(ii) Precipitation category (e.g., fog, drizzle, rain, or snow).

(A) Precipitation intensity.

(B) Duration of precipitation.

(C) Relationship of precipitation change to holdover time.

(iii) Relationship of holdover time to particular fluid concentrations and for different types of fluids.

(iv) When holdover time begins and ends.

(v) Communication procedures.

(A) Communication between ground personnel and the flightcrew to determine the start of holdover time, and the particular holdover timetable to be used. Communications from the ground crew to the cockpit crew should consist of the following information:

(1) Fluid type; e.g., Type I or Type II.

(2) Fluid/water mix ratio.

(3) Start time of final fluid application which is when holdover time begins.

(4) Accomplishment and results of post-deicing/anti-icing check.

(B) ATC coordination.

(C) Dispatch or flight following coordination.

(D) Means for obtaining most current weather information.

(vi) Use of holdover times by the flightcrew.

(vii) Procedures when holdover time is not exceeded.

(A) When, where, and how to accomplish the pretakeoff check.

(viii) Procedures when holdover time is exceeded.

(A) Pretakeoff contamination check; or

(B) Alternate means to determine whether or not surfaces are free of frost, ice, or snow; or

(C) Redeice and determine a new holdover time.

(2) Aircraft Deicing/Anti-Icing Procedures Including Checks to Detect Contaminated Surfaces, and Responsibilities.

(i) Deicing is a procedure by which frost, ice, or snow is removed from the aircraft in order to provide clean surfaces. The procedure can be accomplished by the use of fluids, mechanical means, or by heating the aircraft.

(ii) Anti-icing is a procedure by which the application of certain types of anti-icing fluids provides protection against the formation of frost or ice and accumulation of snow on treated surfaces of the aircraft for a limited period of time (holdover time).

(iii) Deicing/Anti-icing is a combination of the two procedures above. It can be performed in one or two steps.

(A) One-step deicing/anti-icing is carried out with an anti-icing fluid. The fluid used to deice the aircraft remains on aircraft surfaces to provide limited anti-icing capability.

(B) Two-step deicing/anti-icing consists of two distinct steps. The first step, deicing, is followed by the second step, anti-icing, as a separate fluid application. When it has been determined that the surfaces are clean, anti-icing fluid is applied to protect the relevant surfaces, thus providing maximum possible anti-icing protection (holdover time).

(iv) Safety requirements during fluid application.

(v) Deicing/anti-icing fluid application procedures.

(vi) If applicable, remote deicing procedures.

(A) Aircraft type-specific considerations.

(B) Location-specific procedures.

(vii) Contractor Deicing/Anti-icing. In order to comply with the rule, certificate holders who engage in supplemental operations and employ contractor deicing/anti-icing services and who are unable to arrange for the training and qualification of these personnel in advance should have a person assigned to the flights who is fully trained under the certificate holders' approved program to supervise the deicing/anti-icing procedure.

(viii) Deicing/Anti-icing Checking Procedures and Responsibilities. The training program should have aircraft type-specific surface contamination check procedures and guidelines to include the following:

(A) Types of Checks Required. Each certificate holder should detail the types of checks required and the methods for accomplishing these checks. This includes procedural steps for conducting the check as well as the location, personnel requirements, deicing equipment, and lighting required to accomplish the check.

(1) Flightcrew preflight inspection/cold weather preflight inspection procedures. This is the normal walk around preflight inspection conducted by the flightcrew. This inspection should note any aircraft surface contamination and direct any required deicing/anti-icing operations.

(2) Aircraft deicing/anti-icing procedures include a check performed by qualified ground personnel after the deicing/anti-icing fluid application has been completed. This check is an integral part of the aircraft deicing/anti-icing procedure.

(3) A pretakeoff check is performed by the flightcrew prior to takeoff and within the holdover time. This is a check normally conducted from inside the cockpit. Identification of representative surfaces and continual assessment of environmental and other situational conditions should be included in the operator's program.

(4) Pretakeoff contamination check. This check is accomplished after the holdover time has been exceeded and must be completed within 5 minutes prior to beginning takeoff. Each carrier must define aircraft type-specific pretakeoff contamination check procedures. The check must be

conducted from outside the aircraft unless otherwise approved in the carrier's program. Rather than accomplishing this check, the PIC may elect to be redeiced and a new holdover time established.

(B) Identification of critical surfaces or representative surfaces to be checked/inspected during each type of check.

(C) Techniques for recognizing contamination on the aircraft.

(D) Communications procedures to include communications between the flightcrew, ground personnel, ATC, and company station personnel. Communications with ATC should include coordinating deicing/anti-icing of the aircraft with any proposed ATC push-back time and coordinating any other special requirements needed for accomplishing required aircraft checks.

(3) Aircraft Surface Contamination and Critical Area Identification, and How Contamination Adversely Affects Aircraft Performance and Flight Characteristics.

(i) Aircraft Ground Icing Conditions. Certificate holders should have a description of the following conditions included in their program that would implement ground deicing/anti-icing operational procedures:

(A) Inflight Ice Accumulation. Certificate holders should have procedures for flightcrews of arriving flights to report occurrences of inflight icing to the personnel responsible for executing the certificate holder's deicing/anti-icing program. Inflight ice accumulation could result in a ground deicing situation when flights are scheduled for short turnaround times; i.e., for 30 minutes or less, and when ambient temperatures on the ground are at or below freezing.

(B) Freezing Precipitation. Snow, sleet, freezing rain, drizzle, or hail which could adhere to aircraft surfaces.

(C) Frost, including hoarfrost which is a crystallized deposit, formed from water vapor on surfaces which are at or below 0°C (32°F).

(D) Freezing Fog. Clouds of supercooled water droplets that form a deposit of ice on objects in cold weather conditions.

(E) Snow. Precipitation in the form of small ice crystals or flakes which may accumulate on, or adhere to, aircraft surfaces.

(F) Freezing Rain. Water condensed from atmospheric vapor falling to earth in supercooled drops, forming ice on objects.

(G) Rain or High Humidity on Cold-soaked Wing. Water forming ice or frost on the wing surface when the temperature of the aircraft wing surface is at or below 0°C (32°F). This ice or frost may freeze over the entire wing surface and on the wing leading edge.

(H) Rain or High Humidity on Cold-soaked Wing Fuel Tanks. Water forming ice or frost may form on the wing surface when the temperature of the aircraft wing surface in the vicinity of the wing fuel tanks is at or below 0°C (32°F) due to cold-soaked fuel. Certain aircraft are susceptible to the formation of frost or ice on wing upper surfaces when cold-soaked fuel is in the main wing fuel tanks, and the aircraft are exposed to conditions of high humidity, rain, drizzle, or fog at ambient temperatures well above freezing. Under some atmospheric and temperature conditions clear ice may form. The certificate holder's program should include procedures for removing this type of contamination. In certain circumstances, this type of contamination may not require the certificate holder to implement its ground deicing/anti-icing program.

(I) Underwing Frost. Takeoff with frost under the wing in the area of the fuel tanks (caused by cold-soaked fuel) within limits established by the aircraft manufacturer, accepted by FAA aircraft certification offices and stated in aircraft maintenance and flight manuals, may be permitted. This type of contamination may not require the certificate holder to implement its ground deicing/anti-icing program.

(ii) Critical Aircraft Surfaces. Certificate holders should identify for each type of aircraft used in their operations, the critical surfaces which should be checked on preflight and pretakeoff contamination checks. Information from the aircraft manufacturer (or from this AC if the subject information is not available from the aircraft manufacturer) should be used to determine the critical surfaces for each aircraft type.

(iii) Representative Aircraft Surfaces. Certificate holders should identify, for each type of aircraft used in their operations, the representative aircraft surfaces which should be checked during pretakeoff checks. Information from the aircraft manufacturer, or information developed from carrier operating experience, should be used to determine representative surfaces. In the absence of such information, information from this AC can be used to determine representative aircraft surfaces.

(iv) Effects of Frost, Ice, Snow, and Slush on Aircraft Performance, Stability, and Control. The certificate holder should obtain information on aircraft performance when undetected frost, ice, snow, or slush could be adhering to aircraft surfaces from the manufacturer of each type of aircraft it uses in its operations and should ensure that its flight crewmembers and aircraft dispatchers understand these effects. Accident data and National Aeronautics and Space Administration studies have confirmed that some aircraft manufacturers' data indicates that the effects of wing contamination may be significantly more pronounced for hard-leading-edge (hard-wing) airplanes than for slatted-leading-edge (slatted-wing) airplanes. This data indicates for airplanes without leading-edge, high-lift devices that the presence of even minute amounts of ice or other contaminates (equivalent to medium grit sandpaper) results in significant loss of wing lift, which causes the airplane to stall at lower-than-normal angles of attack during takeoff. The discussion of these effects should include, but is not limited to, the following subjects:

(A) Increased drag and weight.

(B) Tendency for rapid pitchup and wing roll off during rotation.

(C) Loss of lift.

(D) Stall occurs at lower-than-normal angle of attack.

(E) Buffet or stall occurs before activation of stall warning.

(F) Decreased effectiveness of flight controls.

(4) Types, Purpose, Characteristics, and Effectiveness of Deicing and Anti-Icing Fluids. There are several kinds of deicing and anti-icing fluids currently available, and each has different characteristics and capabilities. Certificate holders

should ensure that their flight crewmembers, aircraft dispatchers, and ground personnel generally understand the purpose and capabilities of the fluids used in the certificate holders' deicing/anti-icing program; and that their flight crewmembers are generally knowledgeable of the characteristics of each type of fluid. Certificate holders should refer to the following SAE publications for additional information on specific deicing and anti-icing methods and procedures and on fluid characteristics and capabilities: AMS 1424, "Deicing/Anti-Icing Fluid, Aircraft, Newtonian - SAE Type I;" AMS 1428, "Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian, Pseudo-Plastic, SAE Type II"; and ARP 4737, "Aircraft Deicing/Anti-Icing Methods with Fluids, for Large Transport Aircraft;" and the following ISO documents: ISO 11075, "Aerospace - Aircraft Deicing/Anti-Icing Newtonian Fluids ISO Type I;" ISO 11076, "Aerospace - Aircraft Deicing/Anti-icing methods with fluids"; ISO 11077, "Aerospace - Deicing/Anti-Icing Self Propelled Vehicles - Functional Requirements;" and ISO 11078, "Aerospace - Aircraft Deicing/Anti-Icing Non-Newtonian Fluids ISO Type II." The following subjects should be discussed:

(i) Deicing fluids:

(A) Heated water.

(B) Newtonian fluid (SAE/ISO Type I).

(C) Mixtures of water and SAE/ISO Type I fluid.

(D) Mixtures of water and SAE/ISO Type II fluid.

Note: Deicing fluid should be applied heated to assure maximum efficiency.

(ii) Anti-icing fluids:

(A) Newtonian fluid (SAE/ISO Type I).

(B) Mixtures of water and SAE/ISO Type I fluid.

(C) Non-Newtonian fluid (SAE/ISO Type II).

(D) Mixtures of water and SAE/ISO Type II fluid.

Note: SAE/ISO Type II anti-icing fluid is normally applied cold on clean aircraft surfaces, but may be applied heated. Cold SAE/ISO Type II fluid normally provides longer anti-icing protection.

(iii) Fluid Characteristics.

(A) Type I Deicing Fluids.

(1) Unthickened.

(2) Very limited holdover time.

(3) Applied to form thin liquid film on wing.

(B) Type II Anti-icing Fluids.

(1) Thickened.

(2) Longer holdover times in comparison to those of Type I fluids.

(3) Application results in a thick liquid film (a gel-like consistency) on wing.

(4) Air flow over the wing (shear) causes the fluid to progressively flow off the wing during takeoff.

(iv) Fluid Specifications.

(A) SAE and ISO Type I Deicing and Anti-icing Fluids. The following specifications apply: SAE AMS 1424, Deicing/Anti-Icing Fluid, Aircraft, Newtonian - SAE Type I.

1. Monoethylene Glycol (EG).
2. Propylene Glycol (PG).

(B) ISO 11075, Aerospace - Aircraft Deicing/Anti-Icing Newtonian Fluids ISO Type I. These fluids have been approved by nearly all aircraft manufacturers for use on their aircraft when properly applied. The ISO and SAE holdover timetables for Type I fluids are applicable to these fluids.

(C) SAE and ISO Type II Deicing and Anti-icing Fluids. The following specifications apply: SAE AMS 1428, Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian, Pseudo-

Plastic, SAE Type II; and ISO 11078, Aerospace - Aircraft Deicing/Anti-Icing, Non-Newtonian Fluids ISO Type II. These fluids have been approved by most of the manufacturers of large transport category airplanes. In order to be classified as meeting SAE-AMS 1428 and ISO 11078 specifications, these fluids must meet certain chemical performance requirements, and the aerodynamic and high humidity and freezing water spray endurance tests that are required of Type II fluids. These fluids should be applied in accordance with appropriate SAE/ISO methods documents. The SAE and ISO holdover timetables for Type II fluids are applicable to these fluids.

(D) Association of European Airlines (AEA) Deicing and Anti-icing Fluids. AEA Type I deicing fluid and AEA Type II deicing/anti-icing fluids have been approved by nearly all manufacturers of large transport category airplanes for use on their aircraft when properly applied in accordance with aircraft manufacturers' recommendations. The holdover timetables applicable to SAE and ISO approved fluids may be applied for use with AEA Type I and AEA Type II Freezing Point Depressant (FPD) fluids.

(E) United States Military Deicing Fluids. Military Type I and Type II designations have an entirely different meaning than SAE, ISO, or AEA designations. A military Type II fluid does not indicate that the fluid has a longer holdover time than a military Type I fluid. Holdover times have not been established for military deicing fluids. Since holdover timetables do not apply, use of these fluids should only be used in conjunction with a pretakeoff contamination check.

(F) Other Deicing/Anti-icing Fluids. Use of any deicing/anti-icing fluid should be in accordance with the aircraft manufacturer's recommendations. Holdover timetables are not approved for use for any deicing or anti-icing fluid that does not meet SAE, ISO or AEA approved specifications. Use of any fluid that does not meet these specifications should only be used as a last resort and when used should be in conjunction with a pretakeoff contamination check.

(5) Deicing/Anti-Icing Fluids Handling/Performance Implications. The type of fluid used and how completely the fluid flows off the wing during takeoff determines the effects on the following handling/performance factors. The aircraft manufacturer may also provide performance information regarding the use of the different deicing/anti-icing fluids.

(i) Increased rotation speeds/increased field length.

(ii) Increased control (elevator) pressures on takeoff.

(iii) Increased stall speeds/reduced stall margins.

(iv) Lift loss during climbout/increased pitch attitude.

(v) Increased drag during acceleration/increased field length.

(vi) Increased drag during climb.

c. Other Affected Ground Personnel Training. At least the following subjects for ground personnel (i.e., maintenance mechanic, ramp agent, service personnel, and contractors) should be discussed.

(1) Effects of Frost, Ice, Snow, and Slush on Aircraft Surfaces. This discussion is intended to provide ground personnel with an understanding of the critical effect the presence of even minute amounts of frost, ice, or snow on flight surfaces and should include, but is not limited to, the following:

(i) Loss of Lift.

(ii) Increased drag and weight.

(iii) Decreased control.

(iv) Aircraft-specific areas.

(A) Engine foreign object damage potential.

(B) Ram-air intakes.

(C) Instrument pickup points.

(D) Leading edge device (LED) aircraft (aircraft that have slats or leading edge flaps) and non-LED aircraft.

(2) Fluid Characteristics and Capabilities. Deicing/anti-icing fluids with differing properties exist and may continue to be developed. To the extent that they are being utilized by an air carrier, they should be addressed in training programs:

(i) General fluid descriptions.

(ii) Composition and appearance.

(iii) Health precautions/environmental considerations.

(iv) Differences between Type I and Type II deicing/anti-icing fluids.

(v) Purpose for each type.

(vi) Capabilities.

(vii) Shearing characteristics in storage and handling.

(viii) Fluid application methods.

(3) Holdover Times. A discussion of holdover times should include the following:

(i) Source of holdover time data.

(ii) Precipitation category.

(A) Precipitation intensity.

(B) Duration of precipitation.

(C) Relationship of precipitation change to holdover time.

(iii) Relationship of holdover time to particular fluid concentrations for Type I and Type II fluids.

(iv) Identification of when holdover time begins and ends.

(v) Communication procedures between ground personnel and flightcrew to relay the start time of the final deicing/anti-icing fluid application, the type of fluid used, the fluids/water mix ratio, and confirmation that the post application check was accomplished and that the aircraft is free of all contamination.

(4) Equipment. An understanding of the capabilities of the deicing equipment and the qualifications for operation are necessary. The equipment portion of the training program should include the following:

(i) Description of various equipment types.

(ii) Operation of the equipment.

(5) Preflight Check.

(i) In the predeparture sequence, ground deicing may be initiated at one or more of the following times:

(A) On overnight aircraft prior to the flightcrew's arrival.

(B) Following a check by the flightcrew and a request for deicing.

(C) After a normal preflight inspection by ground personnel or the flightcrew, and after the crew is onboard the aircraft.

(ii) In each case, the preflight and the decision on whether or not to deice/anti-ice should be based on appropriate consideration of the circumstances and should include the following:

(A) Weather conducive to frost or ice formation or snow accumulation.

(B) Aircraft critical areas (general and aircraft-specific).

(6) Deicing/Anti-Icing Procedures. Ground personnel should be knowledgeable of deicing and anti-icing application procedures:

Note: For aircraft type-specific procedures, refer to the aircraft operating manual.

(i) One-step deice and two-step deice/anti-ice process.

(ii) Communications from the ground crew to the flightcrew should provide the following information:

(A) Fluid type.

(B) Fluid/water mix ratio.

(C) Start time of final deice/anti-ice application.

(D) Post-application check accomplished.

(iii) Safety requirements and emergency procedures.

(iv) Deicing/anti-icing prior to aircrew arrival.

(v) Gate deicing procedures.

(vi) Remote deicing procedures.

(A) Aircraft-specific considerations.

(B) Location-specific procedures.

(C) Safety precautions.

(vii) Post-application check procedures.

(7) Pretakeoff Contamination Check. This check is accomplished when the holdover time has been exceeded and must be completed within 5 minutes of beginning takeoff. Each carrier must define the content of the pretakeoff contamination check. The check should be conducted from outside the aircraft by qualified ground personnel unless the certificate holder's program authorizes it to be conducted from inside the aircraft by the flightcrew. Training for ground personnel should include the following:

(i) When the check is required.

(ii) The necessary resources, personnel, and equipment to accomplish the check properly.

(iii) Where the check could be accomplished.

(iv) What surfaces must be checked.

(v) Procedures for relaying the condition of the aircraft to the PIC.

(8) Contractor Deicing. Many certificate holders use parties other than themselves to perform deicing. The party with whom they reach an agreement to provide deicing services could be

another carrier, a fixed-base operator or some other service provider. Training for deicing services should include the following:

(i) An approved contract training program. This program should meet the carrier's own training standards.

(ii) Train-the-trainer program (the carrier trains the contract deicing personnel or designated trainer).

(iii) Alternative procedures at airports where contract service agreements are not present. For example, a trained and qualified flightcrew member or other appropriately qualified certificate holder employee provides supervision and quality control during the deicing/anti-icing process and ensures contractor procedures meet the certificate holder's approved program standards.

(iv) Guidance that the flightcrew will hold the contractor to their own approved program standards.

(9) Ground Personnel Qualification. Certificate holders' ground deicing programs should have a qualification program and a quality assurance program to monitor and maintain a high level of competence.

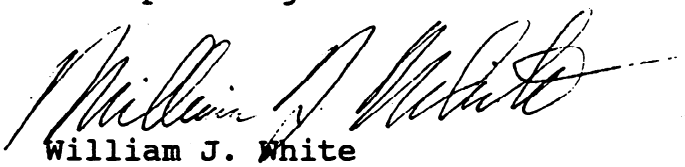
(i) The program should be tailored to the individual airline with each air carrier maintaining its own quality assurance responsibility.

(ii) The program should have a tracking system that ensures that all required training has been satisfactorily completed and recorded for all ground personnel participating in the deicing process. Also, a list naming qualified deicing personnel should be made available to all local managers responsible for deicing.

(iii) An ongoing review plan is advisable to evaluate the effectiveness of the training received by the deicing personnel. Recurrent training should be key to this process.

11. FAR SECTION 121.629(d), "OUTSIDE-THE-AIRCRAFT CHECK" IN LIEU OF AN APPROVED GROUND DEICING/ANTI-ICING PROGRAM. A certificate holder may continue to operate without an approved ground deicing/anti-icing program if it has approved procedures and properly trained personnel for conducting an "outside-the-aircraft check" in accordance with FAR Sections 121.105, 121.123, 121.135(b)(2), 121.415(g), and 121.629(d). Authorization for conducting this check, in lieu of

an approved program, should be contained in the certificate holder's operations specifications (OpSpecs). As stated in FAR Section 121.629(d), this check is accomplished when conditions are such that frost, ice, or snow may reasonably be expected to adhere to the aircraft. Under FAR Section 121.629(d), the check must be completed within 5 minutes of beginning takeoff and must be accomplished from outside the aircraft. Certificate holders' manuals and training programs should detail procedures for accomplishing this check.



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APPENDIX 1. HOLDOVER TIMETABLES

This appendix contains holdover timetable data extracted from "SAE Aerospace Recommended Practice"; ARP 4737, "Aircraft Deicing/Anti-Icing Methods with Fluids, for Large Transport Aircraft"; and ISO 11076, "Aerospace - Aircraft Deicing/Anti-Icing Methods with Fluids." These excerpts are included to provide the holdover times that are currently acceptable for use in developing a certificate holder's holdover timetables. The certificate holder should consult the most recent SAE and ISO documents for complete information for development of timetables and procedures for their use.

APPENDIX 1. HOLDOVER TIMETABLES (Cont'd)

Table 1. Guideline for Holdover Times Anticipated by SAE Type II and ISO Type II Fluid Mixtures as a Function of Weather Conditions and OAT.

CAUTION! THIS TABLE IS FOR USE IN DEPARTURE PLANNING ONLY. IT SHOULD BE USED IN CONJUNCTION WITH PRE-TAKEOFF CHECK PROCEDURES.

OAT		Type II Fluid Concentration Neat-Fluid /Water [% by Volume]	Approximate Holdover Times Anticipated Under Various Weather Conditions (hours: minutes)				
°C	°F		FROST	FREEZING FOG	SNOW	FREEZING RAIN	RAIN ON COLD SOAKED WING
0 and above	32 and above	100/0	12:00	1:15-3:00	0:25-1:00	0:08-0:20	0:24-1:00
		75/25	6:00	0:50-2:00	0:20-0:45	0:04-0:10	0:18-0:45
		50/50	4:00	0:35-1:30	0:15-0:30	0:02-0:05	0:12-0:30
below 0 to -7	below 32 to 19	100/0	8:00	0:35-1:30	0:20-0:45	0:08-0:20	CAUTION! clear ice may require touch for confirmation
		75/25	5:00	0:25-1:00	0:15-0:30	0:04-0:10	
		50/50	3:00	0:20-0:45	0:05-0:15	0:01-0:03	
below -7 to -14	below 19 to 7	100/0	8:00	0:35-1:30	0:20-0:45	List of Symbols °C = Celsius °F = Fahrenheit Vol = Volume OAT = Outside Air Temp.	
		75/25	5:00	0:25-1:00	0:15-0:30		
below -14 to -25	below 7 to -13	100/0	8:00	0:35-1:30	0:20-0:45		
below -25	below -13	100/0 if 7°C(13°F) Buffer is maintained	A buffer of at least 7°C(13°F) must be maintained for Type II used for anti-icing at OAT below -25°C(-13°F). Consider use of Type I fluids where SAE or ISO Type II cannot be used.				

THIS TABLE DOES NOT APPLY TO OTHER THAN SAE OR ISO TYPE II FPD FLUIDS.

THE RESPONSIBILITY FOR THE APPLICATION OF THESE DATA REMAINS WITH THE USER.

CAUTION: THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HIGH WIND VELOCITY AND JET BLAST MAY CAUSE A DEGRADATION OF THE PROTECTIVE FILM. IF THESE CONDITIONS OCCUR, THE TIME OF PROTECTION MAY BE SHORTENED CONSIDERABLY. THIS IS ALSO THE CASE WHEN THE FUEL TEMPERATURE IS SIGNIFICANTLY LOWER THAN OAT.

APPENDIX 1. HOLDOVER TIMETABLES (Cont'd)

Table 2. Guideline for Holdover Times Anticipated by SAE Type I, and ISO Type I Fluid Mixtures as a Function of Weather Conditions and OAT.

CAUTION! THIS TABLE IS FOR USE IN DEPARTURE PLANNING ONLY. IT SHOULD BE USED IN CONJUNCTION WITH PRE-TAKEOFF CHECK PROCEDURES.

Freezing Point of Type I fluid mixture used must be at least 10°C(18°F) below OAT.

Outside Air Temperature		Approximate Holdover Times Anticipated Under Various Weather Conditions (hours:minutes)				
°C	°F	FROST	FREEZING FOG	SNOW	FREEZING RAIN	RAIN ON COLD SOAKED WING
0 & above	32 & above	0:18-0:45	0:12-0:30	0:06-0:15	0:02-0:05	0:06-0:15
below 0 to -7	below 32 to 19	0:18-0:45	0:06-0:15	0:06-0:15	0:01-0:03	CAUTION! Clear ice may require touch for confirmation
below -7	below 19	0:12-0:30	0:06-0:15	0:06-0:15		

THIS TABLE DOES NOT APPLY TO OTHER THAN SAE OR ISO TYPE I FPD FLUIDS.

THE RESPONSIBILITY FOR THE APPLICATION OF THESE DATA REMAINS WITH THE USER.

CAUTION: THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HIGH WIND VELOCITY AND JET BLAST MAY CAUSE A DEGRADATION OF THE PROTECTIVE FILM. IF THESE CONDITIONS OCCUR, THE TIME OF PROTECTION MAY BE SHORTENED CONSIDERABLY. THIS IS ALSO THE CASE WHEN THE FUEL TEMPERATURE IS SIGNIFICANTLY LOWER THAN OAT.