	2.4	2.5	3.3	1.1	2	2.3	1	1.2	1.25
10-11	72	28-Jan-11	P008A	Type IV Fluid Val.	IP Mod	Max-Flight	18	100	20	6.47	-3.2	-6.9	-1.4	-6.5	75	-	-	-	15	2.4	2.4	2.8	1	1.5	1.6	1	1	1
10-11	8	19-Jan-11	P027A	115 Knots Val.	IP-	AD-49	8	115	20	2.88	-8.5	-11.4	-8.6	-10.5	25	-	-	-	30	2.5	2.3	3.25	1	1.7	1.9	1	1.25	1.6
10-11	9	19-Jan-11	E1	Baseline (BLDT)	Fluid Only	AD-49	8	115	20	2.46	-6.7	-10	-7.3	-6.1	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	10	19-Jan-11	P008	Type IV Fluid Val.	IP Mod	Max-Flight	8	115	20	2.04	-6.8	-9.7	-5.5	-10.3	75	-	-	-	25	3.5	3.5	3.9	1	1.6	1.7	1	1	1
10-11	11	20-Jan-11	E2	Effect of Ramp-up Time	None	Max-Flight	8	100	20	3.66	-13.6	-16.5	-13.8	-12.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	12	20-Jan-11	P067	Baseline (BLDT)	Fluid Only	Max-Flight	8	100	20	6.05	-14.2	-16	-12.5	-12.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	15	20-Jan-11	P030A	115 Knots Val.	IP Mod	Max-Flight	8	115	20	4.71	-10.8	-13.3	-11.1	-13.3	75	-	-	-	10	2.3	2.3	3.2	1	1.3	1.4	1	1	1.1
10-11	16	21-Jan-11	P096A	Heavy Snow (HHS)	SN	Max-Flight	8	115	20	7.88	-11.5	-14.5	-10.3	-11.7	-	25	-	-	35	3.3	2.7	3.8	1.2	1.6	1.8	1.1	1.2	1.3

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	17	22-Jan-11	P097A	Heavy Snow (HHS)	S++	Max-Flight	8	115	20	6.35	-15	-17.7	-10.4	-14.9	-	50	-	-	17.5	2.7	3.1	3.3	1.2	1.7	1.9	1.1	1.3	1.6
10-11	18	22-Jan-11	P098A	Heavy Snow (HHS)	S++	Max-Flight	8	115	20	7.56	-14.7	-18.4	-13.6	-16	-	100	-	-	8.75	3	2.8	4	1.5	1.9	2.5	1.2	1.6	1.9
10-11	19	22-Jan-11	P082	Heavy Snow	S++	Max-Flight	8	100	20	9.20	-16.7	-19.7	-13.3	-16.7	-	50	-	-	17.5	3.2	3.2	3.8	1.5	1.8	2.5	1.2	1.6	2
10-11	20	23-Jan-11	P027	115 Knots Val.	IP-	ABC-S Plus	8	115	20	8.27	-17.5	-20	-8.7	-15.9	25	-	-	-	30	2.5	2.75	3.5	1.15	1.5	2	1	1	1.25
10-11	21	23-Jan-11	P070	Baseline (BLDT)	Fluid Only	ABC-S Plus	8	100	20	6.56	-18.2	-20.4	-15.8	-16.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	22	23-Jan-11	P122	IP Data Gap	IP-	ABC-S Plus	8	100	20	10.77	-19.3	-21.3	-16.1	-17.7	25	-	-	-	30	2.75	2.75	3.5	1.4	2	2.75	1	1.15	1.5
10-11	23	23-Jan-11	P028	115 Knots Val.	IP-	Launch	8	115	20	7.20	-21.5	-23.6	-19.1	-20	25	-	-	-	30	3	2.75	4	1.4	2	2.75	1	1.1	1.35
10-11	24	23-Jan-11	P122A	IP Data Gap	IP-	Launch	8	100	20	7.35	-22.5	-24.7	-20.1	-21.2	25	-	-	-	30	3	2.75	4	1.2	2	2.5	1.05	1.15	1.5
10-11	27	23-Jan-11	P121	IP Data Gap	IP-	EG106	8	100	20	3.21	-22.6	-26.4	-20.5	-21.3	25	-	-	-	30	2.35	2.35	3	1	1.2	1.5	1	1	1.1
10-11	28	24-Jan-11	P030	115 Knots Val.	IP Mod	Launch	8	115	20	7.56	-24.5	-27.3	-21.8	-22.5	75	-	-	-	10	3	3	4	1.25	1.75	2.25	1	1.1	1.35
10-11	29	24-Jan-11	P077	Baseline (BLDT)	Fluid Only	Launch	8	100	20	6.56	-23.9	-27.4	-22.5	-21.1	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	30	24-Jan-11	P076	Baseline (BLDT)	Fluid Only	ABC-S Plus	8	100	20	8.13	-23.5	-27.1	-22.1	-22.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	31	24-Jan-11	P029	115 Knots Val.	IP Mod	ABC-S Plus	8	115	20	10.41	-22.8	-27.2	-22.2	-21.8	75	-	-	-	10	3	2.75	3.75	1.35	2	2.75	1	1.15	1.45
10-11	32	24-Jan-11	P078	Baseline (BLDT)	Fluid Only	AD-49	8	100	20	3.92	-22.5	-27.1	-20.4	-22.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	33	24-Jan-11	P079	Baseline (BLDT)	Fluid Only	Max-Flight	8	100	20	8.27	-24.1	-27.4	-21.03	-22.6	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	34	24-Jan-11	P075	Baseline (BLDT)	Fluid Only	EG106	8	100	20	4.28	-23.3	-27.4	-22.4	-22.7	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	35	24-Jan-11	P023	Type IV Fluid Val.	IP-	AD-49	8	115	20	6.35	-23.2	-27.6	-22.6	-21.5	25	-	-	-	30	3	3	4	1.35	2	2.5	1.1	1.25	1.6
10-11	36	24-Jan-11	P080	Baseline (BLDT)	Fluid Only	2031 - Cold	8	100	20	5.63	-24.5	-27.7	-22.8	-22	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	37	24-Jan-11	P026A	Type IV Fluid Val.	IP Mod	Max-Flight	8	115	20	9.70	-24.5	-28.5	-22.8	-23.2	75	-	-	-	10	3	3	4	1.35	1.75	2.25	1	1.1	1.35
10-11	38	24-Jan-11	P029	115 Knots Val.	IP Mod	ABC-S Plus	8	115	20	10.20	-24.2	-28.3	-24	-23.2	75	-	-	-	10	3	3	4	1.2	1.5	2	1	1.15	1.5
10-11	39	24-Jan-11	P073	Baseline (BLDT)	Fluid Only	Max-Flight	8	100	20	7.20	-16	-21.1	-14.2	-17.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	40	24-Jan-11	P024	Type IV Fluid Val.	IP-	Max-Flight	8	100	20	9.84	-15.2	-21	-20.2	-15	25	-	-	-	30	3	3	3.5	1.2	2	2.5	1	1.1	1.35

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	41	25-Jan-11	P025A	Type IV Fluid Val.	IP Mod	AD-49	8	115	20	-	-16.5	-20.6	-14.3	-16.1	75	-	-	-	10	3.1	3	4	1.1	1.5	2	1	1.1	1.25
10-11	42	25-Jan-11	P072	Baseline (BLDT)	Fluid Only	AD-49	8	100	20	3.57	-15.7	-20.5	-14.4	-16.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	43	25-Jan-11	P069	Baseline (BLDT)	Fluid Only	EG106	8	100	20	3.07	-15	-20.2	-13.7	-16	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	44	25-Jan-11	P114	IP Expansion	IP- / SN	EG106	8	100	20	2.85	-13.2	-19.8	-13.5	-15.4	25	25	-	-	10	2.25	2	3.5	1.15	1.35	1.1	1	1.1	1
10-11	45	25-Jan-11	P111	IP Expansion	IP- / SN-	EG106	8	100	20	2.35	-12.9	-19.4	-13.4	-15.7	25	10	-	-	15	2.25	2	3	1	1.1	1.25	1	1	1
10-11	46	25-Jan-11	P113	IP Expansion	IP- / SN-	Launch	8	100	20	7.06	-13.5	-19.1	-13.2	-13.8	25	10	-	-	5	1.75	1.75	3	1.25	1.6	2.25	1	1	1.15
10-11	47	25-Jan-11	P116A	IP Expansion / CL Max	IP- / SN	Launch	16	100	20	8.20	-13.3	-19	-13	-14.9	25	25	-	-	5	2.25	2	3.5	1.3	1.75	2.25	1	1.1	1.15
10-11	48	25-Jan-11	P127/ P065	Baseline (BLDT) / CL MAX	Fluid Only	Launch	14	100	20	4.07	-13.1	-18.7	-11.4	-14.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	49	25-Jan-11	P068	Baseline (BLDT)	Fluid Only	2031 - Cold	8	100	20	3.57	-14.1	-18.7	-13.3	-16	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	50	25-Jan-11	P068A	Baseline (BLDT)	Fluid Only	2031 - Cold	8	100	20	2.78	-13.3	-18.5	-13.5	-18.9	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	51	25-Jan-11	P023A	Type IV Fluid Val.	IP-	EG106	8	100	20	1.64	-11.1	-16.2	-8	-12.9	25	-	-	-	30	2.2	2	2.8	1	1.2	1.3	1	1	1.1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	52	25-Jan-11	P063	Baseline (BLDT)	Fluid Only	EG106	8	100	20	2.78	-13.4	-15.8	-11	-12.6	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	53	26-Jan-11	P024A	Type IV Fluid Val.	IP-	ABC-S Plus	8	100	20	8.92	-12.4	-15.6	-10.3	-12.8	25	-	-	-	30	2.5	2.5	3.2	1.1	2	2.5	1	1.1	1.2
10-11	54	26-Jan-11	P064	Baseline (BLDT)	Fluid Only	ABC-S Plus	8	100	20	5.78	-12.1	-15.4	-9.9	-13.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	55	26-Jan-11	P066	Baseline (BLDT)	Fluid Only	AD-49	8	100	20	2.57	-11.4	-15	-9.6	-10.8	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	56	26-Jan-11	P021	Type IV Fluid Val.	IP- / SN-	AD-49	8	100	20	6.78	-9.6	-14.6	-8.5	N/A	25	10	-	-	15	3	2.8	4	1.5	2	2.5	1.1	1.7	1.9
10-11	57	26-Jan-11	P061	Baseline (BLDT)	Fluid Only	Max-Flight	8	100	20	6.85	-9.9	-14.5	-8.7	-11	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	58	26-Jan-11	P022	Type IV Fluid Val.	IP- / SN-	Max-Flight	8	100	20	7.63	-11.2	-13.7	-8.7	-10.9	25	10	-	-	15	2.3	2.3	3.2	1.3	1.7	2.2	1	1	1.2
10-11	69	27-Jan-11	P007	Type IV Fluid Val.	IP Mod	AD-49	18	100	20	4.22	-3.6	-5.6	-0.6	-8.2	75	-	-	-	25	3.3	2.8	3.7	1.2	1.6	1.6	1	1.4	1.2
10-11	60	26-Jan-11	P053A	Baseline (BLDT)	Fluid Only	Launch	8	100	20	4.71	-4.2	-7.4	-3	-4.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	61	26-Jan-11	P053A	Baseline (BLDT)	Fluid Only	Launch	8	100	20	4.49	-3.5	-7.3	-1.5	-4.6	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	62	27-Jan-11	P053A	Baseline (BLDT)	Fluid Only	Launch	8	100	20	5.06	-4.9	-7.4	-3.8	-4.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
10-11	63	27-Jan-11	P053A	Baseline (BLDT)	Fluid Only	Launch	8	100	20	5.34	-4.5	-7.3	-2.4	-4.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
10-11	64	27-Jan-11	P156	Roughness	IP- / ZR-	Dry	20	100	20	5.20	-5.1	-7	-1.4	0.3	10	-	25	-	10	5	5	5	5	5	5	4.8	4.8	4.8	
10-11	65	27-Jan-11	E3	Dry CL MAX	None	Dry	23	80	20	0.28	-3.1	-6.1	N/A	-2.8	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
10-11	66	27-Jan-11	P053A	Baseline (BLDT)	Fluid Only	Launch	23	80	23	6.05	-4.3	-6.7	-3.4	-4.7	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
10-11	67	27-Jan-11	P053A	Baseline (BLDT)	Fluid Only	Launch	20	90	20	5.34	-3.7	-6.9	-2.6	-5.1	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
10-11	68	27-Jan-11	P054A	Baseline (BLDT)	Fluid Only	AD-49	17	100	20	3.66	-1.8	-5.7	N/A	-1	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
10-11	71	28-Jan-11	P055A	Baseline (BLDT)	Fluid Only	Max-Flight	18	100	20	6.33	-3.7	-6	-2.4	-2.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
10-11	73	28-Jan-11	P014	Type IV Fluid Val.	IP- / SN	Max-Flight	18	100	20	6.47	-4.2	-7.7	-2.5	N/A	25	25	-	-	10	2.7	2.3	3.1	1	1.6	1.7	1	1	1	
10-11	74	28-Jan-11	P012	Type IV Fluid Val.	IP- / SN-	Max-Flight	18	100	20	6.75	-4.8	-8.4	-2	-6.8	25	10	-	-	25	2.5	2.3	3	1	1.5	1.6	1	1	1	
10-11	75	28-Jan-11	P055A	Baseline (BLDT)	Fluid Only	Max-Flight	8	100	20	7.45	-5.8	-8.9	-4	-4.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
10-11	76	28-Jan-11	P055A	Baseline (BLDT)	Fluid Only	Max-Flight	18	100	20	6.61	-5.5	-8.8	N/A	-3.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	77	30-Jan-11	P057	Baseline (BLDT)	Fluid Only	EG106	16.5	100	20	2.60	-11.8	-15.1	-10.8	-9.6	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	78	30-Jan-11	P105	IP Expansion	IP- / SN-	EG106	8	100	20	2.67	-13.8	-16.3	-10.7	-14.2	25	10	-	-	25	2.7	2.2	4	1	1.6	1.8	1	1	1.2
10-11	79	31-Jan-11	P108	IP Expansion	IP- / SN	EG106	8	100	20	3.02	-15.1	-17.3	-12.6	-12.9	25	25	-	-	15	2.8	2.6	4	1.1	1.4	1.8	1	1	1.2
10-11	80	31-Jan-11	P058	Baseline (BLDT)	Fluid Only	ABC-S Plus	14.5	100	20	6.96	-15.1	-18	-12.8	-12.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	81	31-Jan-11	P058	Baseline (BLDT)	Fluid Only	ABC-S Plus	8	100	20	7.10	-14.7	-18	-12.3	-12.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	82	31-Jan-11	P112A	IP Expansion	IP- / SN-	ABC-S Plus	8	115	20	8.37	-16	-18.7	-12.9	-13.8	25	10	-	-	15	2.8	2.5	3.7	1.3	1.8	2.7	1	1.1	1.5
10-11	83	31-Jan-11	P115A	IP Expansion	IP- / SN	ABC-S Plus	8	115	20	9.77	-15.2	-19.6	-13.2	-13.3	25	25	-	-	10	3	2.5	4	1.4	1.8	2.6	1.1	1.2	1.9
10-11	84	31-Jan-11	P113A	IP Expansion	IP- / SN-	Launch	8	115	20	8.37	-17.4	-20.3	-13.8	-15.1	25	10	-	-	10	3	2.8	3.9	1.2	1.8	2.5	1	1.2	1.7
10-11	85	31-Jan-11	P116A	IP Expansion	IP- / SN	Launch	8	115	20	8.09	-17.4	-20.7	-14.4	-15.3	25	25	-	-	5	2.6	2.5	3.5	1.1	1.7	2.3	1	1.1	1.6
10-11	86	31-Jan-11	P074A	Baseline (BLDT)	Fluid Only	2031 - Cold	8	70	20	6.12	-18	-20.7	-15.8	-14.7	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	87	31-Jan-11	P093	Heavy Snow (HHS)	SN	ABC-S Plus	8	115	20	11.95	-11.1	-16.9	-7.9	-11	-	25	-	-	60	3.8	3.3	4	1.9	2.2	3.2	1.3	2.2	2.7

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	88	01-Feb-11	P094	Heavy Snow (HHS)	S + +	ABC-S Plus	8	115	20	13.50	-11.8	-17.2	-10.3	-14.3	-	50	-	-	30	3.8	3.2	4	1.9	2.2	2.9	1.3	2	2.4
10-11	89	01-Feb-11	P094A	Heavy Snow (HHS)	S + +	ABC-S Plus	8	115	20	15.61	-13.4	-17.4	-11.4	-13.4	-	100	-	-	15	3.8	3.4	4	1.9	2.6	3.3	1.3	1.8	2.7
10-11	90	01-Feb-11	E4	Multiple Fluids	Fluid Only	EG106 ABC-S + 09 ABC-S + 10 Max-Flight	8	100	20	6.47	-11.9	-17.2	-12.2	-12.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	91	01-Feb-11	E5	Multiple Fluids	Fluid Only	Octaflo Launch 2031 AD-49	8	100	20	5.34	-14.8	-17.5	-11.6	-11.6	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	93	01-Feb-11	P126B	CL MAX/ IP VAL	IP-	ABC-S Plus	18	100	20	9.85	-12	-16.6	-11.9	-12.8	25	-	-	-	30	2.6	1.8	3	1.2	1.8	1	1	1	1.1
10-11	94	01-Feb-11	P063A	Baseline (BLDT)	Fluid Only	EG106 Old 09-10	18	100	20	1.90	-7.8	-14.4	-7.8	-7.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	95	01-Feb-11	P063/ P125	Baseline (BLDT)	Fluid Only	EG106	18	100	20	3.66	-10.2	-14.4	-7.1	-7.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	96	02-Feb-11	P064A	Baseline (BLDT)	Fluid Only	ABC-S Plus Old 09-10	18	100	20	5.34	-11.2	-14.6	-8.3	-9.1	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	97	02-Feb-11	P064/ P126	Baseline (BLDT)	Fluid Only	ABC-S Plus	18	100	20	5.91	-11.9	-14.7	-8.8	-10.4	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	98	02-Feb-11	E6	Inadequate Application/ CL MAX	None	ABC-S Plus	18	100	20	4.99	-10.6	-14.8	-9.6	-7.6	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	99	02-Feb-11	E7	LE Heater (Clean LE)	None	ABC-S Plus	18	100	20	5.13	-9.1	-14.4	-7	-9.5	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	100	02-Feb-11	E8	Dry Wing	None	Dry	23	80	20	0.42	-10.1	-13.9	N/A	N/A	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-11	101	02-Feb-11	P159	SN w/ No Fluid	SN w/ No Fluid	Dry - Cold Wing	18	100	20	15.82	-6.8	-13.5	-8.2	-6.4	-	200	-	-	5	4	4	4	4	3.7	4	4	3.7	4
10-11	102	02-Feb-11	P019	Type IV Fluid Val.	IP- / ZR-	AD-49	8	100	20	6.75	-6.2	-13.4	-7.8	-7.1	25	-	25	-	10	3.2	2.1	2.8	1.1	1.6	1.6	1	1	1.1
10-11	103	02-Feb-11	P020	Type IV Fluid Val.	IP- / ZR-	Max-Flight	8	100	20	7.59	-6.5	-14	-8.5	-8.6	25	-	25	-	10	2.5	2.4	3.1	1.1	1.5	1.8	1	1	1
10-11	104	02-Feb-11	P110	IP Expansion	IP- / SN	Launch	8	100	20	6.47	-7.5	-12	-8.3	-8.7	25	25	-	-	7	2.8	2.5	3.1	1.1	1.6	1.9	1	1	1
10-11	105	03-Feb-11	P109	IP Expansion	IP- / SN	ABC-S Plus	18	100	20	8.51	-9.3	-13.3	-7.9	-9.6	25	25	-	-	7	2.3	2.2	2.8	1.1	1.6	2	1	1	1
10-11	106	03-Feb-11	P109A	IP Expansion	IP- / SN	AD-49	8	100	20	7.24	-9.4	-13.8	-7.1	-9.2	25	25	-	-	7	1.4	2.2	3.1	1.2	1.8	2.3	1	1.1	1.2
10-11	107	03-Feb-11	P062A	Baseline (BLDT)	Fluid Only	2031 - Cold	18	100	20	3.80	-11.1	-14.1	-8.7	-8.3	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	108	03-Feb-11	P090	Heavy Snow	SN	2031 - Cold	18	100	20	4.57	-11.5	-14.4	-7.8	-10.5	-	12.5	-	-	10	1.7	1.6	2.3	1	1.2	1.6	1	1	1
10-11	109	03-Feb-11	P091	Heavy Snow	S + +	2031 - Cold	18	100	20	6.47	-11	-15.4	-10.1	-13.1	-	50	-	-	7.5	3.25	2.75	3.75	1.1	1.75	2.35	1	1.2	1.1
10-11	110	03-Feb-11	P092	Heavy Snow	S + +	2031 - Cold	18	100	20	8.09	-10.3	-15.6	-9.3	-13.4	-	100	-	-	7.5	3.5	3	4	1.1	2.25	2.5	1	1.75	2.6

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	111	03-Feb-11	E9	Heavy Cont.	SN	2031 - Cold	18	100	20	6.82	-6.3	-16.4	-10.8	-15.3	-	10	-	-	5	2.5	2.5	3	1.25	2	2.25	1.1	1.3	1.1
10-11	112	07-Feb-11	P001	Dry Wing	None	None	23	100	20	-1.27	2.3	0.9	N/A	N/A	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-11	113	07-Feb-11	P162	Rain No Fluid	Rain No Fluid	None	18	100	20	0.42	1.3	0.5	2.8	N/A	-	-	-	75	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-11	114	07-Feb-11	E10	IP/R/SN	IP/R/SN	Launch	8	100	20	2.18	1.8	0.1	2.8	-2.2	25	25	-	25	25	2.3	2.5	4	1	1	1.4	1	1	1
10-11	115	07-Feb-11	P117	IP Data Gap	IP- / R Mod	EG106	8	100	20	0.42	1.4	0.7	3.4	1.5	25	-	-	75	25	2.3	1.3	1.6	1	1	1	1	1	1
10-11	116	07-Feb-11	P118	IP Data Gap	IP- / R Mod	ABC-S Plus	8	100	20	2.39	3	-0.1	3.5	2.9	25	-	-	75	25	1.2	1.3	1.3	1	1	1.1	1	1	1
10-11	117	07-Feb-11	P119A	IP Data Gap	IP- / R-	Launch	8	100	20	2.88	2.3	-0.6	4.6	0.2	25	-	-	25	25	1.3	1.3	1.3	1	1	1	1	1	1
10-11	118	07-Feb-11	E11	IP/R/SN	IP/R/SN	EG106	8	100	20	1.34	1	-0.3	3.6	-0.5	25	25	-	25	25	2	1.3	3.5	1	1	1.2	1	1	1
10-11	119	07-Feb-11	P001A	Dry Wing	None	None	23	100	20	-1.27	-0.1	-1.9	N/A	N/A	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-11	120	08-Feb-11	P003	Dry Wing	None	None	23	80	20	-0.77	-13.2	-15	N/A	N/A	-	-	-	-	-	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
10-11	121	08-Feb-11	P016	Type IV Fluid Val.	IP-	Max-Flight	18	100	20	8.51	-12.9	-14.8	-13.3	-14.1	25	-	-	-	30	2.5	2.5	3	1.2	1.8	2.3	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	122	08-Feb-11	E12	Effect of Ramp-up Time	Fluid Only	ABC-S Plus	8	100	20	5.27	-12.8	-14.5	-12.3	-10.8	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	123	08-Feb-11	E13	Effect of Ramp-up Time	Fluid Only	EG106	8	100	20	2.39	-12.5	-14.4	-11.9	-10	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	125	08-Feb-11	E15	Heavy Cont.	SN	2031 - Cold	18	100	20	18.71	-11.8	-14.7	N/A	-17.2	-	-	-	-	-	4	4	4	1.4	2.4	2.5	1	1.5	1.5
10-11	126	08-Feb-11	E16	IP Expansion / CL Max	IP- / ZR-	EG106	18	100	20	7.24	-10.1	-15.5	-11.6	-9.4	25	-	25	-	40	3.7	3	4.3	1.2	1.5	5	1	1.2	5
10-11	127	08-Feb-11	E17	Heavy Cont.	ZR	None	23	80	20	2.88	-10.7	-15.7	-12.2	-6.2	-	-	25	-	Appro x 5	5	5	5	5	5	5	5	5	5
10-11	128	09-Feb-11	P009	Type IV Fluid Val.	IP- / ZR-	AD-49	8	100	20	4.15	-3.2	-6.2	-6.5	-3.8	25	-	25	-	25	2.5	2.5	2.7	1.1	1.3	1.5	1	1	1
10-11	129	9-Feb-11	P005	Type IV Fluid Val.	IP-	AD-49	8	100	20	4.78	-3.6	-5.7	-4.8	-5.2	25	-	-	-	50	2.8	2.3	3	1	1.5	1.7	1	1	1
10-11	130	09-Feb-11	P157	Wing Geometry	IP- / ZR-	AD-49	8	100	20	4.57	-2.4	-6.1	-3.1	-3.3	25	-	25	-	25	2.3	2.3	2.8	1	1.2	1.6	1	1	1
10-11	133	09-Feb-11	E18	IP/ZR/SN	IP/ZR/SN	ABC-S Plus	8	100	20	6.89	-3.3	-8.5	-2.7	-4.4	25	25	25	-	20	2.7	2.8	4	1	1.4	4.3	1	1	4.3
10-11	57A	27-Jan-10	P036	IP Expansion	IP- / SN-	Launch	8	100	0	2.53	-4.2	-5.4	-3.9	-5.7	25	10	-	-	40	2.6	2.6	3	1	1.3	1.7	1	1	1
10-11	135	10-Feb-11	E19	IP/ZR/SN	IP/ZR/SN	EG106	8	100	20	5.27	-3.9	-10	-8.9	-8.2	25	25	25	-	20	2.2	2.3	4.3	1	1	5	1	1	5

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	136	10-Feb-11	E20	ZR/SN	ZR/SN	ABC-S Plus	8	100	20	6.47	-3.5	-10	-7	-4.7	-	25	25	-	20	2	2	3.6	1	1.6	3.8	1	1	5
10-11	137	10-Feb-11	E21	Heavy Cont.	IP+ /SN +	ABC-S Plus	18	100	20	21.73	-3.5	-8.6	-5	-10.1	200	100	-	-	30	4.3	4.3	4.3	1.8	2.3	4.3	1	1.7	4.7
10-11	108A	03-Feb-11	P090	Heavy Snow	SN	2031 - Cold	18	100	20	6.40	-11.5	-14.8	-8.9	-12.2	-	25	-	-	15	3.5	1.8	4	1.25	1.5	2.25	1.1	1.1	1.1
10-11	127A	08-Feb-11	E17A	Heavy Cont.	ZR	None	23	80	20	1.13	-8.8	-16	N/A	-3.7	-	-	75 (Then 35)	-	Approx 12	5	5	5	5	5	5	5	5	5
10-11	15A	20-Jan-11	P030A	115 Knots Val.	IP Mod	Max-Flight	8	115	20	3.09	-10.4	-12.8	-10.6	-12.5	75	-	-	-	10	2.3	2.3	2.9	1	1	1.3	1	1	1
10-11	15B	20-Jan-11	P030A	115 Knots Val.	IP Mod	Max-Flight	8	115	20	5.27	-10.8	-12.7	-9.8	-12.1	75	-	-	-	10	2.4	2.3	2.9	1	1.4	1.5	1	1	1.1
10-11	41A	25-Jan-11	P025A	Type IV Fluid Val.	IP Mod	AD-49	8	115	20	5.63	-15.4	-20.6	-14.5	-16.2	75	-	-	-	10	3	3.1	4	1.1	2	2.75	1	1.2	1.35
10-11	59A	26-Jan-11	P030A	115 Knots Val.	IP Mod	Max-Flight	8	115	20	4.07	-9.4	-13.9	-8.4	-12.4	75	-	-	-	10	2.5	2.5	3	1.2	1.3	1.6	1	1	1.1
10-11	5A	19-Jan-11	P060	Baseline (BLDT)	Fluid Only	AD-49	8	100	20	3.87	-10.4	-12.4	-8.5	-8.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	64A	27-Jan-11	P156	Roughness	IP- / ZR-	Dry	20	100	20	8.72	-5.6	-6.6	-1.6	-0.9	10	-	25	-	10	5	5	5	5	5	5	5	5	5
10-11	86A	31-Jan-11	P074A	Baseline (BLDT)	Fluid Only	2031 - Cold	8	70	20	6.26	-17.9	-21.1	-15.6	-14.8	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	95A	2-Feb-11	P063/ P125	Baseline (BLDT)	Fluid Only	EG106	18	100	20	2.53	-10.4	-15.2	-9.2	-7.6	-	-	-	-	-	1	1	1	1	1	1	1	1	1
10-11	NRC 1	22-Jan-11	-	-	-	Oil	-	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-11	NRC 2	22-Jan-11	-	-	-	ABC-S Plus	-	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
10-11	70	28-Jan-11	P007A	Type IV Fluid Val.	IP Mod	AD-49	18	100	20	3.94	-4.2	-5.8	-2.6	-7.8	75	-	-	-	15	2.3	2.5	3	1.2	1.6	1.6	1	1.1	1
10-11	131	09-Feb-11	P008A	Type IV Fluid Val.	IP Mod	Launch	8	100	20	5.06	-4.5	-7.5	-3.6	-8.5	75	-	-	-	25	2.8	3.3	3.9	1	1.5	2.2	1	1	1
10-11	132	09-Feb-11	P008B	Type IV Fluid Val.	IP Mod	Max-Flight	8	100	20	6.89	-5.9	-7.4	-3	-8.5	75	-	-	-	25	2.8	3	3.9	1	1.6	2	1	1	1.1
10-11	7	19-Jan-11	P017	Type IV Fluid Val.	IP Mod	AD-49	8	100	20	7.10	-10.4	-12.2	-9.5	-11.3	75	-	-	-	10	2.7	2.7	3.4	1.3	2.2	2.4	1	1.3	1.4
10-11	59	26-Jan-11	P030A	115 Knots Val.	IP Mod	Max-Flight	8	100	20	7.13	-10.9	-13.7	-8.3	-12.5	75	-	-	-	10	2.5	2.5	2.9	1.6	1.7	2.25	1	1	1
10-11	124	08-Feb-11	E14	Effect of Ramp-up Time	IP Mod	ABC-S Plus	18	100	20	7.31	-11.3	-13.9	-10.7	-12.9	75	-	-	-	10	2.5	2.5	3.3	1	1.7	2.2	1	1	1.1
10-11	14	20-Jan-11	P026	Type IV Fluid Val.	IP Mod	Max-Flight	8	100	20	8.02	-12.3	-14.2	-11.8	-13.8	75	-	-	-	10	2.3	2.5	3.3	1.4	2.5	3	1	1	1.2
10-11	13	20-Jan-11	P026A	Effect of Ramp-up Time	IP Mod	Max-Flight	8	100	20	3.73	-12.4	-15	-11.8	-13.9	75	-	-	-	10	2.3	2.5	3.3	1	1.3	1.7	1	1	1.5

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
10-11	92	01-Feb-11	P126A	CL MAX/ IP VAL	IP Mod	ABC-S Plus	-	100	20	12.80	-13.6	-17.3	-11.3	-13.1	75	-	-	-	10	2.5	2.6	3.4	1.2	1.8	2.6	1	1	1
10-11	92A	01-Feb-11	P126A	IP Val	IP Mod	ABC-S Plus	8	100	20	13.36	-14.2	-17.1	-10.8	-14	75	-	-	-	10	2.8	2.5	3.3	1.2	2	2.7	1	1.2	1.5
10-11	26	23-Jan-11	P123	IP Data Gap	IP Mod	EG106	8	100	20	3.07	-21	-25.4	-21	-21	75	-	-	-	10	2.35	2.35	3	1	1.2	1.5	1	1	1.1
10-11	25	23-Jan-11	P124	IP Data Gap	IP Mod	ABC-S Plus	8	100	20	10.77	-22.3	-25.1	-20.2	-21.2	75	-	-	-	10	2.75	2.75	4	1.6	2	2.75	1.1	1.2	2.35
11-12	168	02-Feb-12	P047A	Fluid Tests - Repeatability	IP Mod	ABC-S Plus	8	100	-	4.92	-2.6	-5.5	-	-	75	-	-	-	10	2	2	2.4	1	1	1.4	1	1	1
11-12	169	02-Feb-12	P047A	Fluid Tests - Repeatability	IP Mod	ABC-S Plus	8	100	-	5.70	-2.9	-6.2	-	-	75	-	-	-	10	2	2	1.8	0.7	1.4	1	1	1	1
11-12	172	02-Feb-12	P047A	Fluid Tests - Repeatability	IP Mod	ABC-S Plus	8	100	-	5.97	-3.4	-6.4	-	-	75	-	-	-	10	2.7	2.3	3.5	1.1	1.6	2.3	1.0	1.1	1.8
11-12	124	30-Jan-12	E17	Fluid Tests - Repeatability	IP Mod	EG106	8	100	-	1.83	-3.5	-9.8	-	-	75	-	-	-	25	2.4	2.2	3.8	1	1.1	1.2	1	1	1
11-12	171	02-Feb-12	P047A	Fluid Tests - Repeatability	IP Mod	ABC-S Plus	8	100	-	5.65	-3.7	-6.2	-	-	75	-	-	-	10	3	2.9	3.8	1.2	1.5	2	1.1	1.1	1.7
11-12	170	02-Feb-12	P047A	Fluid Tests - Repeatability	IP Mod	ABC-S Plus	8	100	-	5.66	-3.8	-6.1	-	-	75	-	-	-	10	3.8	3.4	4	1.5	2.2	3.5	1.2	1.8	3.6
11-12	118	30-Jan-12	P045	Fluid Tests - Repeatability	IP Mod	Launch	8	100	-	6.28	-4	-6.1	-	-	75	-	-	-	25	2.1	2.0	2.6	1.1	1.4	1.8	1.0	1.1	1.3

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	1	16-Jan-12	P001	Clean Wing	None	none	8	100	-	-0.27	n/a	-18.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	2	16-Jan-12	P002	Clean Wing	None	none	8	80	-	0.37	n/a	-18.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	3	16-Jan-12	P003	Clean Wing	None	none	22	80	-	0.45	n/a	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	4	16-Jan-12	P006	Clean Wing	None	none	22	80	-	-0.59	-18.6	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	5	16-Jan-12	P004	Clean Wing	None	none	22	80	-	0.48	-9.2	-15.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	6	16-Jan-12	P005	Clean Wing	None	none	22	80	-	0.34	n/a	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	7	16-Jan-12	P007	Clean Wing	None	none	8	100	-	-0.35	-12.3	-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	8	16-Jan-12	P009	Clean Wing	None	none	22	80	-	0.60	-12	-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	9	16-Jan-12	P008	Clean Wing	None	none	8	80	-	0.34	-12	-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	10	16-Jan-12	P010	Clean Wing	None	none	22	80	-	0.08	-13	-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	11	16-Jan-12	P012	Clean Wing	None	none	22	80	-	-0.68	-12	-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	12	16-Jan-12	P011	Clean Wing	None	none	22	80	-	0.22	-13	-15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	13	16-Jan-12	P027	Roughness (Trips)	150-grit	none	22	80	-	1.11	-11.5	-13.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	14	16-Jan-12	P028	Roughness (Trips)	150-grit	none	22	80	-	0.30	15.7	-13.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	15	17-Jan-12	P025	Roughness (Trips)	40-grit	none	15	80	-	2.15	18.9	-8.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	16	17-Jan-12	P026	Roughness (Trips)	40-grit	none	15	80	-	1.55	-6	-8.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	17	17-Jan-12	P029	Roughness (Trips)	80-grit	none	15	80	-	1.36	13.1	-7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	18	17-Jan-12	P030	Roughness (Trips)	80-grit	none	15	80	-	0.90	-5.6	-7.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	19	17-Jan-12	P031	Roughness (Trips)	Full Wing 80 Grit	none	15	80	-	7.24	16.7	-5.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	20	17-Jan-12	P032	Roughness (Trips)	Full Wing 80 Grit	none	15	80	-	7.28	0.3	-4.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	21	17-Jan-12	P031	Roughness (Trips)	Full Wing 80 Grit	none	15	80	-	7.46	-3	-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	22	17-Jan-12	P033	Roughness (Trips)	Grit (-30 grit on LE)	none	20	80	-	6.71	14.4	-4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	23	17-Jan-12	P034	Roughness (Trips)	Grit (-30 grit on LE)	none	22	80	-	6.46	-2	-4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	24	17-Jan-12	P033	Roughness (Trips)	Grit (-30 grit on LE)	none	24	80	-	7.13	-2.1	-4.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	25	17-Jan-12	P035	Roughness (Trips)	Grit (-60 grit on LE)	none	22	80	-	5.11	14	-3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	26	17-Jan-12	P036	Roughness (Trips)	Grit (-60 grit on LE)	none	22	80	-	5.59	-2	-3.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	27	18-Jan-12	P035A	Roughness (Trips)	Grit (only flap)	none	22	80	-	4.77	-14.3	11.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	28	18-Jan-12	P036A	Roughness (Trips)	Grit (only flap)	none	22	80	-	4.96	-14.4	-11.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	29	18-Jan-12	P003	Clean Wing	None	none	22	80	-	0.37	n/a	-13.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	30	18-Jan-12	P006	Clean Wing	None	none	22	80	-	0.40	-11.3	-13.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	31	18-Jan-12	P003A	Clean Wing	None	none	22	80	-	-0.25	-11.3	-13.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	32	18-Jan-12	E1	Flow Visualization	Tufts	none	20	80	-	0.66	-8.6	-12.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	33	18-Jan-12	E2	Flow Visualization	Tufts	none	22	80	-	0.30	-10.8	-12.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	34	18-Jan-12	P006	Clean Wing/Oil Flow Vis	None	none	22	80	-	-0.28	-3	-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	35	19-Jan-12	P013	Oil Flow Visualization	Oil	none	8 static	80	-	n/a	-7.8	-17.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	36	19-Jan-12	P020	Oil Flow Visualization	Oil	none	12 static	80	-	n/a	-9.2	-16.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	37	19-Jan-12	P021	Oil Flow Visualization	Oil	none	12 then sweep to 16	80	-	n/a	-9.2	-15.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	38	19-Jan-12	P022	Oil Flow Visualization	Oil	none	12 then sweep to 18	80	-	n/a	-8.2	-14.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	39	19-Jan-12	P023	Oil Flow Visualization	Oil	none	12 then sweep to 20	80	-	n/a	-6.7	-13.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	40	19-Jan-12	P013	Oil Flow Visualization	Oil	none	8	80	-	n/a	-6.4	-12.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	41	19-Jan-12	E3	Boundary Layer Rake	None	none	20	80	-	n/a	-1.9	-11.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	42	19-Jan-12	E4	Boundary Layer Rake	None	none	20	80	-	n/a	-4.5	-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	43	19-Jan-12	E5	Boundary Layer Rake	None	none	20	80	-	n/a	-6.3	-10.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	44	19-Jan-12	E6	Boundary Layer Rake	None	none	20	80	-	n/a	-5	-10.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
11-12	45	20-Jan-12	E7	Boundary Layer Rake	None	none	20	80	-	n/a	-15	-19.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	46	20-Jan-12	E8	Boundary Layer Rake	None	none	20	80	-	n/a	-18.1	-19.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	47	20-Jan-12	P003	Clean Wing	None	none	20	80	-	-0.84	-15.8	-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	48	20-Jan-12	P006	Clean Wing	None	none	-2 to 22	80	-	-0.47	-17.4	-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	49	20-Jan-12	P039	Fluid Tests - Repeatability	Fluid Only	EG106	8	100	-	n/a	-14.8	-19.4	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
11-12	50	20-Jan-12	P039	Fluid Tests - Repeatability	Fluid Only	EG106	8	100	-	-0.76	-15.2	-18.9	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	51	20-Jan-12	P040	Fluid Tests - Repeatability	Fluid Only	EG106	8	100	-	2.59	-13.1	-18	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	52	20-Jan-12	P040	Fluid Tests - Repeatability	Fluid Only	EG106	8	100	-	3.43	-12.4	-17.1	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	53	20-Jan-12	P065	Fluid Tests - Data at Stall	Fluid Only	EG106	18	100	-	4.41	-13.4	-16.5	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	54	20-Jan-12	P037	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	6.02	-12.9	-16.4	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	55	20-Jan-12	P038	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	n/a	-12.5	-16.4	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
11-12	56	20-Jan-12	P038	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	5.43	-12.4	-15.7	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	57	20-Jan-12	P064	Fluid Tests - Data at Stall	Fluid Only	ABC-S Plus	18	100	-	5.37	-11.3	-15.6	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	125	30-Jan-12	E17	Fluid Tests - Repeatability	IP Mod	EG106	18	100	-	1.69	-4.1	-10.4	-	-	75	-	-	-	25	25	2.3	2.2	3.8	1	1.1	1.1	1.1	1	1
11-12	60	24-Jan-12	P073	END PLATES - Clean Wing	None	none	8	100	-	0.09	2	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	61	24-Jan-12	P074	END PLATES - Clean Wing	None	none	8	80	-	-0.01	2	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	62	24-Jan-12	P075	END PLATES - Clean Wing	None	none	22	80	-	-0.34	2	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	63	24-Jan-12	P078	END PLATES - Clean Wing	None	none	2 to 22	80	-	-0.95	2	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	64	24-Jan-12	P076	END PLATES - Clean Wing	None	none	22	80	-	0.19	2	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	65	24-Jan-12	P077	END PLATES - Clean Wing	None	none	22	80	-	0.13	2	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	66	24-Jan-12	P079	END PLATES - Clean Wing	None	none	8	100	-	0.08	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	67	24-Jan-12	P080	END PLATES - Clean Wing	None	none	8	80	-	0.23	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	68	24-Jan-12	P081	END PLATES - Clean Wing	None	none	18	80	-	0.51	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	69	24-Jan-12	P084	END PLATES - Clean Wing	None	none	-2 to 18	80	-	-0.72	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	70	24-Jan-12	P082	END PLATES - Clean Wing	None	none	18	80	-	0.57	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	71	24-Jan-12	P083	END PLATES - Clean Wing	None	none	18	80	-	0.40	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	72	24-Jan-12	P097	END PLATES - Rough(Trips)	40-grit	none	15	80	-	2.29	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	73	24-Jan-12	P098	END PLATES - Rough(Trips)	40-grit	none	-2 to 15	80	-	2.82	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	74	24-Jan-12	P099	END PLATES - Rough(Trips)	150-grit	none	15	80	-	0.73	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	75	24-Jan-12	P100	END PLATES - Rough(Trips)	150-grit	none	-2 to -15	80	-	0.45	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	76	24-Jan-12	P101	END PLATES - Rough(Trips)	80-grit	none	15	80	-	1.48	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	77	24-Jan-12	P102	END PLATES - Rough(Trips)	80-grit	none	-2 to -15	80	-	1.42	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	78	24-Jan-12	P107A	END PLATES - Rough(Trips)	Grit (only flap)	none	15	80	-	6.69	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	79	24-Jan-12	P108A	END PLATES - Rough(Trips)	Grit (only flap)	none	-2 to 15	80	-	7.33	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	80	24-Jan-12	P075	END PLATES - Clean Wing	None	none	18	80	-	-0.51	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	81	24-Jan-12	P075A	END PLATES - Clean Wing	None	none	18	80	-	-0.09	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	82	24-Jan-12	P078	END PLATES - Clean Wing	None	none	18	80	-	-1.06	d	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	83	25-Jan-12	E9	Boundary Layer Rake	None	none	16	80	-	n/a	4.7	-7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	84	25-Jan-12	E10	Boundary Layer Rake	None	none	16	80	-	n/a	4.3	-7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	85	25-Jan-12	E11	Boundary Layer Rake	None	none	16	80	-	n/a	4.3	-7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	86	25-Jan-12	E12	Boundary Layer Rake	None	none	16	80	-	n/a	-1	-7.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	87	25-Jan-12	E13	Boundary Layer Rake	None	none	16	80	-	n/a	-1	-7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	88	25-Jan-12	E14	Boundary Layer Rake	None	none	16	80	-	n/a	-1	-7.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	89	25-Jan-12	P075	END PLATES - Clean Wing	None	none	18	80	-	-0.76	0.6	-7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	90	25-Jan-12	P078	END PLATES - Clean Wing	None	none	-2 to 18	80	-	-1.12	-5	-7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	91	25-Jan-12	E15	Flow Visualization	Tufts	none	16	80	-	n/a	4	-6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	92	25-Jan-12	E16	Flow Visualization	Tufts	none	18	80	-	n/a	-4.1	-6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	93	25-Jan-12	E16	Flow Visualization	Tufts	none	18	80	-	n/a	-4.1	-6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	94	25-Jan-12	P092	END PLATES - Oil Flow Vis	Oil	none	5	80	-	n/a	6.2	-5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	95	25-Jan-12	P085	END PLATES - Oil Flow Vis	Oil	none	8	80	-	n/a	6	-5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	96	25-Jan-12	P093	END PLATES - Oil Flow Vis	Oil	none	12	80	-	n/a	4.5	-5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	97	26-Jan-12	P094	END PLATES - Oil Flow Vis	Oil	none	12	80	-	n/a	-10	-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	98	26-Jan-12	P078	END PLATES - Clean Wing	Oil	none	stall -4 to stall +4	80	-	n/a	-10	-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	99	26-Jan-12	P095	END PLATES - Oil Flow Vis	Oil	none	12	80	-	n/a	-10	-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	100	26-Jan-12	P078	END PLATES - Clean Wing	None	none	stall -4 to stall +4	80	-	n/a	-5.7	-12.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	101	26-Jan-12	P078	END PLATES - Clean Wing	None	none	stall -4 to stall +4	80	-	n/a	-9.2	-11.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	102	26-Jan-12	P109	END PLATES - Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	5.96	-7.1	-10.6	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	103	26-Jan-12	P110	END PLATES - Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	5.95	-5.5	-8.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	104	26-Jan-12	P136	END PLATES - Fluid Tests - Data at Stall	Fluid Only	ABC-S Plus	13	100	-	5.40	-4.5	-8.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	105	26-Jan-12	P111	END PLATES - Fluid Tests - Repeatability	Fluid Only	EG106	8	100	-	3.11	-3.6	-7.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	106	26-Jan-12	P112	END PLATES - Fluid Tests - Repeatability	Fluid Only	EG106	8	100	-	3.17	-2.7	-6.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	107	26-Jan-12	P137	END PLATES - Fluid Tests - Data at Stall	Fluid Only	EG106	16	100	-	3.91	-2.8	-6.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	108	26-Jan-12	P113	END PLATES - Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	7.76	-1.8	-5.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	109	26-Jan-12	P114	END PLATES - Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	6.62	-2.1	-5.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	110	26-Jan-12	P114	END PLATES - Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	7.40	-2.3	-5.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	111	26-Jan-12	P138	END PLATES - Fluid Tests - Data at Stall	Fluid Only	Launch	15	100	-	7.38	-2.6	-5.7	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	112	26-Jan-12	P007	Clean Wing	None	none	8	100	-	-0.52	-2.6	-5.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	113	29-Jan-12	P003	Clean Wing	None	none	stall	80	-	0.53	-1.4	-5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	114	29-Jan-12	P001	Clean Wing	None	none	8	100	-	-0.22	-1.4	-5.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	115	29-Jan-12	P041	Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	5.38	-1.6	-5.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	116	29-Jan-12	P042	Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	5.80	-1.4	-5.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	117	29-Jan-12	P066	Fluid Tests - Data at Stall	Fluid Only	Launch	18	100	-	5.47	-1.5	-5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	119	30-Jan-12	P046	Fluid Tests - Repeatability	IP Mod	Launch	8	100	-	7.38	-4.4	-7.2	75	-	-	-	-	-	25	3	3	3.7	1.1	1.7	2	1	1	1.1
11-12	121	30-Jan-12	P039A	Fluid Tests - Repeatability	Fluid Only	EG106	8	100	-	3.56	-6.2	-8.8	-	-	-	-	-	-	-	3.0	2.7	3.8	1.0	1.8	2.1	1	1	1.2
11-12	122	30-Jan-12	P039A	Fluid Tests - Repeatability	Fluid Only	EG106	8	100	-	3.52	-6.4	-9.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	123	30-Jan-12	P065A	Fluid Tests - Data at Stall	Fluid Only	EG106	18	100	-	2.94	-6.6	-9.6	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	126	30-Jan-12	P003	Clean Wing	None	none	stall	80	-	0.97	-10	-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	127	30-Jan-12	P003	Clean Wing	None	none	stall	80	-	-0.79	-10	-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	128	30-Jan-12	P154	Windshield Washer Fluid	Fluid Only	Costco Green WWF	8	80	-	0.17	-4.8	-9.7	-	-	-	-	-	-	-	2.4	2.2	3.2	1.1	1.7	2.2	1	1.1	1.5
11-12	129	30-Jan-12	P154	Windshield Washer Fluid	Fluid Only	Rain X WWF	8	80	-	0.35	-4.4	-10.2	-	-	-	-	-	-	-	2.7	2.2	3.2	1	1.5	1.9	1	1.1	1.3
11-12	130	31-Jan-12	P153	Windshield Washer Fluid	Fluid Only	Octaflo EF	8	80	-	1.49	-4.7	-10.6	-	-	-	-	-	-	-	2.5	2.4	3.4	1.2	1.6	1.8	1	1.2	1.3
11-12	131	31-Jan-12	P155	Windshield Washer Fluid	Frost	Costco Green WWF	8	80	-	1.19	-5.4	-10.8	-	-	-	-	-	-	22.5	4	3.8	5	5	5	5	5	5	5
11-12	132	31-Jan-12	P155A	Windshield Washer Fluid	Frost	Rain X WWF	8	80	-	1.34	-6.8	-10.6	-	-	-	-	-	-	22.5	5	5	5	5	5	5	5	5	5
11-12	133	31-Jan-12	P155B	Windshield Washer Fluid	Frost	Octaflo EF	8	80	-	1.08	-6.2	-10.5	-	-	-	-	-	-	22.5	-	-	-	-	-	-	-	-	-
11-12	134	31-Jan-12	P152	Other Fluid Tests: Frost Spot Deicing	Frost	Octaflo EF	8	80	-	1.07	-5.5	-10.4	-	-	-	-	-	-	-	9	3	3.9	1.1	1.1	2.2	1	1.1	1.8
11-12	135	31-Jan-12	P154C	Windshield Washer Fluid	Fluid Only	Prestone	8	80	-	0.82	-6.1	-10.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	136	31-Jan-12	P155C	Windshield Washer Fluid	Frost	Prestone	8	80	-	0.37	-5.0	-10.2	-	-	0.3	-	-	-	45	1	1	1	1	1	1	1	1	1
11-12	137	31-Jan-12	P154D	Windshield Washer Fluid	Fluid Only	Hot Water	8	80	-	0.58	-3.6	-10	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
11-12	138	31-Jan-12	P155D	Windshield Washer Fluid	Frost	Hot Water	8	80	-	0.18	-2.8	-9.7	-	-	-	0.3	-	-	-	45	1	2.3	1	1	3.7	3.7	1	3.7	3.7
11-12	139	31-Jan-12	P003	Clean Wing	None	none	stall	80	-	0.75	-5.3	-9.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	140	31-Jan-12	P003	Clean Wing	None	none	stall	80	-	-0.44	-0.2	-7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	141	31-Jan-12	P001	Clean Wing	None	none	8	100	-	-0.23	0.1	-7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	142	31-Jan-12	P003	Clean Wing	None	none	stall	80	-	-0.01	0.1	-7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	143	31-Jan-12	P001	Clean Wing	None	none	8	100	-	1.30	-3.9	-7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	144	31-Jan-12	P003	Clean Wing	None	none	stall	80	-	-0.09	-3.9	-7.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	145	31-Jan-12	P001	Clean Wing	None	none	8	100	-	0.21	-5.1	-7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	146	31-Jan-12	P003	Clean Wing	None	none	stall	80	-	-0.89	-5.1	-7.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	147	31-Jan-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	4.14	-3.6	-7.6	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
11-12	148	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	5.16	-3.2	-7.5	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	149	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	5.16	-3.2	-7.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	150	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	5.48	-3.0	-7.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	151	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	5.53	-1.9	-7.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	152	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	6.31	-2.9	-7.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	153	01-Feb-12	P001	Clean Wing	None	none	8	100	-	-0.22	-3.5	-7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	154	01-Feb-12	P003	Clean Wing	None	none	stall	80	-	0.10	-3.5	-7.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	155	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	4.59	-2.3	-7.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	156	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	4.96	-2.1	-7.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	157	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	4.62	-2.4	-7.0	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	158	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	4.77	-2.2	-7	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	159	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	4.68	-1.7	-6.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	160	01-Feb-12	P037A	Fluid Tests - Repeatability	Fluid Only	ABC-S Plus	8	100	-	4.73	-1.7	-6.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	161	01-Feb-12	P001	Clean Wing	None	none	8	100	-	-0.43	-2.3	-6.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	162	01-Feb-12	P003	Clean Wing	None	none	stall	80	-	-0.57	-2.3	-6.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	163	01-Feb-12	P003	Clean Wing	None	none	stall	80	-	-1.15	-1.5	-3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	164	01-Feb-12	P001	Clean Wing	None	none	8	100	-	-0.63	-1.5	-3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	165	01-Feb-12	P147	TC R&D – S- & S--	S--	ABC-S Plus (50)	8	100	-	1.45	-2	-4.1	-	-	3	-	-	-	72	2.3	2.3	3	1.0	1.4	1.3	1	1	1.0
11-12	166	01-Feb-12	P148	TC R&D – S- & S--	Mod S (Base line)	ABC-S Plus (50)	8	100	-	2.02	-2.3	-4.4	-	-	25	-	-	-	25	2.5	2.8	4.2	1	1.7	2.5	1	1	1.3
11-12	167	02-Feb-12	P149	TC R&D – S- & S--	Fluid Only	ABC-S Plus (50)	8	100	-	1.91	-2.3	-4.6	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
11-12	120	30-Jan-12	P068	Fluid Tests - Data at Stall	IP Mod	Launch	18	100	-	7.63	-4.9	-8.1	-	-	75	-	-	-	25	3	3.3	3.7	1	1.8	2.3	1	1	1.1
11-12	173	02-Feb-12	P001	Clean Wing	None	none	8	100	-	-0.48	-3.4	-5.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
11-12	174	02-Feb-12	P003	Clean Wing	None	none	stall	80	-	-0.79	-3.4	-5.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	175	02-Feb-12	P003	Clean Wing	None	none	stall	80	-	-0.38	-6	-8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	176	02-Feb-12	P001	Clean Wing	None	none	8	100	-	-0.71	-6	-8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11-12	177	02-Feb-12	P041	Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	4.44	-5	-8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	178	02-Feb-12	P041	Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	5.48	-8	-8.6	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	179	02-Feb-12	P041	Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	4.88	-5.6	-10.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	180	02-Feb-12	P041	Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	5.23	-5.4	-10.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	181	02-Feb-12	P041	Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	5.21	-7.7	-11.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	182	02-Feb-12	P041	Fluid Tests - Repeatability	Fluid Only	Launch	8	100	-	5.53	-6.8	-11.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	183	02-Feb-12	E18	Heavy Contamination (Armageddon)	IP+	Launch	18	100	-	8.79	-6.3	-12.1	-	-	260	-	-	-	20	5	5	5	5	5	5	5	5	5
11-12	184	02-Feb-12	P001	Clean Wing	None	none	8	100	-	-0.44	-6.7	-12.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
11-12	185	02-Feb-12	P003	Clean Wing	None	none	stall	80	-	-0.12	-6.7	-12.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
11-12	59	20-Jan-12	P048	Fluid Tests - Repeatability	IP Mod	ABC-S Plus	8	100	-	10.88	-10.1	-15.5	-	-	75	-	-	-	10	2.3	2.7	3.7	1.1	2	2.7	1	1	1.4
11-12	58	20-Jan-12	P047	Fluid Tests - Repeatability	IP Mod	ABC-S Plus	8	100	-	9.91	-12.1	-15.3	-	-	75	-	-	-	10	2.7	2.5	4	1	2	2.8	1	1	2
12-13	180	29-Jan-13	P042	Ice Phobic Coating R&D	IP mod	Max-Flight	8	100	20	5.67	-1.9	-9.5	-	-	75	-	-	-	15	2.3	2.3	3	1	1.4	1.5	1	1	1.1
12-13	181	29-Jan-13	P045	Ice Phobic Coating R&D	IP mod	Max-Flight	8	100	20	5.04	-2.9	-9.6	-	-	75	-	-	-	15	2.2	2.2	3.0	1	1.4	1.4	1	1	1.1
12-13	163	27-Jan-13	E8	IP Validation with New Fluids	IP mod	ABC-S Plus	8	100	20	6.27	-3.8	-11.8	-	-	75	-	-	-	15	2.4	2	3.1	1.0	1.4	1.3	1	1.0	1.1
12-13	188	31-Jan-13	P041	Ice Phobic Coating R&D	IP mod	Max-Flight	8	100	20	6.57	-3.9	-5.2	-	-	75	-	-	-	15	2	2.2	2.8	1	1.4	1.5	1	1	1.1
12-13	86	17-Jan-13	P196	IP Validation with New Fluids	IP mod	Polar Guard Advance	8	100	20	6.15	-4.7	-6.3	-	-	75	-	-	-	15	2	2	2.5	1	1.7	1.8	1	1	1.1
12-13	164	27-Jan-13	P139R	Effect of Viscosity on Fluid Aerodynamics	IP mod	ABC-S Plus	8	100	20	6.79	-4.9	-11.2	-	-	75	-	-	-	15	2	2.1	3.2	1	1.4	1.5	1	1.0	1.1
12-13	1	19-Dec-12	n/a	Clean Wing	Dry Wing	none	-2 to 22	80	20	-0.62	n/a	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	2	19-Dec-12	n/a	Clean Wing	Dry Wing	none	-2 to 22	80	20	-0.80	n/a	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	3	19-Dec-12	n/a	Clean Wing	Dry Wing	none	8	80	20	-0.12	n/a	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	4	19-Dec-12	n/a	Roughness	Dry Wing	none	8	80	20	5.41	2.1	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	5	19-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	6.29	2.1	1.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	6	19-Dec-12	n/a	Roughness	Dry Wing	none	-2 to 22	80	20	5.59	1	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	7	19-Dec-12	n/a	Roughness	Dry Wing	none	-2 to 22	80	20	6.15	0.9	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	8	19-Dec-12	n/a	Boundary Layer Rake	Dry Wing	none	-2 to 18	80	20	16.45	0.5	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	9	20-Dec-12	n/a	Boundary Layer Rake	Dry Wing	none	-2 to 18	80	20	4.36	-5.4	-5.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	10	20-Dec-12	n/a	Boundary Layer Rake	Dry Wing	none	-2 to 18	80	20	11.39	-3.7	-4.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	11	20-Dec-12	n/a	Boundary Layer Rake	Dry Wing	none	-2 to 18	80	20	19.38	-3	-3.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	12	20-Dec-12	n/a	Roughness	Dry Wing	none	8	80	20	12.66	-1	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	13	20-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	n/a	-1.8	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	14	20-Dec-12	n/a	Roughness	Dry Wing	none	-2 to 22	80	20	12.88	-2.1	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	15	20-Dec-12	n/a	Roughness	Dry Wing	none	-2 to 22	80	20	13.44	-2.5	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	16	20-Dec-12	n/a	Clean Wing	Dry Wing	none	22	80	20	0.16	0	-2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	17	20-Dec-12	n/a	Clean Wing	Dry Wing	none	8	80	20	-0.20	-0.5	-2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	18	20-Dec-12	n/a	Clean Wing	Dry Wing	none	8	100	20	0.25	-1.1	-2.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	19	20-Dec-12	n/a	Roughness	Dry Wing	none	8	80	20	2.29	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	20	20-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	0.80	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	21	20-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	-0.56	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	22	20-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	-0.50	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	23	20-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	-0.50	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	24	20-Dec-12	n/a	Roughness	Dry Wing	none	8	80	20	0.21	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	25	20-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	-0.49	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	26	20-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	-0.15	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	27	20-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	-0.09	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	28	20-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	0.39	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	29	20-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	-0.23	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	30	20-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	-0.80	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	31	20-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	0.95	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	32	20-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	0.48	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	33	20-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	0.33	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	34	20-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	0.07	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	35	20-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	0.36	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	36	20-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	0.70	-2	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
12-13	37	21-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	0.28	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	38	21-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	0.80	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	39	21-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	-0.15	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	40	21-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	0.79	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	41	21-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	0.30	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	42	21-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	-0.31	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	43	21-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	0.96	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	44	21-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	0.23	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	45	21-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	0.07	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	46	21-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	1.01	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	47	21-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	1.38	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	48	21-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	0.22	1.5	0.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	49	21-Dec-12	n/a	Roughness	Dry Wing	none	8	100	20	0.25	1.4	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	50	21-Dec-12	n/a	Roughness	Dry Wing	none	22	80	20	-0.61	1.4	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	51	21-Dec-12	n/a	Roughness	Dry Wing	none	-4 to 22	80	20	-0.30	1.4	0.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	52	8-Jan-13	P102	Evaluation of Stallwarning Sensor	none	none	stall	80	20	0.15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	53	08-Jan-13	P103	Evaluation of Stallwarning Sensor	none	none	stall	80	20	1.94	11.6	0.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	54	08-Jan-13	P104	Evaluation of Stallwarning Sensor	none	none	stall	80	20	1.28	10	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	55	08-Jan-13	P110	Evaluation of Stallwarning Sensor	Fluid Only	Type I EG	stall	80	20	2.48	3	2.8	2.1	5.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	56	08-Jan-13	P107	Evaluation of Stallwarning Sensor	Fluid Only	EG106	stall	80	20	5.20	2.9	3.1	3.0	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	57	08-Jan-13	P103	Evaluation of Stallwarning Sensor	none	none	stall	80	20	2.93	3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	58	08-Jan-13	P104	Evaluation of Stallwarning Sensor	none	none	stall	80	20	1.85	3	2.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	59	08-Jan-13	P107	Evaluation of Stallwarning Sensor	Fluid Only	EG106	stall	80	20	4.38	2.8	1.9	2.4	2.0	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	60	14-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.06	-0.4	-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	61	14-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	-0.29	-0.4	-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	62	14-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	0.40	-0.4	-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	63	15-Jan-13	P211	IP Validation with New Fluids	IP- / R Mod	Polar Guard Advance	8	100	20	3.04	3.1	-1.5	2.6	2.3	25	-	-	75	25	1	1	1	1	1	1	1	1	1
12-13	64	15-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	0.41	-1.8	-2.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	66	15-Jan-13	E1	Baseline	Fluid Only	Max-Flight	stall	80	20	7.71	-0.1	-3.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	68	15-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.35	0.5	-2.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	69	15-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	0.04	-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	73	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	1.39	-0.2	-3.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	74	16-Jan-13	P211	IP Validation with New Fluids	IP- / R Mod	Polar Guard Advance	8	100	20	3.33	2.9	-5.4	-	-	25	-	-	75	25	1	1	1.2	1	1	1.2	1	1	1.1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	75	16-Jan-13	P196	IP Validation with New Fluids	IP-	Polar Guard Advance	8	100	20	6.09	-1.1	-6.2	-	-	25	-	-	-	15	1.8	1.8	2.4	1	1	1.3	1	1	1.2
12-13	76	16-Jan-13	P193	IP Validation with New Fluids	IP-	Polar Guard Advance	8	100	20	4.64	-0.9	-6.4	-	-	25	-	-	-	50	2	2	3	1	1.2	1.5	1	1	1.1
12-13	77	16-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.17	1.1	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	78	16-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	0.00	1.1	0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	80	17-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	0.63	1.7	0.9	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
12-13	81	17-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	1.63	1.7	0.9	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
12-13	82	17-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	0.64	1.6	0.9	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
12-13	83	17-Jan-13	E2	Baseline	Fluid Only	ABC-S Plus	stall	80	20	6.37	1.3	0.6	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
12-13	85	17-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	ABC-S Plus	stall	80	20	1.69	-1.3	-2.4	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
12-13	87	17-Jan-13	P214	IP Validation with New Fluids	IP- / SN-	Polar Guard Advance	8	100	20	6.35	-6.6	-9.7	-	-	25	10	-	-	25	2	2.2	2.7	1.1	2	1.7	1	1	1.3
12-13	88	17-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	-0.09	-10.2	-18.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	89	17-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.41	-10.2	-18.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	90	17-Jan-13	P011	IP Flow-Off Issues	IP-	Polar Guard Advance	8	100	20	9.07	-10.2	-17.6	-	-	25	-	-	-	30	2	2.1	2.6	1.1	1.7	2.2	1	1.3	1.9
12-13	91	17-Jan-13	P012	IP Flow-Off Issues	IP-	Polar Guard Advance	8	115	20	6.58	-11.9	-19	-	-	25	-	-	-	30	2	2.2	2.6	1	1.4	2.0	1	1	1.3
12-13	92	17-Jan-13	P032	IP Flow-Off Issues	IP mod	Polar Guard Advance	8	115	20	8.05	-14.4	-19.1	-	-	75	-	-	-	10	2	2.17	2.5	1	1.3	2.0	1	1.0	1.3
12-13	94	18-Jan-13	E3	Baseline	Fluid Only	Polar Guard Advance	8	100	20	7.98	-14.7	-18.9	-	-	-	-	-	-	#N/A	1	1	1	1	1	1	1	1	1
12-13	95	18-Jan-13	P024	IP Flow-Off Issues	IP mod	ABC-S Plus	8	115	20	7.44	-13.8	-18.5	-	-	75	-	-	-	10	2.2	2.1	3.2	1	1.7	2.1	1	1	1.3
12-13	97	18-Jan-13	P004	IP Flow-Off Issues	IP-	ABC-S Plus	8	115	20	7.58	-14	-19.5	-	-	25	-	-	-	30	2.2	2.2	3.1	1	1.6	1.9	1	1.1	1.5
12-13	98	20-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.18	-13.6	-15.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	99	20-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	-0.04	-15.3	-15.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	100	20-Jan-13	P199	IP Validation with New Fluids	IP-	Polar Guard Advance	8	100	20	9.79	-12.9	-16.2	-	-	25	-	-	-	30	2.2	2.2	2.7	1.2	1.6	2.0	1	1.3	1.7
12-13	101	21-Jan-13	P091	Effect of Ice Phobic Coatings on BLDT	Fluid Only	2031 - Cold	8	67	20	6.08	-15	-17.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	102	21-Jan-13	P033	Ice Phobic Coating R&D	None	none	8	100	20	0.64	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	103	21-Jan-13	P033	Ice Phobic Coating R&D	None	none	22	80	20	0.67	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	104	21-Jan-13	P086	Effect of Ice Phobic Coatings on BLDT	Fluid Only	2031 - Cold	8	67	20	6.54	-12.8	-18.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	105	21-Jan-13	E4	Ice Phobic Coating R&D	None	Max-Flight	8	100	20	7.12	-13.7	-18.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	106	21-Jan-13	E5	Ice Phobic Coating R&D	None	EG106	8	100	20	to be calculated	-14.9	-19.6	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	107	21-Jan-13	P033	Ice Phobic Coating R&D	None	none	8	100	20	1.09	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	108	21-Jan-13	P033	Ice Phobic Coating R&D	None	none	22	80	20	1.55	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	109	22-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.32	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	110	22-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.71	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	111	22-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	-0.08	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	112	22-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.43	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	113	22-Jan-13	P030	IP Flow-Off Issues	IP mod	Max-Flight	8	115	20	7.31	-13.7	-19.2	-	-	75	-	-	-	10	2	2.3	3.1	1.0	1.2	1.6	1	1	1.2
12-13	114	22-Jan-13	P166	IP Expansion	IP- / SN-	Polar Guard Advance	8	115	20	7.14	-10	-18.4	-	-	25	10	-	-	5	2.2	2.2	2.8	1.0	1.4	1.8	1	1	1.3
12-13	115	22-Jan-13	P164	IP Expansion	IP- / SN-	Max-Flight	8	115	20	7.48	-9.3	-18.6	-	-	25	10	-	-	5	2.1	2	3	1.1	1.5	1.8	1	1	1.2
12-13	116	22-Jan-13	P176	IP Expansion	IP- / SN	Max-Flight	8	100	20	7.74	-8.7	-18.7	-	-	25	25	-	-	10	2.3	2.2	2.8	1.2	1.6	1.9	1	1.0	1.2
12-13	117	22-Jan-13	P178	IP Expansion	IP- / SN	Polar Guard Advance	8	100	20	9.65	-10.3	-18.7	-	-	25	25	-	-	10	2.2	2	3.1	1.1	1.4	1.7	1	1.1	1.3
12-13	118	22-Jan-13	P178R	IP Expansion	IP- / SN	Polar Guard Advance	8	100	20	9.32	-10.8	-18.8	-	-	25	25	-	-	7	2.1	2	2.6	1.1	1	1.8	1	1.1	1.3
12-13	119	22-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	-0.31	n/a	-21.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	120	22-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.43	n/a	-21.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	121	22-Jan-13	P024	IP Flow-Off Issues	IP mod	ABC-S Plus	8	115	20	6.56	-19.9	-24	-	-	75	-	-	-	10	3	2.7	3.8	1.1	1.8	2.1	1	1	1.2
12-13	122	23-Jan-13	P114	Baseline (BLDT)	Fluid only	ABC-S Plus - 75/25	8	100	20	5.07	-21.2	-24.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	123	24-Jan-13	P132	Baseline (BLDT)	Fluid Only	Polar Guard Advance - 75/25	8	100	20	3.35	-21.4	-25.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	124	23-Jan-13	P137	Baseline (BLDT)	Fluid Only	Max-Flight - 75/25	8	100	20	4.71	-21.4	-25.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	125	23-Jan-13	P122	Baseline (BLDT)	Fluid only	Launch - 75/25	8	100	20	6.39	-21.8	-25.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	126	23-Jan-13	P127	Baseline (BLDT)	Fluid only	AD-49 - 75/25	8	100	20	5.21	-21.5	-26.4	-	-	-	-	-	-	30	1	1	1	1	1	1	1	1	1
12-13	127	23-Jan-13	P012	IP Flow-Off Issues	IP-	Polar Guard Advance	8	115	20	9.18	-20.5	-27.1	-	-	25	-	-	-	30	2.2	2.2	3	1.1	1.6	1.9	1	1.1	1.4
12-13	128	23-Jan-13	P032	IP Flow-Off Issues	IP mod	Polar Guard Advance	8	115	20	8.78	-22.4	-27.5	-	-	75	-	-	-	10	2.4	2.2	3.2	1.1	1.7	2.2	1	1.1	1.5
12-13	129	23-Jan-13	P010	IP Flow-Off Issues	IP-	Max-Flight	8	115	20	7.14	-22.5	-27.8	-	-	25	-	-	-	30	2.7	2.2	3.2	1	1.5	1.9	1	1.1	1.3
12-13	130	23-Jan-13	P030	IP Flow-Off Issues	IP mod	Max-Flight	8	115	20	8.08	-22.6	-28	-	-	75	-	-	-	10	2.5	2.4	3.0	1.2	1.6	1.8	1	1.2	1.3
12-13	131	23-Jan-13	E6	Effect of Viscosity on Fluid Aerodynamics	Fluid Only	Max-Flight	8	100	20	n/a	-23.6	-28.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	132	23-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	0.19	-20.1	-25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	133	23-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.27	-20.1	-25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	134	23-Jan-13	P028	IP Flow-Off Issues	IP mod	AD-49	8	115	20	5.38	-22.1	-25	-	-	75	-	-	-	10	3	3	3.9	1.1	1.6	2.2	1	1.1	1.8

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	135	23-Jan-13	P124	Baseline (BLDT)	Fluid only	AD-49	8	100	20	3.99	-22.6	-5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	136	23-Jan-13	P151	Effect of Viscosity on Fluid Aerodynamics	Fluid only	AD-49	8	100	20	3.37	-22.8	-24.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	137	23-Jan-13	P004	IP Flow-Off Issues	IP-	ABC-S Plus	8	115	20	6.71	-22.7	-24.7	-	-	25	-	-	-	30	2.8	2.8	3.6	1.1	1.5	2.0	1	1.1	1.3
12-13	138	24-Jan-13	P112	Baseline (BLDT)	Fluid only	ABC-S Plus	8	100	20	4.83	-22.4	-25.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	139	24-Jan-13	P139	Effect of Viscosity on Fluid Aerodynamics	Fluid only	ABC-S Plus	8	100	20	5.46	-22.7	-25.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	140	24-Jan-13	P115	Baseline (BLDT)	Fluid only	ABC-S Plus - 75/25	8	100	20	5.28	-22.5	-25.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	141	24-Jan-13	P024	IP Flow-Off Issues	IP mod	ABC-S Plus	8	115	20	6.82	-22.6	-25.6	-	-	75	-	-	-	10	2.3	2.2	3.4	1.1	1.4	1.8	1	1.1	1.3
12-13	142	24-Jan-13	P030	IP Flow-Off Issues	IP mod	Max-Flight	8	115	20	6.66	-22.8	-25.5	-	-	75	-	-	-	10	2.4	2.3	2.3	1.0	2.0	2	1	1.1	1.3
12-13	143	24-Jan-13	P134	Baseline (BLDT)	Fluid Only	Max-Flight	8	100	20	6.21	-23.1	-25.4	-	-	-25.4	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	144	24-Jan-13	E6	Effect of Viscosity on Fluid Aerodynamics	Fluid only	Max-Flight	8	100	20	5.96	-23.1	-25.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	145	24-Jan-13	P138	Baseline (BLDT)	Fluid Only	Max-Flight - 75/25	8	100	20	4.54	-23	-25.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	146	24-Jan-13	P129	Baseline (BLDT)	Fluid Only	Polar Guard Advance	8	100	20	7.99	-23.3	-25.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	147	24-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	0.59	n/a	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	148	24-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.24	n/a	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	149	24-Jan-13	P032	IP Flow-Off Issues	IP mod	Polar Guard Advance	8	115	20	9.24	-17.2	-19.7	-	-	75	-	-	-	10	2.2	2.2	3.4	1.1	1.6	2.0	1	1	1.2
12-13	150	24-Jan-13	P153	Effect of Viscosity on Fluid Aerodynamics	IP mod	Polar Guard Advance	8	115	20	6.65	-17.1	-20	-	-	75	-	-	-	10	1	1	1	1	1	1	1	1	
12-13	151	24-Jan-13	P133	Baseline (BLDT)	Fluid Only	Polar Guard Advance - 75/25	8	115	20	3.17	-16.6	-20	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	152	25-Jan-13	P130	Baseline (BLDT)	Fluid Only	Polar Guard Advance	8	115	20	5.25	-17.4	-20.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	153	25-Jan-13	P154	Effect of Viscosity on Fluid Aerodynamics	Fluid only	Polar Guard Advance	8	115	20	4.54	-17.3	-20.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	154	25-Jan-13	P028	IP Flow-Off Issues	IP mod	AD-49	8	115	20	4.86	-6.5	-20.7	-	-	75	-	-	-	10	3.0	2.9	4.0	1.1	1.5	2.0	1.0	1.2	1.7
12-13	155	25-Jan-13	P120	Baseline (BLDT)	Fluid only	Launch	8	100	20	6.40	-17.8	-21	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	156	25-Jan-13	P026	IP Flow-Off Issues	IP mod	Launch	8	115	20	9.06	-16.8	-21.1	-	-	75	-	-	-	10	2.3	2.2	3.4	1.1	1.4	1.7	1	1.1	1.2

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	158	25-Jan-13	P116	Baseline (BLDT)	Fluid only	EG106	8	100	20	3.43	-17.8	-21.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	159	25-Jan-13	P008	IP Flow-Off Issues	IP-	AD-49	8	115	20	6.53	-16.2	-21.5	-	-	25	-	-	-	30	3.2	3.2	3.9	1.1	1.6	2.2	1.1	1.3	2.0
12-13	160	25-Jan-13	E7	IP Flow-Off Issues	IP-	AD-49	8	115	20	4.95	-17.4	-21.7	-	-	25	-	-	-	15	2.5	2.3	3.3	1.1	1.6	1.8	1.0	1.2	1.3
12-13	161	27-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	0.82	-4.7	-11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	162	27-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	0.14	-4.7	-11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	165	28-Jan-13	P191	IP Validation with New Fluids	IP-	Max-Flight	8	100	20	4.53	-4.8	-11.8	-	-	25	-	-	-	50	2.3	2.3	3.3	1.0	1.4	1.3	1	1	1.0
12-13	166	28-Jan-13	P002	Baseline	Dry Wing	none	stall	80	20	3.03	6.2	-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	167	28-Jan-13	P002	Baseline	Dry Wing	none	pitch-stall	80	20	1.57	6.2	-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	168	28-Jan-13	P001	Baseline	Dry Wing	none	8	100	20	2.30	6.2	-12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	169	28-Jan-13	P124R	Baseline (BLDT)	Fluid only	AD-49	8	100	20	5.64	-8.6	-11.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	170	28-Jan-13	P213R	IP Validation with New Fluids	IP- / SN-	AD-49	8	100	20	11.70	-4.7	-11.8	-	-	25	10	-	-	40	3.8	3.3	4	1.5	2	3.5	1.2	1.8	3.4

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	171	28-Jan-13	P213	IP Validation with New Fluids	IP- / SN-	AD-49	8	100	20	7.54	-5.4	-11.8	-	-	25	10	-	-	25	3	2.9	3.8	1.2	1.5	2	1.1	1.1	1.6
12-13	172	28-Jan-13	P143R	Effect of Viscosity on Fluid Aerodynamics	IP- / SN-	AD-49	8	100	20	6.15	-5.6	-12	-	-	25	10	-	-	25	2.7	2.3	3.5	1.1	1.4	1.8	1	1.1	1.2
12-13	173	28-Jan-13	P036	Ice Phobic Coating R&D	None	none	8	100	20	0.63	-0.9	-7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	174	28-Jan-13	P036R	Ice Phobic Coating R&D	None	none	stall	80	20	1.49	-6	-7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	175	28-Jan-13	P036R	Ice Phobic Coating R&D	None	none	stall	80	20	0.41	-6	-7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	176	28-Jan-13	P058	Ice Phobic Coating R&D	Fluid only	EG106	8	100	20	3.25	-4.7	-7.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	177	28-Jan-13	P058R	Ice Phobic Coating R&D	Fluid Only	EG106	stall	80	20	4.02	0.8	-7.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	178	29-Jan-13	P059	Ice Phobic Coating R&D	ZR	EG106	8	100	20	3.28	0.1	-7.2	-	-	-	-	25	-	50	1	1	4.3	1	1	5	1	1	5
12-13	179	29-Jan-13	P060	Ice Phobic Coating R&D	IP- / ZR	AD-49	8	100	20	3.95	-0.5	-8.3	-	-	25	-	25	-	25	1.8	1.8	3.7	1	1.1	1.5	1	1	1.3
12-13	182	29-Jan-13	P074	Ice Phobic Coating R&D	SN	none	8	100	20	3.56	-1.6	-9.6	-	-	-	10	-	-	15	4	4	4.0	5	5	5	5	5	5
12-13	183	29-Jan-13	P061	Ice Phobic Coating R&D	ZR	none	8	100	20	3.30	-0.4	-9.4	-	-	-	-	25	-	15	5	5	5	5	5	5	5	5	5

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	184	29-Jan-13	P061R	Ice Phobic Coating R&D	ZR	none	stall	80	20	3.28	-6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	185	31-Jan-13	P035	Ice Phobic Coating R&D	None	none	8	100	20	0.52	-1.4	-2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	186	31-Jan-13	P035R	Ice Phobic Coating R&D	None	none	stall	80	20	1.40	-2.9	-3.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	187	31-Jan-13	P054	Ice Phobic Coating R&D	Fluid only	EG106	8	100	20	3.39	-2.8	-3.6	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	189	31-Jan-13	P056	Ice Phobic Coating R&D	IP- / ZR	AD-49	8	100	20	4.89	-5.7	-7.1	-	-	25	-	25	-	25	24	2.3	3.5	1.0	1.6	2	1	1.1	1.3
12-13	190	31-Jan-13	P057	Ice Phobic Coating R&D	ZR	none	8	100	20	4.66	-7.1	-8.6	-	-	-	-	25	-	15	5	5	5	5	5	5	5	5	5
12-13	191	31-Jan-13	P057R	Ice Phobic Coating R&D	ZR	none	stall	80	20	5.20	-7.1	-8.6	-	-	-	-	25	-	15	-	-	-	-	-	-	-	-	-
12-13	192	31-Jan-13	P034	Ice Phobic Coating R&D	None	none	8	100	20	1.02	-0.5	-10.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	193	31-Jan-13	P034R	Ice Phobic Coating R&D	None	none	stall	80	20	1.31	-7.1	-8.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
12-13	194	31-Jan-13	P050	Ice Phobic Coating R&D	Fluid only	EG106	8	100	20	3.53	-8.7	-10.6	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	196	31-Jan-13	P052	Ice Phobic Coating R&D	IP- / ZR	AD-49	8	100	20	7.10	-8.6	-11.4	-	-	25	-	25	-	25	3	3.2	4	1	1.4	2.9	1	1	1.1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	197	31-Jan-13	P074	Ice Phobic Coating R&D	SN	none	8	100	20	5.04	-6.5	-11.6	-	-	-	10	-	-	15	4	4	4	5	5	5	5	5	5
12-13	198	01-Feb-13	P037	Ice Phobic Coating R&D	None	none	8	100	20	1.30	-8	-15.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	199	01-Feb-13	P037R	Ice Phobic Coating R&D	None	none	stall	80	20	1.73	-13.9	-15.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	200	01-Feb-13	P062	Ice Phobic Coating R&D	Fluid only	EG106	8	100	20	3.58	-12.4	-15.3	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	
12-13	202	01-Feb-13	P068	Ice Phobic Coating R&D	IP- / ZR	AD-49	8	100	20	7.08	-7.8	-13.8	-	-	25	-	25	-	10	2.3	1.8	2.8	1	1.4	1.6	1	1.0	1.1
12-13	203	01-Feb-13	P065	Ice Phobic Coating R&D	ZR	none	8	100	20	3.30	-3.3	-13.1	-	-	-	-	25	-	15	-	-	-	-	-	-	-	-	
12-13	204	01-Feb-13	P065R	Ice Phobic Coating R&D	ZR	none	stall	80	20	3.88	-12.8	-13.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
12-13	113A	22-Jan-13	P030	IP Flow-Off Issues	IP mod	Max-Flight	8	115	20	8.83	-13.4	-18.7	-	-	75	-	-	-	10	2.3	2.3	3	1	1.4	1.7	1.0	1	1.2
12-13	65A	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	n/a	0	-2.6	-1.6	0.1	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	65B	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	0.99	1.2	-2.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
12-13	67A	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	n/a	-1.3	-4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	67B	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	1.48	-1.2	-4.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	70A	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	n/a	-1	-2.7	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	70B	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	2.37	-1	-2.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	71A	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	n/a	0	-2.7	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	71B	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	1.20	-1.4	-2.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	72A	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	n/a	-0.1	-3.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	72B	15-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	1.12	-1.3	-3.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	79A	16-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	n/a	1.4	0.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	79B	16-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	Max-Flight	stall	80	20	2.08	1.5	0.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	84A	17-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	ABC-S Plus	stall	80	20	n/a	0.9	0.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
12-13	84B	17-Jan-13	P224	2nd Wave of Fluid During Rotation	Fluid Only	ABC-S Plus	stall	80	20	1.30	1.1	0.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
12-13	195	31-Jan-13	P040	Ice Phobic Coating R&D	IP mod	Max-Flight	8	100	20	8.30	-9.2	-10.9	-	-	75	-	-	-	15	2.5	2.2	3.1	1	1.4	1	1	1	1.1
12-13	201	01-Feb-13	P043	Ice Phobic Coating R&D	IP mod	Max-Flight	8	100	20	9.08	-11.9	-14.4	-	-	75	-	-	-	10	2.2	2.2	2.8	1.1	1.5	1	1.0	1.0	1.1
12-13	93	18-Jan-13	P031	IP Flow-Off Issues	IP mod	Polar Guard Advance	8	100	20	11.46	-12.7	-18.8	-	-	75	-	-	-	10	2.1	2.2	2.8	1.2	1.7	2.2	1	1.3	1.7
12-13	96A	18-Jan-13	P023	IP Flow-Off Issues	IP mod	ABC-S Plus	8	100	20	10.09	-13.6	-19.7	-	-	75	-	-	-	10	2.4	2.3	3.1	1.1	1.7	2.1	1	1.2	1.6
12-13	96	18-Jan-13	P023	IP Flow-Off Issues	IP mod	ABC-S Plus	8	100	20	n/a	-13.7	-19.1	-	-	75	-	-	-	10	2.2	2.2	3	1.2	1.9	2.5	0.7	1.2	1.9
12-13	157	25-Jan-13	P149	Effect of Viscosity on Fluid Aerodynamics	IP mod	Launch	8	100	20	6.53	-17.4	-21.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	24	10-Jan-14	P031	Type III Allowance Times	IP Mod	2031 - Hot	8	100	20	1.46	-3	-6.7	-2.5	-4	75	-	-	-	5	2.25	2	2.25	1	5	1	1	5	1
13-14	16	09-Jan-14	P046	Type III Allowance Times	IP Mod	2031 - Cold	8	100	20	1.63	-4.8	-7.3	-5.1	-8.2	75	-	-	-	5	2	2	2.15	1	1.1	1.4	1	1	1
13-14	346	27-Jan-14	P037	Type III Allowance Times	IP Mod	2031 - Hot	8	100	20	1.77	-6.4	-7.9	-7.6	-6.2	75	-	-	-	5	2.8	2.4	2.2	2.3	4.7	2.5	2.3	4.8	4.5
13-14	345	27-Jan-14	P051	Type III Allowance Times	IP Mod	2031 - Cold	8	100	20	2.04	-6.9	-7.8	-6.9	-8.9	75	-	-	-	5	2.5	2.7	2.8	1	1.1	1.2	1	1	1
13-14	364	28-Jan-14	E4	Type III Allowance Times	IP Mod	EG106	8	100	20	1.56	-7.1	-10.2	-10.2	-11.3	75	-	-	-	10	2.3	2.3	2.8	3	5	5	3	5	5

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	1	08-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.38	-9.3	-9.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	2	08-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	-0.56	-9.3	-9.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	3	08-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.34	-10.1	-10.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	4	08-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	-0.60	-10.1	-10.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	5	08-Jan-14	P229	R&D	EFFECT OF COOLING SYSTEM	EG106	8	100	20	1.78	-5.2	-9.2	-9.5	-5.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	6	08-Jan-14	P229	R&D	EFFECT OF COOLING SYSTEM	EG106	8	100	20	n/a	n/a	n/a	-8.1	-6.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	7	09-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.24	-9.9	-11.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	8	09-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	-0.41	-7.3	-10.1	-9.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	9	09-Jan-14	P071	IP Expansion	IP- / SN-	ABC-S Plus	8	100	20	6.47	-7.3	-10.1	n/a	-11	25	10	-	-	10	2	2	2.5	1	1.5	1.75	1	1	1.1
13-14	10	09-Jan-14	P071	IP Expansion	IP- / SN	ABC-S Plus	8	100	20	6.38	-6.7	-9.6	-8	-10	25	25	-	-	10	2	2	3	1	1.5	2.25	1	1	1.2
13-14	11	09-Jan-14	P072	IP Expansion	IP- / SN	Launch	8	100	20	6.70	-5.2	-9	-7.4	-10	25	25	-	-	10	2	1.75	3.25	1	1.35	2.25	1	1	1.2

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	12	09-Jan-14	P073	IP Expansion	IP- / SN	AD-49	8	100	20	5.75	-3.3	-7.4	-6.2	-8.5	25	25	-	-	10	2	2	3.5	1	1.6	2.25	1	1.2	1.4
13-14	13	09-Jan-14	P049	Type III Allowance Times	IP- / SN	2031 - Cold	8	100	20	2.32	-3.1	-7.4	-4.4	-7	25	25	-	-	10	2.25	1.9	3.5	1	1.5	1.95	1	1.15	1.2
13-14	14	09-Jan-14	P048	Type III Allowance Times	IP- / SN-	2031 - Cold	8	100	20	1.64	-4.2	-7.2	-6.2	-7.5	25	10	-	-	10	2	2	2.1	1	1.05	1.25	1	1	1
13-14	15	09-Jan-14	P045	Type III Allowance Times	IP-	2031 - Cold	8	100	20	2.14	-4.7	-7.1	-5	-7.3	25	-	-	-	10	2	2	2	1	1	1.15	1	1	1
13-14	17	10-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.00	-4.8	-11.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	18	10-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	0.22	-4.8	-11.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	19	10-Jan-14	P047	Type III Allowance Times	IP- / ZR-	2031 - Cold	8	100	20	1.57	-3.8	-9.2	-3	-5.5	25	-	25	-	7	2	2	2.15	1	1	1.5	1	1	1.35
13-14	20	10-Jan-14	P032	Type III Allowance Times	IP- / ZR-	2031 - Hot	8	100	20	1.77	-3.3	-8.5	-4.5	-1.8	25	-	25	-	7	1.25	1.5	1.45	1	1	1	1	1	1
13-14	21	10-Jan-14	P030	Type III Allowance Times	IP-	2031 - Hot	8	100	20	1.90	-5.2	-7.7	-4.2	-4	25	-	-	-	10	2	2	2.1	1	5	1	1	5	1
13-14	22	10-Jan-14	P030R	Type III Allowance Times	IP-	2031 - Hot	8	100	20	1.64	-2.8	-7.2	-2.5	-2	25	-	-	-	7	1.9	1.75	1.25	1	3	1	1	3	1
13-14	23	10-Jan-14	P030R	Type III Allowance Times	IP-	2031 - Hot	8	100	20	2.00	-2.9	-6.9	-2.4	-1.6	25	-	-	-	5	1.5	1.25	1.15	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	363	28-Jan-14	E3	Type III Allowance Times	IP Mod	ABC-S Plus	8	100	20	8.72	-7.4	-10.6	-11.3	-9.8	75	-	-	-	10	2	2	2.8	1	1.3	1.7	1	1	1.2
13-14	25	10-Jan-14	P035	Type III Allowance Times	IP- / SN	2031 - Hot	8	100	20	1.76	-2.3	-6.1	-2.4	-4	25	25	-	-	10	2.5	2	3.75	1	3.25	3.75	1	5	3.75
13-14	26	13-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.35	8.1	4.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	27	13-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	-0.81	8.1	4.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	28	13-Jan-14	P148	Ice Phobic R&D	Dry Wing	none	8	100	20	-0.29	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	29	13-Jan-14	P149	Ice Phobic R&D	Dry Wing	none	8	100	20	-0.37	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	30	13-Jan-14	P150	Ice Phobic R&D	Dry Wing	none	8	100	20	-0.56	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	31	13-Jan-14	P151	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-1.10	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	32	13-Jan-14	P152	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-1.14	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	33	13-Jan-14	P153	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-1.11	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	34	13-Jan-14	P154	Ice Phobic R&D	Dry Wing	none	-2,0, +2	80	20	n/a	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	35	13-Jan-14	P154	Ice Phobic R&D	Dry Wing	none	-2.0, +2	80	20	n/a	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	36	13-Jan-14	P154	Ice Phobic R&D	Dry Wing	none	-2.0, +2	80	20	n/a	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	37	13-Jan-14	P155	Ice Phobic R&D	Dry Wing	none	-2.0, +2	100	20	n/a	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	38	13-Jan-14	P155	Ice Phobic R&D	Dry Wing	none	-2.0, +2	100	20	n/a	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	39	13-Jan-14	P155	Ice Phobic R&D	Dry Wing	none	-2.0, +2	100	20	n/a	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	40	13-Jan-14	P156	Ice Phobic R&D	Dry Wing	none	-2.0, +2	115	20	n/a	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	41	13-Jan-14	P156	Ice Phobic R&D	Dry Wing	none	-2.0, +2	115	20	n/a	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	42	13-Jan-14	P156	Ice Phobic R&D	Dry Wing	none	-2.0, +2	115	20	n/a	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	43	13-Jan-14	P151R	Ice Phobic R&D	Dry Wing	none	22	80	20	0.26	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	44	13-Jan-14	P152R	Ice Phobic R&D	Dry Wing	none	22	80	20	-0.03	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	45	13-Jan-14	P153R	Ice Phobic R&D	Dry Wing	none	22	80	20	-0.03	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	46	13-Jan-14	P148	Ice Phobic R&D	Dry Wing	none	8	100	20	-0.63	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	47	13-Jan-14	P149	Ice Phobic R&D	Dry Wing	none	8	100	20	-0.27	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	48	13-Jan-14	P150	Ice Phobic R&D	Dry Wing	none	8	100	20	-0.26	5.7	5.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	49	13-Jan-14	P154	Ice Phobic R&D	Dry Wing	none	-2,0 +2	40	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	50	13-Jan-14	P154	Ice Phobic R&D	Dry Wing	none	-2,0 +2	40	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	51	13-Jan-14	P154	Ice Phobic R&D	Dry Wing	none	-2,0 +2	40	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	52	13-Jan-14	P155	Ice Phobic R&D	Dry Wing	none	-2,0 +2	60	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	53	13-Jan-14	P155	Ice Phobic R&D	Dry Wing	none	-2,0 +2	60	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	54	13-Jan-14	P155	Ice Phobic R&D	Dry Wing	none	-2,0 +2	60	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	55	13-Jan-14	P154	Ice Phobic R&D	Dry Wing	none	-2,0 +2	80	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	56	13-Jan-14	P154	Ice Phobic R&D	Dry Wing	none	-2,0 +2	80	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	57	13-Jan-14	P154	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	58	13-Jan-14	P155	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	59	13-Jan-14	P155	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	60	13-Jan-14	P155	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	61	13-Jan-14	P156	Ice Phobic R&D	Dry Wing	none	-2,0,+2	max (120)	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	62	13-Jan-14	P156	Ice Phobic R&D	Dry Wing	none	-2,0,+2	max (120)	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	63	13-Jan-14	P156	Ice Phobic R&D	Dry Wing	none	-2,0,+2	max (120)	20	n/a	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	64	13-Jan-14	P151R	Ice Phobic R&D	Dry Wing	none	23	80	20	1.21	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	65	13-Jan-14	P152R	Ice Phobic R&D	Dry Wing	none	23	80	20	0.09	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	66	13-Jan-14	P153R	Ice Phobic R&D	Dry Wing	none	23	80	20	0.09	6.4	6.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	67	14-Jan-14	P133	Ice Phobic R&D	Dry Wing	none	8	100	20	-0.08	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	68	14-Jan-14	P134	Ice Phobic R&D	Dry Wing	none	8	100	20	0.44	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	69	14-Jan-14	P135	Ice Phobic R&D	Dry Wing	none	8	100	20	0.33	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	70	14-Jan-14	P136	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.38	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	71	14-Jan-14	P137	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.32	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	72	14-Jan-14	P138	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.32	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	73	14-Jan-14	P139	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	74	14-Jan-14	P139	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	75	14-Jan-14	P139	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	76	14-Jan-14	P140	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	77	14-Jan-14	P140	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	78	14-Jan-14	P140	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	79	14-Jan-14	P141	Ice Phobic R&D	Dry Wing	none	-2,0, +2	115	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	80	14-Jan-14	P141	Ice Phobic R&D	Dry Wing	none	-2,0, +2	115	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	81	14-Jan-14	P141	Ice Phobic R&D	Dry Wing	none	-2,0, +2	115	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	82	14-Jan-14	P136	Ice Phobic R&D	Dry Wing	none	20	80	20	1.11	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	83	14-Jan-14	P137	Ice Phobic R&D	Dry Wing	none	20	80	20	1.14	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	84	14-Jan-14	P138	Ice Phobic R&D	Dry Wing	none	20	80	20	1.24	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	85	14-Jan-14	P133	Ice Phobic R&D	Dry Wing	none	8	100	20	0.46	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	86	14-Jan-14	P134	Ice Phobic R&D	Dry Wing	none	8	100	20	0.27	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	87	14-Jan-14	P135	Ice Phobic R&D	Dry Wing	none	8	100	20	0.20	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	88	14-Jan-14	P133	Ice Phobic R&D	Dry Wing	none	8	100	20	0.11	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	89	14-Jan-14	P134	Ice Phobic R&D	Dry Wing	none	8	100	20	0.04	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	90	14-Jan-14	P135	Ice Phobic R&D	Dry Wing	none	8	100	20	0.30	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	91	14-Jan-14	P136	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.31	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	92	14-Jan-14	P137	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.44	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	93	14-Jan-14	P138	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.33	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	94	14-Jan-14	P139	Ice Phobic R&D	Dry Wing	none	2,0,+2	80	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	95	14-Jan-14	P139	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	96	14-Jan-14	P139	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	97	14-Jan-14	P140	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	98	14-Jan-14	P140	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	99	14-Jan-14	P140	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	100	14-Jan-14	P141	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	101	14-Jan-14	P141	Ice Phobic R&D	Dry Wing	none	-2,0, +2	115	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	102	14-Jan-14	P141	Ice Phobic R&D	Dry Wing	none	-2,0, +2	115	20	n/a	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	103	14-Jan-14	P136	Ice Phobic R&D	Dry Wing	none	20	80	20	1.37	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	104	14-Jan-14	P137	Ice Phobic R&D	Dry Wing	none	20	80	20	1.44	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	105	14-Jan-14	P138	Ice Phobic R&D	Dry Wing	none	20	80	20	0.97	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	106	14-Jan-14	P133	Ice Phobic R&D	Dry Wing	none	8	100	20	0.17	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	107	14-Jan-14	P134	Ice Phobic R&D	Dry Wing	none	8	100	20	0.36	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	108	14-Jan-14	P135	Ice Phobic R&D	Dry Wing	none	8	100	20	0.31	4.3	4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	109	14-Jan-14	P103	Ice Phobic R&D	Dry Wing	none	8	100	20	0.33	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	110	14-Jan-14	P104	Ice Phobic R&D	Dry Wing	none	8	100	20	0.50	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	111	14-Jan-14	P105	Ice Phobic R&D	Dry Wing	none	8	100	20	0.25	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	112	14-Jan-14	P106	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.02	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	113	14-Jan-14	P107	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.06	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	114	14-Jan-14	P108	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.07	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	115	14-Jan-14	P109	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	116	14-Jan-14	P109	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	117	14-Jan-14	P109	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	118	14-Jan-14	P110	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	119	14-Jan-14	P110	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	120	14-Jan-14	P110	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	121	14-Jan-14	P111	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	122	14-Jan-14	P111	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	123	14-Jan-14	P111	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	124	14-Jan-14	P106	Ice Phobic R&D	Dry Wing	none	23	80	20	1.43	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	125	14-Jan-14	P107	Ice Phobic R&D	Dry Wing	none	23	80	20	1.53	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	126	14-Jan-14	P108	Ice Phobic R&D	Dry Wing	none	23	80	20	1.30	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	127	14-Jan-14	P103	Ice Phobic R&D	Dry Wing	none	8	100	20	0.50	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	128	14-Jan-14	P104	Ice Phobic R&D	Dry Wing	none	8	100	20	0.76	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	129	14-Jan-14	P105	Ice Phobic R&D	Dry Wing	none	8	100	20	0.85	4.4	4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	130	14-Jan-14	P112	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.65	1.2	-0.4	-	2	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	131	14-Jan-14	P113	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.62	1.2	-0.5	0.1	1.2	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	132	14-Jan-14	P114	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.83	1.1	-1.3	-0.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	133	14-Jan-14	P116	Ice Phobic R&D	Dry Wing	none	8	100	20	1.45	-0.3	-1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	134	14-Jan-14	P117	Ice Phobic R&D	Dry Wing	none	8	100	20	1.36	-0.3	-1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	135	15-Jan-14	P142	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.71	1.4	-1.1	-	2.6	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	136	15-Jan-14	P143	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.74	-0.5	-1.5	0	1	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	137	15-Jan-14	P144	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.42	0.9	-1.7	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	138	15-Jan-14	P146	Ice Phobic R&D	Dry Wing	none	8	100	20	0.65	0.4	-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	139	15-Jan-14	P147	Ice Phobic R&D	Dry Wing	none	8	100	20	0.55	0.4	-1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	140	15-Jan-14	P193	Ice Phobic R&D	Dry Wing	none	8	100	20	0.76	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	141	15-Jan-14	P194	Ice Phobic R&D	Dry Wing	none	8	100	20	0.93	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	142	15-Jan-14	P195	Ice Phobic R&D	Dry Wing	none	8	100	20	0.20	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	143	15-Jan-14	P196	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.25	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	144	15-Jan-14	P197	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.29	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	145	15-Jan-14	P198	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	146	15-Jan-14	P199	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	147	15-Jan-14	P199	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	148	15-Jan-14	P199	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	149	15-Jan-14	P200	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	150	15-Jan-14	P200	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	151	15-Jan-14	P200	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	152	15-Jan-14	P201	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	153	15-Jan-14	P201	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	154	15-Jan-14	P201	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	155	15-Jan-14	P196	Ice Phobic R&D	Dry Wing	none	23	80	20	1.59	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	156	15-Jan-14	P197	Ice Phobic R&D	Dry Wing	none	23	80	20	1.49	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	157	15-Jan-14	P198	Ice Phobic R&D	Dry Wing	none	23	80	20	2.05	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	158	15-Jan-14	P193	Ice Phobic R&D	Dry Wing	none	8	100	20	0.82	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	159	15-Jan-14	P194	Ice Phobic R&D	Dry Wing	none	8	100	20	0.69	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	160	15-Jan-14	P195	Ice Phobic R&D	Dry Wing	none	8	100	20	0.80	-1.5	-2.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	161	15-Jan-14	P202	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.70	-1.2	-2.9	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	162	15-Jan-14	P203	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.68	-1.3	-3	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	163	15-Jan-14	P204	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.66	-1.8	-3.3	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	164	15-Jan-14	P157	Ice Phobic R&D	Fluid Only	EG106	8	100	20	1.99	0.3	-4.3	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	165	15-Jan-14	P158	Ice Phobic R&D	Fluid Only	EG106	8	100	20	1.95	-2.9	-4.1	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	166	15-Jan-14	P159	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.00	0.3	-4.3	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	167	15-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	-0.96	0.3	-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	168	15-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.64	0.3	-0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	169	15-Jan-14	P178	Ice Phobic R&D	Dry Wing	none	8	100	20	0.45	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	170	15-Jan-14	P179	Ice Phobic R&D	Dry Wing	none	8	100	20	0.44	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	171	15-Jan-14	P180	Ice Phobic R&D	Dry Wing	none	8	100	20	0.56	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	172	15-Jan-14	P181	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.20	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	173	15-Jan-14	P182	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.07	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	174	15-Jan-14	P183	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.20	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	175	15-Jan-14	P184	Ice Phobic R&D	Dry Wing	none	-2,0, +2	80	20	n/a	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	176	15-Jan-14	P184	Ice Phobic R&D	Dry Wing	none	-2,0, +2	80	20	n/a	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	177	15-Jan-14	P184	Ice Phobic R&D	Dry Wing	none	-2,0, +2	80	20	n/a	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	178	15-Jan-14	P185	Ice Phobic R&D	Dry Wing	none	-2,0, +2	100	20	n/a	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	179	15-Jan-14	P185	Ice Phobic R&D	Dry Wing	none	-2,0, +2	100	20	n/a	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	180	15-Jan-14	P185	Ice Phobic R&D	Dry Wing	none	-2,0, +2	100	20	n/a	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	181	15-Jan-14	P186	Ice Phobic R&D	Dry Wing	none	-2,0, +2	115	20	n/a	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	182	15-Jan-14	P186	Ice Phobic R&D	Dry Wing	none	-2,0, +2	115	20	n/a	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	183	15-Jan-14	P186	Ice Phobic R&D	Dry Wing	none	-2,0, +2	115	20	n/a	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	184	15-Jan-14	P181	Ice Phobic R&D	Dry Wing	none	23	80	20	2.04	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	185	15-Jan-14	P182	Ice Phobic R&D	Dry Wing	none	23	80	20	1.35	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	186	15-Jan-14	P183	Ice Phobic R&D	Dry Wing	none	23	80	20	2.09	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	187	15-Jan-14	P178	Ice Phobic R&D	Dry Wing	none	8	100	20	0.81	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	188	15-Jan-14	P179	Ice Phobic R&D	Dry Wing	none	8	100	20	0.68	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	189	15-Jan-14	P180	Ice Phobic R&D	Dry Wing	none	8	100	20	0.54	-1	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	190	15-Jan-14	P187	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.46	-0.3	-0.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	191	15-Jan-14	P188	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.80	-0.5	-0.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	192	15-Jan-14	P189	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.40	-0.3	-0.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	193	16-Jan-14	P191	Ice Phobic R&D	Dry Wing	none	8	100	20	0.25	-0.3	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	194	16-Jan-14	P192	Ice Phobic R&D	Dry Wing	none	8	100	20	0.62	-0.3	-1.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	195	16-Jan-14	P208	Ice Phobic R&D	Dry Wing	none	8	100	20	0.39	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	196	16-Jan-14	P209	Ice Phobic R&D	Dry Wing	none	8	100	20	0.66	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	197	16-Jan-14	P210	Ice Phobic R&D	Dry Wing	none	8	100	20	0.86	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	198	16-Jan-14	P211	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.32	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	199	16-Jan-14	P212	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.25	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	200	16-Jan-14	P213	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.13	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	201	16-Jan-14	P215	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	202	16-Jan-14	P215	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	203	16-Jan-14	P215	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	204	16-Jan-14	P214	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	205	16-Jan-14	P214	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	206	16-Jan-14	P214	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	207	16-Jan-14	P216	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	208	16-Jan-14	P216	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	209	16-Jan-14	P216	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	210	16-Jan-14	P211	Ice Phobic R&D	Dry Wing	none	23	80	20	1.78	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
13-14	211	16-Jan-14	P212	Ice Phobic R&D	Dry Wing	none	23	80	20	1.81	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	212	16-Jan-14	P213	Ice Phobic R&D	Dry Wing	none	23	80	20	1.60	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	213	16-Jan-14	P208	Ice Phobic R&D	Dry Wing	none	8	100	20	0.49	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	214	16-Jan-14	P209	Ice Phobic R&D	Dry Wing	none	8	100	20	0.70	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	215	16-Jan-14	P210	Ice Phobic R&D	Dry Wing	none	8	100	20	0.66	-2.3	-1.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	216	16-Jan-14	P217	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.68	-0.8	-2	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
13-14	217	16-Jan-14	P218	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.84	-1.1	-2.2	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
13-14	218	16-Jan-14	P219	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.65	-2.2	-2.5	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
13-14	219	16-Jan-14	P221	Ice Phobic R&D	Dry Wing	none	8	100	20	1.21	-1.8	-2.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	220	16-Jan-14	P222	Ice Phobic R&D	Dry Wing	none	8	100	20	1.01	-1.8	-2.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	221	16-Jan-14	P220	Ice Phobic R&D	ZR	none	8	100	20	2.59	-1.8	-2.8	-	-	-	-	100	-	2	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	222	16-Jan-14	P118	Ice Phobic R&D	Dry Wing	none	8	100	20	0.50	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	223	16-Jan-14	P119	Ice Phobic R&D	Dry Wing	none	8	100	20	0.71	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	224	16-Jan-14	P120	Ice Phobic R&D	Dry Wing	none	8	100	20	1.14	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	225	16-Jan-14	P121	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.29	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	226	16-Jan-14	P122	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.50	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	227	16-Jan-14	P123	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	228	16-Jan-14	P124	Ice Phobic R&D	Dry Wing	none	n/a*	n/a*	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	229	16-Jan-14	P124	Ice Phobic R&D	Dry Wing	none	n/a*	n/a*	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	230	16-Jan-14	P124	Ice Phobic R&D	Dry Wing	none	n/a*	n/a*	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	231	16-Jan-14	P125	Ice Phobic R&D	Dry Wing	none	n/a*	n/a*	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	232	16-Jan-14	P125	Ice Phobic R&D	Dry Wing	none	n/a*	n/a*	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	233	16-Jan-14	P125	Ice Phobic R&D	Dry Wing	none	n/a*	n/a*	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	234	16-Jan-14	P126	Ice Phobic R&D	Dry Wing	none	n/a*	n/a*	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	235	16-Jan-14	P126	Ice Phobic R&D	Dry Wing	none	n/a*	n/a*	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	236	16-Jan-14	P126	Ice Phobic R&D	Dry Wing	none	n/a*	n/a*	20	n/a	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	237	16-Jan-14	P121	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	2.09	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	238	16-Jan-14	P122	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	1.80	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	239	16-Jan-14	P123	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	2.10	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	240	16-Jan-14	P118	Ice Phobic R&D	Dry Wing	none	8	100	20	1.03	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	241	16-Jan-14	P119	Ice Phobic R&D	Dry Wing	none	8	100	20	1.50	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	242	16-Jan-14	P120	Ice Phobic R&D	Dry Wing	none	8	100	20	1.12	-3.4	-3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	243	16-Jan-14	P127	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.96	-1.6	-3.5	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	244	16-Jan-14	P128	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.94	-3.3	-3.7	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	245	17-Jan-14	P129	Ice Phobic R&D	Fluid Only	EG106	8	100	20	3.47	-1.8	-3.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	246	17-Jan-14	P129	Ice Phobic R&D	Fluid Only	EG106	8	100	20	3.07	-1.3	-4.1	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	247	17-Jan-14	P131	Ice Phobic R&D	Dry Wing	none	8	100	20	1.13	-2.6	-4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	248	17-Jan-14	P132	Ice Phobic R&D	Dry Wing	none	8	100	20	n/a	-2.6	-4.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	249	17-Jan-14	P130	Ice Phobic R&D	ZR	none	8	100	20	1.34	-1.5	-4.1	-	-	-	-	25	-	5	-	-	-	-	-	-	-	-	-
13-14	250	17-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	1.26	0	-4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	251	17-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	0.17	0	-4.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	252	17-Jan-14	P025	Type I Low Speed	Fluid Only	Polar Plus	8	100	20	0.16	-0.3	-4.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	253	17-Jan-14	P026	Type I Low Speed	Fluid Only	Polar Plus	8	60	20	2.11	-1.4	-4.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	254	17-Jan-14	P028	Type I Low Speed	Fluid Only	Polar Plus	8	55	20	1.91	-1.6	-4.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	255	17-Jan-14	P029	Type I Low Speed	Fluid Only	Polar Plus	8	45	20	1.71	-0.6	-4.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	256	17-Jan-14	P029	Type I Low Speed	Baseline	none	8	45	20	-0.04	-0.2	-4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	257	17-Jan-14	P028	Type I Low Speed	Baseline	none	8	55	20	0.41	-0.2	-4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	258	17-Jan-14	P029	Type I Low Speed	Fluid Only	Polar Plus	8	45	20	2.95	-0.7	-4.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
13-14	259	17-Jan-14	P028	Type I Low Speed	Fluid Only	Polar Plus	8	55	20	2.44	-1	-4.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
13-14	260	20-Jan-14	P163	Ice Phobic R&D	Dry Wing	none	8	100	20	0.18	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	261	20-Jan-14	P164	Ice Phobic R&D	Dry Wing	none	8	100	20	0.68	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	262	20-Jan-14	P165	Ice Phobic R&D	Dry Wing	none	8	100	20	0.27	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	263	20-Jan-14	P166	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.16	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	264	20-Jan-14	P167	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.17	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	265	20-Jan-14	P168	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.27	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	266	20-Jan-14	P169	Ice Phobic R&D	Dry Wing	none	2,0,+2	80	20	n/a	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	267	20-Jan-14	P169	Ice Phobic R&D	Dry Wing	none	2,0,+2	80	20	n/a	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	268	20-Jan-14	P169	Ice Phobic R&D	Dry Wing	none	-2,0,+2	80	20	n/a	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	269	20-Jan-14	P170	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	270	20-Jan-14	P170	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	271	20-Jan-14	P170	Ice Phobic R&D	Dry Wing	none	-2,0,+2	100	20	n/a	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	272	20-Jan-14	P171	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	273	20-Jan-14	P171	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	274	20-Jan-14	P171	Ice Phobic R&D	Dry Wing	none	-2,0,+2	115	20	n/a	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	275	20-Jan-14	P166	Ice Phobic R&D	Dry Wing	none	23	80	20	1.83	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	276	20-Jan-14	P167	Ice Phobic R&D	Dry Wing	none	23	80	20	1.59	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	277	20-Jan-14	P168	Ice Phobic R&D	Dry Wing	none	23	80	20	1.77	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	278	20-Jan-14	P163	Ice Phobic R&D	Dry Wing	none	8	100	20	0.63	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	279	20-Jan-14	P164	Ice Phobic R&D	Dry Wing	none	8	100	20	0.62	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	280	20-Jan-14	P165	Ice Phobic R&D	Dry Wing	none	8	100	20	0.66	-8.3	-8.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	281	20-Jan-14	P172	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.75	-8.7	-9	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	282	20-Jan-14	P173	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.91	-8.7	-9.4	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	283	20-Jan-14	P174	Ice Phobic R&D	Fluid Only	EG106	8	100	20	2.88	-9.8	-10	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	284	20-Jan-14	P176	Ice Phobic R&D	Dry Wing	none	8	100	20	0.26	-10.1	-10.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	285	20-Jan-14	P177	Ice Phobic R&D	Dry Wing	none	8	100	20	0.52	-10.1	-10.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	286	20-Jan-14	P175	Ice Phobic R&D	ZR	none	8	100	20	2.47	-10.3	-10.7	-	-	-	-	25	-	6	-	-	-	-	-	-	-	-	-
13-14	287	20-Jan-14	P136	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.08	-11.6	-11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
13-14	288	20-Jan-14	P137	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.13	-11.6	-11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	289	20-Jan-14	P138	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.10	-11.6	-11.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	290	20-Jan-14	P166	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.10	-13	-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	291	20-Jan-14	P167	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.03	-13	-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	292	20-Jan-14	P168	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	-0.01	-13	-13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	293	20-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.52	-17.9	-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	294	20-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	0.03	-17.9	-20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	295	20-Jan-14	P056	Type III Allowance Times	IP-	2031 - Cold	8	100	20	5.55	-18.7	-20.4	-17	-18.1	25	-	-	-	-	10	2.2	2.2	2.7	1	1.8	2.1	1	1	1.2
13-14	297	21-Jan-14	P041	Type III Allowance Times	IP-	2031 - Hot	8	100	20	4.79	-18.1	-21.1	-	-11.8	25	-	-	-	-	10	2.2	2.1	2.7	2.3	3.8	1.6	2.3	5	1.2
13-14	299	21-Jan-14	P020	Type I Low Speed	Fluid Only	Polar Plus	8	100	20	2.01	-18.5	-21.7	-18.2	-18.1	-	-	-	-	-	-	1	1	1	1	1	1	1	1	
13-14	300	21-Jan-14	P021	Type I Low Speed	Fluid Only	Polar Plus	8	60	20	4.57	-20.5	-22	-18.1	-18.1	-	-	-	-	-	-	1	1	1	1	1	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm²/h)	SN Rate (g/dm²/h)	ZR Rate (g/dm²/h)	R Rate (g/dm²/h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
13-14	301	21-Jan-14	P021	Type I Low Speed	Fluid Only	Polar Plus	8	60	20	4.41	-20.2	-22.4	-	-18.6	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	302	21-Jan-14	P022	Type I Low Speed	Fluid Only	Polar Plus	8	55	20	3.83	-20.2	-22.4	-19.1	-18	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	303	21-Jan-14	P023	Type I Low Speed	Fluid Only	Polar Plus	8	45	20	4.21	-17.6	-22.5	-21.4	-17.86	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	304	21-Jan-14	P064 / P101	IP Expansion	IP- / SN-	Polar Guard Advance	8	115	20	8.01	-14.6	-23.5	-19.4	-16.3	25	10	-	-	15	2.5	2.7	3.8	1.2	1.9	3.2	1.1	1.1	2.8	
13-14	305	21-Jan-14	P102	New Ice Pellet Dispenser Validation	IP-/SN-	Polar Guard Advance	8	115	20	7.80	-11.4	-23.8	-19.5	-14.5	25	10	-	-	15	2.5	2.6	3.8	1.2	2	3	1	1.4	2.9	
13-14	306	21-Jan-14	P099	New Ice Pellet Dispenser Validation	IP-/SN-	Polar Guard Advance	8	115	20	7.97	-14.4	-24	-18.2	-15.4	25	10	-	-	15	2.3	2.3	3.6	1.2	1.8	3	1	1.5	2.7	
13-14	307	21-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.62	-14	-22.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	308	21-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	0.00	-14	-22.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	309	21-Jan-14	P100	New Ice Pellet Dispenser Validation	IP-/SN-	Polar Guard Advance	8	115	20	7.94	-9.6	-22.6	-	-17	25	10	-	-	15	2.8	2.8	4	1.1	2	3.3	1.1	1.5	3.2	
13-14	310	21-Jan-14	P065	IP Expansion	IP- / SN-	EG106	8	115	20	2.00	-17.4	-23.1	-16.4	-18.7	25	10	-	-	15	1.7	1.7	2.3	1	1.3	1.5	1	1.1	1.3	
13-14	311	21-Jan-14	P065	IP Expansion	IP- / SN-	EG106	8	100	20	4.06	-18.1	-23.9	-21	-19.6	25	10	-	-	15	1.9	1.9	2.3	1.1	1.5	1.7	1	1.1	1.2	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	312	21-Jan-14	P061	IP Expansion	IP- / SN-	Launch	8	115	20	9.11	-17.4	-24.3	-19.8	-18.6	25	10	-	-	15	2.8	2.7	3.7	1.1	1.9	2.4	1	1.6	2.1
13-14	313	21-Jan-14	P062	IP Expansion	IP- / SN-	Max-Flight	8	115	20	8.54	-15.3	-24.5	-19.8	-18.6	25	10	-	-	15	2.6	2.5	3.5	1.1	1.8	2.4	1	1.1	1.4
13-14	314	22-Jan-14	P063	IP Expansion	IP- / SN-	AD-49	8	115	20	8.39	-19.8	-24.8	-18.8	-19.7	25	10	-	-	15	3	2.4	4	1.3	2	3.7	1.1	1.8	3.7
13-14	315	22-Jan-14	P063	IP Expansion	IP- / SN-	AD-49	8	115	20	7.14	-19.4	-25.1	-20.1	-20.2	25	10	-	-	10	2.9	2.8	3.8	1.2	1.9	3	1.1	1.9	3
13-14	316	22-Jan-14	P016	Type I Low Speed	Fluid Only	Dow ADF	8	100	20	1.11	-23.4	-25.5	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	317	22-Jan-14	P017	Type I Low Speed	Fluid Only	Dow ADF	8	60	20	1.83	-23.6	-25.6	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	318	22-Jan-14	P018	Type I Low Speed	Fluid Only	Dow ADF	8	55	20	2.11	-24.1	-25.6	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	319	22-Jan-14	P019	Type I Low Speed	Fluid Only	Dow ADF	8	45	20	3.05	-24.3	-25.7	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	320	22-Jan-14	P007	Type I Low Speed	Fluid Only	Polar Plus	8	100	20	3.84	-24.3	-25.8	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	321	22-Jan-14	P008	Type I Low Speed	Fluid Only	Polar Plus	8	60	20	6.15	-25	-25.9	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1
13-14	322	22-Jan-14	P009	Type I Low Speed	Fluid Only	Polar Plus	8	55	20	7.65	-25.4	-26	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
13-14	323	22-Jan-14	P010	Type I Low Speed	Fluid Only	Polar Plus	8	45	20	8.40	-25.1	-26	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
13-14	324	22-Jan-14	P011	Type I Low Speed	Fluid Only	Polar Plus	8	100	20	4.06	-24.8	-26.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
13-14	325	22-Jan-14	P012	Type I Low Speed	Fluid Only	Polar Plus	8	60	20	6.50	-25.6	-26.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
13-14	326	22-Jan-14	P013	Type I Low Speed	Fluid Only	Polar Plus	8	55	20	8.14	-25.1	-26.4	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
13-14	327	22-Jan-14	P014	Type I Low Speed	Fluid Only	Polar Plus	8	45	20	8.55	-25.5	-26.5	-	-23.2	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
13-14	328	22-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.00	-16.1	-19.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	329	22-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	-0.43	-16.1	-19.8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	330	22-Jan-14	P096	New Ice Pellet Dispenser Validation	IP Mod	Launch	8	115	20	7.67	-18.1	-20	-18.8	-18.9	75	-	-	-	-	10	2.5	3	3.6	1	1.9	2.4	1	1	1.6
13-14	331	22-Jan-14	P093	New Ice Pellet Dispenser Validation	IP Mod	Launch	8	115	20	8.95	-16.3	-20.2	-17.7	-19.5	75	-	-	-	-	10	2.7	2.8	3.6	1.1	2.1	2.5	1	1.4	2
13-14	332	22-Jan-14	P097	New Ice Pellet Dispenser Validation	IP Mod	Launch	8	115	20	9.25	-17	-20.6	-16.9	-18.9	75	-	-	-	-	10	2.9	2.8	3.8	1.1	1.7	2.5	1	1.2	1.5
13-14	333	22-Jan-14	P094	New Ice Pellet Dispenser Validation	IP Mod	Launch	8	115	20	9.42	-16.4	-20.6	-17.9	-19.2	75	-	-	-	-	10	3	2.8	3.8	1.1	1.9	2.4	1	1.2	1.5

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	334	23-Jan-14	P098	New Ice Pellet Dispenser Validation	IP Mod	Launch	8	115	20	10.82	-18.8	-20.9	-19.6	-19.8	75	-	-	-	10	2.9	2.8	3.8	1.1	1.9	2.3	1	1.1	1.4
13-14	335	22-Jan-14	P095	New Ice Pellet Dispenser Validation	IP Mod	Launch	8	115	20	9.55	-20	-21	-17.7	-20.2	75	-	-	-	10	2.8	2.8	3.8	1.1	1.9	2.2	1	1.3	1.5
13-14	336	23-Jan-14	P098	New Ice Pellet Dispenser Validation	IP Mod	Launch	8	115	20	9.35	-19.6	-21.4	-17.8	-19.9	75	-	-	-	10	3	2.8	3.8	1.1	1.6	2.2	1	1.3	1.5
13-14	337	23-Jan-14	P098	New Ice Pellet Dispenser Validation	IP Mod	Launch	8	115	20	8.66	-20.6	-21.9	-18.2	-19.2	75	-	-	-	5	2.6	2.5	3.7	1.1	1.8	2.2	1	1.1	1.4
13-14	338	23-Jan-14	P081	IP Validation with New Temps & Fluids	IP Mod	ABC-S Plus	8	115	20	6.61	-20.6	-22.3	-18.3	-20.2	75	-	-	-	7	2.8	2.7	3.8	1	1.7	2.1	1	1.1	1.3
13-14	339	23-Jan-14	P084	IP Validation with New Temps & Fluids	IP Mod	Max-Flight	8	115	20	7.35	-21.5	-22.6	-18.4	-20.8	75	-	-	-	7	2.6	2.6	3.9	1	1.7	2.2	1	1	1.2
13-14	340	23-Jan-14	P086	IP Validation with New Temps & Fluids	IP Mod	Polar Guard Advance	8	115	20	6.37	-21.4	-22.8	-19.4	-21.1	75	-	-	-	10	2.7	2.4	3.8	1	1.6	2.2	1	1	1.2
13-14	341	27-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	-0.16	-9.3	-13.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	342	27-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	0.45	-9.3	-13.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	343	27-Jan-14	P050	Type III Allowance Times	IP-	2031 - Cold	8	100	20	1.76	-11.4	-11.6	-12.3	-12	25	-	-	-	10	2.5	2.7	2.8	1	1	1.3	1	1	1.1
13-14	344	27-Jan-14	P036	Type III Allowance Times	IP-	2031 - Hot	8	100	20	2.30	-9.1	-9.2	-9.8	-6.2	25	-	-	-	10	2.3	2.4	2.2	3	5	5	3	5	5

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	350	27-Jan-14	P052	Type III Allowance Times	IP- / ZR-	2031 - Cold	8	100	20	2.68	-11.1	-12.2	-10	-10.3	25	-	25	-	5	2.5	2.7	2.9	1	1.1	1.5	1	1	1.1
13-14	351	27-Jan-14	P038	Type III Allowance Times	IP- / ZR-	2031 - Hot	8	100	20	2.15	-9.6	-12.9	-10.9	-5.1	25	-	25	-	5	2	2	2.3	5	5	5	5	5	5
13-14	352	27-Jan-14	P054	Type III Allowance Times	IP- / SN-	2031 - Cold	8	100	20	3.75	-11	-12.8	-10.1	-12.4	25	10	-	-	10	2.5	2.8	3.3	1.1	1.4	1.8	1	1.1	1.3
13-14	353	27-Jan-14	P055	Type III Allowance Times	IP- / SN	2031 - Cold	8	100	20	3.83	-10.2	-13	-10.2	-12.1	25	25	-	-	5	2.5	2.7	3.5	1.1	1.4	2	1	1.1	1.3
13-14	354	28-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	0.46	-11.4	-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	355	28-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	-0.26	-11.4	-19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	356	28-Jan-14	P085	IP Validation with New Temps & Fluids	IP Mod	AD-49	8	115	20	6.66	-11.6	-18.7	-	-16.6	75	-	-	-	7	2.7	2.4	3.5	1.2	1.6	2	1	1.3	1.5
13-14	357	28-Jan-14	P085	IP Validation with New Temps & Fluids	IP Mod	AD-49	8	115	20	7.16	-14	-17.9	-16.8	-16.9	75	-	-	-	10	3	2.8	3.8	1.2	1.6	2.2	1	1.2	1.6
13-14	358	28-Jan-14	P081	IP Validation with New Temps & Fluids	IP Mod	ABC-S Plus	8	115	20	n/a	-12.2	-16.9	-17.3	-16	75	-	-	-	10	2.5	2.3	3.8	1	1.5	-	-	-	-
13-14	359	28-Jan-14	P081	IP Validation with New Temps & Fluids	IP Mod	ABC-S Plus	8	115	20	7.31	-10.9	-14.1	-16.6	-14.7	75	-	-	-	10	2.4	2.4	3.8	1.1	1.5	1.9	1	1.1	1.2
13-14	360	28-Jan-14	P083	IP Validation with New Temps & Fluids	IP Mod	Launch	8	115	20	6.95	-12.1	-12.3	-13	-14.8	75	-	-	-	10	2.3	2.3	3.7	1.1	1.3	1.9	1	1	1.2

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
13-14	361	28-Jan-14	P084	IP Validation with New Temps & Fluids	IP Mod	Max-Flight	8	115	20	5.08	-10.9	-11	-11.1	-13.4	75	-	-	-	10	2.2	2.3	3.3	1	1.2	1.7	1	1	1.2
13-14	362	28-Jan-14	P086	IP Validation with New Temps & Fluids	IP Mod	Polar Guard Advance	8	115	20	6.01	-11	-10.9	-11.4	-13.2	75	-	-	-	10	2.3	2.3	3.3	1	1.3	1.7	1	1	1.2
13-14	365	28-Jan-14	P136	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.13	-10.4	-10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	366	28-Jan-14	P137	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.67	-10.4	-10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	367	28-Jan-14	P138	Ice Phobic R&D	Dry Wing	none	8 pitch pause	100	20	0.52	-10.4	-10.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	368	29-Jan-14	P002	Baseline	Dry Wing	none	22	80	20	-0.41	-8.2	-14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	369	29-Jan-14	P001	Baseline	Dry Wing	none	8	100	20	-0.01	-8.2	-14.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
13-14	370	29-Jan-14	P020	Type I Low Speed	Fluid Only	Polar Plus	8	100	20	1.57	-13.8	-13.6	-	-12.8	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	371	29-Jan-14	P021	Type I Low Speed	Fluid Only	Polar Plus	8	60	20	3.52	-13.4	-13.3	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	372	29-Jan-14	P022	Type I Low Speed	Fluid Only	Polar Plus	8	55	20	4.47	-13.1	-12.6	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1
13-14	373	29-Jan-14	P023	Type I Low Speed	Fluid Only	Polar Plus	8	45	20	5.41	-13	-12.5	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
13-14	374	29-Jan-14	P024	Type I Low Speed	Fluid Only	Polar Plus	8	30	20	6.79	-12.6	-12.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1
13-14	375	29-Jan-14	E3/P023	Type I Low Speed	Fluid Only w/ Squeegee Lines	Polar Plus	8	45	20	3.06	-12.6	-12.2	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
13-14	376	29-Jan-14	P157	Ice Phobic R&D	Fluid Only	2031	fixed angle 4deg	100	20	n/a	-12.6	-12.3	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	
13-14	377	29-Jan-14	P228	R&D	HEAVY CONTAMINATION	ABC-S+	22	80	20	12.73	-4.1	-11.2	-	-	375	-	50	-	26	-	-	-	-	-	-	-	-	-	
13-14	378	29-Jan-14	P226	R&D	APM Unit	None	23	80	20	1.57	-1.8	-11.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	379	29-Jan-14	P226	R&D	APM Unit	None	23 PITCH PAUSE	80	20	0.41	-11.3	-11.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	380	29-Jan-14	P226	R&D	APM Unit	ABC-S Plus	23	80	20	7.56	-11.3	-11.1	-	-10.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	381	29-Jan-14	P226	R&D	APM Unit	ABC-S Plus	23 PITCH PAUSE	80	20	2.33	-11.6	-11.1	-	-10.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	382	29-Jan-14	P226	R&D	APM Unit	ABC-S Plus (unit covered)	23	80	20	2.96	-11.3	-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	383	29-Jan-14	P226	R&D	APM Unit	ABC-S Plus (unit covered)	23 PITCH PAUSE	80	20	2.02	-11.3	-11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
13-14	347	27-Jan-14	E1	Type III Allowance Times	IP Mod	ABC-S Plus - Hot	8	100	20	5.13	-9.4	-11.3	-7.3	-7.2	75	-	-	-	10	2.1	2.4	2.8	3	5	5	3	5	5	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
13-14	349	27-Jan-14	P037	Type III Allowance Times	IP Mod	2031 - Hot	8	100	20	3.61	-9.5	-12.4	-9.9	-7.4	75	-	-	-	5	2.7	2.7	2.5	3	5	5	3	5	5	
13-14	348	27-Jan-14	E2	Type III Allowance Times	IP Mod	EG106 - Hot	8	100	20	1.40	-10.6	-11.7	-9.6	-10.3	75	-	-	-	10	2.5	2.3	3	3	5	5	3	5	5	
13-14	296	21-Jan-14	P057	Type III Allowance Times	IP Mod	2031 - Cold	8	100	20	4.90	-17.7	-20.6	-17.4	-18	75	-	-	-	5	2.3	2.3	2.8	1	1.8	2.1	1	1.1	1.3	
13-14	298	21-Jan-14	P042	Type III Allowance Times	IP Mod	2031 - Hot	8	100	20	4.73	-19	-21.3	-17.5	-12	75	-	-	-	5	2.2	2.5	3.2	2.4	5	2	2.3	5	1.2	
15-16	69	25-Jan-16	P072	Type IV Validation and New Fluids	IP Mod	LNT E450	8	100	20	3.30	-2.0	-6.6	-2.6	-9.8	75	-	-	-	25	2.3	2.5	4.0	1.0	1.4	1.9	1.0	1.0	1.0	
15-16	1	18-Jan-16	P096	Type IV Validation and New Fluids	IP- / ZR-	AD-49 (75/25)	8	100	20	3.32	-5.5	-7.5	missed	-4.67	25	-	25	-	10	-	-	-	-	-	-	-	-	-	-
15-16	2	18-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	n/a	-12.4	-14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	3	18-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	n/a	-12.4	-14.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	4	18-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	n/a	-14.3	-15.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	5	18-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	n/a	-15.2	-15.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	6	18-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	n/a	-14.6	-15.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
15-16	7	18-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	1.29	-15.4	-15.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	8	18-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	0.01	-15.6	-15.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
15-16	9	19-Jan-16	P099	Type IV Validation and New Fluids	IP-	FCY 9311	8	100	20	10.09	-15.4	-16.2	-14.2	-15.2	25	-	-	-	-	30	2.4	2.4	3.8	1.1	1.7	2.3	1.0	1.2	1.3
15-16	10	19-Jan-16	P082	Type IV Validation and New Fluids	IP-	LNT E450	8	100	20	5.82	-15.2	-16.8	-14.5	-15.1	25	-	-	-	-	30	2.2	2.2	2.6	1.0	1.3	1.7	1.0	1.0	1.2
15-16	12	19-Jan-16	P087	Type IV Validation and New Fluids	Fluid Only	LNT E450	8	100	20	6.46	-15.7	-17	-14.7	-12.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	14	19-Jan-16	P100	Type IV Validation and New Fluids	IP Mod	FCY 9311	8	115	20	8.45	-15.8	-17.2	-14.4	-15.4	75	-	-	-	-	10	2.5	2.7	3.8	1.0	1.7	2.7	1.0	1.1	1.2
15-16	15	19-Jan-16	P104	Type IV Validation and New Fluids	Fluid Only	FCY 9311	8	100	20	6.41	-15.7	-16.7	-14.4	-13.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	16	19-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	0.61	-10.7	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	17	19-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	1.12	-11.1	n/a	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	18	19-Jan-16	P202	IP Expansion	Fluid Only	ABC-S Plus	8	100	20	5.85	-11.1	-11	n/a	-8.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	19	19-Jan-16	P096	Type IV Validation and New Fluids	IP- / ZR-	FCY 9311	8	100	20	6.27	-8.5	-10	-8.6	-7.7	25	-	25	-	-	10	2.5	2.5	3.5	1.0	1.5	1.8	1.0	1.0	1.0

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
15-16	20	20-Jan-16	P079	Type IV Validation and New Fluids	IP- / ZR-	LNT E450	8	100	20	4.90	-7.6	-8.9	-7.2	-7.8	25	-	25	-	10	1.8	2.0	2.0	1.0	1.1	1.5	1.0	1.0	1.0
15-16	21	20-Jan-16	P080	Type IV Validation and New Fluids	IP- / SN-	LNT E450	8	100	20	5.35	-6.6	-9.2	-7.0	-2.2	25	10	-	-	15	1.7	2.0	2.4	1.0	1.4	1.7	1.0	1.0	1.2
15-16	22	20-Jan-16	P097	Type IV Validation and New Fluids	IP- / SN-	FCY 9311	8	100	20	6.95	-6.5	-9.6	-7.1	-8.8	25	10	-	-	15	2.4	2.8	3.5	1.1	1.5	2.1	1.0	1.1	1.2
15-16	23	20-Jan-16	P189	IP Expansion - METAR	IP / SN	ABC-S Plus	8	100	20	7.38	-8.2	-10.2	-7.7	-9.8	75	25	-	-	7	2.3	2.7	3.5	1.1	1.7	2.4	1.0	1.0	1.2
15-16	24	20-Jan-16	P189	IP Expansion - METAR	IP / SN	ABC-S Plus	8	100	20	8.16	-7.7	-10.4	-8.7	-10.9	75	25	-	-	10	3.0	3.0	4.0	1.2	1.8	2.5	1.0	1.1	1.2
15-16	25	20-Jan-16	P193	IP Expansion - METAR	IP / ZD	ABC-S Plus	8	100	20	7.01	-7.2	-10.3	-5.3	-9.5	75	-	13	-	10	2.4	2.5	3.2	1.1	1.5	2.1	1.0	1.1	1.1
15-16	26	20-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	0.10	-8.0	-8.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	27	20-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	-0.98	-8.0	-8.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	28	20-Jan-16	P026	Type III Allowance Times	IP-	AeroClear MAX - Cold	8	80	20	2.73	-5.5	-9	-5.7	-8.9	25	-	-	-	10	2.2	2.0	2.4	1.0	1.0	1.5	1.0	1.0	1.1
15-16	29	20-Jan-16	P027	Type III Allowance Times	IP Mod	AeroClear MAX - Cold	8	80	20	2.14	-5.3	-9	-6.3	-10.0	75	-	-	-	5	2.0	2.0	2.7	1.0	1.2	1.4	1.0	1.0	1.1
15-16	30	21-Jan-16	P028	Type III Allowance Times	IP- / ZR-	AeroClear MAX - Cold	8	80	20	2.52	-4.1	-9.7	-6.6	-6.8	25	-	25	-	5	1.8	2.0	2.1	1.0	1.0	1.2	1.0	1.0	1.0

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
15-16	31	21-Jan-16	P029	Type III Allowance Times	IP- / SN-	AeroClear MAX - Cold	8	80	20	1.91	-5.1	-10.1	-6.5	-9.7	25	10	-	-	10	2.0	1.7	3.0	1.0	1.2	1.7	1.0	1.0	1.5
15-16	32	21-Jan-16	P030	Type III Allowance Times	IP- / SN	AeroClear MAX - Cold	8	80	20	2.69	-5.4	-10.3	-7.3	-10.8	25	25	-	-	10	2.0	2.7	3.8	1.0	1.5	2.5	1.0	1.0	1.4
15-16	33	21-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	80	20	3.52	-7.2	-10.7	-7.9	-7.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	34	21-Jan-16	P018	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	100	20	2.72	-6.3	-11	-7.6	-6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	35	21-Jan-16	P210	IP Expansion - METAR	IP / ZD	Polar Guard Advance	8	100	20	9.32	-6.9	-11.6	-6.7	-9.9	75	-	13	-	10	2.7	2.7	3.9	1.0	1.7	2.5	1.0	1.0	1.2
15-16	36	21-Jan-16	P206	IP Expansion - METAR	IP / SN	Polar Guard Advance	8	100	20	11.06	-7.4	-12	-8.6	-11.6	75	25	-	-	10	3.0	3.0	4.0	1.2	1.7	2.6	1.0	1.0	1.4
15-16	37	21-Jan-16	P206	IP Expansion - METAR	IP / SN	Polar Guard Advance	8	100	20	9.42	-7.7	-12.6	-9.3	-11.2	75	25	-	-	7	2.8	2.5	3.7	1.1	1.4	2.5	1.0	1.1	1.4
15-16	38	21-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	0.25	-6.8	-6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	39	21-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	-0.58	-6.8	-6.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	40	21-Jan-16	P189	IP Expansion - METAR	IP / SN	ABC-S Plus	8	100	20	6.70	-3.5	-6.9	-5.5	-8.7	75	25	-	-	7	2.9	2.7	3.4	1.1	1.9	2.1	1.0	1.0	1.1
15-16	41	21-Jan-16	P188	IP Expansion - METAR	IP / SN	ABC-S Plus	8	100	20	7.48	-3.8	-7	-5.4	-9.3	75	25	-	-	10	2.8	2.8	3.7	1.2	2.0	2.3	1.0	1.0	1.1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
15-16	42	22-Jan-16	P192	IP Expansion - METAR	IP / ZD	ABC-S Plus	8	100	20	6.06	-3.1	-7.1	-5.7	-8.9	75	-	13	-	15	3.0	3.0	4.0	1.1	1.7	2.0	1.0	1.0	1.1
15-16	43	22-Jan-16	P194	IP Expansion - Current IP and SN	IP- / SN-	ABC-S Plus	8	100	20	6.91	-4.3	-7.5	-5.8	-8.0	25	10	-	-	40	2.8	2.8	4.0	1.2	1.7	1.9	1.0	1.1	1.2
15-16	44	22-Jan-16	P196	IP Expansion - Current IP and SN	IP- / SN	ABC-S Plus	8	100	20	6.66	-4.4	-7.6	-6.4	-8.8	25	25	-	-	20	3.2	2.8	3.8	1.3	2.0	2.3	1.0	1.4	1.3
15-16	45	22-Jan-16	P171	IP Expansion - METAR	IP / SN	AD-49	8	100	20	7.34	-4.4	-7.7	-5.3	-9.2	75	25	-	-	10	2.9	2.8	4.0	1.1	1.7	2.1	1.0	1.1	1.2
15-16	46	22-Jan-16	P177	IP Expansion - Current IP and SN	IP- / SN-	AD-49	8	100	20	5.56	-4.0	-8.1	-6.0	-6.4	25	10	-	-	40	3.1	3.0	4.0	1.2	1.8	2.5	1.0	1.2	1.2
15-16	47	22-Jan-16	P175	IP Expansion - METAR	IP / ZD	AD-49	8	100	20	6.07	-4.9	-8.5	-5.8	-9.6	75	-	13	-	15	2.8	2.7	3.8	1.1	1.5	1.9	1.0	1.1	1.3
15-16	48	22-Jan-16	P179	IP Expansion - Current IP and SN	IP- / SN	AD-49	8	100	20	7.63	-4.7	-8.9	-5.7	-8.7	25	25	-	-	20	2.8	2.7	3.8	1.2	1.7	2.8	1.0	1.1	1.5
15-16	49	22-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	-0.35	-8.2	-8.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	50	22-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	-0.60	-8.2	-8.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	51	22-Jan-16	P211	IP Expansion - Current IP and SN	IP- / SN-	Polar Guard Advance	8	100	20	8.73	-5.1	-9.5	-4.9	-9.2	25	10	-	-	40	2.8	2.8	4.0	1.1	1.4	2.6	1.0	1.0	1.3
15-16	52	23-Jan-16	P205	IP Expansion - METAR	IP / SN	Polar Guard Advance	8	100	20	9.27	-4.9	-10.1	-7.1	-10.4	75	25	-	-	10	2.7	2.8	4.0	1.1	1.4	2.5	1.0	1.0	1.2

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
15-16	53	23-Jan-16	P209	IP Expansion - METAR	IP / ZD	Polar Guard Advance	8	100	20	8.23	-4.8	-10.6	-7.5	-9.6	75	-	13	-	15	2.8	3.0	3.8	1.0	1.5	2.3	1.0	1.2	1.1
15-16	54	23-Jan-16	P213	IP Expansion - Current IP and SN	IP- / SN	Polar Guard Advance	8	100	20	9.63	-5.2	-10.8	-7.7	-10.8	25	25	-	-	20	2.8	3.1	3.9	1.1	1.6	2.6	1.0	1.1	1.9
15-16	55	23-Jan-16	P213	IP Expansion - Current IP and SN	IP- / SN	Polar Guard Advance	8	100	20	8.85	-6.2	-11.4	-8.6	-11.0	25	25	-	-	15	2.8	2.9	3.7	1.2	1.6	2.4	1.0	1.0	1.4
15-16	56	23-Jan-16	P025	Type III Allowance Times	IP- / SN	AeroClear MAX - Cold	8	80	20	2.71	-6.4	-12	-8.7	-12.7	25	25	-	-	10	2.3	2.2	3.8	1.0	1.2	1.6	1.0	1.0	1.1
15-16	57	23-Jan-16	P025	Type III Allowance Times	IP- / SN	AeroClear MAX - Cold	8	80	20	2.57	-7.5	-12.3	-9.7	-12.8	25	25	-	-	10	2.5	2.4	3.6	1.0	1.2	1.6	1.0	1.0	1.1
15-16	58	23-Jan-16	P008	Type III Allowance Times	IP- / SN	AeroClear MAX - Cold	8	100	20	2.12	-7.2	-12.7	-10.0	-13.3	25	25	-	-	10	2.7	2.7	3.5	1.0	1.2	1.3	1.0	1.0	1.1
15-16	59	23-Jan-16	P022	Type III Allowance Times	IP- / ZR-	AeroClear MAX - Cold	8	80	20	2.79	-6.6	-13	-9.9	-9.7	25	-	25	-	7	1.7	1.7	2.5	1.0	1.0	1.4	1.0	1.0	1.1
15-16	60	23-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	68	20	5.81	-9.6	-13.3	-9.8	-9.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	61	24-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	0.59	-1.2	-8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	62	24-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	-0.08	-1.2	-8.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	63	24-Jan-16	P088	Type IV Validation and New Fluids	IP-	FCY 9311	8	100	20	3.46	-2.6	-7.1	-4.5	-7.5	25	-	-	-	50	2.7	2.8	4.0	1.0	1.4	1.6	1.0	1.1	1.2

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
15-16	64	25-Jan-16	P090	Type IV Validation and New Fluids	IP- / ZR-	FCY 9311	8	100	20	8.40	-1.5	-7.6	-4.5	-5.0	25	-	25	-	25	25	2.7	2.8	4.3	1.0	1.1	5.0	1.1	1.1	4.7
15-16	65	25-Jan-16	P090	Type IV Validation and New Fluids	IP- / ZR-	ABC-S Plus	8	100	20	5.51	-1.5	-7.5	-3.4	-4.8	25	-	25	-	25	25	2.8	2.8	5.0	1.0	1.3	5.0	1.0	1.0	4.0
15-16	66	25-Jan-16	P090	Type IV Validation and New Fluids	IP- / ZR-	Polar Guard Advance	8	100	20	5.82	-0.6	-7.2	-3.6	-4.9	25	-	25	-	25	25	2.6	2.7	4.7	1.0	1.1	5.0	1.0	1.0	5.0
15-16	67	25-Jan-16	P090	Type IV Validation and New Fluids	IP- / ZR-	AD-49	8	100	20	6.49	-1.5	-7	-3.9	-4.3	25	-	25	-	25	25	2.8	2.8	5.0	1.0	1.3	5.0	1.0	1.0	5.0
15-16	68	25-Jan-16	P073	Type IV Validation and New Fluids	IP- / ZR-	LNT E450	8	100	20	3.11	-1.3	-6.7	-3.3	-6.4	25	-	25	-	25	25	2.0	2.0	2.3	1.0	1.0	1.1	1.0	1.0	1.0
15-16	70	25-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	0.61	3.3	-3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	71	25-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	-0.14	3.3	-3.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	72	25-Jan-16	P023	Type III Allowance Times	IP- / R-	AeroClear MAX - Cold	8	80	20	2.02	2.4	-3.5	-0.1	-2.0	25	-	-	25	7	7	1.0	1.3	1.4	1.0	1.0	1.2	1.0	1.0	1.1
15-16	73	25-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	80	20	2.65	1.5	-3.6	-0.8	-0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	74	25-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	68	20	4.12	1.1	-3.6	-0.4	-0.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	75	26-Jan-16	P091	Type IV Validation and New Fluids	IP- / R-	FCY 9311	8	100	20	4.09	0.0	-3.9	0.0	-3.6	25	-	-	25	25	25	1.7	2.3	3.8	1.0	1.0	2.8	1.0	1.0	2.8

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
15-16	76	26-Jan-16	P074	Type IV Validation and New Fluids	IP- / R-	LNT E450	8	100	20	4.28	0.0	-4	-1.0	-4.1	25	-	-	25	25	1.3	1.3	3.2	1.0	1.1	1.1	1.0	1.0	1.0
15-16	77	26-Jan-16	P170	IP Expansion - METAR	IP / R	AD-49	8	100	20	12.38	-0.7	-4.5	-1.4	-3.5	75	-	-	75	25	2.7	3.0	5.0	2.3	1.2	5.0	2.3	1.1	5.0
15-16	78	26-Jan-16	P170	IP Expansion - METAR	IP / R	AD-49	8	100	20	3.02	-1.1	-0.43	-2.1	-4.2	75	-	-	75	10	2.3	2.5	3.8	1.0	1.0	1.8	1.0	1.0	1.2
15-16	79	26-Jan-16	P170	IP Expansion - METAR	IP / R	AD-49	8	100	20	7.79	0.0	-4	-1.8	-4.4	75	-	-	75	15	2.7	2.8	5.0	1.0	1.0	5.0	1.0	1.0	3.3
15-16	80	26-Jan-16	P138	IP Expansion - METAR	IP / R	FCY 9311	8	100	20	8.41	-0.4	-3.8	-2.3	-4.6	75	-	-	75	15	2.3	2.7	5.0	1.0	1.1	4.0	1.0	1.0	5.0
15-16	81	26-Jan-16	P204	IP Expansion - METAR	IP / R	Polar Guard Advance	8	100	20	5.23	0.4	-3	-1.9	-4.4	75	-	-	75	15	2.7	2.8	5.0	1.0	1.1	5.0	1.0	1.0	5.0
15-16	82	26-Jan-16	P187	IP Expansion - METAR	IP / R	ABC-S Plus	8	100	20	6.72	1.3	-2.6	-3.8	-4.0	75	-	-	75	15	2.5	2.7	5.0	1.0	1.3	5.0	1.0	1.0	5.0
15-16	83	27-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	-0.49	-3.4	-7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	84	27-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	-0.57	-3.4	-7.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	85	27-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	68	20	4.62	-2.5	-7.9	-4.0	-2.8	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	86	27-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	80	20	3.17	-4.0	-9.2	-4.4	-3.5	-	-	-	-	-	-	-	-	-	-	-	-	-	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
15-16	87	27-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	22	80	20	2.36	-4.8	-9.6	-4.8	-3.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	88	28-Jan-16	P018	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	100	20	2.55	-4.7	-9.6	-5.5	-4.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	89	28-Jan-16	P002	Baseline	Dry Wing	none	22	68	20	-0.29	-8.1	-9.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	90	28-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	22	68	20	3.74	-6.1	-8.7	-7.2	-6.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	91	28-Jan-16	P022	Type III Allowance Times	IP- / ZR-	AeroClear MAX - Cold	8	80	20	2.54	-2.7	-8.4	-5.3	-4.1	25	-	25	-	7	1.5	1.7	2.3	1.0	1.0	1.1	1.0	1.0	1.0	1.1
15-16	92	28-Jan-16	P145	IP Expansion - Current IP and SN	IP- / SN-	FCY 9311	8	100	20	7.99	-4.0	-8.5	-4.5	-7.9	25	10	-	-	40	2.9	2.8	4.0	1.1	1.5	2.3	1.0	1.3	1.2	
15-16	93	28-Jan-16	P092	Type IV Validation and New Fluids	IP- / SN-	FCY 9311	8	100	20	5.75	-1.7	-7.6	-5.3	-7.7	25	10	-	-	25	2.5	2.7	3.8	1.0	1.5	2.2	1.0	1.1	1.2	
15-16	94	28-Jan-16	P090	Type IV Validation and New Fluids	IP- / ZR-	FCY 9311	8	100	20	9.91	-2.1	-7.3	-5.0	-4.9	25	-	25	-	25	2.3	2.8	5.0	1.0	1.4	5.0	1.0	1.0	5.0	
15-16	95	28-Jan-16	P090	Type IV Validation and New Fluids	IP- / ZR-	FCY 9311	8	100	0	2.52	-1.7	-6.7	-3.9	-4.6	25	-	25	-	25	2.3	2.3	3.0	1.0	1.1	1.2	1.0	1.0	1.0	
15-16	96	28-Jan-16	P001	Baseline	Dry Wing	none	8	100	20	-1.32	5.3	-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
15-16	97	28-Jan-16	P002	Baseline	Dry Wing	none	22	80	20	-1.20	5.3	-1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
15-16	98	28-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	68	20	3.19	2.2	-1.1	-0.2	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	99	28-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	22	68	20	2.98	2.2	-1.1	1.5	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	100	28-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	80	20	1.81	1.8	-1.1	1.6	1.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	101	28-Jan-16	P035	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	22	80	20	1.84	1.7	-1.2	1.6	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	102	29-Jan-16	P018	Type III Allowance Times	Fluid Only	AeroClear MAX - Cold	8	100	20	1.20	1.7	-1.2	1.7	1.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
15-16	103	29-Jan-16	P021	Type III Allowance Times	IP Mod	AeroClear MAX - Cold	8	80	20	1.04	2.1	-1.2	1.7	-5.2	75	-	-	-	-	5	1.8	2.0	2.2	1.0	1.0	1.1	1.0	1.0	1.0
15-16	104	29-Jan-16	P004	Type III Allowance Times	IP Mod	AeroClear MAX - Cold	8	80	20	0.83	2.9	-1.4	0.7	-8.1	75	-	-	-	-	15	2.2	2.5	4.0	1.0	1.0	1.1	1.0	1.0	1.0
15-16	105	29-Jan-16	E1	Heavy Contamination	IP+ /ZR-	AeroClear MAX - Cold	22	80	20	21.54	2.3	-1.1	-0.4	-4.9	150	-	25	-	25	4.3	4.3	4.7	1.0	1.0	5.0	1.0	1.0	1.0	1.0
15-16	13	19-Jan-16	P083	Type IV Validation and New Fluids	IP Mod	LNT E450	8	100	20	6.43	-15.4	-17	-14.6	-15.2	75	-	-	-	-	10	2.2	2.2	2.6	1.1	1.4	2.2	1.0	1.0	1.3
15-16	11	19-Jan-16	P083	Type IV Validation and New Fluids	IP Mod	LNT E450	8	100	20	5.97	-16.8	-17.1	-14.7	-15.5	75	-	-	-	-	10	2.0	2.2	2.6	1.1	1.3	1.8	1.0	1.0	1.2
17-18	3	29-Jan-18	P080	Type IV Validation and New Fluids	IP Mod	ECO-SHIELD	8	100	20	5.59	-7.3	-9.9	-4.6	-4.2	75	-	-	-	-	15	2.0	2.0	3.7	1.0	1.7	2.2	1.0	1.0	1.0

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
17-18	34	01-Feb-18	P087	Type IV Validation and New Fluids	IP Mod	ECO-SHIELD	8	100	20	6.89	-7.6	-9.4	-7.3	-11.2	75	-	-	-	10	2.3	2.3	3.0	1.0	1.6	2.0	1.0	1.0	1.1
17-18	13	30-Jan-18	P015	Type IV Validation and New Fluids	IP Mod	ChemR EG IV	8	100	20	1.86	-10.0	-11	-9.0	-13.1	75	-	-	-	10	1.8	2.0	2.3	1.0	1.3	1.5	1.0	1.0	1.2
17-18	1	28-Jan-18	P001	Baseline	Dry Wing	none	8	100	20	-0.32	1.1	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	2	28-Jan-18	P002	Baseline	Dry Wing	none	22	80	20	0.15	-4.2	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	4	29-Jan-18	P001	Baseline	Dry Wing	none	8	100	20	-0.26	-4.4	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	5	29-Jan-18	P002	Baseline	Dry Wing	none	22	80	20	-0.27	-8.4	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	6	29-Jan-18	P083	Type IV Validation and New Fluids	IP-	ECO-SHIELD	8	100	20	4.82	-7.4	-9.6	-6.8	-10.1	25	-	-	-	30	1.7	1.7	3.0	1.0	1.5	1.8	1.0	1.0	1.0
17-18	7	29-Jan-18	P086	Type IV Validation and New Fluids	IP- / ZR-	ECO-SHIELD	8	100	20	4.85	-8.1	-9.7	-8.0	-7.4	25	-	25	-	10	1.3	1.7	2.5	1.0	1.1	1.8	1.0	1.0	1.0
17-18	8	30-Jan-18	P014	Type IV Validation and New Fluids	IP- / ZR-	ChemR EG IV	8	100	20	3.21	-8.2	-9.6	-7.9	-8.5	25	-	25	-	10	1.3	1.5	2.2	1.0	1.0	1.5	1.0	1.0	1.2
17-18	9	30-Jan-18	P016	Type IV Validation and New Fluids	IP Mod/ZD	ChemR EG IV	8	100	20	2.36	-7.9	-9.4	-8.4	-11.3	75	-	13	-	7	1.5	1.7	2.3	1.0	1.2	1.5	1.0	1.0	1.2
17-18	10	30-Jan-18	P088	Type IV Validation and New Fluids	IP Mod/ZD	ECO-SHIELD	8	100	20	5.79	-7.1	-9.8	-8.3	-10.1	75	-	13	-	7	2.0	2.0	2.7	1.0	1.7	2.0	1.0	1.0	1.0

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
17-18	11	30-Jan-18	P084	Type IV Validation and New Fluids	IP- / SN-	ECO-SHIELD	8	100	20	4.96	-5.5	-10.1	-8.7	-10.2	25	10	-	-	15	1.8	1.8	2.8	1.1	1.7	2.3	1.0	1.0	1.0
17-18	12	30-Jan-18	P012	Type IV Validation and New Fluids	IP- / SN-	ChemR EG IV	8	100	20	2.48	-7.8	-10.4	-7.8	-11.6	25	10	-	-	15	1.8	1.7	3.3	1.0	1.2	1.5	1.0	1.0	1.0
17-18	14	30-Jan-18	P001	Baseline	Dry Wing	none	8	100	20	-0.06	-11.9	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	15	30-Jan-18	P002	Baseline	Dry Wing	none	22	80	20	-0.19	-12.6	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	16	30-Jan-18	P017	Type IV Validation and New Fluids	IP-	ChemR EG IV	8	100	20	2.60	-13.3	-14.2	-12.0	-15.1	25	-	-	-	30	2.0	2.0	2.8	1.0	1.2	1.4	1.0	1.0	1.2
17-18	17	30-Jan-18	P018	Type IV Validation and New Fluids	IP- / SN-	ChemR EG IV	8	100	20	3.36	-12.5	-15.2	-13.4	-15.2	25	10	-	-	15	2.0	2.0	2.8	1.0	1.3	1.5	1.0	1.0	1.2
17-18	42	02-Feb-18	P181	EG Type IV Expansion	IP Mod	ChemR EG IV	8	100	20	2.29	-10.5	-11	-8.8	-14.2	75	-	-	-	25	2.6	2.8	4.0	1.0	1.1	1.7	1.0	1.0	1.1
17-18	19	31-Jan-18	P025	Type IV Validation and New Fluids	Fluid Only	ChemR EG IV	8	100	20	5.38	-14.5	-16.2	-14.5	-12.6	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	20	31-Jan-18	P089	Type IV Validation and New Fluids	IP-	ECO-SHIELD	8	115	20	6.54	-15.8	-16.8	-14.0	-15.4	25	-	-	-	30	2.5	2.3	3.3	1.0	1.8	2.3	1.0	1.0	1.1
17-18	21	31-Jan-18	P090	Type IV Validation and New Fluids	IP- / SN-	ECO-SHIELD	8	115	20	6.36	-13.6	-17.3	-15.4	-15.1	25	10	-	-	15	2.2	2.0	3.2	1.0	1.5	1.9	1.0	1.0	1.1
17-18	22	31-Jan-18	P091	Type IV Validation and New Fluids	IP Mod	ECO-SHIELD	8	115	20	8.79	-17.0	-17.7	-15.7	-16.7	75	-	-	-	10	2.2	2.0	3.7	1.0	1.7	2.3	1.0	1.0	1.2

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
17-18	23	31-Jan-18	P097	Type IV Validation and New Fluids	Fluid Only	ECO-SHIELD	8	100	20	6.05	-16.7	-17.7	-16.2	-14.3	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	24	31-Jan-18	P235	Type III HS Allowance Times	Fluid Only	AeroClear MAX - Cold	8	100	20	3.27	-17.1	-18	-15.6	-14.8	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	25	31-Jan-18	P001	Baseline	Dry Wing	none	8	100	20	0.60	-9.1	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	26	31-Jan-18	P002	Baseline	Dry Wing	none	22	80	20	0.71	n/a	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	27	31-Jan-18	P001	Baseline	Dry Wing	none	8	100	20	0.03	-9.8	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	28	31-Jan-18	P002	Baseline	Dry Wing	none	22	80	20	0.26	n/a	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	29	31-Jan-18	P096	Type IV Validation and New Fluids	Fluid Only	ECO-SHIELD	8	100	20	5.81	-9.6	-11.8	-9.1	-9.5	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	30	31-Jan-18	P024	Type IV Validation and New Fluids	Fluid Only	ChemR EG IV	8	100	20	4.97	-8.6	-11.5	-8.5	-9.3	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	31	31-Jan-18	P177	EG Type IV Expansion	IP-	ChemR EG IV	8	100	20	1.80	-8.7	-10.8	-8.7	-12.3	25	-	-	-	50	2.3	2.7	3.9	1.0	1.2	1.6	1.0	1.0	1.0	
17-18	32	01-Feb-18	P179	EG Type IV Expansion	IP- / ZD	ChemR EG IV	8	100	20	5.43	-6.4	-10.2	-8.2	-10.0	25	-	13	-	30	2.5	2.5	4.0	1.0	1.0	5.0	1.0	1.0	1.5	
17-18	33	01-Feb-18	P178	EG Type IV Expansion	IP- / SN-	ChemR EG IV	8	100	20	3.68	-5.2	-9.7	-7.1	-10.3	25	10	-	-	50	2.9	2.5	4.3	1.0	1.6	4.0	1.0	1.0	3.8	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
17-18	35	01-Feb-18	P234	Type III HS Allowance Times	Fluid Only	AeroClear MAX - Cold	8	100	20	2.65	-7.3	-9.2	-7.5	-8.5	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	36	01-Feb-18	P001	Baseline	Dry Wing	none	8	100	20	0.29	-0.1	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	37	01-Feb-18	P002	Baseline	Dry Wing	none	22	80	20	-0.11	n/a	n/a	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
17-18	38	01-Feb-18	P082	Type IV Validation and New Fluids	IP Mod / R	ECO-SHIELD	8	100	20	4.65	-1.6	-1.6	-0.6	-4.8	75	-	-	75	10	2.2	2.5	4.0	1.0	1.1	2.7	1.0	1.0	1.7
17-18	39	01-Feb-18	P010	Type IV Validation and New Fluids	IP Mod / R	ChemR EG IV	8	100	20	7.21	-3.5	-4.2	-3.3	-7.0	75	-	-	75	10	2.2	2.2	4.7	1.0	1.0	5.0	1.0	1.0	5.0
17-18	40	01-Feb-18	P003	Type IV Validation and New Fluids	IP-	ChemR EG IV	8	100	20	1.28	-6.8	-7.4	-4.7	-10.5	25	-	-	-	50	2.5	2.5	3.5	1.0	1.1	1.3	1.0	1.0	1.2
17-18	41	01-Feb-18	P075	Type IV Validation and New Fluids	IP-	ECO-SHIELD	8	100	20	6.50	-8.2	-9.1	-7.6	-10.3	25	-	-	-	50	2.3	2.5	4.0	1.0	1.8	2.2	1.0	1.0	1.0
17-18	43	02-Feb-18	P180	EG Type IV Expansion	IP- / ZR-	ChemR EG IV	8	100	20	5.76	-12.2	-13.3	-10.9	-10.7	25	-	25	-	30	3.3	2.8	5.0	1.8	1.1	5.0	1.0	1.0	5.0
17-18	18	31-Jan-18	P019	Type IV Validation and New Fluids	IP Mod	ChemR EG IV	8	100	20	2.71	-14.8	-15.7	-13.8	-16.6	75	-	-	-	10	2.0	1.8	2.8	1.0	1.2	1.6	1.0	1.0	1.2
18-19	34	24-Jan-19	P034	Type IV Validation and New Fluids	IP Mod	Max Flight SNEG	8	100	20	4.48	-2.57	-3.2	-4.1	-11.1	75	-	-	-	15	2.25	2.25	3	1	1.25	1.25	1	1	1
18-19	33	24-Jan-19	P086	Type IV Validation and New Fluids	IP Mod	Defrost ECO 4	8	100	20	3.48	-2.84	-3.7	-5.3	-11.0	75	-	-	-	15	2.25	2.25	3.4	1	1.5	1.9	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
18-19	32	23-Jan-19	P112	Type IV Validation and New Fluids	IP Mod	Defrost EG 4	8	100	20	2.49	-3.86	-4.5	-5.8	-13.7	75	-	-	-	25	2.25	2.25	3.5	1	1	1.15	1	1	1
18-19	31	23-Jan-19	P008	Type IV Validation and New Fluids	IP Mod	Max Flight AVIA	8	100	20	1.92	-4.12	-4.9	-5.9	-13.7	75	-	-	-	25	2.25	2.45	3.5	1	1	1.05	1	1	1
18-19	1	21-Jan-19	P001	Baseline	Dry Wing	none	8	100	20	-0.47	-18.1	-21.9	n/a	-16.9	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	2	21-Jan-19	P002	Baseline	Dry Wing	none	22	80	20	1.30	-18.1	-21.9	n/a	-16.9	-	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	3	21-Jan-19	P027	Type IV Validation and New Fluids	Fluid Only	Max Flight AVIA	8	100	20	4.89	-22.8	-22	-22.1	-20.8	-	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18-19	4	21-Jan-19	P053	Type IV Validation and New Fluids	Fluid Only	Max Flight SNEG	8	100	20	6.99	-22.6	-22.3	-21.7	-21.1	-	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18-19	5	21-Jan-19	P105	Type IV Validation and New Fluids	Fluid Only	Defrost ECO 4	8	100	20	9.38	-22.6	-22.2	-22.9	-21.3	-	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18-19	6	21-Jan-19	P131	Type IV Validation and New Fluids	Fluid Only	Defrost EG 4	8	100	20	6.77	-22.8	-22.4	-22.6	-21.9	-	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18-19	7	21-Jan-19	E1	Type IV Validation and New Fluids	Fluid Only	Polar Guard Advance	8	100	20	6.94	-22.4	-22.3	-22.4	-21.3	-	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18-19	8	21-Jan-19	E2	Type IV Validation and New Fluids	Fluid Only	Endurance EG106	8	100	20	4.80	-22.0	-22.5	-22.2	-21.4	-	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
18-19	9	21-Jan-19	P105	Type IV Validation and New Fluids	Fluid Only	Defrost ECO 4	8	100	20	8.90	-22.3	-22.6	-22.1	-21.7	-	-	-	-	-	-	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
18-19	10	21-Jan-19	P001	Baseline	Dry Wing	none	8	100	20	0.12	-18.6	-18.5	n/a	-17.8	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	11	21-Jan-19	P002	Baseline	Dry Wing	none	22	80	20	0.46	-18.6	-18.5	n/a	-17.8	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	12	21-Jan-19	P002	Baseline	Dry Wing	none	22	80	20	0.26	-19.8	-18.7	n/a	-19.5	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	13	21-Jan-19	P046	Type IV Validation and New Fluids	IP-	Max Flight SNEG	8	115	20	7.07	-19.8	-19.5	-19.5	-20.5	25	-	-	-	30	2.3	2.3	3.8	1.0	1.8	3.3	1.0	1.1	1.3	
18-19	14	21-Jan-19	P098	Type IV Validation and New Fluids	IP-	Defrost ECO 4	8	115	20	8.77	-20.7	-20.2	-20.1	-21.4	25	-	-	-	30	2.0	2.0	3.3	1.0	1.9	3.0	1.0	1.0	1.7	
18-19	15	22-Jan-19	P020	Type IV Validation and New Fluids	IP-	Max Flight AVIA	8	100	20	5.66	-21.4	-21.2	-21.3	-22.6	25	-	-	-	30	2.0	2.0	3.0	1.0	1.7	2.0	1.0	1.0	1.1	
18-19	17	22-Jan-19	P124	Type IV Validation and New Fluids	IP-	Defrost EG 4	8	100	20	6.72	-22.0	-22.1	-21.6	-23.4	25	-	-	-	30	2.0	2.0	2.5	1.0	1.5	2.0	1.0	1.0	1.2	
18-19	19	22-Jan-19	P001	Baseline	Dry Wing	none	8	100	20	-0.60	-12.2	-14.9	n/a	-12.6	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	20	22-Jan-19	E3	Baseline	Dry Wing	none	Pitch Pause	100	20	n/a	-12.2	-14.9	n/a	-12.6	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	21	22-Jan-19	P002	Baseline	Dry Wing	none	22	80	20	2.80	-12.2	-14.9	n/a	-12.6	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	22	22-Jan-19	P045	Type IV Validation and New Fluids	IP Mod	Max Flight SNEG	8	115	20	7.18	-13.5	-14.9	-14.5	-17.2	75	-	-	-	10	2.0	2.0	3.3	1.0	1.5	2.2	1.0	1.0	1.3	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
18-19	23	22-Jan-19	P097	Type IV Validation and New Fluids	IP Mod	Defrost ECO 4	8	115	20	6.30	-13.35	-15.1	-14.3	-16.7	75	-	-	-	10	2.0	2.0	3.0	1.0	1.5	2.0	1.0	1.0	1.0	1.2
18-19	24	22-Jan-19	P104	Type IV Validation and New Fluids	Fluid Only	Defrost ECO 4	8	100	20	7.53	-13.65	-15.0	-15.3	-16.2	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	25	23-Jan-19	P001	Baseline	Dry Wing	none	8	100	20	0.11	-7.1	-13.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	26	23-Jan-19	P090	Type IV Validation and New Fluids	IP- / SN-	Defrost ECO 4	8	100	20	7.75	-8.51	-13.9	-12.8	-14.2	25	10	-	-	15	2	2	3	1.1	1.75	2.25	1.2	1	1.3	
18-19	27	23-Jan-19	P038	Type IV Validation and New Fluids	IP- / SN-	Max Flight SNEG	8	100	20	9.91	-8.35	-13.4	-12.6	-14.1	25	10	-	-	15	2	2	3.25	1.15	1.8	2.25	1.05	1	1.5	
18-19	28	23-Jan-19	P044	Type IV Validation and New Fluids	IP- / SN-	Max Flight SNEG	8	115	20	6.83	-8.9	-12.8	-12.4	-14.1	25	10	-	-	15	2	2	3	1.1	1.35	1.75	1	1	1.25	
18-19	29	23-Jan-19	P001	Baseline	Dry Wing	none	8	100	20	0.22	-3.75	-5.3	n/a	-5.2	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	30	23-Jan-19	P002	Baseline	Dry Wing	none	22	80	20	1.19	-3.75	-5.3	n/a	-5.2	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	35	24-Jan-19	P032	Type IV Validation and New Fluids	IP- / ZR-	Max Flight SNEG	8	100	20	3.47	-0.81	-2.1	-3.4	-6.3	25	-	25	-	25	2	2	3	1	1	1.25	1	1	1.25	
18-19	36	24-Jan-19	P111	Type IV Validation and New Fluids	IP- / R-	Defrost EG 4	8	100	20	1.44	0.65	0.0	-1.9	-6.6	25	-	-	25	25	1.5	1.5	2	1	1	1	1	1	1	1
18-19	37	24-Jan-19	P085	Type IV Validation and New Fluids	IP- / R-	Defrost ECO 4	8	100	20	2.93	0.72	-0.1	-1.2	-5.9	25	-	-	25	25	1.5	1.75	2.75	1	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
18-19	38	29-Jan-19	P001	Baseline	Dry Wing	none	8	100	20	-0.02	-11.65	-16.6	n/a	-13.1	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	39	29-Jan-19	P002	Baseline	Dry Wing	none	22	80	20	1.47	-11.65	-16.6	n/a	-13.1	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	40	29-Jan-19	P096	Type IV Validation and New Fluids	IP- / SN-	Defrost ECO 4	8	115	20	7.89	-15.54	-15.8	-16.5	-17.3	25	10	-	-	15	2.5	2.5	2.75	1.1	1.45	1.75	1	1.05	1.3	
18-19	41	29-Jan-19	P018	Type IV Validation and New Fluids	IP- / SN-	Max Flight AVIA	8	100	20	4.33	-13.95	-14.9	-16.2	-17.7	25	10	-	-	15	2	2	2.5	1.05	1.15	1.3	1	1	1.05	
18-19	42	29-Jan-19	P122	Type IV Validation and New Fluids	IP- / SN-	Defrost EG 4	8	100	20	5.15	-13.13	-13.7	-15.3	-17.0	25	10	-	-	15	2.5	2.5	2.75	1	1.05	1.3	1	1	1.05	
18-19	43	29-Jan-19	P118	Type IV Validation and New Fluids	IP- / ZR-	Defrost EG 4	8	100	20	4.36	-10.07	-12	-13.5	-13.7	25	-	25	-	10	2	2	2.5	1	1	1.15	1	1	1	
18-19	44	30-Jan-19	P001	Baseline	Dry Wing	none	8	100	20	1.04	-7.87	-14.1	n/a	-10.4	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	45	30-Jan-19	P002	Baseline	Dry Wing	none	22	80	20	1.46	-7.87	-14.1	n/a	-10.4	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
18-19	46	30-Jan-19	P014	Type IV Validation and New Fluids	IP- / ZR-	Max Flight AVIA	8	100	20	2.95	-10.31	-10.7	-14.3	-13.9	25	-	25	-	10	2.25	2	2.5	1	1	1.1	1	1	1	
18-19	47	30-Jan-19	P040	Type IV Validation and New Fluids	IP- / ZR-	Max Flight SNEG	8	100	20	8.14	-13.24	-9.9	-13.7	-13.4	25	-	25	-	10	2.5	2.5	3	1.2	1.6	3.8	1	1.1	3.8	
18-19	48	30-Jan-19	P092	Type IV Validation and New Fluids	IP- / ZR-	Defrost ECO 4	8	100	20	7.12	-13	-9.2	-14.37	-12.87	25	-	25	-	10	2.5	2.5	3	1.05	1.35	2.5	1	1	1.2	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
18-19	16	22-Jan-19	P021	Type IV Validation and New Fluids	IP Mod	Max Flight AVIA	8	100	20	5.53	-21.0	-21.1	-22.3	-23.1	75	-	-	-	10	2.0	2.0	2.7	1.0	1.5	2.0	1.0	1.0	1.1
18-19	18	22-Jan-19	P125	Type IV Validation and New Fluids	IP Mod	Defrost EG 4	8	100	20	6.62	-21.1	-21.7	-22.8	-22.7	75	-	-	-	10	2.0	2.0	2.7	1.0	1.4	2.1	1.0	1.0	1.2
19-20	21	22-Jan-20	P062	EG Type IV Expansion	IP Mod	Safewing EG IV NORTH	8	100	20	1.27	-5.44	-3.7	-6.06	-13.07	75	-	-	-	35	3.3	2.8	4	1	1	1.13	1	1	1
19-20	1	19-Jan-20	P001	Baseline	Dry Wing	none	8	100	20	0.10	-11.94	-11.3	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19-20	2	19-Jan-20	P002	Baseline	Dry Wing	none	22	80	20	1.31	-12.56	-11.5	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19-20	4	19-Jan-20	P018	Type IV Validation and New Fluids	IP-	Safewing EG IV NORTH	8	100	20	2.48	-13.84	-13.4	-13.3	-16.68	25	-	-	-	30	2.0	1.9	3.0	1.0	1.0	1.5	1.0	1.0	1.0
19-20	5	20-Jan-20	P019	Type IV Validation and New Fluids	IP- / SN-	Safewing EG IV NORTH	8	100	20	2.84	-14.9	-14	-14.12	-16.52	25	10	-	-	15	2.0	1.9	2.9	1.0	1.1	1.5	1.0	1.0	1.0
19-20	3	19-Jan-20	P020	Type IV Validation and New Fluids	IP Mod	Safewing EG IV NORTH	8	100	20	2.41	-12.91	-12.3	-12.3	-17.28	75	-	-	-	10	2.2	1.9	3.3	1.0	1.0	1.5	1.0	1.0	1.0
19-20	7	20-Jan-20	P071	EG Type IV Expansion	IP-	Safewing EG IV NORTH	8	100	20	2.79	-16.35	-15.7	-15.47	-18.09	25	-	-	-	50	2.3	2.1	4.0	1.0	1.1	1.7	1.0	1.0	1.1
19-20	8	20-Jan-20	P027	Type IV Validation and New Fluids	Fluid Only	Safewing EG IV NORTH	8	100	20	3.30	-17.03	-15.9	-16.6	-15.33	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19-20	9	20-Jan-20	P001	Baseline	Dry Wing	none	8	100	20	0.89	-10.27	-11.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
19-20	10	20-Jan-20	P002	Baseline	Dry Wing	none	22	80	20	1.37	n/a	-11.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19-20	12	20-Jan-20	P126	EG Type IV Expansion	IP- / SN-	ChemR EG IV	8	100	20	3.19	-13.56	-13.4	-14.21	-16.53	25	10	-	-	30	2.4	2.43	4	1	1.67	2.07	1	1.1	1.3	
19-20	14	21-Jan-20	P153	EG Type IV Expansion	IP- / SN-	EG106	8	100	20	1.95	-14.39	-14.4	-14.77	-17.07	25	10	-	-	30	2.5	2.337	4	1	1.37	1.7	1	1.07	1.2	
19-20	16	21-Jan-20	P099	EG Type IV Expansion	IP- / SN-	Defrost EG 4	8	100	20	3.42	-15.11	-15.3	-15.4	-17.59	25	10	-	-	30	2.5	2.337	3.83	1	1.13	1.43	1	1	1.1	
19-20	17	21-Jan-20	P001	Baseline	Dry Wing	none	8	100	20	0.57	-5.53	-4.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19-20	18	21-Jan-20	P002	Baseline	Dry Wing	none	22	80	20	0.57	n/a	-4.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19-20	19	21-Jan-20	P057	EG Type IV Expansion	IP-	Safewing EG IV NORTH	8	100	20	0.83	-5.34	-3.8	-5.76	-10.49	25	-	-	-	70	2.83	2.23	4	1	1	1.03	1	1	1	
19-20	20	21-Jan-20	P058	EG Type IV Expansion	IP- / SN-	Safewing EG IV NORTH	8	100	20	1.53	-4.67	-3.6	-5.77	-10.74	25	10	-	-	50	3	2.5	4	1	1.07	1.33	1	1	1	
19-20	11	20-Jan-20	P127	EG Type IV Expansion	IP Mod	ChemR EG IV	8	100	20	2.11	-13.8	-12.5	-11.93	-17.25	75	-	-	-	25	3.27	2.73	4	1	1.43	1.67	1	1.07	1.13	
19-20	22	22-Jan-20	P060	EG Type IV Expansion	IP- / ZR-	Safewing EG IV NORTH	8	100	20	4.67	-5.24	-3.8	-6.23	-8.01	25	-	25	-	40	3	2.23	5	1	1.03	5	1	1	5	
19-20	23	22-Jan-20	P063	EG Type IV Expansion	IP Mod/ZD	Safewing EG IV NORTH	8	100	20	0.85	-5.32	-3.6	-5.84	-11.55	75	-	13	-	20	3	2.57	4	1	1.03	1.4	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
19-20	24	22-Jan-20	P025	Type IV Validation and New Fluids	Fluid Only	Safewing EG IV NORTH	8	100	20	2.84	-5.04	-3.6	-5.99	-7.01	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
19-20	13	20-Jan-20	P154	EG Type IV Expansion	IP Mod	EG106	8	100	20	1.09	-15.47	-14.1	-14.56	-18.28	75	-	-	-	25	3.1	2.7	4	1	1.1	1.53	1	1.03	1.13
19-20	15	21-Jan-20	P100	EG Type IV Expansion	IP Mod	Defrost EG 4	8	100	20	2.83	-15.65	-14.5	-14.9	-18.53	75	-	-	-	25	2.97	3	4	1	1.2	1.73	1	1	1
19-20	6	20-Jan-20	P073	EG Type IV Expansion	IP Mod	Safewing EG IV NORTH	8	100	20	2.25	-15.68	-14.7	-14.63	-18.53	75	-	-	-	25	3.1	3.0	4.0	1.0	1.1	2.4	1.0	1.0	1.0
20-21	9	11-Jan-21	P035	Type IV Validation and New Fluids	IP Mod	Polar Guard Xtend	8	100	20	3.71	1.11	0.8	3.4	-5.5	75	-	-	-	15	2.25	2.05	2.75	1	1.5	1.25	1	1	1
20-21	96	26-Jan-21	P142	EG Type IV Expansion	IP Mod	ChemR EG IV	8	100	20	2.75	-3.75	-4.5	-3.8	-9.3	75	-	-	-	35	3.25	2.75	4	1	1	1.15	1	1	1
20-21	95	26-Jan-21	P115	EG Type IV Expansion	IP Mod	Defrost EG 4	8	100	20	3.16	-4.05	-4.5	-2.7	-9.9	75	-	-	-	35	2.75	2.55	4	1	1	1.05	1	1	1
20-21	38	17-Jan-21	P009	Type IV Validation and New Fluids	IP Mod	ClearWing EG	8	100	20	1.99	-5.07	-4.5	-3.6	-10.1	75	-	-	-	25	2.25	2.15	3.75	1	1	1	1	1	1
20-21	54	19-Jan-21	P042	Type IV Validation and New Fluids	IP Mod	Polar Guard Xtend	8	100	20	7.48	-5.45	-8	-6.1	-8.6	75	-	-	-	10	2	1.75	2.25	1	1.3	1.65	1	1	1
20-21	55	19-Jan-21	P061	EG Type IV Expansion	IP Mod	Max Flight AVIA	8	100	20	2.06	-6.21	-8.3	-5.6	-12.3	75	-	-	-	35	2.9	2.5	4	1	1.1	1.15	1	1	1
20-21	56	19-Jan-21	P169	EG Type IV Expansion	IP Mod	EG106	8	100	20	1.92	-6.87	-8.5	-6.8	-12.1	75	-	-	-	35	3	2.5	4	1	1	1.05	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
20-21	42	18-Jan-21	P196	EG Type IV Expansion	IP Mod	ClearWing EG	8	100	20	2.20	-7.51	-7.3	-6.1	-11.5	75	-	-	-	35	3.5	2.9	4	1	8.1	1.75	1	1	1.05
20-21	50	19-Jan-21	P176	EG Type IV Expansion	IP Mod	EG106	8	100	20	2.20	-7.8	-10.2	-7.7	-13.6	75	-	-	-	25	2.5	2.25	3.75	1	1	1.2	1	1	1
20-21	51	19-Jan-21	P068	EG Type IV Expansion	IP Mod	Max Flight AVIA	8	100	20	3.29	-8.71	-10.5	-8.9	-13.9	75	-	-	-	25	2.5	2.25	3.75	1	1.15	1.25	1	1	1
20-21	1	11-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	-0.27	-3.07	-6.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	2	11-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	0.75	-3.07	-6.7	n/a	n/a	-	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	3	11-Jan-21	P025	Type IV Validation and New Fluids	Fluid Only	ClearWing EG	8	100	20	3.71	-4.81	-6.6	-5.1	-4.6	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
20-21	4	11-Jan-21	P051	Type IV Validation and New Fluids	Fluid Only	Polar Guard Xtend	8	100	20	6.38	-3.26	-6.3	-3.8	-3.6	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
20-21	5	11-Jan-21	P030	Type IV Validation and New Fluids	IP-	Polar Guard Xtend	8	100	20	3.98	-2.3	-6	-3.3	-7.7	29	-	-	-	50	2.65	2.65	4	1.05	2.25	2.1	1	1.05	1.25
20-21	6	11-Jan-21	P031	Type IV Validation and New Fluids	IP- / SN-	Polar Guard Xtend	8	100	20	7.14	-3.66	-5.8	-3.7	-8.6	29	12	-	-	40	3.5	2.95	4	1.05	1.95	3.15	1	1.05	1.85
20-21	7	11-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	-0.41	4.08	0.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
20-21	8	11-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	0.96	4.08	0.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
20-21	10	11-Jan-21	P004	Type IV Validation and New Fluids	IP-	ClearWing EG	8	100	20	1.44	-0.08	0.4	0.7	-5.3	25	-	-	-	50	2	1.55	3.75	1	1	1.1	1	1	1
20-21	11	12-Jan-21	P033	Type IV Validation and New Fluids	IP- / ZR-	Polar Guard Xtend	8	100	20	3.50	-0.13	0.23	0.4	-3.0	25	-	25	-	25	2.1	1.4	1.7	1	1	1	1	1	1
20-21	12	12-Jan-21	P037	Type IV Validation and New Fluids	IP Mod / R	Polar Guard Xtend	8	100	20	2.81	-0.35	0.1	-0.4	-4.0	92	-	-	75	10	2.25	1.75	3.4	1	1.1	1.35	1	1.05	1.05
20-21	13	12-Jan-21	P198	EG Type IV Expansion	IP Mod / R	ClearWing EG	8	100	20	13.04	-0.05	0	-0.5	-1.9	92	-	-	75	20	3.5	3.4	5	2.25	1	4.5	1.1	1	4.5
20-21	14	12-Jan-21	P198	EG Type IV Expansion	IP Mod / R	ClearWing EG	8	100	20	7.14	-0.61	-0.2	-0.5	-3.5	92	-	-	75	15	3	2.9	5	1	1	4	1	1	4
20-21	15	12-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	0.48	1.45	0.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	16	12-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	0.62	1.45	0.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	17	12-Jan-21	P063	EG Type IV Expansion	IP Mod / R	Max Flight AVIA	8	100	20	3.16	0.13	0.4	1.2	-4.2	92	-	-	75	15	2.65	2	4	1	1	3.75	1	1	3.15
20-21	18	12-Jan-21	P117	EG Type IV Expansion	IP Mod / R	Defrost EG 4	8	100	20	5.42	-0.26	0.2	-0.3	-5.1	92	-	-	75	15	2	1.35	5	1	1	4	1	1	3.9
20-21	19	12-Jan-21	P171	EG Type IV Expansion	IP Mod / R	EG106	8	100	20	11.74	-0.67	0	-0.3	-4.3	92	-	-	75	15	2.65	2.9	5	1	1	4.5	1	1	4.5
20-21	76	22-Jan-21	P140	EG Type IV Expansion	IP- / ZR-	ChemR EG IV	8	100	0	2.26	-3.42	-3.08	-2.5	-5.2	25	-	25	-	40	3	2.65	4.5	1	1.05	2.25	1	1	1.25

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
20-21	21	13-Jan-21	P171	EG Type IV Expansion	IP Mod / R	EG106	8	100	0	2.13	-0.66	-0.4	0.2	-4.5	92	-	-	75	12	1.75	2	4.25	1	1	1.05	1	1	1
20-21	22	13-Jan-21	P090	EG Type IV Expansion	IP Mod / R	Safewing EG IV NORTH	8	100	20	6.66	-0.57	-0.5	0.7	-3.6	92	-	-	75	15	3.15	3	5	1	1.05	4	1	1	4
20-21	23	13-Jan-21	P195	EG Type IV Expansion	IP- / R-	ClearWing EG	8	100	20	3.09	-0.31	-0.7	0.0	-4.4	32	-	-	25	25	1.75	1.3	5	1	1	3.75	1	1	3.5
20-21	24	13-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	0.82	3.2	0.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	25	13-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	2.06	3.2	0.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	26	13-Jan-21	P144	EG Type IV Expansion	IP Mod / R	ChemR EG IV	8	100	20	2.33	1.57	0.5	1.8	-2.4	92	-	-	75	15	2.9	2.5	4	1	1	3	1	1	1.5
20-21	27	13-Jan-21	P171	EG Type IV Expansion	IP Mod / R	EG106	8	100	20	1.85	1.13	0.7	1.4	-3.6	92	-	-	75	15	2.25	2	4	1	1	2	1	1	1.25
20-21	28	14-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	0.96	4.9	0.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	29	14-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	1.92	4.9	0.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	30	14-Jan-21	P171	EG Type IV Expansion	IP Mod / R	EG106	8	100	20	1.85	1.7	0.7	2.5	-3.6	75	-	-	75	20	2.65	2.35	4	1	1	1.55	1	1	1
20-21	31	15-Jan-21	P171	EG Type IV Expansion	IP Mod / R	EG106	8	100	20	1.85	1.95	0.7	0.9	-4.3	75	-	-	75	15	1.35	2	3.5	1	1	1.3	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
20-21	32	15-Jan-21	P198	EG Type IV Expansion	IP Mod / R	ClearWing EG	8	100	20	1.03	2.13	0.7	1.2	-1.8	75	-	-	75	20	3	2.9	4	1	1	1.15	1	1	1.05	
20-21	33	15-Jan-21	P117	EG Type IV Expansion	IP Mod / R	Defrost EG 4	8	100	20	2.33	1.21	0.6	1.3	-4.5	75	-	-	75	20	2	1.65	5	1	1	2.25	1	1	1.05	
20-21	41	18-Jan-21	P007	Type IV Validation and New Fluids	IP- / ZR-	ClearWing EG	8	100	0	1.65	-6.49	-6.7	-5.7	-7.9	25	-	25	-	25	2.5	2	3.25	1	1	1.55	1	1	1.05	
20-21	35	15-Jan-21	P117	EG Type IV Expansion	IP Mod / R	Defrost EG 4	8	100	20	2.33	1.08	0.4	0.4	-5.4	75	-	-	75	15	1.6	1.3	4.25	1	1	1.3	1	1	1.05	
20-21	36	17-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	0.96	-4.48	-4.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	37	17-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	1.44	-4.48	-4.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	39	17-Jan-21	P005	Type IV Validation and New Fluids	IP- / SN-	ClearWing EG	8	100	20	2.81	-4.98	-5	-5.4	-9.8	25	10	-	-	40	3	2.25	3.75	1	1.5	2.25	1	1	1	
20-21	40	18-Jan-21	P007	Type IV Validation and New Fluids	IP- / ZR-	ClearWing EG	8	100	20	7.28	-6.14	-5.8	-5.9	-7.5	25	-	25	-	25	2.5	2.05	5	1	1	5	1	1	5	
20-21	34	15-Jan-21	P117	EG Type IV Expansion	IP Mod / R	Defrost EG 4	8	100	0	1.58	1.01	0.5	0.5	-4.5	75	-	-	75	20	2	1.65	5	1	1	1.15	1	1	1	
20-21	43	18-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	0.69	-7.33	-8.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	44	18-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	1.78	-7.33	-8.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
20-21	45	18-Jan-21	P041	Type IV Validation and New Fluids	IP- / ZR-	Polar Guard Xtend	8	100	20	7.07	-8.32	-8.9	-7.0	-6.9	25	-	25	-	10	2	1.9	2.5	1	1.75	2	1	1.05	1.25	
20-21	46	18-Jan-21	P038	Type IV Validation and New Fluids	IP-	Polar Guard Xtend	8	100	20	7.55	-8.77	-9	-7.5	-10.3	25	-	-	-	30	2.15	2	3	1	2	2.25	1	1	1.1	
20-21	47	18-Jan-21	P003	Type IV Validation and New Fluids	IP- / SN-	Max Flight SNEG	8	100	20	8.10	-8.68	-9	-7.1	-9.9	25	10	-	-	15	2.15	2.05	3.25	1.1	1.5	1.85	1	1.05	1.05	
20-21	48	19-Jan-21	P064	EG Type IV Expansion	IP-	Max Flight AVIA	8	100	20	2.54	-9.51	-9.53	-7.9	-12.2	25	-	-	-	50	2	2	3.5	1	1	1.3	1	1	1	
20-21	49	19-Jan-21	P199	EG Type IV Expansion	IP-	ClearWing EG	8	100	20	2.68	-7.73	-9.8	-8.6	-11.6	25	-	-	-	50	2.1	2	3.65	1	1.05	1.35	1	1	1	
20-21	52	19-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	1.03	-2.41	-8.1	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	53	19-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	2.20	-2.41	-8.1	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	57	20-Jan-21	P137	EG Type IV Expansion	IP-	ChemR EG IV	8	100	20	2.20	-6.61	-8.5	-6.5	-9.7	25	-	-	-	70	3	2.5	4	1	1.05	1.05	1	1	1	
20-21	58	20-Jan-21	P110	EG Type IV Expansion	IP-	Defrost EG 4	8	100	20	3.29	-6.01	-8.2	-6.7	-10.4	25	-	-	-	70	2.5	2.25	3.7	1	1	1.1	1	1	1	
20-21	59	20-Jan-21	P059	EG Type IV Expansion	IP- / ZR-	Max Flight AVIA	8	100	20	5.77	-8.14	-8.2	-7.2	-8.3	25	-	25	-	40	3	2.5	5	1.15	1.15	5	1	1	2	
20-21	60	20-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	0.62	-8.12	-12.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
20-21	61	20-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	1.65	-8.12	-12.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	62	20-Jan-21	P065	EG Type IV Expansion	IP- / SN-	Max Flight AVIA	8	100	20	3.36	-9.37	-12.1	-10.2	-13.4	25	10	-	-	30	2.35	2.25	3.75	1	1.15	1.6	1	1	1	
20-21	63	20-Jan-21	P200	EG Type IV Expansion	IP- / SN-	ClearWing EG	8	100	20	4.87	-9.27	-12.3	-10.1	-13.3	25	10	-	-	30	2.95	2.55	3.85	1	1.65	2.25	1	1.1	1.3	
20-21	64	20-Jan-21	P173	EG Type IV Expansion	IP- / SN-	EG106	8	100	20	3.64	-9.59	-13	-10.1	-13.3	25	10	-	-	30	2.6	2.25	3.9	1	1.2	1.75	1	1.05	1.1	
20-21	65	21-Jan-21	P094	EG Type IV Expansion	IP- / ZR-	Safewing EG IV NORTH	8	100	20	5.15	-9.9	-13.1	-11.1	-10.3	25	-	25	-	30	3	2.28	5	1	1	5	1	1	5	
20-21	66	21-Jan-21	P067	EG Type IV Expansion	IP- / ZR-	Max Flight AVIA	8	100	20	7.00	-10.59	-13	-9.9	-10.1	25	-	25	-	30	2.75	2.4	5	1	1.1	5	1	1	5	
20-21	67	21-Jan-21	P148	EG Type IV Expansion	IP- / ZR-	ChemR EG IV	8	100	20	7.48	-10.58	-12.9	-9.5	-9.7	25	-	25	-	30	3	2.5	5	1.1	1.75	5	1	1.5	5	
20-21	68	21-Jan-21	P039	Type IV Validation and New Fluids	IP- / SN-	Polar Guard Xtend	8	100	20	9.40	-9.68	-13	-10.5	-11.7	25	10	-	-	15	2.25	2	3.25	1.15	1.9	2.1	1.1	1.15	1.5	
20-21	69	21-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	0.21	-2.33	-8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
20-21	70	21-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	0.62	-2.33	-8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
20-21	71	21-Jan-21	P165	EG Type IV Expansion	IP- / SN-	EG106	8	100	20	3.16	-3.68	-7.1	-5.3	-9.9	25	10	-	-	50	2.75	2	4	1	1.05	2.25	1	1	1.1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
20-21	72	21-Jan-21	P057	EG Type IV Expansion	IP- / SN-	Max Flight AVIA	8	100	20	2.33	-3.24	-5.7	-3.8	-9.4	25	10	-	-	50	3	2.5	4	1	1.15	1.5	1	1	1
20-21	73	22-Jan-21	P194	EG Type IV Expansion	IP- / ZR-	ClearWing EG	8	100	20	6.52	-2.31	-4.5	-2.8	-5.9	25	-	25	-	40	3	2.5	5	1	1	5	1	1	5
20-21	74	22-Jan-21	P140	EG Type IV Expansion	IP- / ZR-	ChemR EG IV	8	100	20	9.88	-1.88	-2.1	-2.2	-4.7	25	-	25	-	40	3	2.6	5	1	1	5	1	1	5
20-21	75	22-Jan-21	P140	EG Type IV Expansion	IP- / ZR-	ChemR EG IV	8	100	20	12.83	-2.41	-2	-1.6	-4.7	25	-	25	-	35	2.75	2.15	5	1	1	5	1	1	5
20-21	26A	21-Jan-10	P007	IP Validation	IP- / ZR-	EG106	8	100	0	1.29	-3.3	-5.9	-2.8	-6.2	25	-	25	-	25	1.8	2	1.9	1	1	1	1	1	1
20-21	77	24-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	-0.96	-9.63	-10.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	78	24-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	0.21	-9.63	-10.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	79	25-Jan-21	P066	EG Type IV Expansion	IP- / ZD	Max Flight AVIA	8	100	20	5.56	-10.12	-12.1	-10.4	-11.3	25	-	13	-	30	3	2.85	5	1	1	5	1	1	5
20-21	80	25-Jan-21	P201	EG Type IV Expansion	IP- / ZD	ClearWing EG	8	100	20	6.73	-8.96	-12.5	-10.7	-11.2	25	-	13	-	30	2.5	2.5	5	1	1.15	5	1	1.05	5
20-21	81	25-Jan-21	P177	EG Type IV Expansion	IP Mod/ZD	EG106	8	100	20	2.61	-10.22	-12.4	-9.5	-12.9	75	-	13	-	10	2.6	2.5	3.45	1	1.1	1.3	1	1.05	1.05
20-21	82	25-Jan-21	P096	EG Type IV Expansion	IP Mod/ZD	Safewing EG IV NORTH	8	100	20	3.98	-9.35	-11.94	-10.5	-13.4	75	-	13	-	15	3	3	4	1	1.05	2.5	1	1	1.35

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
20-21	83	25-Jan-21	P069	EG Type IV Expansion	IP Mod/ZD	Max Flight AVIA	8	100	20	3.36	-9.48	-11.8	-10.1	-13.3	75	-	13	-	15	2.75	2.65	4	1	1.1	1.5	1	1	1.1
20-21	84	25-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	2.06	-3.65	-7.4	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	85	25-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	2.95	-3.65	-7.4	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	86	25-Jan-21	P062	EG Type IV Expansion	IP Mod/ZD	Max Flight AVIA	8	100	20	3.57	-3.91	-7.2	-5.7	-10.8	75	-	13	-	20	2.65	2.5	4	1	1	2.5	1	1	1
20-21	87	25-Jan-21	P170	EG Type IV Expansion	IP Mod/ZD	EG106	8	100	20	7.41	-4.3	-6.8	-5.5	-10.3	75	-	13	-	25	2.5	2.5	5	1	1.05	5	1	1	2.1
20-21	88	25-Jan-21	P197	EG Type IV Expansion	IP Mod/ZD	ClearWing EG	8	100	20	7.14	-3.3	-6.7	-4.6	-10.1	75	-	13	-	20	2.95	2.6	5	1	1.05	4.5	1	1	2
20-21	89	26-Jan-21	P036	Type IV Validation and New Fluids	IP Mod/ZD	Polar Guard Xtend	8	100	20	6.59	-3.36	-6.4	-4.7	-8.0	75	-	13	-	10	2.5	2.25	3	1	1.75	2	1	1	1.4
20-21	90	26-Jan-21	P085	EG Type IV Expansion	IP- / ZD	Safewing EG IV NORTH	8	100	20	6.93	-1.66	-6.3	-4.5	-7.8	25	-	13	-	40	2.65	2.25	4.5	1	1	4.75	1	1	2.5
20-21	91	26-Jan-21	P112	EG Type IV Expansion	IP- / ZD	Defrost EG 4	8	100	20	3.91	-1.55	-6.2	-4.4	-7.8	25	-	13	-	40	2.7	2.5	4.5	1	1	3.25	1	1	2.5
20-21	92	26-Jan-21	P193	EG Type IV Expansion	IP- / ZD	ClearWing EG	8	100	20	7.76	-1.74	-6.1	-4.9	-7.5	25	-	13	-	40	2.65	2.5	5	1	1	5	1	1	5
20-21	93	26-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	1.30	-1.52	-4.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
20-21	94	26-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	2.13	-1.52	-4.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	97	27-Jan-21	P111	EG Type IV Expansion	IP- / SN-	Defrost EG 4	8	100	20	3.36	-2.79	-4.4	-3.6	-9.4	25	10	-	-	50	2.75	2.5	4	1	1.05	1.35	1	1	1	
20-21	98	27-Jan-21	P192	EG Type IV Expansion	IP- / SN-	ClearWing EG	8	100	20	3.29	-3.01	-4.2	-3.7	-8.6	25	10	-	-	50	3.4	2.5	4	1.15	1.15	1.75	1	1	1.75	
20-21	99	27-Jan-21	P191	EG Type IV Expansion	IP-	ClearWing EG	8	100	20	2.61	-4.16	-4.3	-3.6	-7.9	25	-	-	-	70	2.8	2.5	4	1	1	1.05	1	1	1	
20-21	100	27-Jan-21	P143	EG Type IV Expansion	IP Mod/ZD	ChemR EG IV	8	100	20	7.34	-2.69	-4.6	-3.9	-9.5	75	-	13	-	20	3.05	2.55	4.5	1.1	1.05	4	1	1	2.5	
20-21	101	27-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	1.24	-3.97	-4.4	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	102	27-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	0.96	-3.97	-4.4	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	103	27-Jan-21	P056	EG Type IV Expansion	IP-	Max Flight AVIA	8	100	20	1.30	-5.39	-5.1	-3.83	-8.93	25	-	-	-	70	3	2.5	4	1	1	1	1	1	1	
20-21	104	27-Jan-21	P164	EG Type IV Expansion	IP-	EG106	8	100	20	3.09	-6.02	-6.1	-5.17	-9.37	25	-	-	-	70	2.6	2.4	4	1	1.05	1.3	1	1	1	
20-21	105	28-Jan-21	P116	EG Type IV Expansion	IP Mod/ZD	Defrost EG 4	8	100	20	3.64	-6.74	-7.1	-6.2	-10.87	75	-	13	-	20	2.7	2.5	4.5	1	1	2	1	1	1	
20-21	106	28-Jan-21	P113	EG Type IV Expansion	IP- / ZR-	Defrost EG 4	8	100	20	5.83	-6.68	-7.5	-7.27	-8.03	25	-	25	-	40	2.75	2.5	5	1	1	5	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
20-21	107	28-Jan-21	P140	EG Type IV Expansion	IP- / ZR-	ChemR EG IV	8	100	20	7.07	-7.51	-8.2	-7.1	-7.53	25	-	25	-	40	3.375	2.8	5	1.35	1.25	5	1.05	1.05	1.55
20-21	108	28-Jan-21	P140	EG Type IV Expansion	IP- / ZR-	ChemR EG IV	8	100	20	8.03	-9.02	-8.7	-7.43	-7.47	25	-	25	-	40	3	3	5	1.35	1.75	5	1.1	1.25	5
20-21	109	28-Jan-21	P001	Baseline	Dry Wing	none	8	100	20	0.00	-14.4	-14.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	110	28-Jan-21	P002	Baseline	Dry Wing	none	22	80	20	1.72	-14.4	-14.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	111	28-Jan-21	P045	Type IV Validation and New Fluids	IP- / SN-	Polar Guard Xtend	8	115	20	7.69	-15.06	-15.2	-14.2	-14.47	25	10	-	-	15	2.5	2.3	3	1.05	1.75	2.25	1	1.2	1.6
20-21	112	28-Jan-21	P045	Type IV Validation and New Fluids	IP- / SN-	Polar Guard Xtend	8	115	20	8.37	-15.25	-15.7	-14.23	-14.53	25	10	-	-	15	2.5	2.35	3.1	1.05	1.6	2.1	1	1.15	1.35
20-21	113	29-Jan-21	P044	Type IV Validation and New Fluids	IP-	Polar Guard Xtend	8	115	20	9.75	-16.19	-16.3	-14.6	-15.75	25	-	-	-	30	2.5	2.3	3.25	1	2	2.1	1	1.15	1.3
20-21	114	29-Jan-21	P054	Type IV Validation and New Fluids	Fluid Only	Polar Guard Xtend	8	100	20	7.00	-16.23	-16.8	-15.33	-12.97	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
20-21	115	29-Jan-21	P046	Type IV Validation and New Fluids	IP Mod	Polar Guard Xtend	8	115	20	9.79	-16.72	-16.9	-5.17	-15.8	75	-	-	-	10	2.5	2.35	3.05	1	1.75	2.15	1	1.15	1.5
20-21	116	29-Jan-21	P046	Type IV Validation and New Fluids	IP Mod	Polar Guard Xtend	8	115	20	n/a	n/a	n/a	-15.2	n/a	75	-	-	-	5	2.4	2.2	3	n/a	n/a	n/a	n/a	n/a	n/a
20-21	117	29-Jan-21	P027	Type IV Validation and New Fluids	Fluid Only	ClearWing EG	8	100	20	5.23	-16.8	-17.1	-15.7	-13.13	-	-	-	-	Enter Test Plan #	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
21-22	38	13-Jan-22	P208	Type IV Validation and New Fluids	IP Mod	Polar Guard® Xtend	8	100	20	4.23	-2.6	-6.7	-3.4	-9.1	75	-	-	-	15	2.05	2	3	1	1.35	1.35	1	1	1.05
21-22	39	13-Jan-22	P642	EG Type IV Expansion	IP Mod	FCY-EGIV	8	100	20	1.16	-3.42	-6.2	-4.3	-10.7	75	-	-	-	45	3.5	3.1	4	1	1	1.05	1	1	1
21-22	40	14-Jan-22	P086	Type IV Validation and New Fluids	IP Mod	Defrost NORTH 4	8	100	20	1.23	-4.44	-6.1	-3.6	-11.4	75	-	-	-	35	3	2.4	4	1	1	1.15	1	1	1
21-22	3	09-Jan-22	P112	Type IV Validation and New Fluids	IP Mod	ClearWing ECO	8	100	20	8.94	-4.99	-5.4	-4.9	-8.7	75	-	-	-	15	2	2	2.9	1	1.75	2	1	1	1.15
21-22	6	10-Jan-22	P093	Type IV Validation and New Fluids	IP Mod	Defrost NORTH 4	8	100	20	1.91	-7.66	-10	-9.6	-13.2	75	-	-	-	25	2.35	2.25	4	1	1.1	1.25	1	1	1.05
21-22	5	10-Jan-22	P060	Type IV Validation and New Fluids	IP Mod	ChemR Nordik IV	8	100	20	1.16	-8.25	-9.1	-7.7	-12.4	75	-	-	-	35	2.1	2	4	1	1.1	1.2	1	1	1.05
21-22	7	10-Jan-22	P191	Type IV Validation and New Fluids	IP Mod	FCY-EGIV	8	100	20	1.77	-9.23	-11	-9.8	-14.2	75	-	-	-	25	2.7	2	4	1	1.1	1.5	1	1	1.05
21-22	107	25-Jan-22	P215	Type IV Validation and New Fluids	IP Mod	Polar Guard® Xtend	8	100	20	9.28	-12.18	-15.2	-12.0	-13.9	75	-	-	-	10	2.25	2	3.1	1	2	2	1	1.1	1.45
21-22	24	11-Jan-22	P655	EG Type IV Expansion	IP Mod	FCY-EGIV	8	100	20	4.71	-15.4	-18.6	-14.5	-17.9	75	-	-	-	25	3.25	3	4	1	1.15	1.85	1	1	1
21-22	91	24-Jan-22	P303	EG Type IV Expansion	IP Mod	Max Flight AVIA	8	100	20	4.09	-15.6	-19.07	-15.2	-18.8	75	-	-	-	20	3.15	3	4	1	1.1	1.25	1	1	1.05
21-22	118	27-Jan-22	P597	EG Type IV Expansion	IP Mod	ChemR Nordik IV	8	100	20	2.46	-15.75	-22.8	-16.8	-18.9	75	-	-	-	20	3.1	3	3.7	1	1.15	1.3	1	1.1	1.2

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
21-22	11	10-Jan-22	P597	EG Type IV Expansion	IP Mod	ChemR Nordik IV	8	100	20	3.14	-15.83	-18.3	-14.7	-17.2	75	-	-	-	25	3.05	2.9	4	1	1.2	1.35	1	1	1.1
21-22	1	09-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.27	-3.33	-4.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	2	09-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.41	-3.33	-4.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	119	27-Jan-22	P597	EG Type IV Expansion	IP Mod	ChemR Nordik IV	8	100	20	2.80	-16.08	-23.8	-17.5	-19.2	75	-	-	-	15	3.1	3	3.4	1	1.15	1.3	1	1.05	1.1
21-22	4	09-Jan-22	P107	Type IV Validation and New Fluids	IP-	ClearWing ECO	8	100	20	7.23	-5.09	-7	-6.5	-8.6	25	-	-	-	50	2	1.9	2.75	1.05	1.35	1.75	1	1	1.25
21-22	23	11-Jan-22	P626	EG Type IV Expansion	IP Mod	Defrost NORTH 4	8	100	20	4.91	-16.31	-18.6	-14.7	-17.6	75	-	-	-	25	3.25	2.9	4	1	1.15	1.35	1	1.1	1.15
21-22	82	21-Jan-22	P274	EG Type IV Expansion	IP Mod	ClearWing EG	8	100	20	3.82	-16.62	-20.6	-17.6	-19.2	75	-	-	-	25	3.7	3	4	1	1.4	2.5	1	1.1	2.15
21-22	8	10-Jan-22	P212	Type IV Validation and New Fluids	IP- / SN-	Polar Guard [®] Xtend	8	100	20	7.57	-7.98	-11.3	-9.6	-11.1	25	10	-	-	15	2	1.9	3.1	1	2.25	2	1	1.15	1.65
21-22	9	10-Jan-22	P001	Baseline	Dry Wing	none	8	115	20	0.41	-10.58	-16.4	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	10	10-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	1.23	-10.58	-16.4	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	85	21-Jan-22	P600	EG Type IV Expansion	IP Mod	ChemR Nordik IV	8	100	20	2.93	-17.02	-22.78	-19.0	-20.4	75	-	-	-	20	3.3	3	3.8	1	1.15	1.55	1	1.05	1.15

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
21-22	12	10-Jan-22	P219	Type IV Validation and New Fluids	IP Mod	Polar Guard® Xtend	8	115	20	8.94	-16.25	-19.2	-16.2	-16.6	75	-	-	-	10	2.25	2	3.65	1	1.9	2.3	1	1.1	1.35
21-22	13	11-Jan-22	P217	Type IV Validation and New Fluids	IP-	Polar Guard® Xtend	8	115	20	9.35	-16.61	-20.8	-17.5	-15.9	25	-	-	-	30	2.05	2	3.55	1.05	2	2.4	1	1.1	1.65
21-22	14	11-Jan-22	P079	Type IV Validation and New Fluids	Fluid Only	ChemR Nordik IV	8	100	20	4.77	-18.99	-21.4	-18.2	-16.1	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	15	11-Jan-22	P105	Type IV Validation and New Fluids	Fluid Only	Defrost NORTH 4	8	100	20	5.32	-19.09	-22	-18.7	-15.7	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	16	11-Jan-22	P129	Type IV Validation and New Fluids	Fluid Only	ClearWing ECO	8	100	20	10.85	-19.64	-22.7	-17.6	-15.8	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	17	11-Jan-22	P201	Type IV Validation and New Fluids	Fluid Only	FCY-EGIV	8	100	20	3.55	-19.81	-22.8	-19.3	-16.9	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	18	11-Jan-22	P225	Type IV Validation and New Fluids	Fluid Only	Polar Guard® Xtend	8	100	20	6.41	-19.91	-23.2	-19.7	-17.2	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	19	11-Jan-22	P217	Type IV Validation and New Fluids	IP-	Polar Guard® Xtend	8	115	20	8.25	-20.06	-23.9	-19.1	-19.4	25	-	-	-	20	2.25	2.05	3.3	1.05	2	2.2	1	1.1	1.3
21-22	20	11-Jan-22	P124	Type IV Validation and New Fluids	IP-	ClearWing ECO	8	115	20	11.87	-20.07	-24.3	-19.9	-19.8	25	-	-	-	20	2	2	2.85	1.1	2	2.45	1	1.2	1.6
21-22	21	11-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	0.34	-14.05	-19.1	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	22	11-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.48	-14.05	-19.1	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
21-22	121	27-Jan-22	P099	Type IV Validation and New Fluids	IP Mod	Defrost NORTH 4	8	100	20	5.25	-17.35	-22.9	-17.5	-19.1	75	-	-	-	10	3	2.5	3.4	1	1.2	1.65	1	1	1.15
21-22	25	12-Jan-22	P123	Type IV Validation and New Fluids	IP Mod	ClearWing ECO	8	115	20	n/a	n/a	n/a	-14.9	-16.7	75	-	-	-	10	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	26	12-Jan-22	P123	Type IV Validation and New Fluids	IP Mod	ClearWing ECO	8	115	20	9.41	-13.42	-17.3	-12.2	-15.0	75	-	-	-	10	2	1.85	3	1.15	2	2.15	1	1.35	1.75
21-22	27	12-Jan-22	P128	Type IV Validation and New Fluids	Fluid Only	ClearWing ECO	8	100	20	10.50	-14.02	-17.17	-12.8	-13.1	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	28	12-Jan-22	P217	Type IV Validation and New Fluids	IP-	Polar Guard [®] Xtend	8	115	20	6.48	-13.99	-16.9	-11.5	-14.0	25	-	-	-	30	2.1	2	3	1	1.35	1.85	1	1.05	1.25
21-22	29	12-Jan-22	P224	Type IV Validation and New Fluids	Fluid Only	Polar Guard [®] Xtend	8	100	20	6.28	-11.47	-16.7	-10.7	-11.7	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	30	12-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.27	-2.87	-8.1	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	31	12-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.75	-2.87	-8.1	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	32	12-Jan-22	P203	Type IV Validation and New Fluids	IP-	Polar Guard [®] Xtend	8	100	20	3.75	-3.05	-7.6	-4.4	-8.1	25	-	-	-	50	2	1.8	3	1	1.2	1.4	1	1	1.05
21-22	33	13-Jan-22	P055	Type IV Validation and New Fluids	IP-	ChemR Nordik IV	8	100	20	1.23	-4.21	-7.8	-4.4	-9.3	25	-	-	-	70	2.25	1.9	4	1	1.1	1.25	1	1	1.05
21-22	34	13-Jan-22	P608	EG Type IV Expansion	IP-	Defrost NORTH 4	8	100	20	0.89	-3.12	-7.7	-5.0	-8.8	25	-	-	-	90	2.6	2.15	4	1	1	1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
21-22	35	13-Jan-22	P637	EG Type IV Expansion	IP-	FCY-EGIV	8	100	20	1.50	-3.84	-7.5	-4.2	-8.1	25	-	-	-	90	2.7	2.2	4	1	1	1.05	1	1	1
21-22	36	13-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.34	-1.75	-6.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	37	13-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	-0.07	-1.75	-6.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	41	14-Jan-22	P082	Type IV Validation and New Fluids	IP- / SN-	Defrost NORTH 4	8	100	20	0.95	-3.15	-5.62	-4.9	-9.8	25	10	-	-	50	3	2.35	4	1	1.15	1.05	1	1	1
21-22	42	14-Jan-22	P126	Type IV Validation and New Fluids	Fluid Only	ClearWing ECO	8	100	20	8.32	-4.12	-5.8	-4.9	-6.4	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	43	14-Jan-22	P108	Type IV Validation and New Fluids	IP- / SN-	ClearWing ECO	8	100	20	9.00	-4.65	-6.7	-3.6	-8.4	25	10	-	-	40	2.4	2	3.75	1.1	2	2.75	1	1.15	2
21-22	44	14-Jan-22	P222	Type IV Validation and New Fluids	Fluid Only	Polar Guard® Xtend	8	100	20	5.66	-5.13	-7.6	-5.8	-6.0	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	45	16-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.75	-12.06	-16.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	46	16-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.82	-12.06	-16.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	47	16-Jan-22	P595	EG Type IV Expansion	IP-	ChemR Nordik IV	8	100	20	1.64	-14.51	-16.7	-13.9	-15.3	25	-	-	-	50	2.25	1.95	3.2	1	1.2	1.2	1	1	1
21-22	48	17-Jan-22	P624	EG Type IV Expansion	IP-	Defrost NORTH 4	8	100	20	2.93	-13.61	-15.6	-13.4	-15.0	25	-	-	-	70	2.75	2.35	3.8	1	1.1	1.35	1	1	1.05

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
21-22	49	17-Jan-22	P653	EG Type IV Expansion	IP-	FCY-EGIV	8	100	20	2.52	-13.08	-14.4	-11.5	-14.2	25	-	-	-	60	2.55	2.25	3.55	1	1.1	1.2	1	1	1
21-22	50	17-Jan-22	P121	Type IV Validation and New Fluids	IP-	ClearWing ECO	8	115	20	9.28	-12.04	-13.1	-11.4	-12.7	25	-	-	-	30	2	1.9	2.75	1.25	2	2.1	1.2	1.3	1.6
21-22	51	17-Jan-22	P218	Type IV Validation and New Fluids	IP- / SN-	Polar Guard [®] Xtend	8	115	20	7.91	-9.3	-11.9	-10.6	-10.4	25	10	-	-	15	2.4	2.1	3	1.1	1.85	2.1	1	1.1	1.25
21-22	52	17-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.34	-4.52	-6.3	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	53	17-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	-0.07	-4.52	-6.3	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	54	17-Jan-22	P058	Type IV Validation and New Fluids	IP- / ZR-	ChemR Nordik IV	8	100	20	4.02	-5.6	-7.4	-5.5	-7.2	25	-	25	-	40	3	2.8	5	1	1.05	5	1	1	5
21-22	55	18-Jan-22	P084	Type IV Validation and New Fluids	IP- / ZR-	Defrost NORTH 4	8	100	20	4.50	-7.02	-8.5	-7.1	-8.3	25	-	25	-	40	2.85	2.55	5	1	1	5	1	1	5
21-22	56	18-Jan-22	P110	Type IV Validation and New Fluids	IP- / ZR-	ClearWing ECO	8	100	20	8.12	-5.29	-8.6	-8.0	-6.9	25	-	25	-	25	2.8	2.55	5	1	1.5	5	1	1.15	5
21-22	57	18-Jan-22	P182	Type IV Validation and New Fluids	IP- / ZR-	FCY-EGIV	8	100	20	4.71	-5.85	-9.1	-7.6	-7.5	25	-	25	-	40	3	2.65	5	1	1	5	1	1	5
21-22	58	18-Jan-22	P206	Type IV Validation and New Fluids	IP- / ZR-	Polar Guard [®] Xtend	8	100	20	6.75	-6.91	-9.9	-8.6	-7.4	25	-	25	-	25	3	2.85	5	1	1.35	5	1	1.1	5
21-22	59	18-Jan-22	P127	Type IV Validation and New Fluids	Fluid Only	ClearWing ECO	8	100	20	9.41	-10.31	-10.9	-9.7	-10.4	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
21-22	60	18-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.20	-7.71	-16	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	61	18-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.82	-7.71	-16	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	62	18-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.41	-10.16	-16.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	63	18-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.27	-10.16	-16.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	64	18-Jan-22	P064	Type IV Validation and New Fluids	IP- / SN-	ChemR Nordik IV	8	100	20	2.05	-9.6	-17.3	-12.3	-13.9	25	10	-	-	30	2.85	2.45	3.7	1	1.15	1.5	1	1.05	1.15	
21-22	65	19-Jan-22	P090	Type IV Validation and New Fluids	IP- / SN-	Defrost NORTH 4	8	100	20	3.82	-10.97	-17.5	-11.7	-14.2	25	10	-	-	30	2.9	2.5	3.85	1	1.15	1.45	1	1	1.15	
21-22	66	19-Jan-22	P188	Type IV Validation and New Fluids	IP- / SN-	FCY-EGIV	8	100	20	3.14	-11.18	-17.5	-11.9	-14.5	25	10	-	-	30	2.95	2.5	3.95	1.05	1.15	1.4	1.05	1.05	1.15	
21-22	67	19-Jan-22	P122	Type IV Validation and New Fluids	IP- / SN-	ClearWing ECO	8	115	20	9.21	-11.35	-17.2	-13.0	-13.1	25	10	-	-	15	2.6	2.3	3	1.1	1.6	1.95	6	1.15	1.5	
21-22	68	19-Jan-22	P218	Type IV Validation and New Fluids	IP- / SN-	Polar Guard® Xtend	8	115	20	6.28	-12.33	-16.7	-12.9	-12.5	25	10	-	-	15	2.55	2.25	3	1.1	1.2	1.6	1.1	1.15	1.45	
21-22	69	19-Jan-22	P469	PG Type IV Expansion	IP Mod	Polar Guard® Advance	8	115	20	6.68	-14.98	-16.2	-13.7	-15.5	75	-	-	-	15	3	2.6	4	1.05	1.5	2.5	1.05	1.1	1.15	
21-22	70	19-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-1.09	-1.4	-4.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
21-22	71	19-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.95	-1.4	-4.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	72	19-Jan-22	P056	Type IV Validation and New Fluids	IP- / SN-	ChemR Nordik IV	8	100	20	0.61	-4.27	-5.81	-2.6	-8.9	25	10	-	-	50	3	2.5	4	1	1.15	1.15	1	1	1	
21-22	73	20-Jan-22	P204	Type IV Validation and New Fluids	IP- / SN-	Polar Guard [®] Xtend	8	100	20	5.87	-5.11	-8.3	-5.5	-9.5	25	10	-	-	40	2.75	2.45	4	1.05	1.4	2.5	1	1.1	1.3	
21-22	74	20-Jan-22	P216	Type IV Validation and New Fluids	IP Mod/ZD	Polar Guard [®] Xtend	8	100	20	5.93	-9.89	-10.9	-7.9	-10.2	75	-	13	-	7	2.4	2.05	3	1	1.15	1.55	1	1.05	1.2	
21-22	75	20-Jan-22	P068	Type IV Validation and New Fluids	IP Mod/ZD	ChemR Nordik IV	8	100	20	1.43	-10.95	-12	-9.9	-12.9	75	-	13	-	10	2.6	2.3	2.65	1	1.1	1.2	1	1.05	1.05	
21-22	76	20-Jan-22	P622	EG Type IV Expansion	IP Mod/ZD	Defrost NORTH 4	8	100	20	3.68	-10.18	-13.4	-10.7	-13.5	75	-	13	-	20	3	2.9	4	1	1.1	4	1	1	4	
21-22	77	20-Jan-22	P243	EG Type IV Expansion	IP-	DOW EG106	8	100	20	0.82	-15.45	-16	-13.5	-16.0	25	-	-	-	50	2.55	2.05	3.8	1	1.1	1.25	1	1.05	1.05	
21-22	78	20-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.48	-9.27	-18.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
21-22	79	20-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.00	-9.27	-18.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
21-22	80	20-Jan-22	P596	EG Type IV Expansion	IP- / SN-	ChemR Nordik IV	8	100	20	2.52	-12.58	-18.5	-15.0	-16.1	25	10	-	-	30	3	2.7	3.7	1	1.2	1.45	1	1.1	1.1	
21-22	81	20-Jan-22	P273	EG Type IV Expansion	IP- / SN-	ClearWing EG	8	100	20	7.23	-15.99	-19.6	-16.0	-17.7	25	10	-	-	30	3	2.55	4	1.15	1.85	2.6	1.05	1.35	2.2	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
21-22	83	21-Jan-22	P272	EG Type IV Expansion	IP-	ClearWing EG	8	100	20	3.55	-15.91	-21.5	-17.7	-17.7	25	-	-	-	50	2.65	2.5	4	1.1	1.45	2.05	1.1	1.15	1.45	
21-22	84	21-Jan-22	P301	EG Type IV Expansion	IP-	Max Flight AVIA	8	100	20	3.07	-17.45	-22.2	-18.1	-19.5	25	-	-	-	50	2.65	2.45	3.6	1	1.3	1.7	1	1	1.05	
21-22	120	27-Jan-22	P597	EG Type IV Expansion	IP Mod	ChemR Nordik IV	8	100	20	3.27	-18.36	-23.6	-17.7	-18.9	75	-	-	-	10	3	2.75	3	1	1.2	1.5	1	1.1	1.15	
21-22	86	23-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.48	-8.08	-16.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	87	23-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	-0.07	-8.08	-16.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	88	23-Jan-22	P625	EG Type IV Expansion	IP- / SN-	Defrost NORTH 4	8	100	20	4.37	-11.71	-17.4	-13.5	-15.6	25	10	-	-	30	3	2.65	3.8	1	1.15	1.45	1	1	1.05	
21-22	89	23-Jan-22	P331	EG Type IV Expansion	IP- / SN-	Safewing EG IV NORTH	8	100	20	3.96	-13.59	-17.6	-14.0	-16.4	25	10	-	-	30	2.75	2.5	4	1	1.15	1.5	1	1	1.15	
21-22	90	24-Jan-22	P654	EG Type IV Expansion	IP- / SN-	FCY-EGIV	8	100	20	4.50	-13.13	-18	-14.9	-17.2	25	10	-	-	30	3.05	2.6	4	1	1.2	1.75	1	1	1.25	
21-22	92	24-Jan-22	E1	Moderate Ice Pellets and Snow	IP / SN	DOW EG106	8	100	20	4.43	-14.06	-19.6	-15.6	-18.2	75	25	-	-	15	3.5	2.9	4	1.1	1.35	1.55	1	1.2	1.25	
21-22	93	24-Jan-22	E2	Moderate Ice Pellets and Snow	IP / SN	ClearWing EG	8	100	20	8.32	-14.73	-21.4	-15.7	-18.4	75	25	-	-	10	3.2	2.75	3.9	1.1	1.45	2.1	1	1.35	2	
21-22	94	24-Jan-22	E3	Moderate Ice Pellets and Snow	IP / SN	Max Flight SNEG	8	115	20	9.48	-16.7	-21.9	-16.5	-18.7	75	25	-	-	7	3.4	3	4	1.2	2	4	1.1	1.4	4	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
21-22	95	24-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	0.00	-8.3	-14.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	96	24-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	1.43	-8.3	-14.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	97	24-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	0.14	-12.35	-14.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	98	24-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.14	-12.35	-14.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	99	24-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.48	-11.53	-14.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	100	24-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.41	-11.53	-14.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	101	24-Jan-22	P588	EG Type IV Expansion	IP-	ChemR Nordik IV	8	100	20	1.64	-10.66	-14.7	-12.0	-12.9	25	-	-	-	70	2.75	2.4	3.6	1	1.15	1.2	1	1.05	1.05	
21-22	102	25-Jan-22	P617	EG Type IV Expansion	IP-	Defrost NORTH 4	8	100	20	2.05	-9.1	-14.5	-10.9	-12.8	25	-	-	-	70	2.65	2.35	3.65	1	1	1.15	1	1	1	
21-22	103	25-Jan-22	P646	EG Type IV Expansion	IP-	FCY-EGIV	8	100	20	0.82	-9.49	-14.4	-11.1	-12.2	25	-	-	-	70	2.55	2.3	3.9	1	1.05	1.2	1	1	1	
21-22	104	25-Jan-22	P211	Type IV Validation and New Fluids	IP-	Polar Guard [®] Xtend	8	100	20	7.09	-9.22	-14.4	-9.5	-12.0	25	-	-	-	30	2.1	2	3	1	1.65	1.75	1	1.05	1.2	
21-22	105	25-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.75	-7.25	-14.4	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
21-22	106	25-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.27	-7.25	-14.4	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	108	25-Jan-22	P115	Type IV Validation and New Fluids	IP-	ClearWing ECO	8	100	20	11.39	-9.29	-16.7	-12.6	-12.9	25	-	-	-	30	2.35	2.15	2.95	1.15	2	2.1	1.15	1.9	1.95
21-22	109	26-Jan-22	E3	Moderate Ice Pellets and Snow	IP / SN	Max Flight SNEG	8	115	20	7.98	-13.61	-17.8	-13.3	-15.4	75	25	-	-	5	3	2.45	3.75	1.05	1.3	3.6	1	1.1	2.2
21-22	110	26-Jan-22	E4	Moderate Ice Pellets and Snow	IP / SN	Defrost NORTH 4	8	100	20	5.18	-13.33	-18.5	-14.7	-16.9	75	25	-	-	15	3.5	3.05	4	1	1.2	1.65	1	1	1.15
21-22	111	26-Jan-22	E5	Moderate Ice Pellets and Snow	IP / SN	Safewing EG IV NORTH	8	100	20	4.23	-14.1	-19.5	-15.2	-17.4	75	25	-	-	10	3	2.55	3.75	1	1.2	1.4	1	1	1.1
21-22	112	26-Jan-22	E6	Moderate Ice Pellets and Snow	IP / SN	Defrost ECO 4	8	115	20	8.46	-15.34	-20.2	-15.2	-16.3	75	25	-	-	5	2.95	2.55	3.5	1.05	1.4	2	1	1.15	1.5
21-22	113	26-Jan-22	E7	Moderate Ice Pellets and Snow	IP / SN	ChemR Nordik IV	8	100	20	3.96	-15.38	-21	-15.7	-17.7	75	25	-	-	10	3.2	2.85	3.6	1.05	1.25	1.6	1	1.15	1.25
21-22	114	26-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	0.20	-14.59	-19.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	115	26-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.68	-14.59	-19.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	116	26-Jan-22	E1	Moderate Ice Pellets and Snow	IP / SN	EG106	8	100	20	3.55	-14.36	-21.1	-15.5	-17.4	75	25	-	-	10	2.9	2.35	3.5	1	1.2	1.45	1	1.1	1.1
21-22	117	26-Jan-22	E8	Moderate Ice Pellets and Snow	IP / SN	Polar Guard Advance	8	115	20	7.64	-15.04	-22.2	-15.6	-17.4	75	25	-	-	5	3.05	2.35	4	1.15	1.45	3.9	1.1	1.4	3.85

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
21-22	122	27-Jan-22	P196A	Type IV Validation and New Fluids	IP Mod	FCY-EGIV	8	115	20	2.46	-16.02	-22.5	-16.8	-19.3	75	-	-	-	10	2.8	2.95	3.1	1	1.2	1.35	1	1	1
21-22	123	27-Jan-22	P196	Type IV Validation and New Fluids	IP-	FCY-EGIV	8	115	20	3.14	-15.24	-21.8	-17.8	-18.3	25	-	-	-	30	2.6	2.2	3.45	1	1.1	1.25	1	1	1.1
21-22	124	27-Jan-22	P001	Baseline	Dry Wing	none	8	100	20	-0.14	1.92	-4.3	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	125	27-Jan-22	P002	Baseline	Dry Wing	none	22	80	20	0.20	-3.45	-4.1	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
21-22	126	27-Jan-22	P206	Type IV Validation and New Fluids	IP- / ZR-	Polar Guard® Xtend	8	100	20	3.07	-2.57	-3.79	-3.0	-4.9	25	-	25	-	25	24	2.3	5	1	1	2.25	1	1	1
21-22	127	28-Jan-22	P084	Type IV Validation and New Fluids	IP- / ZR-	Defrost NORTH 4	8	100	20	7.57	-3.67	-3.8	-3.2	-6.0	25	-	25	-	40	2.45	2	5	1	1	5	1	1	5
21-22	128	28-Jan-22	E9	PG Type IV Expansion	IP/ZR/S N	Polar Guard Xtend	8	100	20	3.34	-3.99	-5.2	-3.2	-5.2	25	10	25	-	20	2.65	2.2	5	1	1.05	5	1	1	5
21-22	129	28-Jan-22	E10	EG Type IV Expansion	IP/ZR/S N	ChemR Nordik IV	8	100	20	3.00	-6.65	-8.5	-6.2	-8.3	25	10	25	-	20	2.85	2.55	5	1	1	1	1	1	1
23-24	1	14-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-0.27	-6.8	-6.5	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	2	14-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	0.27	-6.8	-6.5	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	3	14-Jan-24	P111	Type IV Validation and New Fluids	IP-	ClearWing ECO	8	100	20	8.30	-6.9	-6.9	-6.2	-9.2	25	-	-	-	50	1.75	1.6	3.5	1	1.55	2.35	1	1	1.35

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	4	15-Jan-24	P085	Type IV Validation and New Fluids	IP-	AVIA Flight PG	8	100	20	8.03	-7.3	-6.9	-7.1	-9.7	25	-	-	-	50	2	1.85	3.75	1	1.25	1.65	1	1	1
23-24	5	15-Jan-24	P166	EG Type IV Expansion	IP-	AVIAFlight EG	8	100	20	0.41	-7.8	-7.4	-5.8	-8.6	25	-	-	-	90	2.95	2	4	1	1	1.15	1	1	1
23-24	6	15-Jan-24	P172	EG Type IV Expansion	IP Mod	AVIAFlight EG	8	100	20	0.68	-8.5	-8.4	-7.3	-10.9	75	-	-	-	45	4	3	4	1	1	1.25	1	1	1.05
23-24	7	15-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-0.41	-7.5	-8.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	8	15-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	0.68	-7.5	-8.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	9	15-Jan-24	P068	Type IV Validation and New Fluids	IP- / SN-	AVIA Flight EG	8	100	20	1.56	-8.1	-9	-7.2	-11.3	25	10	-	-	30	2.35	2	4	1.05	1.05	1.35	1	1	1
23-24	10	15-Jan-24	P071	Type IV Validation and New Fluids	IP Mod	AVIA Flight EG	8	100	20	0.34	-7.7	-9.1	-7.3	-12.5	75	-	-	-	25	3	2.35	4	1	1	1.15	1	1	1
23-24	11	16-Jan-24	P061	Type IV Validation and New Fluids	IP- / ZR-	AVIA Flight EG	8	100	20	6.80	-4.3	-8.7	-4.1	-5.9	25	-	25	-	40	3.15	2.8	5	1.4	1.6	5	1.15	1.35	5
23-24	12	16-Jan-24	P089	Type IV Validation and New Fluids	IP- / ZR-	AVIA Flight PG	8	100	20	7.55	-4.9	-9.1	-5.2	-6.1	25	-	25	-	25	2.3	2.35	3.75	1	1.1	4.5	1	1	4.5
23-24	13	16-Jan-24	P115	Type IV Validation and New Fluids	IP- / ZR-	ClearWing ECO	8	100	20	7.62	-6.1	-9	-5.5	-5.7	25	-	25	-	25	2.5	2	5	1.05	1.25	5	1	1.1	5
23-24	14	16-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-0.88	-6.2	-8.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
23-24	15	16-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-0.68	-6.2	-8.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	16	16-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	0.20	-6.2	-8.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	17	16-Jan-24	P064	Type IV Validation and New Fluids	IP Mod/ZD	AVIA Flight EG	8	100	20	6.26	-7.1	-10	-5.7	-9.5	75	-	13	-	20	2.85	2.4	4.5	1	1.05	5	1	1	5	
23-24	18	16-Jan-24	P092	Type IV Validation and New Fluids	IP Mod/ZD	AVIA Flight PG	8	100	20	6.87	-9.3	-9.9	-7.6	-9.9	75	-	13	-	10	2	1.95	3	1.05	1.35	1.85	1	1.05	1.15	
23-24	19	17-Jan-24	P374	PG Type IV Expansion	IP Mod/ZD	ClearWing ECO	8	100	20	9.46	-10.3	-10.2	-8.1	-9.7	75	-	13	-	10	2.25	1.75	2.35	1.2	1.65	1.75	1	1.35	1.65	
23-24	20	17-Jan-24	P124	Type IV Validation and New Fluids	IP- / ZR-	ClearWing ECO	8	100	20	8.98	-11.4	-10.7	-9.3	-8.8	25	-	25	-	10	1.9	1.8	2	1.1	1.3	1.5	1	1.15	1.4	
23-24	21	17-Jan-24	P133	Type IV Validation and New Fluids	Fluid Only	ClearWing ECO	8	100	20	8.98	-11.5	-10.9	-9.5	-9	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
23-24	22	17-Jan-24	P070	Type IV Validation and New Fluids	IP- / ZR-	AVIA Flight EG	8	100	20	5.92	-10.8	-12	-9.4	-9.0	25	-	25	-	30	3	2.45	5	1.2	1.2	5	1.2	1.2	5	
23-24	23	17-Jan-24	P098	Type IV Validation and New Fluids	IP- / ZR-	AVIA Flight PG	8	100	20	6.80	-10.5	-12.4	-8.9	-8.1	25	-	25	-	10	2	1.95	3.35	1	1.25	1.7	1	1.05	1.15	
23-24	24	17-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-0.68	-8.3	-8.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
23-24	25	17-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	0.20	-8.3	-8.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
23-24	26	17-Jan-24	P095	Type IV Validation and New Fluids	IP-	AVIA Flight PG	8	100	20	7.96	-9.6	-9.1	-8.5	-11.0	25	-	-	-	30	2.05	1.95	2.7	1.05	1.55	1.7	1	1.15	1.35	
23-24	27	17-Jan-24	P121	Type IV Validation and New Fluids	IP-	ClearWing ECO	8	100	20	9.39	-9.4	-9.1	-8.9	-10.7	25	-	-	-	30	2.05	1.75	2.5	1.25	2	2.1	1.05	1.3	1.5	
23-24	28	18-Jan-24	P072	Type IV Validation and New Fluids	IP Mod/ZD	AVIA Flight EG	8	100	20	1.22	-9.1	-8.9	-8.4	-12.2	75	-	13	-	10	2.05	1.75	2.5	1.25	2	2.1	1.05	1.3	1.5	
23-24	29	18-Jan-24	P096	Type IV Validation and New Fluids	IP- / SN-	AVIA Flight PG	8	100	20	8.03	-8.7	-9.1	-8.3	-10.6	25	10	-	-	15	2.1	1.9	3.4	1.1	1.25	1.5	1	1.1	1.2	
23-24	30	18-Jan-24	P099	Type IV Validation and New Fluids	IP Mod	AVIA Flight PG	8	100	20	8.10	-9	-9.1	-8.6	-10.7	75	-	-	-	10	2.4	2	3.1	1	1.3	1.7	1	1.05	1.2	
23-24	31	18-Jan-24	P122	Type IV Validation and New Fluids	IP- / SN-	ClearWing ECO	8	100	20	9.80	-8.9	-9	-7.5	-9.6	25	10	-	-	15	2.2	1.9	2.9	1.2	1.55	1.8	1.05	1.25	1.7	
23-24	32	18-Jan-24	P125	Type IV Validation and New Fluids	IP Mod	ClearWing ECO	8	100	20	10.41	-9.4	-9.1	-8.5	-10.3	75	-	-	-	10	2.05	2	2.85	1.15	1.55	1.85	1	1.1	1.35	
23-24	33	18-Jan-24	P504	New AT Conditions	IP / SN	Polar Guard Advance	8	100	20	7.01	-7.8	-9.4	-7.0	-9.3	75	25	-	-	5	2.05	2	3.15	1.05	1.25	1.85	1	1.15	1.3	
23-24	34	18-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-0.88	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	35	18-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	to be calculated	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
23-24	36	18-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-0.95	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
23-24	37	18-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	0.20	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	38	18-Jan-24	P058	Type IV Validation and New Fluids	IP- / SN-	AVIA Flight EG	8	100	20	2.86	-5.5	-7.3	-4.7	-9.6	25	10	-	-	50	3.2	2.25	4	1	1.2	2.25	1	1.05	1.35	
23-24	39	18-Jan-24	P086	Type IV Validation and New Fluids	IP- / SN-	AVIA Flight PG	8	100	20	8.98	-6.8	-8	-5.2	-9.7	25	10	-	-	40	2.35	2.25	3.75	1.1	1.3	2.3	1	1.1	1.5	
23-24	40	19-Jan-24	P469	New AT Conditions	IP / SN	EG106	8	100	20	2.31	-8.2	-10.3	-6.5	-12.9	75	25	-	-	20	3	2.45	4	1	1.2	1.95	1	1.05	1.65	
23-24	41	19-Jan-24	P504	New AT Conditions	IP / SN	Polar Guard Advance	8	100	20	8.23	-9.4	-10.9	-8.0	-11.2	75	25	-	-	10	2.95	2.5	3.9	1.05	1.55	1.75	1	1.2	1.25	
23-24	42	19-Jan-24	P081	Type IV Validation and New Fluids	Fluid Only	AVIA Flight EG	8	100	20	2.45	-8.9	-11.8	-8.8	-8.2	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
23-24	43	19-Jan-24	P107	Type IV Validation and New Fluids	Fluid Only	AVIA Flight PG	8	100	20	7.69	-10.7	-12.3	-8.9	-8.6	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
23-24	44	19-Jan-24	P133	Type IV Validation and New Fluids	Fluid Only	ClearWing ECO	8	100	20	9.73	-12	-12.6	-9.4	-9.1	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
23-24	45	21-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-1.50	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
23-24	46	21-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	0.27	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
23-24	47	21-Jan-24	P464	New AT Conditions	IP / SN	AVIA Flight EG	8	100	20	4.83	-8.6	-10.2	-5.6	-13.2	75	25	-	-	20	3.7	2.6	4	1	1.2	2	1	1.05	1.3	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	48	21-Jan-24	P464	New AT Conditions	IP / SN	AVIA Flight EG	8	100	20	2.04	-9.1	-10.2	-7.8	-14.0	75	25	-	-	15	3	2.3	4	1	1.15	1.75	1	1	1
23-24	49	22-Jan-24	P479	New AT Conditions	IP / SN	ChemR NORDIK IV	8	100	20	1.43	-6.9	-12.6	-7.4	-12.6	75	25	-	-	15	3	2.75	4	1	1.25	1.5	1	1.1	1.15
23-24	50	22-Jan-24	E1	New AT Conditions	IP / SN	Defrost ECO 4	8	100	20	9.32	-7.3	-13.3	-8.9	-12.3	75	25	-	-	10	2.9	2.5	4	1.1	1.55	2	1	1.2	1.55
23-24	51	22-Jan-24	E2	New AT Conditions	IP / SN	Defrost ECO 4	8	100	20	6.94	-7.8	-13.7	-8.7	-11.9	75	25	-	-	7	2.55	2.05	3.4	1	1.4	1.65	1	1.05	1.25
23-24	52	22-Jan-24	E1	New AT Conditions	IP / SN	Defrost ECO 4	8	100	20	8.84	-9.1	-13.4	-9.7	-12.2	75	25	-	-	10	2.75	2.4	3.9	1.1	1.45	1.75	1	1.2	1.55
23-24	53	22-Jan-24	P484	New AT Conditions	IP / SN	Defrost North 4	8	100	20	2.72	-8.6	-11.6	-9.3	-13.2	75	25	-	-	15	3.2	2.65	3.8	1	1	1.2	1	1	1
23-24	54	22-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-1.02	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	55	22-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	-0.61	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	56	22-Jan-24	P118	Type IV Validation and New Fluids	IP Mod/ZD	ClearWing ECO	8	100	20	6.12	-1.2	-0.9	-0.4	-5.0	75	-	13	-	10	2	1.65	2.5	1.05	1.3	1.3	1	1.05	1.1
23-24	57	22-Jan-24	P468	New AT Conditions	IP / SN	EG106	8	100	20	0.07	-0.9	-0.4	0.1	-8.1	75	25	-	-	30	3.5	2.8	4	1	1.15	1.3	1	1	1
23-24	58	23-Jan-24	P478	New AT Conditions	IP / SN	ChemR NORDIK IV	8	100	20	0.68	-0.9	-0.3	-0.3	-8.0	75	25	-	-	25	3	2.65	4	1	1.05	1.2	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	59	23-Jan-24	P503	New AT Conditions	IP / SN	Polar Guard Advance	8	100	20	3.13	-0.7	0	-0.6	-6.8	75	25	-	-	15	3	2.65	3.25	1	1.2	1.15	1	1	1
23-24	60	23-Jan-24	P503	New AT Conditions	IP / SN	Polar Guard Advance	8	100	20	3.40	-0.9	0.1	-0.7	-7.0	75	25	-	-	20	3	2.6	4	1	1.3	1.2	1	1	1
23-24	61	23-Jan-24	P483	New AT Conditions	IP / SN	Defrost North 4	8	100	20	0.68	-0.9	0	-0.4	-8.5	75	25	-	-	25	3	2.6	4	1	1	1	1	1	1
23-24	62	23-Jan-24	P473	New AT Conditions	IP / SN	ClearWing EG	8	100	20	0.95	-1	0.1	-0.8	-8	75	25	-	-	25	3.2	2.65	4	1	1.05	1.3	1	1	1.1
23-24	63	23-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-1.22	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	64	23-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	-0.34	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	65	23-Jan-24	P117	Type IV Validation and New Fluids	IP Mod	ClearWing ECO	8	100	20	8.16	-4.4	-5.8	-3.3	-7.5	75	-	-	-	15	2.25	2.15	2.75	1	1.55	1.75	1	1.15	1.25
23-24	66	23-Jan-24	P091	Type IV Validation and New Fluids	IP Mod	AVIA Flight PG	8	100	20	7.07	-5.1	-6.3	-4.9	-8.8	75	-	-	-	15	2.65	2.25	3.35	1	1.4	1.65	1	1.1	1.25
23-24	67	23-Jan-24	P063	Type IV Validation and New Fluids	IP Mod	AVIA Flight EG	8	100	20	0.54	-6.3	-7.3	-5.7	-9.8	75	-	-	-	35	3.45	2.9	4	1	1.05	1.2	1	1	1.05
23-24	68	24-Jan-24	P112	Type IV Validation and New Fluids	IP- / SN-	ClearWing ECO	8	100	20	9.25	-5.2	-8.5	-5.8	-8.8	25	10	-	-	40	2.65	2.35	3.3	1.15	1.65	2	1	1.2	1.55
23-24	69	24-Jan-24	P166	EG Type IV Expansion	IP-	AVIA Flight EG	8	100	20	1.09	-8.1	-9.5	-7.3	-9.2	25	-	-	-	90	3	2.6	4	1	1	1.1	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	70	24-Jan-24	P509	New AT Conditions	IP / SN	ABC-S Plus	8	100	20	7.28	-7	-9.4	-7.3	-9.0	75	25	-	-	10	2.75	2.5	2.95	1.2	1.65	1.7	1	1.15	1.3
23-24	71	24-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-0.88	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	72	24-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	0.54	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	73	24-Jan-24	P092	Type IV Validation and New Fluids	IP Mod/ZD	AVIA Flight PG	8	100	20	5.03	-1	-4.5	-1.3	-6.5	75	-	13	-	10	2	1.95	3	1	1.2	1.25	1	1.05	1
23-24	74	24-Jan-24	P454	Mixed and Triplet Conditions	IP- / ZR- / SN-	Polar Guard Advance	8	100	20	2.79	0.1	-3.9	-2.0	-4.2	25	10	25	-	20	2.2	1.75	2.95	1	1.05	1.2	1	1.05	1.2
23-24	75	24-Jan-24	P454	Mixed and Triplet Conditions	IP- / ZR- / SN-	Polar Guard Advance	8	100	20	5.31	0.7	-3.1	-1.2	-4.0	25	10	25	-	40	3	2.75	5	1	1	5	1	1	5
23-24	76	25-Jan-24	P456	Mixed and Triplet Conditions	IP- / ZR- / SN-	ABC-S Plus	8	100	20	5.37	1	-2.4	-0.6	-4.1	25	10	25	-	40	2.9	2.8	5	1	1.15	5	1	1	5
23-24	77	25-Jan-24	P440	Mixed and Triplet Conditions	IP- / ZR- / SN-	EG106	8	100	20	6.46	1.1	-1.8	-1.5	-4.9	25	10	25	-	45	3	2.7	5	1	1	5	1	1	5
23-24	78	25-Jan-24	P444	Mixed and Triplet Conditions	IP- / ZR- / SN-	ChemR NORDIK IV	8	100	20	4.01	-0.6	-1.5	-1.3	-4.5	25	10	25	-	45	3.15	3	5	1	1	5	1	1	5
23-24	79	25-Jan-24	P001	Baseline	Dry Wing	none	8	100	20	-0.95	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	80	25-Jan-24	P002	Baseline	Dry Wing	none	22	80	20	0.41	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	81	25-Jan-24	P066	Type IV Validation and New Fluids	IP Mod / R	AVIA Flight EG	8	100	20	0.14	2.1	0.5	3.3	-3.2	75	-	-	75	15	3.05	2.85	4	1	1	1.15	1	1	1
23-24	82	25-Jan-24	P120	Type IV Validation and New Fluids	IP Mod / R	ClearWing ECO	8	100	20	4.90	1.7	0.4	1.7	-2.3	75	-	-	75	10	2	1.75	2.25	1	1.2	1.1	1	1	1.05
23-24	83	26-Jan-24	P438	Mixed and Triplet Conditions	IP- / ZR- / SN-	AVIA Flight EG	8	100	20	5.03	1.8	0.3	1.8	-1.1	25	10	25	-	45	3.7	3.5	4	2.1	1	4	1.1	1	4
23-24	84	26-Jan-24	P438	Mixed and Triplet Conditions	IP- / ZR- / SN-	AVIA Flight EG	8	100	20	2.24	1.5	0	0.5	-2.5	25	10	25	-	35	3	2.75	4	1	1	4	1	1	4
23-24	85	26-Jan-24	P452	Mixed and Triplet Conditions	IP- / ZR- / SN-	ClearWing ECO	8	100	20	4.49	2.4	-0.1	1.1	-2.7	25	10	25	-	40	2.5	2	4	1	1.2	1.25	1	1	1.1
23-24	86	04-Feb-24	P001	Baseline	Dry Wing	none	8	100	20	-1.16	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	87	04-Feb-24	P002	Baseline	Dry Wing	none	22	80	20	0.20	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	88	04-Feb-24	P040	Type IV Validation and New Fluids	IP Mod / R	4Flite PG	8	100	20	3.61	2.4	-0.2	2.9	-2.9	75	-	-	75	10	1.95	1.65	3.1	1	1.05	1.05	1	1	1
23-24	89	04-Feb-24	P094	Type IV Validation and New Fluids	IP Mod / R	AVIA Flight PG	8	100	20	3.20	1.7	-0.1	1.1	-3.4	75	-	-	75	10	1.9	1.65	3	1	1.05	1.05	1	1	1
23-24	90	05-Feb-24	P442	Mixed and Triplet Conditions	IP- / ZR- / SN-	ClearWing EG	8	100	20	12.45	1.5	0	1.3	-3.9	25	10	25	-	45	3	2.55	4	1	1	4.5	1	1	4.5
23-24	91	05-Feb-24	P442	Mixed and Triplet Conditions	IP- / ZR- / SN-	ClearWing EG	8	100	20	11.16	1.4	-0.7	0.7	-4.8	25	10	25	-	35	2.85	2.25	5	1	1	5	1	1	5

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	92	05-Feb-24	P442	Mixed and Triplet Conditions	IP- / ZR- / SN-	ClearWing EG	8	100	20	8.64	0.1	-1.8	1.0	-5.4	25	10	25	-	25	2.35	2.1	5	1	1	5	1	1	5
23-24	93	05-Feb-24	P001	Baseline	Dry Wing	none	8	100	20	-0.82	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	94	05-Feb-24	P002	Baseline	Dry Wing	none	22	80	20	-0.75	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	95	05-Feb-24	P446	Mixed and Triplet Conditions	IP- / ZR- / SN-	Defrost North 4	8	100	20	2.59	1.8	-0.9	3.1	-5.0	25	10	25	-	25	2.2	1.5	4	1	1	4.5	1	1	4.5
23-24	96	05-Feb-24	P442	Mixed and Triplet Conditions	IP- / ZR- / SN-	ClearWing EG	8	100	20	1.16	1.6	-0.9	0.0	-5.9	25	10	25	-	20	2.25	1.7	4	1	1.05	3.4	1	1	2.6
23-24	97	06-Feb-24	P391	PG Type IV Expansion	IP Mod	Polar Guard Advance	8	100	20	3.33	0.4	-1.8	-0.4	-7.9	75	-	-	-	25	2.75	2.9	4	1	1.25	1.35	1	1	1
23-24	98	06-Feb-24	P416	PG Type IV Expansion	IP Mod	ABC-S Plus	8	100	20	4.69	-0.4	-2.5	-1.5	-7.9	75	-	-	-	30	3	2.65	4	1	1.65	1.75	1	1.1	1.05
23-24	99	06-Feb-24	P366	PG Type IV Expansion	IP Mod	ClearWing ECO	8	100	20	6.67	-0.6	-3.3	-1.6	-7.8	75	-	-	-	30	2.75	2.9	4	1.05	1.5	2	1	1.05	1.1
23-24	100	06-Feb-24	P316	PG Type IV Expansion	IP Mod	4Flite PG	8	100	20	6.12	-1.5	-4	-2.1	-9.1	75	-	-	-	30	2.95	2.8	4	1	1.4	1.7	1	1	1.2
23-24	101	06-Feb-24	P132	Type IV Validation and New Fluids	Fluid Only	ClearWing ECO	8	100	20	8.23	-1.5	-4.5	-3.0	-2.9	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	102	06-Feb-24	P001	Baseline	Dry Wing	none	8	100	@ start of day	-0.95	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	103	06-Feb-24	P002	Baseline	Dry Wing	none	22	80	@ start of day	-0.48	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	104	06-Feb-24	P390	PG Type IV Expansion	IP- / R-	Polar Guard Advance	8	100	20	4.42	1.7	-2.6	1.8	-3.2	25	-	-	25	40	2.5	2.2	5	1	1	5	1	1	5
23-24	105	06-Feb-24	P415	PG Type IV Expansion	IP- / R-	ABC-S Plus	8	100	20	6.33	0.8	-4	-0.6	-3.9	25	-	-	25	50	2.65	2.5	5	1	1.05	5	1	1	5
23-24	106	07-Feb-24	P315	PG Type IV Expansion	IP- / R-	4Flite PG	8	100	20	5.65	-0.6	-4.9	-1.3	-4.1	25	-	-	25	40	2.55	2.5	5	1	1.05	5	1	1	5
23-24	107	07-Feb-24	P386	PG Type IV Expansion	IP-	Polar Guard Advance	8	100	20	1.36	-1.7	-6	-1.2	-6.3	25	-	-	-	90	2.75	2.8	4	1	1.1	1.15	1	1	1
23-24	108	07-Feb-24	P508	New AT Conditions	IP / SN	ABC-S Plus	8	100	20	8.00	-2.3	-5.7	-3.7	-8.7	75	25	-	-	20	2.95	2.85	4	1.1	1.45	2.25	1	1.15	1.6
23-24	109	07-Feb-24	P001	Baseline	Dry Wing	none	8	100	20	-1.22	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	110	07-Feb-24	P002	Baseline	Dry Wing	none	22	80	20	0.20	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	111	07-Feb-24	P411	PG Type IV Expansion	IP-	ABC-S Plus	8	100	20	2.72	1.3	-1.8	1.2	-5.7	25	-	-	-	90	2.5	2.45	4	1	1.2	1.2	1	1	1.05
23-24	112	08-Feb-24	P311	PG Type IV Expansion	IP-	4Flite PG	8	100	20	2.18	1	-2.3	0.2	-5.7	25	-	-	-	90	2.7	2.5	4	1	1.3	1.15	1	1	1
23-24	113	08-Feb-24	P388	PG Type IV Expansion	IP - / D	Polar Guard Advance	8	100	20	5.24	0.6	-2.8	-0.7	-4.0	25	-	-	13	60	2.8	2.65	4	1	1	5	1	1	5

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	114	08-Feb-24	P391	PG Type IV Expansion	IP Mod	Polar Guard Advance	8	100	20	4.56	-0.2	-3.4	-1.6	-8.5	75	-	-	-	30	3	3	4	1	1.2	1.5	1	1	1
23-24	115	08-Feb-24	P001	Baseline	Dry Wing	none	8	100	20	-0.61	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	116	08-Feb-24	P002	Baseline	Dry Wing	none	22	80	20	0.20	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	117	08-Feb-24	E3	Roughness	none	none	8	100	20	7.62	9.8	1.6	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	118	08-Feb-24	E4	Roughness	none	none	8	100	20	3.40	2.8	1.5	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	119	08-Feb-24	E5	Roughness	none	none	8	100	20	2.65	2.2	1.4	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	120	08-Feb-24	E6	Roughness	none	none	8	100	20	1.90	1.9	1.3	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	121	09-Feb-24	E7	Roughness	none	none	8	100	20	1.36	2.2	1.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	122	09-Feb-24	E8	Roughness	none	none	8	100	20	-0.88	3	1	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	123	09-Feb-24	P413	PG Type IV Expansion	IP- / D	ABC-S Plus	8	100	20	2.93	1.7	0.8	2.7	-3.6	25	-	-	13	60	2.6	2.5	4	1	1.1	1.4	1	1	1.2
23-24	124	09-Feb-24	P198	EG Type IV Expansion	IP- / D	EG106	8	100	20	1.36	1.5	0.7	1.4	-4.1	25	-	-	13	60	3	2.35	4	1	1	4	1	1	4

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
23-24	125	11-Feb-24	P001	Baseline	Dry Wing	none	8	100	20	-1.70	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	126	11-Feb-24	P002	Baseline	Dry Wing	none	22	80	20	0.07	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	127	12-Feb-24	E9	Roughness	none	none	8	100	20	4.63	5.7	2.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	128	12-Feb-24	E10	Roughness	none	none	8	100	20	4.22	5.7	2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	129	12-Feb-24	E11	Roughness	none	none	8	100	20	1.97	5.3	1.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	130	12-Feb-24	E12	Roughness	none	none	8	100	20	0.75	3.5	1.7	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	131	12-Feb-24	E13	Roughness	none	none	8	100	20	0.14	4.6	1.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	132	12-Feb-24	P227	EG Type IV Expansion	IP- / D	ClearWing EG	8	100	20	3.67	0.4	1.4	2.7	-3.6	25	-	-	13	60	3	2.15	4	1	1	4	1	1	4	
23-24	133	12-Feb-24	P001	Baseline	Dry Wing	none	8	100	20	-1.16	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	134	12-Feb-24	P002	Baseline	Dry Wing	none	22	80	20	-0.07	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	135	12-Feb-24	P256	EG Type IV Expansion	IP- / D	ChemR NORDIK IV	8	100	20	1.90	2.7	-0.9	3.2	-4.5	25	-	-	13	60	2.75	2.45	4	1	1	4	1	1	4	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	136	13-Feb-24	P285	EG Type IV Expansion	IP- / D	Defrost North 4	8	100	20	13.81	1.2	-2.3	-0.2	-5.1	25	-	-	13	60	2.6	2.35	5	1	1	5	1	1	5
23-24	137	13-Feb-24	P285	EG Type IV Expansion	IP- / D	Defrost North 4	8	100	20	4.76	0.6	-2.9	-0.7	-5.8	25	-	-	13	40	2.45	2.1	5	1	1	5	1	1	5
23-24	138	13-Feb-24	P313	PG Type IV Expansion	IP- / D	4Flite PG	8	100	20	6.94	-1.6	-4	-1.3	-4.5	25	-	13	-	60	2.55	2.4	4	1	1.05	4	1	1	4
23-24	139	13-Feb-24	P037	Type IV Validation and New Fluids	IP Mod	4Flite PG	8	100	20	4.56	-1.1	-4.8	-1.7	-7.1	75	-	-	-	15	2.2	2.1	3	1	1.15	1.25	1	1	1.05
23-24	140	13-Feb-24	P001	Baseline	Dry Wing	none	8	100	20	-0.75	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	141	13-Feb-24	P002	Baseline	Dry Wing	none	22	80	20	-0.41	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	142	13-Feb-24	P032	Type IV Validation and New Fluids	IP- / SN-	4Flite PG	8	100	20	7.21	-6.1	-5.4	-3.0	-8.8	25	10	-	-	40	2.6	2.35	4	1	1.3	1.75	1	1.05	1.15
23-24	143	13-Feb-24	P038	Type IV Validation and New Fluids	IP Mod/ZD	4Flite PG	8	100	20	5.78	-5	-6.3	-6.0	-7.8	75	-	13	-	10	2.45	2.25	2.95	1	1.25	1.4	1	1	1.1
23-24	144	13-Feb-24	P035	Type IV Validation and New Fluids	IP- / ZR-	4Flite PG	8	100	20	7.28	-6.8	-8	-6.3	-5.9	25	-	25	-	25	2.65	2.45	4	1	1.05	4	1	1	4
23-24	145	14-Feb-24	P031	Type IV Validation and New Fluids	IP-	4Flite PG	8	100	20	6.53	-8.4	-8.3	-7.9	-9.6	25	-	-	-	50	2.4	2.2	3.85	1	1.3	1.8	1	1.05	1.2
23-24	146	14-Feb-24	P037	Type IV Validation and New Fluids	IP Mod	4Flite PG	8	100	20	7.35	-7.5	-8.6	-7.6	-10.6	75	-	-	-	15	2.5	2.25	3.55	1	1.3	1.75	1	1.05	1.25

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
23-24	147	14-Feb-24	P398	PG Type IV Expansion	IP Mod	Polar Guard Advance	8	100	20	7.28	-8.6	-8.8	-8.1	-11.5	75	-	-	-	25	3.25	3	4	1	1.45	1.75	1	1.05	1.2
23-24	148	14-Feb-24	P397	PG Type IV Expansion	IP- / ZR-	Polar Guard Advance	8	100	20	4.97	-7.2	-8.7	-8.3	-6.7	25	-	25	-	25	3	2.75	5	1	1.1	3	1	1	2.25
23-24	149	14-Feb-24	P001	Baseline	Dry Wing	none	8	100	20	-1.02	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	150	14-Feb-24	P002	Baseline	Dry Wing	none	22	80	20	0.14	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	151	14-Feb-24	P503	New AT Conditions	IP / SN	Polar Guard Advance	8	100	20	5.99	-5.8	-5.5	-4.3	-8.9	75	25	-	-	10	2.7	2.7	3.45	1	1.3	1.65	1	1.05	1.1
23-24	152	14-Feb-24	P488	New AT Conditions	IP / SN	4Flite PG	8	100	20	6.19	-6.4	-5.9	-5.7	-10.0	75	25	-	-	10	2.5	2.5	3.3	1	1.3	1.6	1	1.05	1.2
23-24	153	14-Feb-24	P473	New AT Conditions	IP / SN	ClearWing EG	8	100	20	2.24	-6.6	-6.5	-6.1	-11.7	75	25	-	-	20	2.55	2.9	4	1	1.15	1.55	1	1	1
23-24	154	15-Feb-24	E14	New AT Conditions	IP / SN	Safewing EG IV NORTH	8	100	20	0.14	-7.2	-7	-6.4	-12.3	75	25	-	-	20	2.9	2.75	4	1	1.05	1.05	1	1	1
23-24	155	15-Feb-24	P321	PG Type IV Expansion	IP- / ZD	4Flite PG	8	100	20	5.71	-7.5	-7.4	-7.0	-7.9	25	-	13	-	30	2.65	2.6	4	1	1.15	4	1	1	3.85
23-24	156	15-Feb-24	P396	PG Type IV Expansion	IP- / ZD	Polar Guard Advance	8	100	20	4.97	-7.3	-8	-7.2	-7.7	25	-	13	-	30	3	2.9	4	1	1.1	4	1	1	2.75
23-24	157	15-Feb-24	P421	PG Type IV Expansion	IP- / ZD	ABC-S Plus	8	100	20	5.10	-7.9	-8.4	-6.4	-7.2	25	-	13	-	30	2.7	2.65	4	1	1.2	2.9	1	1	2.15

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
23-24	158	15-Feb-24	P053	Type IV Validation and New Fluids	Fluid Only	4Flite PG	8	100	20	3.68	-8.1	-8.7	-7.3	-6.1	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	159	15-Feb-24	P001	Baseline	Dry Wing	none	8	100	20	-1.36	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	160	15-Feb-24	P002	Baseline	Dry Wing	none	22	80	20	0.68	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
23-24	161	15-Feb-24	E15	Fluid Application Quantity	SN +	ABC-S Plus	8	100	20	8.23	-3.1	-5.9	-3.8	-8.0	-	50	-	-	40	3.3	2.7	4	1.15	1.45	3.75	1	1.2	3.75	
23-24	162	15-Feb-24	E16	Fluid Application Quantity	SN +	ABC-S Plus	8	100	20	6.67	-3.3	-5.7	-2.9	-7.4	-	50	-	-	40	4	3.85	4	1.3	1.65	3.5	1.05	1.2	3	
23-24	163	16-Feb-24	E17	Fluid Application Quantity	ZR-	ABC-S Plus	8	100	20	1.77	-1.1	-5.6	-4.1	-0.1	-	-	25	-	40	1	1	5	1	1	5	1	1	5	
24-25	1	12-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-0.68	-	-4.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	2	12-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	0.48	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	3	13-Jan-25	P083	Type IV Validation and New Fluids	IP Mod / R	LAUNCH PLUS	8	100	20	2.66	-0.9	-4.6	-0.2	-4.2	75	-	-	75	10	2.35	1.9	4.25	1	1.1	3	1	1.05	2.25	
24-25	4	13-Jan-25	P047	Type IV Validation and New Fluids	IP Mod / R	Cleansurface IV	8	100	20	4.03	-2.3	-4.6	-1.2	-4.1	75	-	-	75	10	2.2	1.85	3.8	1	1.1	2	1	1	1.3	
24-25	5	13-Jan-25	P011	Type IV Validation and New Fluids	IP Mod / R	FW-IV	8	100	20	7.17	-2.2	-4.7	-1.1	-6.5	75	-	-	75	15	2.1	2	4.25	1	1.05	4	1	1	3.75	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
24-25	6	13-Jan-25	P084	Type IV Validation and New Fluids	IP-	LAUNCH PLUS	8	100	20	3.48	-3.5	-4.7	-1.6	-6.2	25	-	-	-	50	2	1.8	3.15	1	1.1	1.3	1	1	1.05
24-25	7	13-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-1.37	-	-0.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	8	13-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	0.07	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	9	13-Jan-25	E1	PG Type IV Expansion	IP- / D	LAUNCH PLUS	8	100	20	9.69	-0.97	-1.1	0.0	-2.9	25	-	-	13	60	2.5	2	4.25	1	1.05	3.75	1	1	3.75
24-25	10	14-Jan-25	E2	PG Type IV Expansion	IP- / D	LAUNCH PLUS	8	100	20	6.69	-1.04	-1.6	-0.8	-3.5	25	-	-	13	50	2.4	2	4	1	1	3.5	1	1	3.5
24-25	11	14-Jan-25	P449	PG Type IV Expansion	IP- / D	AVIAFlight PG	8	100	20	5.80	-1.12	-2.2	-1.1	-3.6	25	-	-	13	50	2.2	2.1	3.75	1	1.05	3.4	1	1	3
24-25	12	14-Jan-25	P081	Type IV Validation and New Fluids	IP Mod / SN	LAUNCH PLUS	8	100	20	3.82	-2.44	-2.9	-1.9	-7.2	75	25	-	-	15	3.2	2.4	4	1	1.4	2	1	1	1.05
24-25	13	14-Jan-25	P045	Type IV Validation and New Fluids	IP Mod / SN	Cleansurface IV	8	100	20	7.58	-3.3	-3.2	-2.5	-7.7	75	25	-	-	15	3.3	3	4	1	1.4	2	1	1.05	1.15
24-25	14	14-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-0.68	-	-6.2	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	15	14-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	-0.27	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	16	14-Jan-25	P048	Type IV Validation and New Fluids	IP-	Cleansurface IV	8	100	20	7.20	-6.2	-6.8	-4.1	-8.0	25	-	-	-	50	2.35	2.35	3.65	1	1.5	2	1	1.05	1.1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
24-25	17	14-Jan-25	P051	Type IV Validation and New Fluids	IP- / ZR-	Cleansurface IV	8	100	20	6.64	-6	-7.1	-5.8	-4.8	25	-	25	-	25	25	2.5	2.5	3.65	1	1.1	1.45	1	1	1.05
24-25	18	15-Jan-25	P015	Type IV Validation and New Fluids	IP- / ZR-	FW-IV	8	100	20	6.08	-5.8	-8.1	-5.6	-7.3	25	-	25	-	40	2.5	2.25	5	1	1.05	5	1	1	5	
24-25	19	15-Jan-25	P087	Type IV Validation and New Fluids	IP- / ZR-	LAUNCH PLUS	8	100	20	5.12	-7.1	-8.5	-6.8	-6.5	25	-	25	-	25	2.6	2.35	3.3	1	1.05	1.6	1	1	1.1	
24-25	20	15-Jan-25	P089	Type IV Validation and New Fluids	IP Mod	LAUNCH PLUS	8	100	20	7.73	-9.1	-9	-7.9	-10.9	75	-	-	-	15	2.95	2.35	3.5	1	1.5	1.75	1	1	1.25	
24-25	21	15-Jan-25	P024	Type IV Validation and New Fluids	IP Mod	FW-IV	8	100	20	1.37	-9.6	-9.6	-8.3	-13.1	75	-	-	-	35	3.1	2.5	4	1	1	1.1	1	1	1.05	
24-25	22	15-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-0.39	-	-7.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
24-25	23	15-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	0.14	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
24-25	24	15-Jan-25	P012	Type IV Validation and New Fluids	IP-	FW-IV	8	100	20	0.57	-4.2	-6.9	-4.4	-9.9	25	-	-	-	70	2.45	2.05	3.75	1	1	1	1	1	1	
24-25	25	15-Jan-25	P085	Type IV Validation and New Fluids	IP- / SN-	LAUNCH PLUS	8	100	20	5.30	-3.5	-6.7	-5.1	-8.4	25	10	-	-	40	2.9	2.3	3.6	1	1.3	1.55	1	1.05	1.15	
24-25	26	16-Jan-25	P049	Type IV Validation and New Fluids	IP- / SN-	Cleansurface IV	8	100	20	7.20	-2.7	-6.3	-4.1	-7.1	25	10	-	-	40	3.15	2.75	3.65	1.05	1.25	1.95	1	1.05	1.15	
24-25	27	16-Jan-25	P013	Type IV Validation and New Fluids	IP- / SN-	FW-IV	8	100	20	1.23	-3.61	-7.8	-4.3	-9.6	25	10	-	-	50	3.2	2.35	4	1	1.2	1.05	1	1	1	

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
24-25	28	16-Jan-25	E3	PG Type IV Expansion	IP Mod	Cleansurface IV	8	100	20	8.40	-3	-6.3	-4.4	-9.1	75	-	-	-	25	3.75	3.4	4	1	1.5	2.35	1	1	1.15
24-25	29	16-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-0.51	-	-5.1	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	30	16-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	0.20	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	31	16-Jan-25	P016	Type IV Validation and New Fluids	IP- / ZR- / SN-	FW-IV	8	100	20	1.17	0	-4.8	-0.9	-6.1	25	10	25	-	20	2.15	1.7	3.05	1	1	1	1	1	1
24-25	32	16-Jan-25	E4	PG Type IV Expansion	IP- / R-	LAUNCH PLUS	8	100	20	6.42	-0.1	-4.8	-1.8	-4.7	25	-	-	25	40	2.5	2.05	4.25	1	1.1	4.25	1	1	4.25
24-25	33	17-Jan-25	E5	PG Type IV Expansion	IP- / R-	Cleansurface IV	8	100	20	5.82	-0.44	-4.7	-1.6	-3.3	25	-	-	25	40	2.6	2.65	4.25	1	1.1	4	1	1	4
24-25	34	17-Jan-25	P450	PG Type IV Expansion	IP- / R-	AVIAFlight PG	8	100	20	5.82	-0.6	-4.8	-1.1	-4.1	25	-	-	25	40	2.5	2.6	4.25	1	1.05	4	1	1	4
24-25	35	17-Jan-25	P418	PG Type IV Expansion	IP- / R- / SN-	4Flite PG	8	100	20	5.52	-1.5	-5	-2.1	-4.5	25	10	-	25	40	2.6	2.7	4.25	1	1.05	3.5	1	1	3.25
24-25	36	19-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-0.20	-	-11.5	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	37	19-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	0.27	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	38	19-Jan-25	P018	Type IV Validation and New Fluids	IP Mod / SN	FW-IV	8	100	20	2.02	-8.1	-11.3	-7.2	-13.4	75	25	-	-	15	2.75	2.7	3.75	1	1.2	1.35	1	1	1

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
24-25	39	19-Jan-25	P020	Type IV Validation and New Fluids	IP-	FW-IV	8	100	20	0.63	-9.6	-11.9	-9.8	-12.1	25	-	-	-	70	2.4	2.4	3.75	1	1	1.15	1	1	1
24-25	40	20-Jan-25	P021	Type IV Validation and New Fluids	IP- / SN-	FW-IV	8	100	20	1.43	-10.4	-12.9	-9.7	-13.5	25	10	-	-	30	2.45	2.2	3.7	1	1.15	1.2	1	1	1
24-25	41	20-Jan-25	P098	Type IV Validation and New Fluids	IP Mod/ZD	LAUNCH PLUS	8	100	20	7.65	-11.4	-13.5	-10.2	-11.4	75	-	13	-	7	2.3	2.25	3.1	1.1	1.75	1.95	1	1.1	1.2
24-25	42	20-Jan-25	P062	Type IV Validation and New Fluids	IP Mod/ZD	Cleansurface IV	8	100	20	11.43	-11.4	-14	-10.3	-11.5	75	-	13	-	7	2.3	2.25	3.35	1.1	1.75	2	1	1.15	1.4
24-25	43	20-Jan-25	P063	Type IV Validation and New Fluids	IP-	Cleansurface IV	8	115	20	8.27	-13.4	-14.9	-11.4	-13.3	25	-	-	-	30	2.5	2.5	3.45	1	1.5	1.95	1	1.05	1.25
24-25	44	20-Jan-25	P072	Type IV Validation and New Fluids	Fluid Only	Cleansurface IV	8	100	20	6.83	-14.2	-15.4	-12.3	-11.6	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	45	20-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-0.31	-	-15.9	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	46	20-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	1.06	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	47	20-Jan-25	P099	Type IV Validation and New Fluids	IP-	LAUNCH PLUS	8	115	20	6.60	-10.7	-16.1	-10.4	-12.4	25	-	-	-	30	2.35	2.45	3.05	1	1.3	2.1	1	1.05	1.1
24-25	48	20-Jan-25	P365	PG Type IV Expansion	IP-	Polar Guard Advance	8	100	20	9.50	-10.6	-15.9	-10.8	-12.0	25	-	-	-	50	2.35	2.4	3.25	1	2	2.25	1	1.1	2.25
24-25	49	21-Jan-25	P200	EG Type IV Expansion	IP-	EG106	8	100	20	2.20	-12.4	-15.2	-11.4	-13.2	25	-	-	-	90	3	2.3	4	1	1.15	2	1	1.15	1.85

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
24-25	50	21-Jan-25	P028	Type IV Validation and New Fluids	IP- / SN-	FW-IV	8	100	20	3.49	-13.1	-14.8	-12.2	-15.3	25	10	-	-	25	2.6	2.35	4	1	1.2	1.3	1	1	1
24-25	51	21-Jan-25	P064	Type IV Validation and New Fluids	IP- / SN-	Cleansurface IV	8	115	20	10.85	-14	-15.8	-12.9	-14.3	25	10	-	-	15	2.7	2.7	3.75	1.1	1.4	2	1	1.15	1.4
24-25	52	21-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-0.36	-	-13.8	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	53	21-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	0.07	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	54	21-Jan-25	P059	Type IV Validation and New Fluids	IP- / ZR-	Cleansurface IV	8	100	20	9.09	-8.7	-14.7	-10.1	-8.3	25	-	25	-	10	2.5	2.5	3.2	1.05	1.25	2	1	1.05	1.8
24-25	55	21-Jan-25	P062	Type IV Validation and New Fluids	IP Mod/ZD	Cleansurface IV	8	100	20	11.40	-9.05	-14.9	-9.7	-11.0	75	-	13	-	7	2.3	2.3	3.25	1.2	1.45	2.25	1	1.15	1.6
24-25	56	21-Jan-25	P057	Type IV Validation and New Fluids	IP- / SN-	Cleansurface IV	8	100	20	11.49	-10.2	-15.3	-10.8	-12.7	25	10	-	-	15	2.55	2.45	3.55	1.15	1.5	2.3	1	1.15	1.4
24-25	57	22-Jan-25	P071	Type IV Validation and New Fluids	Fluid Only	Cleansurface IV	8	100	20	7.81	-12.3	-15.6	-12.2	-12.8	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	58	22-Jan-25	P093	Type IV Validation and New Fluids	IP- / SN-	LAUNCH PLUS	8	100	20	10.09	-10.65	-15.8	-11.2	-13.3	25	10	-	-	15	2.4	2.2	3.2	1.15	1.4	2.25	1	1.2	1.75
24-25	59	22-Jan-25	P093	Type IV Validation and New Fluids	IP- / SN-	LAUNCH PLUS	8	115	20	7.30	-12.95	-14.9	-11.9	-13.9	25	10	-	-	15	2.35	2.3	3.25	1	1.3	2	1	1.1	1.2
24-25	60	22-Jan-25	P065	Type IV Validation and New Fluids	IP Mod	Cleansurface IV	8	115	20	11.09	-13.5	-15.1	-13.1	-15.2	75	-	-	-	10	3	2.6	4	1	1.4	2.35	1	1.3	1.7

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap
24-25	61	22-Jan-25	X2	Type IV Validation and New Fluids	IP Mod / SN	Cleansurface IV	8	115	20	10.65	-12.6	-15.3	-12.9	-14.7	75	25	-	-	5	2.6	2.55	3.6	1.05	1.5	2.35	1.05	1.35	1.75
24-25	62	22-Jan-25	P108	Type IV Validation and New Fluids	Fluid Only	LAUNCH PLUS	8	100	20	5.48	-13.7	-15.6	-13.1	-13.4	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	63	22-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-0.47	-	-10.5	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	64	22-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	0.59	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	65	22-Jan-25	P055	Type IV Validation and New Fluids	IP Mod/ZD	Cleansurface IV	8	100	20	8.66	-5.2	-9.9	-6.1	-9.3	75	-	13	-	10	2.9	2.85	3.6	1.05	1.45	2.25	1	1.05	1.15
24-25	66	22-Jan-25	P091	Type IV Validation and New Fluids	IP Mod/ZD	LAUNCH PLUS	8	100	20	6.89	-4.63	-9.6	-6.9	-9.5	75	-	13	-	10	2.75	2.6	3.1	1	1.3	1.85	1	1.05	1.2
24-25	67	23-Jan-25	P019	Type IV Validation and New Fluids	IP Mod/ZD	FW-IV	8	100	20	3.11	-5.27	-9.9	-7.2	-11.6	75	-	13	-	20	2.85	2.65	4	1	1	3	1	1	1.1
24-25	68	23-Jan-25	E6	R&D	SN	Cleansurface IV	8	100	20	11.97	-10.2	-10.2	-6.7	-9.5	-	25	-	-	35	3.35	2.75	4	1.3	1.7	3	1	1.15	1.5
24-25	69	23-Jan-25	E7	R&D	SN	LAUNCH PLUS	8	100	20	12.15	-4.6	-9.7	-5.4	-8.6	-	25	-	-	50	3.55	2.6	4	2.35	1.75	3	1.9	1.75	2.5
24-25	70	23-Jan-25	P070	Type IV Validation and New Fluids	Fluid Only	Cleansurface IV	8	100	20	7.42	-6.2	-9.7	-7.3	-7.5	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	71	23-Jan-25	P001	Baseline	Dry Wing	none	8	100	20	-0.31	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Log of Tests Conducted with Thin High-Performance Wing Section – RJ Wing (cont'd)

Test Winter Season	Test #	Date	Test Plan #	Objective	Test Condition	Fluid Name	Rotation Angle	Speed (Kts)	Flap Angle (0°, 20°)	Corrected for 3D Effects % Lift Loss On 8° CI vs Dry CI	Tunnel Temp. Before Test (°C)	OAT Before Test (°C)	AVG Wing Temp. Before Fluid Appl. (°C)	AVG Wing Temp. Before Test (°C)	IP Rate (g/dm ² /h)	SN Rate (g/dm ² /h)	ZR Rate (g/dm ² /h)	R Rate (g/dm ² /h)	Exposure Time (min)	Rating Before Takeoff Run LE	Rating Before Takeoff Run TE	Rating Before Takeoff Run Flap	Rating At Rotation LE	Rating At Rotation TE	Rating At Rotation Flap	Rating After Takeoff Run LE	Rating After Takeoff Run TE	Rating After Takeoff Run Flap	
24-25	72	23-Jan-25	P002	Baseline	Dry Wing	none	22	80	20	0.29	-	-	n/a	n/a	-	-	-	-	-	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
24-25	73	23-Jan-25	P052	Type IV Validation and New Fluids	IP- / ZR- / SN-	Cleansurface IV	8	100	20	5.76	-3.03	-6.5	-2.8	-4.9	25	10	25	-	20	3	3	3.35	1	1.15	1.2	1	1.05	1	
24-25	74	23-Jan-25	P016	Type IV Validation and New Fluids	IP- / ZR- / SN-	FW-IV	8	100	20	2.21	-2.91	-7.4	-4.2	-7.7	25	10	25	-	20	2.75	2.3	3.3	1	1	1.25	1	1	1.05	
24-25	75	23-Jan-25	P088	Type IV Validation and New Fluids	IP- / ZR- / SN-	LAUNCH PLUS	8	100	20	5.84	-2.8	-8.3	-4.8	-6.0	25	10	25	-	20	2.65	2.6	3.35	1	1.2	2.4	1	1.05	1.75	
24-25	76	24-Jan-25	E8	R&D	SN	LAUNCH PLUS	8	100	20	8.02	-6.7	-9.9	-5.9	-9.3	-	25	-	-	35	2.95	2.45	3.6	1.05	1.25	1.65	1	1.1	1.15	