OFFICIAL FAA HOLDOVER TIME TABLES

WINTER 2014-2015

REVISION 1.1

The information contained in this document serves as the official FAA guidance, Holdover Tables, and Allowance Times for use during the 2014-2015 winter season. The contents of this document are included by reference in FAA Notice (N) 8900.275 that is published in FSIMS. This document is designed to be used in conjunction with N 8900.275.

Questions concerning FAA aircraft ground de/anti-icing requirements or Flight Standards policies should be addressed to charles.j.enders@faa.gov or 202-267-4557.

Questions on the technical content of the holdover time tables should be addressed to warren.underwood@faa.gov or 404-305-7163.

Questions regarding editorial content or web access issues should be addressed to sung.shin@faa.gov or 202-267-8086.

CHANGE CONTROL RECORDS

This page indicates any changes made to individual pages within the document. Changed pages have the appropriate revision date in the header. Sidebars are shown to assist in identifying where changes have been made on these pages.

It is the responsibility of the end user to periodically check the following website for updates: https://www.faa.gov/other_visit/aviation_industry/airline_operators/airline_safety/deicing/.

REVISION	***DATE***	***DESCRIPTION OF CHANGES***	***AFFECTED PAGES***	***AUTHOR***
1.0	August 6, 2014	Correction of lowest operational use temperature for Shaanxi Cleanway Cleansurface I	44	FAA/APS
1.1	October 22, 2014	N 8900.TBD changed to N 8900.275	Cover, i, 2, 4	FAA

SUMMARY OF CHANGES AND KEY GUIDANCE FOR 2014-2015

TYPE I FLUIDS. The Type I holdover time tables are unchanged. Previously, they were divided into two tables, Table 1 for aircraft with critical surfaces constructed predominantly of aluminum, and Table 1A for aircraft with critical surfaces constructed predominantly of composites. Table 0 also includes aluminum and composite values for Type I fluid HOTs in active frost conditions. The aluminum values also apply to other metals used in aircraft construction such as titanium.

The Type I fluid holdover times for composite surfaces, Table 1A, and applicable sections of Table 0, must be applied to aircraft with all critical surfaces that are predominantly or entirely constructed of composite materials. However, the Type I fluid holdover times for composite surfaces do not need to be applied to aircraft that are currently in service, have a demonstrated safe operating history using Type I fluid aluminum structure holdover times, and have critical surfaces only partially constructed of composite material. If there is any doubt, consult with the aircraft manufacturer to determine whether aluminum or composite holdover times are appropriate for the specific aircraft.

TYPE II FLUIDS. A fluid-specific holdover (HOT) time table has been created for the new Type II fluid, LNT Solutions P250. The addition of this fluid did not impact the generic holdover times.

Kilfrost ABC-2000 has been removed from the Type II guidelines as per the protocol for removing obsolete fluids.

The Type II generic HOT table is unchanged.

TYPE III FLUIDS. The Type III generic HOT table values are unchanged. However, a note has been added to the table to indicate it is only applicable when Type III fluid is applied unheated. Research indicates HOTs of Type III fluid can be shorter in some conditions when fluid is applied heated.

TYPE IV FLUIDS. Fluid-specific HOT tables have been created for three new Type IV fluids: Clariant Max Flight Sneg, LNT Solutions E450, and Newave Aerochemical FCY 9311. No holdover times are provided for 75/25 or 50/50 dilutions of E450 and FCY 9311.

Lyondell Arctic Shield has been removed from the Type IV guidelines as per the protocol for removing obsolete fluids.

Six decreases have been made to the Type IV generic HOT table values as a result of the addition of the new Type IV fluids.

HOLDOVER TIMES FOR NON-STANDARD DILUTIONS OF TYPE II, III, AND IV FLUIDS. When a Type II, III, or IV fluid is diluted to other than the published 100/0, 75/25 or 50/50 dilutions, the more conservative holdover time and LOUT associated with either the dilution above or below the selected dilution are applicable.

For example:

1) The holdover time and LOUT of a 80/20 dilution would be the more conservative holdover time and LOUT of either the 100/0 or 75/25 dilutions;
2) The holdover time and LOUT of a 60/40 dilution would be the more conservative holdover time and LOUT of either the 75/25 or 50/50 dilutions.

ACTIVE FROST HOLDOVER TIMES. The active frost holdover times, Table 0, are unchanged for 2014-15.

SNOWFALL VISIBILITY TABLE. Table 1C, Snowfall Intensities as a Function of Prevailing Visibility, is unchanged for 2014-15. For simplification purposes, portions of the table may be included in an air carrier's winter operations plan in non-table format. An example would be: "Since very light snow is being added to some of the Type II and Type IV tables, and since the METAR and the associated ATIS do not report very light snow, a METAR reported visibility of 2.5 miles or higher can be used as an indication that the snowfall intensity is very light." An air carrier certainly would also have the option of providing a more detailed description utilizing lower METAR reported visibilities for specific day/night and temperature conditions.

SURFACE VISIBILITY. Some METARS contain tower visibility as well as surface visibility. Whenever surface visibility is available from an official source, such as a METAR, in either the main body of the METAR or in the Remarks ("RMK") section, the preferred action is to use the surface visibility value.

USE OF RUNWAY VISUAL RANGE (RVR). The use of RVR is not permitted for determining visibility used with the holdover tables.

USE OF ELECTRONIC HAND HELD DEVICES TO DETERMINE HOLDOVER TIMES (eHOT). Electronic devices to determine HOTs may be used as part of an air operator's Title 14 of the Code of Federal Regulations (14 CFR) part 121, § 121.629 winter operations plan submitted to the FAA for approval. If for any reason the device or application fails or if the user has any concern regarding the accuracy of the data being displayed, printed tables sourced from the FAA HOTS must be used as a fall back information source. Questions regarding the use of these devices should be submitted to charles.j.enders@faa.gov, 202-267-4557.

ICE PELLET AND SMALL HAIL ALLOWANCE TIMES. Additional research has been conducted to provide guidance for aircraft operations during ice pellet conditions when operating with Type III undiluted (100/0) fluid applied unheated. A separate ice pellet allowance time table has been developed for Type III fluids (Table 9).

Small hail has been added to the allowance time tables as it has been determined to be meteorologically equivalent to moderate ice pellets. It has also been added to the titles of the allowance time guidance section and allowance time tables.

Research has indicated that Type IV propylene glycol (PG) fluids are removed less effectively during take-off when contaminated with moderate ice pellets at temperatures below -16 °C. Therefore operations in these conditions are not recommended and no allowance times exist for PG fluids in conditions of moderate ice pellets at temperatures below -16 °C, irrespective of aircraft rotation speed.

Research has provided data to support a new Type IV allowance time of 7 minutes for light ice pellets mixed with moderate snow at temperatures below -5 to -10 °C.

EARLY FLUID FAILURE ON EXTENDED SLATS AND FLAPS. Research has determined that fluid degradation is accelerated by the steeper angles of the flaps/slats in the takeoff configuration. The degree of potential degradation is significantly affected by the specific aircraft design. For the winter of 2014-2015, holdover time and allowance time tables have been published which include 90% adjusted holdover / allowance times. The 90% adjusted times were obtained by multiplying the standard holdover / allowance times by 90% and rounding the result to the nearest minute. (Note: times of 5 minutes and less do not change as the 10% reduction is less than required to reduce the time by one minute. Additionally, the 90% adjustment was applied to the uncapped snow holdover times. In some cases, this leads to adjusted snow holdover times which are longer than 90% of the standard (capped) holdover time.)

The 90% adjusted tables provide holdover / allowance times that must be used when flaps and slats are deployed prior to de/anti-icing. Standard holdover / allowance times can be used if flaps and slats are deployed as close to departure as safety allows. Additional guidance is provided in N 8900.275.

LOWEST OPERATIONAL USE TEMPERATURE (LOUT) TABLE. Lowest Operational Use Temperature (LOUT) information for Types I, II, III and IV fluids has been updated with revised values for some fluids. Information has also been added for new fluids and deleted for obsolete fluids. This information has been derived by the FAA based on data provided by the fluid manufacturers. The LOUT information can be found in Tables 7-1 for Type I fluids and Tables 7-2, 7-3, and 7-4 for Types II, III, and IV fluids respectively Tables 7-2, and 7-4 now include data for dilutions of Type II and Type IV fluids. Contact the fluid manufacturer if further clarification with respect to the information in these tables is required.

The Lowest Operational Use Temperature, or LOUT, is the lowest temperature at which a de/anti-icing fluid will adequately flow off aircraft critical surfaces and maintain the required anti-icing freezing point buffer which is 7 °C (13 °F) below outside air temperature (OAT) for SAE Type II, Type III, and Type IV fluids and 10 °C (18 °F) below (OAT) for SAE Type I fluids.

For example, if a Type IV fluid has been aerodynamically tested and demonstrated adequate flow-off capability down to -30 °C (-22 °F), and the freezing point of this fluid is -35 °C (-31 °F), the LOUT would be -28 °C (-18.4 °F) to account for the required 7 °C (13 °F) freezing point buffer. In this case, the freezing point buffer requirement is the LOUT limiting factor.

Similarly if a Type I fluid has been found to adequately flow off down to -29 °C (-20.2 °F), and the freezing point is -40 °C (-40 °F) , the LOUT would be -29 °C (-20.2 °F) to account for the lowest temperature at which the fluid adequately flows off the aircraft. Here, in this example, the fluid aerodynamic flow-off capability limits the LOUT.

There are two aerodynamic fluid flow-off test protocols for fluids; the low speed test is for aircraft with rotation speeds less than 100 knots and the high speed test for aircraft with rotation speeds greater than 100 knots. Type II, and Type IV fluids generally do not pass the low speed test. Therefore in order for these fluids to be used on a low rotation speed aircraft (rotation speed of 100 knots or less), the aircraft manufacturer must conduct testing to determine if these fluids can be safely applied on these aircraft and to identify operational procedures that must be implemented to insure the safe operation when these fluids have been applied.

The LOUTs for Type I fluids provided in Table 7-1 also include the manufacturer specified fluid/water concentration used to establish the LOUT for each fluid. This concentration should not be exceeded.

As previously stated, in the cases of Types II, III, and IV fluids, there can be multiple LOUTs to account for the undiluted fluid (100/0) and the 50/50 and 75/25 dilutions. In addition to being provided in Tables 7-2, 7-3, and 7-4, the LOUTs are also listed in their brand-specific holdover tables, but not Table 0, the frost holdover table. For this table, refer to Tables 7-2, 7-3, or 7-4, or the Type II, III, or IV HOTs to determine if the LOUT of the fluid being applied is warmer than -25 °C (-13 °F) and restrict use to -25 °C or the LOUT, whichever is warmer. Type I fluid LOUTs are only found in Table 7-1, and are allowed to be used at temperatures down to their actual LOUT.

FLIGHT CREW AWARENESS OF CONDITIONS AFFECTING THE AIRCRAFT ANTI-ICING TREATMENT FOLLOWING DEICING AND ANTI-ICING OPERATIONS. The operator's deicing plan must provide a process that informs the captain of the time of the deicing/anti-icing treatment and conditions that have affected the aircraft anti-icing treatment since that time. If the flight crew is not present at the time of the deicing/anti-icing application, the crew will review this information before calculating the holdover time.

STANDARDIZED INTERNATIONAL AIRCRAFT GROUND DEICING PROGRAM (SIAGDP). For those air carriers participating in the SIAGDP one change was agreed upon after the 2010-2011 winter revisions were made to the SIAGDP. This change was included in the 2011-2012 revision. This change addresses a concern that the air carriers have expressed over the completion of the annual

audits within the anniversary month. In addition to the scheduling difficulties that this has generated, it has also necessitated that many of the audits be conducted in late summer and early fall prior to the service providers being in a full operational mode. In many cases this has limited the auditor's effectiveness and has not been conducive to the high quality audit that is fundamental to the success of the SIAGDP. Therefore it was agreed upon by the member air carriers participating in the SIAGDP and the FAA policy office that the grace month concept that is currently applied to the training/qualification annual requirements under the SIAGDP will be also applied to the annual audit requirements. This allows a three month period in which the audit can be conducted and credited as though it was conducted in the month it was originally due. For example if the audit in 2009 was completed in September the next audit would be due in September 2010. The 2010 audit could be completed in either August, September or October 2010 and credited as completed in its original due month of September 2010. The next audit would be due in September 2011 regardless of which of the three months the audit was completed in 2010. The same grace month rational will apply for the 2011 audit as well. If the recurring audit is not completed in the three month applicable period then the service provider would be considered as a new service provider under the SIAGDP and an initial detailed qualification audit would need to be completed prior to any SIAGDP participating air carrier utilizing their services under the SIAGDP. Policy development is continuing in 2014-15.

GUIDANCE ON HAIL AND SMALL HAIL. The meteorological conditions "hail" and "small hail" are not equivalent. No holdover times exist for either of these conditions; however, it has been determined that small hail is meteorologically equivalent to moderate ice pellets and therefore moderate ice pellet allowance times can be used in small hail conditions. The following changes have been made to provide clearer guidance on the use of holdover times and allowance times in hail and small hail conditions:

a) Small hail has been added to the list of "other" weather conditions for which holdover times do not exist. This list is provided as a note in each of the Type I, II, III and IV HOT tables.

b) Additional text has been added to the "other" weather conditions note in the Type III and IV HOT tables to guide users to the allowance time tables in ice pellet and small hail conditions.

c) Small hail has been added to the allowance time tables (Table 9 and Table 10).

d) A section on hail and small hail has been added to N 8900.275.

INTERPRETATION OF METAR CODE GS. The World Meteorological Organization (WMO) states METAR code GS is used for two meteorological conditions: "snow pellets" and "small hail." However, investigation has determined that not all countries follow these guidelines. The use of the reported GS code can potentially lead to difficulties in determining which condition (snow pellets or small hail) is occurring and therefore in establishing the appropriate holdover time/allowance time. Consequently, a new section has been added to N 8900.275 to provide guidance for determining which holdover times/allowance times should be used with METAR code GS.

TABLE **PAGE**

TABLE **PAGE**

TABLE PAGE

GUIDANCE/INFORMATION PAGE

TABLE 0. FAA HOLDOVER TIME GUIDELINES FOR SAE TYPE I, TYPE II, TYPE III, AND TYPE IV FLUIDS IN ACTIVE FROST

Outside Air Temperature[1,2]		Approximate Holdover Times (hours:minutes)
Degrees Celsius	Degrees Fahrenheit	Active Frost
		Type I
-1 and above	30 and above	0:45 (0:35)[3]
below -1 to -3	below 30 to 27	
below -3 to -10	below 27 to 14	
below -10 to -14	below 14 to 7	
below -14 to -21	below 7 to -6	
below -21 to LOUT	below -6 to LOUT	

Outside Air Temperature[2]		Concentration Neat Fluid/Water (Volume %/ Volume %)	Approximate Holdover Times (hours:minutes)		
Degrees Celsius	Degrees Fahrenheit		Active Frost		
			Type II	Type III	Type IV
-1 and above	30 and above	100/0	8:00	2:00	12:00
		75/25	5:00	1:00	5:00
		50/50	3:00	0:30	3:00
below -1 to -3	below 30 to 27	100/0	8:00	2:00	12:00
		75/25	5:00	1:00	5:00
		50/50	1:30	0:30	3:00
below -3 to -10	below 27 to 14	100/0	8:00	2:00	10:00
		75/25	5:00	1:00	5:00
below -10 to -14	below 14 to 7	100/0	6:00	2:00	6:00
		75/25	1:00	1:00	1:00
below -14 to -21	below 7 to -6	100/0	6:00	2:00	6:00
below -21 to -25	below -6 to -13	100/0	2:00	2:00	4:00
Below -25	Below -13	No holdover time guidelines exist			

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

1 Type I Fluid / Water Mixture must be selected so that the freezing point of the mixture is at least 10 °C (18 °F) below outside air temperature.
2 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected.
3 Value in parenthesis is for composite aircraft.

CAUTIONS:

- FLUIDS USED DURING GROUND DE/ANTI-ICING DO NOT PROVIDE IN-FLIGHT ICING PROTECTION.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 1. FAA HOLDOVER TIME GUIDELINES FOR SAE TYPE I FLUID ON CRITICAL AIRCRAFT SURFACES COMPOSED PREDOMINANTLY OF ALUMINUM

Outside Air Temperature[1,2]		Wing Surface	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[3]			Freezing Drizzle[5]	Light Freezing Rain	Rain on Cold Soaked Wing[6]	Other[7]
				Very Light[4]	Light[4]	Moderate				
-3 and above	27 and above	Aluminum	0:11-0:17	0:18-0:22	0:11-0:18	0:06-0:11	0:09-0:13	0:02-0:05	0:02-0:05	
below -3 to -6	below 27 to 21	Aluminum	0:08-0:13	0:14-0:17	0:08-0:14	0:05-0:08	0:05-0:09	0:02-0:05	CAUTION: No holdover time guidelines exist	
below -6 to -10	below 21 to 14	Aluminum	0:06-0:10	0:11-0:13	0:06-0:11	0:04-0:06	0:04-0:07	0:02-0:05		
Below -10	below 14	Aluminum	0:05-0:09	0:07-0:08	0:04-0:07	0:02-0:04				

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

1 Type I fluid / water mixture must be selected so that the freezing point of the mixture is at least 10 °C (18 °F) below outside air temperature.
2 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected.
3 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
4 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
5 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
6 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
7 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE I FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 1A. FAA HOLDOVER TIME GUIDELINES FOR SAE TYPE I FLUID ON CRITICAL AIRCRAFT SURFACES COMPOSED PREDOMINANTLY OF COMPOSITES

Outside Air Temperature[1,2]		Wing Surface	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[3]			Freezing Drizzle[5]	Light Freezing Rain	Rain on Cold Soaked Wing[6]	Other[7]
				Very Light[4]	Light[4]	Moderate				
-3 and above	27 and above	Composite	0:09-0:16	0:12-0:15	0:06-0:12	0:03-0:06	0:08-0:13	0:02-0:05	0:01-0:05	
below -3 to -6	below 27 to 21	Composite	0:06-0:08	0:11-0:13	0:05-0:11	0:02-0:05	0:05-0:09	0:02-0:05	CAUTION: No holdover time guidelines exist	
below -6 to -10	below 21 to 14	Composite	0:04-0:08	0:09-0:12	0:05-0:09	0:02-0:05	0:04-0:07	0:02-0:05		
Below -10	below 14	Composite	0:04-0:07	0:07-0:08	0:04-0:07	0:02-0:04				

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

1 Type I fluid / water mixture must be selected so that the freezing point of the mixture is at least 10 °C (18 °F) below outside air temperature.
2 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected.
3 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
4 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
5 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
6 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
7 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE I FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 1B. FAA GUIDELINES FOR THE APPLICATION OF SAE TYPE I FLUID MIXTURE MINIMUM CONCENTRATIONS AS A FUNCTION OF OUTSIDE AIR TEMPERATURE

<table>
<tr><th rowspan="2">Outside Air Temperature (OAT)</th><th rowspan="2">One-step Procedure Deicing/Anti-icing[1]</th><th colspan="2">Two-step Procedure</th></tr>
<tr><th>First step: Deicing</th><th>Second step: Anti-icing[1,2]</th></tr>
<tr><td>-3 °C (27 °F) and above</td><td rowspan="2">Mix of fluid and water heated to 60 °C (140 °F) minimum at the nozzle, with a freezing point of at least 10 °C (18 °F) below OAT</td><td>Heated water or a mix of fluid and water heated to 60 °C (140 °F) minimum at the nozzle</td><td rowspan="2">Mix of fluid and water heated to 60 °C (140 °F) minimum at the nozzle, with a freezing point of at least 10 °C (18 °F) below OAT</td></tr>
<tr><td>Below -3 °C (27 °F)</td><td>Freezing point of heated fluid mixture shall not be more than 3 °C (5 °F) above OAT</td></tr>
<tr><td colspan="4">1 Fluids must only be used at temperatures above their lowest operational use temperature (LOUT).
2 To be applied before first-step fluid freezes, typically within 3 minutes. (This time may be higher than 3 minutes in some conditions, but potentially lower in heavy precipitation, colder temperatures, or for critical surfaces constructed of composite materials. If necessary, the second step shall be applied area by area.)</td></tr>
<tr><td colspan="4">Notes:
Upper temperature limit shall not exceed fluid and aircraft manufacturers' recommendations.
To use Type I holdover time guidelines in all conditions including active frost, at least 1 liter per square meter (~2 gal. per 100 square feet) fluid must be applied to the deiced surfaces.
This table is applicable for the use of Type I Holdover Time Guidelines in all conditions, including active frost. If holdover times are not required, a temperature of 60 °C (140 °F) at the nozzle is desirable.
The lowest operational use temperature (LOUT) for a given Type I fluid is the higher of:<ol type="a">
The lowest temperature at which the fluid meets the aerodynamic acceptance test for a given aircraft type, or
The actual freezing point of the fluid plus a freezing point buffer of 10 °C (18 °F).
Caution: WING SKIN TEMPERATURES MAY DIFFER AND, IN SOME CASES, BE LOWER THAN OAT. A STRONGER MIX (MORE GLYCOL) MAY BE NEEDED UNDER THESE CONDITIONS.</td></tr>
</table>

TABLE 1C. SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY

Time of Day	Temp.		Visibility in Statute Miles (Meters)									
	Degrees Celsius	Degrees Fahrenheit	≥ 2 1/2 (≥ 4000)	2 (3200)	1 3/4 (2800)	1 1/2 (2400)	1 1/4 (2000)	1 (1600)	3/4 (1200)	1/2 (800)	≤ 1/4 (≤ 400)	
Day	colder/equal -1	colder/equal 30	Very Light	Very Light	Very Light	Light	Light	Light	Moderate	Moderate	**Heavy**	Snowfall Intensity
	warmer than -1	warmer than 30	Very Light	Light	Light	Light	Light	Moderate	Moderate	**Heavy**	**Heavy**	
Night	colder/equal -1	colder/equal 30	Very Light	Light	Light	Moderate	Moderate	Moderate	Moderate	**Heavy**	**Heavy**	
	warmer than -1	warmer than 30	Very Light	Light	Moderate	Moderate	Moderate	Moderate	**Heavy**	**Heavy**	**Heavy**	

NOTE 1: This table is for estimating snowfall intensity. It is based upon the technical report, "The Estimation of Snowfall Rate Using Visibility," Rasmussen, et al., Journal of Applied Meteorology, October 1999 and additional in situ data.

NOTE 2: This table is to be used with Type I, II, III, and IV fluid guidelines.

NOTE 3: If visibility from a source other than the METAR is used, round to the nearest visibility in the table, rounding down if it is right in between two values. For example, .6 and .625 (5/8) would both be rounded to .5 (1/2).

HEAVY = Caution—No Holdover Time Guidelines Exist

During snow conditions alone, the use of Table 1C in determining snowfall intensities does not require pilot company coordination or company reporting procedures since this table is more conservative than the visibility table used by official weather observers in determining snowfall intensities.

Because the FAA Snow Intensity Table, like the FMH-1 Table, uses visibility to determine snowfall intensities, and if the visibility is being reduced by snow along with other forms of obscuration such as fog, haze, smoke, etc., the FAA Snow Intensity Table does not need to be used to estimate the snow fall intensity for HOT determination. Use of the FAA Snow Intensity Table under these conditions may needlessly overestimate the actual snowfall intensity and therefore the snowfall intensity being reported by the weather observer or automated service observing system (ASOS), from the FMH-1 Table may be used.

TABLE 2. FAA HOLDOVER TIME GUIDELINES FOR SAE TYPE II FLUIDS

Outside Air Temperature[1]		Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	0:35-1:30	0:20-0:45	0:30-0:55	0:15-0:30	0:08-0:40	
		75/25	0:25-1:00	0:15-0:30	0:20-0:45	0:10-0:25	0:05-0:25	
		50/50	0:15-0:30	0:05-0:15	0:08-0:15	0:05-0:09	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:20-1:05	0:15-0:30	0:20-0:45[7]	0:10-0:20[7]		
		75/25	0:25-0:50	0:10-0:20	0:15-0:30[7]	0:08-0:15[7]		
Below -14 to -25 or LOUT	Below 7 to -13 or LOUT	100/0	0:15-0:35	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 2A. FAA TYPE II HOLDOVER TIME GUIDELINES FOR ABAX ECOWING 26

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	1:25-2:35	1:35-1:50	1:00-1:35	0:40-1:00	0:50-1:35	0:40-0:50	0:20-1:25	
		75/25	1:05-1:55	1:15-1:25	0:45-1:15	0:25-0:45	0:45-1:05	0:25-0:35	0:10-1:00	
		50/50	0:30-0:45	0:40-0:50	0:20-0:40	0:10-0:20	0:15-0:25	0:08-0:10	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:45-2:15	1:25-1:40	0:55-1:25	0:35-0:55	0:30-1:10[7]	0:15-0:35[7]		
		75/25	0:35-1:15	0:55-1:05	0:40-0:55	0:25-0:40	0:20-0:50[7]	0:15-0:25[7]		
below -14 to -25	below 7 to -13	100/0	0:25-0:45	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- ABAX ECOWING 26 TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 2B. FAA TYPE II HOLDOVER TIME GUIDELINES FOR AVIATION SHAANXI HI-TECH CLEANWING II

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	0:55-1:50	0:30-0:55	0:35-1:05	0:25-0:35	0:10-0:55	
		75/25	0:50-1:20	0:25-0:45	0:35-1:00	0:20-0:30	0:07-0:50	
		50/50	0:35-1:00	0:15-0:30	0:20-0:40	0:10-0:20	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:45-1:50	0:30-0:55	0:30-0:55[7]	0:20-0:25[7]		
		75/25	0:40-1:45	0:25-0:45	0:35-0:40[7]	0:20-0:25[7]		
below -14 to -29	below 7 to -20.2	100/0	0:20-0:50	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- AVIATION SHAANXI HI-TECH CLEANWING II TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 2C. FAA TYPE II HOLDOVER TIME GUIDELINES FOR CLARIANT SAFEWING MP II FLIGHT

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	3:30-4:00	2:35-3:00	1:35-2:35	1:00-1:35	1:20-2:00	0:45-1:25	0:10-1:30	
		75/25	1:50-2:45	2:35-3:00	1:20-2:35	0:40-1:20	1:10-1:30	0:30-0:55	0:06-0:50	
		50/50	0:55-1:45	0:45-0:55	0:25-0:45	0:10-0:25	0:20-0:30	0:10-0:15	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:55-1:45	1:50-2:10	1:05-1:50	0:40-1:05	0:35-1:30[7]	0:25-0:45[7]		
		75/25	0:25-1:05	1:20-1:40	0:40-1:20	0:20-0:40	0:25-1:10[7]	0:20-0:35[7]		
Below -14 to -29	Below 7 to -20.2	100/0	0:30-0:50	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT
- CLARIANT SAFEWING MP II FLIGHT TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 2D. FAA TYPE II HOLDOVER TIME GUIDELINES FOR CLARIANT SAFEWING MP II FLIGHT PLUS

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:40-4:00	0:50-1:50	1:25-2:00	0:45-1:00	0:15-2:00	
		75/25	2:35-4:00	1:00-1:45	1:35-2:00	0:50-1:15	0:15-1:15	
		50/50	1:05-2:20	0:15-0:25	0:30-1:05	0:15-0:20	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:40-2:20	0:35-1:15	0:35-1:25[7]	0:35-0:55[7]		
		75/25	0:30-1:45	0:55-1:40	0:25-1:10[7]	0:30-0:45[7]		
Below -14 to -29	Below 7 to -20.2	100/0	0:20-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT
- CLARIANT SAFEWING MP II FLIGHT PLUS TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 2E. FAA TYPE II HOLDOVER TIME GUIDELINES FOR CRYOTECH POLAR GUARD II

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:50-4:00	2:35-2:50	1:50-2:35	1:20-1:50	1:35-2:00	1:15-1:30	0:15-2:00	
		75/25	2:30-4:00	2:25-2:55	1:20-2:25	0:45-1:20	1:40-2:00	0:40-1:10	0:09-1:40	
		50/50	0:50-1:25	1:20-1:45	0:35-1:20	0:15-0:35	0:20-0:45	0:09-0:20	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:55-2:30	1:45-1:55	1:15-1:45	0:55-1:15	0:35-1:35[7]	0:35-0:45[7]		
		75/25	0:40-1:30	1:45-2:05	1:00-1:45	0:35-1:00	0:25-1:05[7]	0:35-0:45[7]		
Below -14 to -30.5	Below 7 to -22.9	100/0	0:25-0:50	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT
- CRYOTECH POLAR GUARD II TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 2F. FAA TYPE II HOLDOVER TIME GUIDELINES FOR KILFROST ABC-K PLUS

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:15-3:45	1:00-1:40	1:50-2:00	1:00-1:25	0:20-2:00	
		75/25	1:40-2:30	0:35-1:10	1:25-2:00	0:50-1:10	0:15-2:00	
		50/50	0:35-1:05	0:07-0:15	0:20-0:30	0:10-0:15	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:30-1:05	0:50-1:25	0:25-1:00[7]	0:15-0:35[7]		
		75/25	0:25-1:25	0:35-1:05	0:20-0:55[7]	0:09-0:30[7]		
below -14 to -29	below 7 to -20.2	100/0	0:30-0:55	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- KILFROST ABC-K PLUS TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 2G. FAA TYPE II HOLDOVER TIME GUIDELINES FOR LNT SOLUTIONS P250

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:10-4:00	3:00-3:00	1:45-3:00	0:55-1:45	1:35-2:00	0:50-1:25	0:15-2:00	
		75/25	1:50-2:35	2:50-3:00	1:25-2:50	0:45-1:25	1:20-1:35	0:40-1:00	0:10-1:50	
		50/50	0:35-0:50	0:35-0:35	0:30-0:35	0:15-0:30	0:20-0:35	0:15-0:20	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:45-2:20	3:00-3:00	1:40-3:00	0:50-1:40	0:25-1:20[7]	0:25-0:35[7]		
		75/25	0:35-1:45	2:50-3:00	1:25-2:50	0:45-1:25	0:20-1:15[7]	0:20-0:30[7]		
Below -14 to LOUT	Below 7 to LOUT	100/0	0:20-0:50	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT
- LNT SOLUTIONS P250 TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 2H. FAA TYPE II HOLDOVER TIME GUIDELINES FOR NEWAVE AEROCHEMICAL FCY-2

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	1:15-2:25	0:30-0:55	0:35-1:05	0:25-0:35	0:08-0:45	
		75/25	0:50-1:30	0:20-0:40	0:25-0:45	0:15-0:25	0:05-0:25	
		50/50	0:25-0:35	0:15-0:25	0:10-0:20	0:07-0:10	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:45-1:30	0:15-0:30	0:20-0:45[7]	0:15-0:20[7]		
		75/25	0:30-1:05	0:10-0:20	0:15-0:30[7]	0:08-0:15[7]		
below -14 to -28	below 7 to -18.4	100/0	0:25-0:35	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- NEWAVE AEROCHEMICAL FCY-2 TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 3. FAA HOLDOVER TIME GUIDELINES FOR SAE TYPE III FLUIDS[1]

Outside Air Temperature[2]		Approximate Holdover Times Under Various Weather Conditions (hours: minutes)								
Degrees Celsius	Degrees Fahrenheit	Type III Fluid Concentration Neat Fluid/Water (Volume %/Volume %)	Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[3]			Freezing Drizzle[5]	Light Freezing Rain	Rain on Cold Soaked Wing[6]	Other[7]
				Very Light[4]	Light[4]	Moderate				
-3 and above	27 and above	100/0	0:20-0:40	0:35-0:40	0:20-0:35	0:10-0:20	0:10-0:20	0:08-0:10	0:06-0:20	
		75/25	0:15-0:30	0:25-0:35	0:15-0:25	0:08-0:15	0:08-0:15	0:06-0:10	0:02-0:10	
		50/50	0:10-0:20	0:15-0:20	0:08-0:15	0:04-0:08	0:05-0:09	0:04-0:06	CAUTION: No holdover time guidelines exist	
below -3 to -10	below 27 to 14	100/0	0:20-0:40	0:30-0:35	0:15-0:30	0:09-0:15	0:10-0:20	0:08-0:10		
		75/25[8]	0:15-0:30	0:25-0:30	0:10-0:25	0:07-0:10	0:09-0:12	0:06-0:09		
below -10	below 14	100/0	0:20-0:40	0:30-0:35	0:15-0:30	0:08-0:15				

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

1 Fluid must be applied unheated to use these holdover times. No holdover times exist for Type III fluid applied heated.
2 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type III fluid cannot be used.
3 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
4 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
5 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
6 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
7 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 9 provides allowance times for ice pellets and small hail).
8 For aircraft with rotation speeds less than 100 knots, these holdover times only apply to outside air temperatures of -9 °C (15.8 °F) and above.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST WILL REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE III FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4. FAA HOLDOVER TIME GUIDELINES FOR SAE TYPE IV FLUIDS

Outside Air Temperature[1]		Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	1:50-2:55	0:35-1:10	0:50-1:30	0:35-0:55	0:10-1:15	
		75/25	1:05-1:45	0:30-0:55	0:45-1:10	0:30-0:45	0:09-0:50	
		50/50	0:20-0:35	0:07-0:15	0:15-0:20	0:08-0:10	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:20-1:20	0:25-0:50	0:20-1:00[7]	0:10-0:25[7]		
		75/25[8]	0:25-0:50	0:20-0:40	0:15-1:05[7]	0:10-0:25[7]		
below -14 to -25 or LOUT	below 7 to -13 or LOUT	100/0[9]	0:15-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).
8 For Cryotech Polar Guard temperature is limited to -5.5 °C (22 °F).
9 For Cryotech Polar Guard and Clariant Max Flight 04, temperature is limited to -23.5 °C (-10.3 °F). If the fluid specific brand is unknown, all of the temperature limitations in this and the preceding note apply.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4A. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR ABAX AD-480

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:00-3:30	0:40-1:20	0:50-1:30	0:35-0:55	0:15-1:35	
		75/25	1:30-2:45	0:30-1:05	0:50-1:15	0:30-0:45	0:10-1:15	
		50/50	0:30-0:45	0:09-0:20	0:15-0:25	0:09-0:15	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:20-1:20	0:30-0:55	0:25-1:20[7]	0:15-0:30[7]		
		75/25	0:25-0:50	0:20-0:45	0:25-1:05[7]	0:15-0:30[7]		
below -14 to -26	below 7 to -14.8	100/0	0:15-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- ABAX AD-480 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4B. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR ABAX ECOWING AD-49

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	3:20-4:00	2:50-3:00	1:50-2:50	1:10-1:50	1:25-2:00	1:00-1:25	0:10-1:55	
		75/25	2:25-4:00	2:05-2:15	1:40-2:05	1:20-1:40	1:55-2:00	0:50-1:30	0:10-1:40	
		50/50	0:25-0:50	0:40-0:45	0:25-0:40	0:15-0:25	0:15-0:30	0:10-0:15	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:20-1:35	2:50-3:00	1:50-2:50	1:10-1:50	0:25-1:25[7]	0:20-0:25[7]		
		75/25	0:30-1:10	2:05-2:15	1:40-2:05	1:20-1:40	0:15-1:05[7]	0:15-0:25[7]		
below -14 to -26	below 7 to -14.8	100/0	0:25-0:40	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- ABAX ECOWING AD-49 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4C. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR CLARIANT MAX FLIGHT 04

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:40-4:00	3:00-3:00	2:45-3:00	1:25-2:45	2:00-2:00	1:10-1:30	0:20-2:00	
		75/25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		50/50	N/A	N/A	N/A	N/A	N/A	N/A	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:50-2:30	2:20-2:50	1:10-2:20	0:35-1:10	0:25-1:30[7]	0:20-0:40[7]		
		75/25	N/A	N/A	N/A	N/A	N/A	N/A		
below -14 to -23.5	below 7 to -10.3	100/0	0:20-0:45	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CLARIANT MAX FLIGHT 04 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4D. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR CLARIANT MAX FLIGHT SNEG

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:25-4:00	2:45-3:00	1:40-2:45	1:05-1:40	2:00-2:00	0:50-1:40	0:20-1:30	
		75/25	4:00-4:00	2:25-2:50	1:30-2:25	0:55-1:30	1:30-2:00	1:05-1:20	0:15-1:45	
		50/50	1:30-3:30	1:45-2:20	0:45-1:45	0:20-0:45	0:35-1:10	0:15-0:30	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:45-2:20	2:00-2:20	1:15-2:00	0:45-1:15	0:30-1:25[7]	0:25-0:40[7]		
		75/25	0:30-1:25	1:40-2:00	1:00-1:40	0:40-1:00	0:20-1:05[7]	0:20-0:40[7]		
below -14 to -29	below 7 to -20.2	100/0	0:20-0:50	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CLARIANT MAX FLIGHT SNEG TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4E. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR CLARIANT SAFEWING MP IV LAUNCH

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	4:00-4:00	2:50-3:00	1:45-2:50	1:05-1:45	1:30-2:00	1:00-1:40	0:15-1:40	
		75/25	3:40-4:00	3:00-3:00	1:45-3:00	1:00-1:45	1:40-2:00	0:45-1:15	0:10-1:45	
		50/50	1:25-2:45	1:25-1:40	0:45-1:25	0:25-0:45	0:30-0:50	0:20-0:25	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	1:00-1:55	2:10-2:30	1:20-2:10	0:50-1:20	0:35-1:40[7]	0:25-0:45[7]		
		75/25	0:40-1:20	2:25-2:55	1:25-2:25	0:45-1:25	0:25-1:10[7]	0:25-0:45[7]		
below -14 to -28.5	below 7 to -19.3	100/0	0:30-0:50	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CLARIANT SAFEWING MP IV LAUNCH TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4F. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR CLARIANT SAFEWING MP IV LAUNCH PLUS

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	3:55-4:00	3:00-3:00	2:05-3:00	0:55-2:05	2:00-2:00	1:00-2:00	0:20-2:00	
		75/25	3:55-4:00	3:00-3:00	1:55-3:00	0:50-1:55	2:00-2:00	1:20-1:25	0:20-1:50	
		50/50	1:15-1:50	1:35-2:00	0:45-1:35	0:20-0:45	0:25-1:00	0:15-0:20	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:55-2:15	3:00-3:00	1:25-3:00	0:40-1:25	0:25-1:35[7]	0:25-0:40[7]		
		75/25	0:40-2:00	2:55-3:00	1:15-2:55	0:30-1:15	0:20-1:05[7]	0:20-0:30[7]		
below -14 to -29	below 7 to -20.2	100/0	0:25-0:50	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CLARIANT SAFEWING MP IV LAUNCH PLUS TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4G. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR CRYOTECH POLAR GUARD

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:15-3:30	0:50-1:30	1:15-2:00	0:50-1:15	0:15-1:25	
		75/25	1:40-2:40	0:35-1:10	1:05-1:25	0:35-1:00	0:10-1:15	
		50/50	0:25-0:40	0:10-0:15	0:15-0:25	0:10-0:15	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:45-1:45	0:30-0:55	0:25-1:10[7]	0:15-0:35[7]		
		75/25[8]	0:35-1:30[8]	0:20-0:40[8]	0:25-1:05[8]	0:20-0:30[8]		
Below -14 to -23.5	Below 7 to -10.3	100/0	0:20-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).
8 Temperature is limited to -5.5 °C (22 °F) when using 75/25 dilution of this fluid.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CRYOTECH POLAR GUARD TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4H. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR CRYOTECH POLAR GUARD ADVANCE

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:50-4:00	2:35-2:50	1:50-2:35	1:20-1:50	1:35-2:00	1:15-1:30	0:15-2:00	
		75/25	2:30-4:00	2:25-2:55	1:20-2:25	0:45-1:20	1:40-2:00	0:40-1:10	0:09-1:40	
		50/50	0:50-1:25	1:20-1:45	0:35-1:20	0:15-0:35	0:20-0:45	0:09-0:20	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:55-2:30	1:45-1:55	1:15-1:45	0:55-1:15	0:35-1:35[7]	0:35-0:45[7]		
		75/25	0:40-1:30	1:45-2:05	1:00-1:45	0:35-1:00	0:25-1:05[7]	0:35-0:45[7]		
Below -14 to -30.5	Below 7 to -22.9	100/0	0:25-0:50	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CRYOTECH POLAR GUARD ADVANCE TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4I. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR DOW CHEMICAL UCAR™ ENDURANCE EG106

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:05-3:10	2:45-3:00	1:20-2:45	0:40-1:20	1:10-2:00	0:50-1:15	0:20-2:00	
		75/25	N/A	N/A	N/A	N/A	N/A	N/A	CAUTION: No holdover time guidelines exist	
		50/50	N/A	N/A	N/A	N/A	N/A	N/A		
below -3 to -14	below 27 to 7	100/0	1:50-3:20	2:10-2:45	1:05-2:10	0:30-1:05	0:55-1:50[7]	0:45-1:10[7]		
		75/25	N/A	N/A	N/A	N/A	N/A	N/A		
below -14 to -27	below 7 to -16.6	100/0	0:30-1:05	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- DOW CHEMICAL UCAR ENDURANCE EG106 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4J. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR DOW CHEMICAL UCAR™ FLIGHTGUARD AD-480

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:00-3:30	0:40-1:20	0:50-1:30	0:35-0:55	0:15-1:35	
		75/25	1:30-2:45	0:30-1:05	0:50-1:15	0:30-0:45	0:10-1:15	
		50/50	0:30-0:45	0:09-0:20	0:15-0:25	0:09-0:15	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:20-1:20	0:30-0:55	0:25-1:20[7]	0:15-0:30[7]		
		75/25	0:25-0:50	0:20-0:45	0:25-1:05[7]	0:15-0:30[7]		
below -14 to -26	below 7 to -14.8	100/0	0:15-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- DOW CHEMICAL UCAR FLIGHTGUARD AD-480 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4K. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR DOW CHEMICAL UCAR™ FLIGHTGUARD AD-49

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	3:20-4:00	2:50-3:00	1:50-2:50	1:10-1:50	1:25-2:00	1:00-1:25	0:10-1:55	
		75/25	2:25-4:00	2:05-2:15	1:40-2:05	1:20-1:40	1:55-2:00	0:50-1:30	0:10-1:40	
		50/50	0:25-0:50	0:40-0:45	0:25-0:40	0:15-0:25	0:15-0:30	0:10-0:15	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:20-1:35	2:50-3:00	1:50-2:50	1:10-1:50	0:25-1:25[7]	0:20-0:25[7]		
		75/25	0:30-1:10	2:05-2:15	1:40-2:05	1:20-1:40	0:15-:1:05[7]	0:15-0:25[7]		
below -14 to -26	below 7 to -14.8	100/0	0:25-0:40	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- DOW CHEMICAL UCAR FLIGHTGUARD AD-49 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4L. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR KILFROST ABC-S

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:35-4:00	1:00-1:40	1:20-1:50	1:00-1:25	0:20-1:15	
		75/25	1:05-1:45	0:30-0:55	0:45-1:10	0:35-0:50	0:10-0:50	
		50/50	0:20-0:35	0:07-0:15	0:15-0:20	0:08-0:10	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:45-2:05	0:45-1:20	0:20-1:00[7]	0:10-0:30[7]		
		75/25	0:25-1:00	0:25-0:50	0:20-1:10[7]	0:10-0:35[7]		
below -14 to -28	below 7 to -18.4	100/0	0:20-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- KILFROST ABC-S TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4M. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR KILFROST ABC-S PLUS

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:10-4:00	3:00-3:00	2:05-3:00	1:15-2:05	1:50-2:00	1:05-2:00	0:25-2:00	
		75/25	1:25-2:40	2:05-2:25	1:15-2:05	0:45-1:15	1:00-1:20	0:30-0:50	0:10-1:20	
		50/50	0:30-0:55	1:00-1:10	0:30-1:00	0:15-0:30	0:15-0:40	0:15-0:20	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:55-3:30	2:55-3:00	1:45-2:55	1:00-1:45	0:25-1:35[7]	0:20-0:30[7]		
		75/25	0:45-1:50	1:45-2:00	1:00-1:45	0:35-1:00	0:20-1:10[7]	0:15-0:25[7]		
below -14 to -28	below 7 to -18.4	100/0	0:40-1:00	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- KILFROST ABC-S PLUS TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4N. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR LNT SOLUTIONS E450

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	1:50-2:55	0:35-1:10	1:35-2:00	0:55-1:20	0:25-2:00	
		75/25	N/A	N/A	N/A	N/A	N/A	
		50/50	N/A	N/A	N/A	N/A	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	1:30-3:55	0:25-0:50	1:45-2:00[7]	1:05-1:40[7]		
		75/25	N/A	N/A	N/A	N/A		
below -14 to LOUT	below 7 to LOUT	100/0	0:35-1:05	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- LNT SOLUTIONS E450 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 4O. FAA TYPE IV HOLDOVER TIME GUIDELINES FOR NEWAVE AEROCHEMICAL FCY 9311

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	1:55-4:00	2:20-2:55	1:10-2:20	0:35-1:10	1:10-2:00	0:40-1:05	0:15-1:25	
		75/25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		50/50	N/A	N/A	N/A	N/A	N/A	N/A	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:35-2:05	1:35-2:00	0:50-1:35	0:25-0:50	0:35-1:20[7]	0:20-0:35[7]		
		75/25	N/A	N/A	N/A	N/A	N/A	N/A		
below -14 to -29.5	below 7 to -21.1	100/0	0:30-0:55	0:40-0:50	0:30-0:40	0:15-0:30				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10 provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- NEWAVE AEROCHEMICAL FCY 9311 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 5. FAA GUIDELINES FOR THE APPLICATION OF SAE TYPE II, TYPE III, AND TYPE IV FLUID MIXTURES MINIMUM CONCENTRATIONS AS A FUNCTION OF OUTSIDE AIR TEMPERATURE (CONCENTRATIONS IN % VOLUME)

Outside Air Temperature (OAT)	One-step Procedure Deicing/Anti-icing[1]	Two-step Procedure	
		First step: Deicing	Second step: Anti-icing[1,2]
-3 °C (27 °F) and above	50/50 Heated[3] Types II, III or IV	Heated water or a heated mix of Type I, II, III or IV, and water	50/50 Type II, III, or IV
Below -3 °C (27 °F) to -14 °C (7 °F)	75/25 Heated[3] Types II, III or IV	Heated suitable mix of Type I, II, III or IV, and water with a freezing point not more than 3 °C (5 °F) above actual OAT	75/25 Type II, III, or IV
below -14 °C (7 °F) to -25 °C (-13 °F)	100/0 Heated[3] Types II, III or IV	Heated suitable mix of Type I, II, III or IV, and water with a freezing point not more than 3 °C (5 °F) above actual OAT	100/0 Type II, III, or IV
Below -25 °C (-13 °F)	**SAE Type II/IV** fluid may be used below -25 °C (-13 °F) provided that the OAT is at or above the LOUT. **SAE Type III fluid** may be used below -10 °C (14 °F) provided that the OAT is at or above the LOUT. Consider the use of **SAE Type I** (Table 1A) when **Type II, III, or IV** fluid cannot be used.		

1) Fluids must only be used at temperatures above their lowest operational use temperature (LOUT).

2) To be applied before first step fluid freezes, typically within 3 minutes. (This time may be higher than 3 minutes in some conditions, but potentially lower in heavy precipitation, in colder temperatures, or for critical surfaces constructed of composite materials. If necessary, the second step shall be applied area by area.

3) Clean aircraft may be anti-iced with unheated Type II, III, or IV fluid.

NOTES:

- For heated fluids, a fluid temperature not less than 60 °C (140 °F) at the nozzle is desirable. Upper temperature limit shall not exceed fluid and aircraft manufacturer's recommendations.
- The lowest operational use temperature (LOUT) for a given Type II, III, or IV fluid is the higher of:
  a) The lowest temperature at which the fluid meets the aerodynamic acceptance test for a given aircraft type, or
  b) The actual freezing point of the fluid plus a freezing point buffer of 7 °C (13 °F).

CAUTIONS:

- Wing skin temperatures may differ and in some cases may be lower than OAT. A stronger mix (more glycol) can be used under these conditions.
- As fluid freezing may occur, 50/50 Types II, III, or IV fluid shall not be used for the anti-icing step of a cold-soaked wing as indicated by frost or ice on the lower surface of the wing in the area of the fuel tank.
- An insufficient amount of anti-icing fluid, especially in the second step of a two-step procedure, may cause a substantial loss of holdover time, particularly when using a Type I fluid mixture for the first step (deicing) of a two-step procedure.
- Repeated deicing/anti-icing with heated thickened fluids without the frequent use of Type I fluid/water mixtures for deicing can lead to the buildup of residue which can re-hydrate and freeze on control surfaces, hinges, and associated actuators during flight and restrict movement of these devices, leading to an unsafe condition. If repeated deicing/anti-icing with heated thickened fluids occurs, periodic inspections and removal of residue in accordance with the aircraft manufacturer's instructions and procedures should be followed.

TABLE 6. LOWEST ON-WING VISCOSITY VALUES FOR DE/ANTI-ICING FLUIDS

(See Page 42 for Table 6 Notes)

FLUID NAME	FLUID DILUTION	LOWEST ON-WING VISCOSITY[1,2] (mPa.s)	
		MANUFACTURER METHOD	AIR 9968 METHOD
Type II De/Anti-Icing Fluids			
ABAX Ecowing 26	100/0	4 900 (h)	4 600 (a)
	75/25	2 200 (a)	2 200 (a)
	50/50	50 (a)	50 (a)
Aviation Shaanxi Hi-Tech Cleanwing II	100/0	4 650 (e)	4 500 (a)
	75/25	9 450 (e)	10 000 (a)
	50/50	10 150 (e)	10 200 (a)
Clariant Safewing MP II FLIGHT	100/0	3 340 (a)	3 340 (a)
	75/25	12 900 (c)	12 900 (c)
	50/50	11 500 (a)	11 500 (a)
Clariant Safewing MP II FLIGHT PLUS	100/0	3,650 (n)	3 100 (a)
	75/25	12,400 (n)	10 450 (a)
	50/50	7,800 (n)	7 050 (a)
Clariant Safewing MP II 1951	100/0	2 500 (g)	2 750 (a)
	75/25	2 900 (g)	3 000 (a)
	50/50	50 (g)	50 (a)
Cryotech Polar Guard II	100/0	4 400 (f)	4 050 (a)
	75/25	11 600 (f)	9 750 (a)
	50/50	80 (a)	80 (a)
Kilfrost ABC-3	100/0	2 500 (e)	2 500 (a)
	75/25	2 000 (e)	2 000 (a)
	50/50	400 (e)	400 (a)
Kilfrost ABC-K Plus	100/0	2 850 (e)	2 640 (a)
	75/25	12 650 (e)	12 650 (c)
	50/50	4 200 (e)	5 260 (a)
LNT Solutions P250	100/0	2 400 (dd)	2 150 (a)
	75/25	16 200 (dd)	15 200 (a)
	50/50	8 150 (dd)	8 100 (a)
Newave Aerochemical FCY-2	100/0	7 000 (e)	8 920 (a)
	75/25	18 550 (e)	18 550 (e)
	50/50	6 750 (e)	7 030 (a)
Type III De/Anti-Icing Fluids			
Clariant Safewing MP III 2031 ECO	100/0	120 (m)	Not Applicable
	75/25	55 (m)	Not Applicable
	50/50	10 (m)	Not Applicable
Type IV De/Anti-Icing Fluids			
ABAX AD-480	100/0	15 200 (h)	12 800 (d)
	75/25	16 000 (h)	12 400 (d)
	50/50	4 000 (h)	3 800 (a)
ABAX Ecowing AD-49	100/0	12 150 (i)	11 000 (a)
	75/25	30 700 (i)	32 350 (c)
	50/50	19 450 (i)	21 150 (c)
See next page for additional Type IV Fluids			

TABLE 6. LOWEST ON-WING VISCOSITY VALUES FOR DE/ANTI-ICING FLUIDS (CONT'D)

(See Page 42 for Table 6 Notes)

FLUID NAME	FLUID DILUTION	LOWEST ON-WING VISCOSITY[1,2] (mPa.s)	
		MANUFACTURER METHOD	AIR 9968 METHOD
Type IV De/Anti-Icing Fluids (cont'd)			
Clariant Max Flight 04	100/0	5 540 (b)	5 540 (a)
	75/25	Dilution Not Applicable	Dilution Not Applicable
	50/50	Dilution Not Applicable	Dilution Not Applicable
Clariant Max Flight Sneg	100/0	8 700 (o)	8 050 (a)
	75/25	20 200 (p)	21 800 (c)
	50/50	13 600(p)	15 000 (c)
Clariant Safewing MP IV LAUNCH	100/0	7 550 (a)	7 550 (a)
	75/25	18 000 (a)	18 000 (a)
	50/50	17 800 (a)	17 800 (a)
Clariant Safewing MP IV LAUNCH PLUS	100/0	8,700 (o)	8,450 (a)
	75/25	18,800 (p)	17,200 (c)
	50/50	9,700 (o)	12,150 (a)
Cryotech Polar Guard	100/0	32 100 (k)	36 300 (c)
	75/25	24 200 (k)	27 800 (c)
	50/50	6 200 (k)	7 500 (a)
Cryotech Polar Guard Advance	100/0	4 400 (f)	4 050 (a)
	75/25	11 600 (f)	9 750 (a)
	50/50	80 (a)	80 (a)
Dow UCAR™ Endurance EG106	100/0	24 850 (j)	2 230 (a)
	75/25	Dilution Not Applicable	Dilution Not Applicable
	50/50	Dilution Not Applicable	Dilution Not Applicable
Dow UCAR™ FlightGuard AD-480	100/0	15 200 (h)	12 800 (d)
	75/25	16 000 (h)	12 400 (d)
	50/50	4 000 (h)	3 800 (a)
Dow UCAR™ FlightGuard AD-49	100/0	12 150 (i)	11 000 (a)
	75/25	30 700 (i)	32 350 (c)
	50/50	19 450 (i)	21 150 (c)
Kilfrost ABC-S	100/0	17 000 (e)	17 000 (c)
	75/25	12 000 (e)	12 000 (c)
	50/50	2 000 (e)	2 000 (a)
Kilfrost ABC-S Plus	100/0	17 900 (e)	17 900 (c)
	75/25	18 300 (e)	18 300 (c)
	50/50	7 500 (e)	7 500 (a)
LNT Solutions E450	100/0	45 300 (l)	Not Available[3]
	75/25	Dilution Not Applicable	Dilution Not Applicable
	50/50	Dilution Not Applicable	Dilution Not Applicable
Newave Aerochemical FCY 9311	100/0	14 100 (c)	14 100 (c)
	75/25	Dilution Not Applicable	Dilution Not Applicable
	50/50	Dilution Not Applicable	Dilution Not Applicable

TABLE 6. LOWEST ON-WING VISCOSITY VALUES FOR DE/ANTI-ICING FLUIDS (CONT'D) (Table 6 Notes)

NOTES

1 Significance of this Table: The viscosity values in this table are those of the fluids provided by the manufacturers for holdover time testing. For the holdover time guidelines to be valid, the viscosity of the fluid on the wing shall not be lower than that listed in this table. The user should periodically ensure that the viscosity value of a fluid sample taken from the wing surface is not lower than that listed.

2 The Aerospace Information Report (AIR) 9968 viscosity method should only be used for field verification and auditing purposes; when in doubt as to which method is appropriate, use the manufacturer method. Viscosity measurement methods are indicated as letters (in parentheses) beside each viscosity value. Details of each measurement method are shown in the table below. The exact measurement method (spindle, container, fluid volume, temperature, speed, duration) must be used to compare the viscosity of a sample to a viscosity given in this table.

3 Measurements using the AIR 9968 method do not provide stable, reliable results. Use the manufacturer method to evaluate the viscosity of this fluid.

Method	Brookfield Spindle	Container	Fluid Volume	Temp.	Speed	Duration
a	LV1 (with guard leg)	600 mL low form (Griffin) beaker	575 mL*	20°C	0.3 rpm	10 minutes 0 seconds
b	LV1 (with guard leg)	600 mL low form (Griffin) beaker	575 mL*	20°C	0.3 rpm	33 minutes 20 seconds
c	LV2-disc (with guard leg)	600 mL low form (Griffin) beaker	425 mL*	20°C	0.3 rpm	10 minutes 0 seconds
d	LV2-disc (with guard leg)	250 mL tall form (Berzelius) beaker	200 mL*	20°C	0.3 rpm	10 minutes 0 seconds
dd	LV2-disc (with guard leg)	200 mL tall form (Berzelius) beaker	155 mL*	20°C	0.3 rpm	10 minutes 0 seconds
e	LV2-disc (with guard leg)	150 mL tall form (Berzelius) beaker	135 mL*	20°C	0.3 rpm	10 minutes 0 seconds
f	SC4-34/13R	small sample adapter	10 mL	20°C	0.3 rpm	10 minutes 0 seconds
g	SC4-34/13R	small sample adapter	10 mL	20°C	0.3 rpm	15 minutes 0 seconds
h	SC4-34/13R	small sample adapter	10 mL	20°C	0.3 rpm	30 minutes 0 seconds
i	SC4-31/13R	small sample adapter	10 mL	20°C	0.3 rpm	10 minutes 0 seconds
j	SC4-31/13R	small sample adapter	10 mL	0°C	0.3 rpm	10 minutes 0 seconds
k	SC4-31/13R	small sample adapter	9 mL	20°C	0.3 rpm	10 minutes 0 seconds
l	SC4-31/13R	small sample adapter	9 mL	0°C	0.3 rpm	10 minutes 0 seconds
m	LV0	UL adapter	16 mL	20°C	0.3 rpm	10 minutes 0 seconds
n	LV1	big sample adapter	50 mL	20°C	0.3 rpm	10 minutes 0 seconds
o	LV1	big sample adapter	55 mL	20°C	0.3 rpm	10 minutes 0 seconds
p	LV2-disc	big sample adapter	60 mL	20°C	0.3 rpm	10 minutes 0 seconds

*If necessary, adjust fluid volume to ensure fluid is level with notch on the spindle shaft

TABLE 7. LOWEST OPERATIONAL USE TEMPERATURES OF ANTI-ICING FLUIDS (2014-15)

(See Page 48 for Table 7 Notes and Cautions)

Table 7-1: Type I Anti-Icing Fluids				
Fluid Name	Lowest Operational Use Temperatures with Dilution Per Cent Fluid/Water at LOUT in Parenthesis[1]			
	Low Speed Aerodynamic Test[2]		High Speed Aerodynamic Test[2]	
	Degrees Celsius	Degrees Fahrenheit	Degrees Celsius	Degrees Fahrenheit
ABAX DE-950	-26 (71/29)	-14.8 (71/29)	-31 (71/29)	-23.8(71/29)
ABAX DE-950 Colorless	Not tested[4]	Not tested[4]	-24 (60/40)	-11.2 (60/40)
AllClear Systems LLC Lift-Off P-88	-24.5 (70/30)	-12.1 (70/30)	-29.5 (70/30)	-21.1 for 70/30
AllClear Systems LLC Lift-Off E-188	-40 (70/30)	-40 (70/30)	-41.5 (70/30)	-42.7 (70/30)
Arcton Arctica DG ready-to-use	-26 as supplied	-14.8 as supplied	-26 as supplied	-14.8 as supplied
Arcton Arctica DG 91 Concentrate	-25 (75/25)	-13 (75/25)	-25 (75/25)	-13 (75/25)
Aviation Shaanxi Hi-Tech Cleanwing I	Not tested[4]	Not tested[4]	-39.5 (75/25)	-39.1 (75/25)
Aviation Xi'an Hi-Tech KHF-1	Not available[3]	Not available[3]	-38.5 (75/25)	-37.3 (75/25)
Baltic Ground Services DEFROSOL ADF	-25 (65/35)	-13 (65/35)	-30 (65/35	-22 (65/35)
Beijing Phoenix Air Traffic CBSX-1	Not available[3]	Not available[3]	Not available[3]	Not available[3]
Beijing Wangye Aviation Chemical KLA-1	Not available[3]	Not available[3]	-30.5 (60/40)	-22.9 (60/40)
Beijing Yadilite Aviation Chemical Product Co. Ltd YD-101 Type I	Not tested[4]	Not tested[4]	-30 (60/40)	-22 (60/40)
CHEMCO CHEMR EG I	-30 (75/25)	-22 (75/25)	-40 (75/25)	-40 (75/25)
CHEMCO CHEMR REG I	Not available[3]	Not available[3]	-40.5 (75/25)	-40.9 (75/25
Clariant EcoFlo Concentrate	Not tested[4]	Not tested[4]	-30.5 (65/35)	-22.9 (65/35)
Clariant EcoFlo 2 Concentrate	Not tested[4]	Not tested[4]	-29 (65/35)	-20.2 (65/35)
Clariant Octaflo EF Concentrate	-25 (65/35)	-13 (65/35)	-33 (65/35)	-27.4 (65/35)
Clariant Octaflo EF-80	-25 (70/30)	-13 (70/30)	-33 (70/30)	-27.4 (70/30)
Clariant Octaflo EG Concentrate	-40.5 (70/30)	-40.9 (70/30)	-44 (70/30)	-47.2 (70/30)
Clariant Octaflo Loyd	-40 (70/30)	-40 (70/30)	-45.5 (70/30)	-49.9 (70/30)
Clariant Safewing EG I 1996	-35.5 (75/25)	-31.9 (75/25)	-43 (75/25)	-45.4 (75/25)
Clariant Safewing EG I 1996 (88)	-39.5 (70/30)	-39.1 (70/30)	-41.5 (70/30)	-42.7 (70/30)
Clariant Safewing MP I 1938 ECO	-25.5 (65/35)	-13.9 (65/35)	-32 (65/35)	-25.6 (65/35)
Clariant Safewing MP I 1938 ECO (80)	-25 (71/29)	-13 (71/29)	-32.5 (71/29)	-26.5 (71/29)
Clariant Safewing MP I 1938 ECO (80) Premix 55% i.g. ready-to-use	Not tested[4]	Not tested[4]	-19 as supplied	-2.2 as supplied
Clariant Safewing MP I ECO PLUS (80)	-25 (71/29)	-13 (71/29)	-33 (71/29)	-27.4 (71/29)
See next page for additional Type I Fluids				

TABLE 7. LOWEST OPERATIONAL USE TEMPERATURES OF ANTI-ICING FLUIDS (CONT'D)

(See Page 48 for Table 7 Notes and Cautions)

Table 7-1: Type I Anti-Icing Fluids (continued)

FLUID NAME	LOWEST OPERATIONAL USE TEMPERATURES WITH DILUTION PER CENT FLUID/WATER AT LOUT IN PARENTHESIS[1]			
	LOW SPEED AERODYNAMIC TEST[2]		HIGH SPEED AERODYNAMIC TEST[2]	
	DEGREES CELSIUS	DEGREES FAHRENHEIT	DEGREES CELSIUS	DEGREES FAHRENHEIT
Cryotech Polar Plus® Concentrate	-27 (63/37)	-16.6 (63/37)	-32 (63/37)	-25.6 (63/37)
Cryotech Polar Plus® LT	-27 (63/37)	-16.6 (63/37)	-33 (63/37)	-27.4 (63/37)
Cryotech Polar Plus® (80)	-24.5 (70/30)	-12.1 (70/30)	-32.5 (70/30)	-26.5 (70/30)
Deicing Solutions LLC Safetemp® ES Plus	-25.5 (65/35)	-13.9 (65/35)	-29 (65/35)	-20.2 (65/35)
Dow UCAR™ ADF XL54	-33 as supplied	-27.4 as supplied	-33 as supplied	-27.4 as supplied
Dow UCAR™ Aircraft Deicing Fluid Concentrate	-36.5 (75/25)	-33.7 (75/25)	-45 (75/25)	-49 (75/25)
Dow UCAR™ PG ADF Dilute 55/45	-24 as supplied	-11.2 as supplied	-25 as supplied	-13 as supplied
Dow UCAR™ PG Aircraft Deicing Fluid Concentrate	-25 (65/35)	-13 (65/35)	-32 (65/35)	-25.6 (65/35)
Heilongjiang Hangjie Aero-chemical *(formerly Harbin Aeroclean Aviation)* HJF-1	Not tested[4]	Not tested[4]	-42 (65/35)	-43.6 (65/35)
HOC SafeTemp® ES Plus	-25.5 (65/35)	-13.9 (65/35)	-29 (65/35)	-20.2 (65/35)
Hokkaido Fever Snow AG	-21.5 as supplied	-6.7 as supplied	-23 as supplied	-9.4 as supplied
Inland Technologies Duragly-E Concentrate	-26 (60/40)	-14.8 (60/40)	-26 (60/40)	-14.8 (60/40)
Inland Technologies Duragly-P Concentrate	-25 (60/40)	-13 (60/40)	-25 (60/40)	-13 (60/40)
Kilfrost DF Plus	-25.5 (69/31)	-13.9 (69/31)	-32 (69/31)	-25.6 (69/31)
Kilfrost DF Plus (80)	-26 (69/31)	-14.8 (69/31)	-31.5 (69/31)	-24.7 (69/31)
Kilfrost DF Plus (88)	-26.5 (69/31)	-15.7 (69/31)	-32 (63/37)	-25.6 (63/37)
Kilfrost DF^{sustain}™	-34 (68/32)	-29.2 (68/32)	-41 (68/32)	-43 (68/32)
LNT Solutions E188	-30.5 (70/30)	-22.9 (70/30)	-41 (70/30)	-41.8 (70/30)
LNT Solutions P180	-26 (69/31)	-14.8 (69/31)	-32 (69/31)	-25.6 (70/30)
LNT Solutions P188	-24.5 (70/30)	-12.1 (70/30)	-31.5 (70/30)	-24.7 (70/30)
Newave FCY-1A	-40 (75/25)	-40 (75/25)	-40 (75/25)	-40 (75/25)
Newave FCY-1Bio^{+}	Not tested[4]	Not tested[4]	-40.5 (75/25)	-40.9 (75/25
Shanxi Cleanway Cleansurface I	-32.5 (75/25)[5]	-26.5 (75/25)[5]	-40.5 (75/25)	-40.9 (75/25)
Shanxi Cleanway Cleansurface I-BIO	Not tested[4]	Not tested[4]	-37 (75/25)	-34.6 (75/25)

TABLE 7. LOWEST OPERATIONAL USE TEMPERATURES OF ANTI-ICING FLUIDS (CONT'D)

(See Page 48 for Table 7 Notes and Cautions)

Table 7-2: Type II Anti-Icing Fluids			
Fluid Name	**Dilution, Neat Fluid/Water (Volume %/Volume %)**	**Lowest Operational Use Temperatures[1]**	
		High Speed Aerodynamic Test[2]	
		Degrees Celsius	**Degrees Fahrenheit**
ABAX Ecowing 26	100/0	-25	-13
	75/25	-14	7
	50/50	-3	27
Aviation Shaanxi Hi-Tech Cleanwing II	100/0	-29	-20.2
	75/25	-14	7
	50/50	-3	27
Clariant Safewing MP II 1951	100/0	-28	-18.4
	75/25	-14	7
	50/50	-3	27
Clariant Safewing MP II FLIGHT	100/0	-29	-20.2
	75/25	-14	7
	50/50	-3	27
Clariant Safewing MP II FLIGHT PLUS	100/0	-29	-20.2
	75/25	-14	7
	50/50	-3	27
Cryotech Polar Guard II	100/0	-30.5	-22.9
	75/25	-14	7
	50/50	-3	27
Kilfrost ABC-3	100/0	-27	-16.6
	75/25	-14	7
	50/50	-3	27
Kilfrost ABC-K Plus	100/0	-29	-20.2
	75/25	-14	7
	50/50	-3	27
LNT Solutions P250	100/0	Not available[3]	Not available[3]
	75/25	Not available[3]	Not available[3]
	50/50	Not available[3]	Not available[3]
Newave Aerochemical FCY-2	100/0	-28	-18.4
	75/25	-14	7
	50/50	-3	27

TABLE 7. LOWEST OPERATIONAL USE TEMPERATURES OF ANTI-ICING FLUIDS (CONT'D)

(See Page 48 for Table 7 Notes and Cautions)

Table 7-3: Type III Anti-Icing Fluids

Fluid Name	Dilution, Neat Fluid/Water (Volume %/Volume %)	Lowest Operational Use Temperatures[1]			
		Low Speed Aerodynamic Test		High Speed Aerodynamic Test[2]	
		Degrees Celsius	Degrees Fahrenheit	Degrees Celsius	Degrees Fahrenheit
Clariant Safewing MP III 2031 ECO	100/0	-16.5	2.3	-29	-20.2
	75/25	-9	15.8	-10	14
	50/50	-3	27	-3	27

Table 7-4: Type IV (100/0) Anti-Icing Fluids

Fluid Name	Dilution, Neat Fluid/Water (Volume %/Volume %)	Lowest Operational Use Temperatures[1]	
		High Speed Aerodynamic Test[2]	
		Degrees Celsius	Degrees Fahrenheit
ABAX AD-480	100/0	-26	-14.8
	75/25	-14	7
	50/50	-3	27
ABAX Ecowing AD-49	100/0	-26	-14.8
	75/25	-14	7
	50/50	-3	27
Clariant Max Flight 04	100/0	-23.5	-10.3
	75/25	Dilution not applicable	
	50/50	Dilution not applicable	
Clariant Max Flight Sneg	100/0	-29	-20.2
	75/25	-14	7
	50/50	-3	27
Clariant Safewing MP IV LAUNCH	100/0	-28.5	-19.3
	75/25	-14	7
	50/50	-3	27
Clariant Safewing MP IV LAUNCH PLUS	100/0	-29	-20.2
	75/25	-14	7
	50/50	-3	27
Cryotech Polar Guard	100/0	-23.5	-10.3
	75/25	-5.5	22.1
	50/50	-3	27

See next page for additional Type IV Fluids

TABLE 7. LOWEST OPERATIONAL USE TEMPERATURES OF ANTI-ICING FLUIDS (CONT'D)

(See Page 48 for Table 7 Notes and Cautions)

Table 7-4: Type IV (100/0) Anti-Icing Fluids (continued)			
FLUID NAME	**DILUTION, NEAT FLUID/WATER (VOLUME %/VOLUME %)**	**LOWEST OPERATIONAL USE TEMPERATURES[1]**	
		HIGH SPEED AERODYNAMIC TEST[2]	
		DEGREES CELSIUS	**DEGREES FAHRENHEIT**
Cryotech Polar Guard Advance	100/0	-30.5	-22.9
	75/25	-14	7
	50/50	-3	27
Dow UCAR™ Endurance EG106 De/Anti-Icing Fluid	100/0	-27	-16.6
	75/25	Dilution not applicable	
	50/50	Dilution not applicable	
Dow UCAR™ FlightGuard AD-480	100/0	-26	-14.8
	75/25	-14	7
	50/50	-3	27
Dow UCAR™ FlightGuard AD-49	100/0	-26	-14.8
	75/25	-14	7
	50/50	-3	27
Kilfrost ABC-S	100/0	-28	-18.4
	75/25	-14	7
	50/50	-3	27
Kilfrost ABC-S PLUS	100/0	-28	-18.4
	75/25	-14	7
	50/50	-3	27
LNT Solutions E450	100/0	Not available[3]	Not available[3]
	75/25	Dilution not applicable	
	50/50	Dilution not applicable	
Newave Aerochemical FCY 9311	100/0	-29.5	-21.1
	75/25	Dilution not applicable	
	50/50	Dilution not applicable	

TABLE 7. LOWEST OPERATIONAL USE TEMPERATURES OF ANTI-ICING FLUIDS (CONT'D)
(Table 7 Notes and Cautions)

NOTES

1. The lowest operational use temperature (LOUT) for a given fluid is the warmer of:

   a) The lowest temperature at which the fluid meets the low and/or high speed aerodynamic acceptance test; or
   b) The actual freezing point of the fluid plus its freezing point buffer of 10 °C (18 °F).

   The values in this table were provided by the fluid manufacturer and were determined using pre-production fluid samples when available. In some cases, the fluid manufacturer requested the publication of a more conservative value than the pre-production test value.

2. If uncertain whether the aircraft to be treated conforms to the low speed or the high speed aerodynamic test, consult the aircraft manufacturer. The aerodynamic test is defined in SAE AS 5900 (latest version).
3. Manufacturer had not provided LOUT information at the time of this publication.
4. Manufacturer has indicated fluid not tested.
5. Fluid was not retested for low speed aerodynamics. This data will be removed four years after the expiry of the last low speed aerodynamics test.

CAUTIONS:

- LOUT data provided in this table is based on the manufacturer's data.
- Type I fluids supplied in concentrated form must not be used in that form and must be diluted.
- For Type I fluids that are intended to be diluted, the LOUT is derived from a dilution that provides the lowest operational use temperature. For other dilutions, determine the freezing point of the fluid and add a 10 °C (18 °F) freezing point buffer, as this will usually yield a higher (warmer) and more restrictive operational use temperature. Consult the fluid manufacturer or fluid documentation for further clarification and guidance on establishing the appropriate operational use of a diluted fluid.

TABLE 8. LIST OF FLUIDS TESTED FOR ANTI-ICING PERFORMANCE AND AERODYNAMIC ACCEPTANCE (2014-2015)

(See Page 51 for Table 8 Notes)

Type I Deicing/Anti-Icing Fluids[1]

Company Name	Fluid Name
ABAX Industries	DE-950
ABAX Industries	DE-950 Colorless
AllClear Systems LLC	Lift-Off P-88
AllClear Systems LLC	Lift-Off E-188
Arcton Ltd.	Arctica DG Ready to Use
Arcton Ltd.	Arctica DG 91 Concentrate
Aviation Shaanxi High-Tech Physical Co. Ltd.	Cleanwing I
Aviation Xi'an High-Tech	KHF-1
Baltic Ground Services	DEFROSOL ADF
Beijing Phoenix Air Traffic Product Development and Trading Co.	CBSX-1
Beijing Wangye Aviation Chem. Prod. Co.	KLA-1
Beijing Yadilite Aviation Chemical Product Co. Ltd	YD-101 Type I
CHEMCO Inc.	CHEMR EG I
CHEMCO Inc.	CHEMR REG I
Clariant GmbH	EcoFlo Concentrate
Clariant GmbH	EcoFlo 2 Concentrate
Clariant GmbH	Octaflo EF Concentrate
Clariant GmbH	Octaflo EF 80
Clariant GmbH	Octaflo EG Concentrate
Clariant GmbH	Octaflo Lyod
Clariant GmbH	Safewing MP I 1938 ECO (80)
Clariant GmbH	Safewing MP I 1938 ECO (80) Premix 55% i.g. ready-to-use
Clariant GmbH	Safewing MP I 1938 ECO
Clariant GmbH	Safewing EG I 1996
Clariant GmbH	Safewing EG I 1996 (88)
Clariant GmbH	Safewing MP I ECO PLUS (80)
Cryotech Deicing Technology	Polar Plus® Concentrate
Cryotech Deicing Technology	Polar Plus® LT
Cryotech Deicing Technology	Polar Plus® (80)
Deicing Solutions LLC	Safetemp® ES Plus
Dow Chemical Company	UCAR™ ADF Concentrate
Dow Chemical Company	UCAR™ ADF XL-54
Dow Chemical Company	UCAR™ PG ADF Concentrate
Dow Chemical Company	UCAR™ PG ADF Dilute 55/45
Heilongjiang Hangjie Aero-chemical Technology Co. Ltd. *(formerly Harbin Aeroclean Aviation Tech Co. Ltd.)*	HJF-1
HOC Industries	SafeTemp® ES Plus
Hokkaido NOF Corporation	Fever Snow AG
Inland Technologies	Duragly-E Concentrate
Inland Technologies	Duragly-P Concentrate
Kilfrost	Kilfrost DF PLUS
Kilfrost	Kilfrost DF PLUS (80)
Kilfrost	Kilfrost DF PLUS (88)

TABLE 8. LIST OF FLUIDS TESTED FOR ANTI-ICING PERFORMANCE AND AERODYNAMIC ACCEPTANCE (CONT'D)

(See Page 51 for Table 8 Notes)

Type I Deicing/Anti-Icing Fluids[1] (continued)

Company Name	Fluid Name
Kilfrost	Kilfrost DF^{sustain}™
LNT Solutions	E188
LNT Solutions	P180
LNT Solutions	P188
Newave Aerochemical Co. Ltd.	FCY-1A
Newave Aerochemical Co. Ltd.	FCY-1Bio^{+}
Shanxi Cleanway Aviation Chemical Co., Ltd.	Cleansurface I
Shanxi Cleanway Aviation Chemical Co., Ltd.	Cleansurface I-BIO

Type II Deicing/Anti-Icing Fluids[2]

Company Name	Fluid Name
ABAX Industries	Ecowing 26
Aviation Shaanxi Hi-Tech Physical Chemical Co., Ltd.	Cleanwing II
Clariant GmbH	Safewing MP II 1951
Clariant GmbH	Safewing MP II FLIGHT
Clariant GmbH	Safewing MP II FLIGHT PLUS
Cryotech Deicing Technology	Polar Guard II
Kilfrost	ABC-3
Kilfrost	ABC-K PLUS
LNT Solutions	P250
Newave Aerochemical Co Ltd.	FCY-2

Type III Deicing/Anti-Icing Fluids[2]

Company Name	Fluid Name
Clariant GmbH	Safewing MP III 2031 ECO

Type IV Deicing/Anti-Icing Fluids[2]

Company Name	Fluid Name
ABAX Industries	AD-480
ABAX Industries	Ecowing AD-49
Clariant GmbH	Max Flight 04
Clariant GmbH	Max Flight Sneg
Clariant GmbH	Safewing MP IV LAUNCH
Clariant GmbH	Safewing MP IV LAUNCH PLUS
Cryotech Deicing Technology	Polar Guard
Cryotech Deicing Technology	Polar Guard Advance
Dow Chemical Company	UCAR™ Endurance EG106 De/Anti-icing Fluid
Dow Chemical Company	UCAR™ FlightGuard AD-480
Dow Chemical Company	UCAR™ FlightGuard AD-49
Kilfrost	ABC-S
Kilfrost	ABC-S Plus
LNT Solutions	E450
Newave Aerochemical	FCY 9311

TABLE 8. LIST OF FLUIDS TESTED FOR ANTI-ICING PERFORMANCE AND AERODYNAMIC ACCEPTANCE (CONT'D)
(Table 8 Notes)

NOTES

1. This table lists fluids that have been tested with respect to anti-icing performance requirements according to SAE AMS 1424, Paragraph 3.5.2 and aerodynamic performance according to SAE AMS 1424, Paragraph 3.5.3 only by the Anti-Icing Materials International Laboratory at the University of Quebec at Chicoutimi, Canada, web site: www.uqac.ca/amil. The end user is responsible for confirming that other SAE AMS 1424 technical requirement tests, such as materials compatibility, and stability, etc, have been performed by contacting the fluid manufacturer.
2. This table lists Types II, III, or IV fluids that have been tested with respect to anti-icing performance requirements according to SAE AMS 1428, Paragraph 3.2.4 and aerodynamic performance according to SAE AMS 1428, Paragraph 3.2.5 only by the Anti-Icing Materials International Laboratory at the University of Quebec at Chicoutimi, Canada, web site: www.uqac.ca/amil. The end user is responsible for confirming that other SAE AMS 1428 technical requirement tests, such as materials compatibility, and stability, etc, have been performed by contacting the fluid manufacturer.

Ice Pellet and Small Hail Allowance Times 2014-2015

1. Background

During the winter of 2006-2007, operations in ice pellets were approved for “light ice pellets” with an allowance time of 25 minutes. That time was based on limited research conducted late in the winter of 2005-2006 at the request of various industry groups. Additional and more comprehensive ice pellet research was conducted jointly by the research teams of the FAA and Transport Canada during the 2007-2008 winter season.

This research consisted of extensive climatic chamber and wind tunnel testing with ice pellets (light and moderate) and light ice pellets mixed with other forms of precipitation. Additionally, Type IV anti-icing fluid with ice pellets embedded was evaluated for its aging qualities over periods of time beyond the allowance times, when the active precipitation time was limited to the allowance times. Results of this research provide the basis for extended allowance times for operations in light ice pellets, as well as allowance times for operations in moderate ice pellets and light ice pellets mixed with other forms of precipitation. Additional ice pellet research was conducted during the winter season of 2008-2009 which further expanded the ice pellet allowance times under specified conditions. Guidance was also provided for Type IV anti-icing fluid with embedded ice pellets “aged” beyond its allowance time when the precipitation stops at or prior to the expiration of the allowance time.

During the winter of 2009-2010, wind tunnel research conducted with a newer generation type airfoil showed that Propylene Glycol (PG) and Ethylene Glycol (EG) fluids behave differently under certain temperature and ice pellet conditions. Specifically, higher aircraft rotation speeds are required to effectively remove PG fluid contaminated with light or moderate ice pellets at temperatures less than -10 °C. Therefore, there are no allowance times associated with the use of PG fluids on aircraft with rotation speeds of less than 115 knots in conditions of light or moderate ice pellets at temperatures below -10 °C.

Furthermore, research with this newer generation type airfoil has shown that the allowance times are shorter when using PG fluids under certain conditions for all aircraft regardless of the rotation speed. This research resulted in the allowance time when using PG fluids at temperatures of -5 °C and above being limited to 15 minutes in moderate ice pellets. Currently all Type IV fluids are PG based with the exception of Dow EG106 and LNT Solutions E450 which are EG based.

Research has indicated that Type IV PG fluids are removed less effectively when contaminated with moderate ice pellets at temperatures below -16°C; operations in these conditions are not recommended. Therefore, there are no allowance times associated with the use of PG fluids in conditions of moderate ice pellets at temperatures below -16°C, irrespective of aircraft rotation speed.

In 2014-15, allowance times were published for undiluted (100/0) Type III fluid applied unheated in select conditions. Further testing is required to expand Type III allowance times in other conditions, such as temperatures below -10°C. Allowance times for small hail were also added, as it was determined small hail is meteorologically equivalent to moderate ice pellets.

2. Operations in Light and Moderate Ice Pellets and Light Ice Pellets mixed with other forms of precipitation.

A. Tests have shown that ice pellets generally remain in the frozen state imbedded in Type III and Type IV anti-icing fluid, and are not absorbed by the fluid in the same manner as other forms of precipitation. Using current guidelines for determining anti-icing fluid failure, the presence of a contaminant not absorbed by the fluid (remaining imbedded) would be an indication that the fluid has failed. These imbedded ice pellets are generally not readily detectable by the human eye during pre-takeoff contamination check procedures. Therefore, a visual pre-takeoff contamination check in ice pellet conditions may not be of value and is not required.

B. The research data have also shown that after proper deicing and anti-icing, the accumulation of light ice pellets, moderate ice pellets, and ice pellets mixed with other forms of precipitation in Type III or Type IV fluid will not prevent the fluid from flowing off the aerodynamic surfaces during takeoff except as noted above. This flow-off due to the shearing forces occurs with rotation speeds consistent with Type III or Type IV anti-icing fluid recommended applications, and up to the applicable allowance time listed in Table 9 and Table 10 below. These allowance times are from the start of the Type III/IV anti-icing fluid application. Additionally, if the ice pellet condition stops, and the allowance time has not been exceeded, the operator is permitted to consider the Type III or Type IV anti-icing fluid effective without any further action up to 90 minutes after the start of the application time of the Type III or Type IV anti icing fluid, however, the OAT must remain constant or increase during the 90 minute period under the following conditions:

- light ice pellets mixed with light or moderate freezing drizzle;
- light ice pellets mixed with light freezing rain;
- light ice pellets mixed with light rain; and
- light ice pellets mixed with moderate rain.

Examples:

1) Type IV anti-icing fluid is applied with a start of application time of 10:00, OAT is 0 °C, light ice pellets fall until 10:20 and stop and do not restart. The allowance time stops at 10:50; however, provided that no precipitation restarts after the allowance time of 10:50 the aircraft may takeoff without any further action up to 11:30.

2) Type IV anti-icing fluid is applied with a start of application time of 10:00, OAT is 0 °C, light ice pellets mixed with freezing drizzle falls until 10:10 and stops and restarts at 10:15 and stops at 10:20. The allowance time stops at 10:25, however provided that the OAT remains constant or increases and that no precipitation restarts after the allowance time of 10:25, the aircraft may takeoff without any further action up to 11:30.

3) Type IV anti-icing fluid is applied with a start of application time of 10:00, OAT is 0 °C, light ice pellets mixed with light freezing rain falls until 10:10, stops and restarts at 10:15, and stops at 10:20. The allowance time stops at 10:25; however, provided that the OAT remains constant or increases and no precipitation restarts after the end of the allowance time at 10:25, the aircraft may take off without any further action until 11:30.

4) On the other hand, if Type IV anti-icing fluid is applied with a start of application time of 10:00, OAT is 0 °C, light ice pellets mixed with freezing drizzle falls until 10:10 and stops and restarts at 10:30 with the allowance time stopping at 10:25 the aircraft may not takeoff, no matter how short the time or type of precipitation after 10:25, without being deiced and anti-iced if precipitation is present.

C. Operators with a deicing program approved in accordance with Title 14 of the Code of Federal Regulations 14 CFR part 121, § 121.629, will be allowed, in the specified ice pellet and small hail conditions listed in Tables 9 and 10, up to the specific allowance time, to commence the takeoff with the following restrictions:

1) The aircraft critical surfaces must be free of contaminants before applying Type III or Type IV anti-icing fluid. If not, the aircraft must be properly deiced and checked to be free of contaminants before the application of Type III or Type IV anti-icing fluid.

2) The allowance time is valid only if the aircraft is anti-iced with undiluted Type III or Type IV fluid.

3) The Type III allowance times are only applicable for un-heated anti-icing fluid applications.

4) Due to the shearing qualities of Type III and Type IV fluids with imbedded ice pellets, this allowance is limited to aircraft with a rotation speed of 100 knots or greater or 115 knots as indicated in the Ice Pellet Allowance Table below.

5) If the takeoff is not accomplished within the applicable allowance time in Table 9 or Table 10, the aircraft must be completely deiced, and if precipitation is still present, anti-iced again prior to a subsequent takeoff. If the precipitation stops at or before the time limits of the applicable allowance time and does not restart, the aircraft may takeoff up to 90 minutes after the start of the application of the Type III or Type IV anti-icing fluid, subject to the restrictions in 2. B. on the previous page.

6) A pre-takeoff contamination check is not required. The allowance time cannot be extended by an internal or external check of the aircraft critical surfaces.

7) If ice pellet precipitation becomes heavier than moderate or if the light ice pellets mixed with other forms of allowable precipitation exceeds the listed intensities or temperature range, the allowance time cannot be used.

8) If the temperature decreases below the temperature on which the allowance time was based,

    a) and the new lower temperature has an associated allowance time for the precipitation condition and the present time is within the new allowance time, then that new time must be used as the allowance time limit.

    b) and the allowance time has expired (within the 90 minute post anti-icing window if the precipitation has stopped within the allowance time), the aircraft may not takeoff and must be completely deiced and, if applicable, anti-iced before a subsequent takeoff.

TABLE 9. FAA ICE PELLET AND SMALL HAIL ALLOWANCE TIMES FOR SAE TYPE III FLUIDS (2014-2015)

This table is for use with SAE Type III undiluted (100/0) fluids applied unheated only

Precipitation Type	Outside Air Temperature		
	-5°C and above	Below -5 to -10°C	Below -10°C[1]
Light Ice Pellets	10 minutes	10 minutes	**Caution: No allowance times currently exist**
Moderate Ice Pellets or Small Hail	5 minutes	5 minutes	
Light Ice Pellets Mixed with Light or Moderate Freezing Drizzle	7 minutes	5 minutes	
Light Ice Pellets Mixed with Light Freezing Rain	7 minutes	5 minutes	
Light Ice Pellets Mixed with Light Rain	7 minutes[2]		
Light Ice Pellets Mixed with Moderate Rain			
Light Ice Pellets Mixed with Light Snow	10 minutes	10 minutes	
Light Ice Pellets Mixed with Moderate Snow	10 minutes	10 minutes	

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

NOTES

1 Ensure that the lowest operational use temperature (LOUT) is respected.

2 No allowance times exist in this condition for temperatures below 0°C; consider use of light ice pellets mixed with light freezing rain.

CAUTIONS:

- FLUIDS USED DURING GROUND DE/ANTI-ICING DO NOT PROVIDE IN-FLIGHT ICING PROTECTION.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

TABLE 10. FAA ICE PELLET AND SMALL HAIL ALLOWANCE TIMES FOR SAE TYPE IV FLUIDS (2014-2015)

This table is for use with SAE Type IV undiluted (100/0) fluids only.
All Type IV fluids are propylene glycol based with the exception of Dow EG106 and LNT E450 which are ethylene glycol based.

Precipitation Type	Outside Air Temperature		
	-5°C and above	Below -5 to -10°C	Below -10°C[1]
Light Ice Pellets	50 minutes	30 minutes	30 minutes[2]
Moderate Ice Pellets or Small Hail	25 minutes[3]	10 minutes	10 minutes[2,4]
Light Ice Pellets Mixed with Light or Moderate Freezing Drizzle	25 minutes	10 minutes	**Caution: No allowance times currently exist**
Light Ice Pellets Mixed with Light Freezing Rain	25 minutes	10 minutes	
Light Ice Pellets Mixed with Light Rain	25 minutes[5]		
Light Ice Pellets Mixed with Moderate Rain	25 minutes[6]		
Light Ice Pellets Mixed with Light Snow	25 minutes	15 minutes	
Light Ice Pellets Mixed with Moderate Snow	10 minutes	7 minutes	

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

NOTES

1 Ensure that the lowest operational use temperature (LOUT) is respected.

2 No allowance times exist for propylene glycol (PG) fluids when used on aircraft with rotation speeds less than 115 knots. (For these aircraft, if the fluid type is not known, assume zero allowance time).

3 Allowance time is 15 minutes for propylene glycol (PG) fluids, or when the fluid type is unknown.

4 No allowance times exist for propylene glycol (PG) fluids in this condition for temperatures below -16°C.

5 No allowance times exist for this condition for temperatures below 0 °C; consider use of light ice pellets mixed with light freezing rain.

6 No allowance times exist in this condition for temperatures below 0 °C

CAUTIONS:

- FLUIDS USED DURING GROUND DE/ANTI-ICING DO NOT PROVIDE IN-FLIGHT ICING PROTECTION.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

Operations in Heavy Snow 2014-2015
(No Change from 2013-2014 Guidance)

1. **Tactile and Visual Checks of Aircraft.** No holdover times (HOT) exist for heavy snow conditions in the current HOT tables. Review of existing data from past testing has indicated takeoffs may be safely conducted with proper tactile and/or visual checks, as appropriate for the aircraft, and a determination that the fluid has not failed. A tactile and/or visual check in heavy snow conditions must be accomplished in a manner that provides an assessment that can be accurately accomplished. It is imperative that the tactile and/or visual check procedures to determine if the anti-icing fluid has failed in heavy snow conditions be at least as comprehensive as the authorized procedures for the operator's pretakeoff contamination check (when HOTs have been exceeded) for those precipitation conditions for which HOTs exist. Anti-icing fluids dissolve the snow and absorb the resulting moisture into the fluid. When the fluid begins to fail it starts to change in appearance (e.g., less glossy and more opaque) and the snow starts to accumulate on and in the fluid. At this stage, the fluid has failed and takeoff is not authorized. If the operator's procedure to accomplish this check is different from the operator's approved pretakeoff contamination check procedures for other precipitation conditions, this check procedure must be verified and approved by the operator's Principal Operations Inspector (POI).

2. **Takeoff in Heavy Snow Conditions.** Operators with a deicing program approved in accordance with 14 CFR part 121, § 121.629, will be allowed to takeoff in heavy snow conditions subject to the following restrictions:

   1) The aircraft must be anti-iced with undiluted Type IV fluid.

   2) The aircraft critical surfaces must be free of contaminants, or the aircraft must be properly deiced before the application of the anti-icing fluid.

   3) When appropriate, the operator must accomplish an approved tactile and/or visual check of the aircraft critical surfaces within 5 minutes of takeoff.

   4) If this check is accomplished visually from within the aircraft, the view must be such that it is not obscured by de/anti-icing fluid, dirt, or fogging. If the critical surfaces cannot be seen due to snowfall, distance from the viewing position, or inadequate lighting, or for any other reason, the check must be a visual or tactile check conducted from outside the aircraft.

   5) If a definitive fluid failure determination cannot be made using the checks prescribed, takeoff is not authorized. The aircraft must be completely deiced, and if precipitation is still present, anti-iced again before a subsequent takeoff.

   Note: Current aircraft certification standards only require testing of flight instrument sensing devices and engine anti-icing systems in moderate snow levels. Ground operations in heavy snow conditions may exceed the capabilities or limitations of these systems and devices to adequately provide anti-icing.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 0-90%. FAA 90 PERCENT ADJUSTED HOLDOVER TIME GUIDELINES FOR SAE TYPE I, TYPE II, TYPE III, AND TYPE IV FLUIDS IN ACTIVE FROST

Outside Air Temperature[1,2]		Approximate Holdover Times (hours:minutes)
Degrees Celsius	Degrees Fahrenheit	Active Frost
		Type I
-1 and above	30 and above	0:41 (0:32)[3]
below -1 to -3	below 30 to 27	
below -3 to -10	below 27 to 14	
below -10 to -14	below 14 to 7	
below -14 to -21	below 7 to -6	
below -21 to LOUT	below -6 to LOUT	

Outside Air Temperature[2]		Concentration Neat Fluid/Water (Volume %/ Volume %)	Approximate Holdover Times (hours:minutes)		
Degrees Celsius	Degrees Fahrenheit		Active Frost		
			Type II	Type III	Type IV
-1 and above	30 and above	100/0	7:12	1:48	10:48
		75/25	4:30	0:54	4:30
		50/50	2:42	0:27	2:42
below -1 to -3	below 30 to 27	100/0	7:12	1:48	10:48
		75/25	4:30	0:54	4:30
		50/50	1:21	0:27	2:42
below -3 to -10	below 27 to 14	100/0	7:12	1:48	9:00
		75/25	4:30	0:54	4:30
below -10 to -14	below 14 to 7	100/0	5:24	1:48	5:24
		75/25	0:54	0:54	0:54
below -14 to -21	below 7 to -6	100/0	5:24	1:48	5:24
below -21 to -25	below -6 to -13	100/0	1:48	1:48	3:36
Below -25	Below -13	No holdover time guidelines exist			

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

1 Type I Fluid / Water Mixture must be selected so that the freezing point of the mixture is at least 10 °C (18 °F) below outside air temperature.
2 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected.
3 Value in parenthesis is for composite aircraft.

CAUTIONS:

- FLUIDS USED DURING GROUND DE/ANTI-ICING DO NOT PROVIDE IN-FLIGHT ICING PROTECTION.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 1-90%. FAA 90 PERCENT ADJUSTED HOLDOVER TIME GUIDELINES FOR SAE TYPE I FLUID ON CRITICAL AIRCRAFT SURFACES COMPOSED PREDOMINANTLY OF ALUMINUM

Outside Air Temperature[1,2]		Wing Surface	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[3]			Freezing Drizzle[5]	Light Freezing Rain	Rain on Cold Soaked Wing[6]	Other[7]
				Very Light[4]	Light[4]	Moderate				
-3 and above	27 and above	Aluminum	0:10-0:15	0:16-0:20	0:10-0:16	0:05-0:10	0:08-0:12	0:02-0:05	0:02-0:05	
below -3 to -6	below 27 to 21	Aluminum	0:07-0:12	0:13-0:15	0:07-0:13	0:05-0:07	0:05-0:08	0:02-0:05	CAUTION: No holdover time guidelines exist	
below -6 to -10	below 21 to 14	Aluminum	0:05-0:09	0:10-0:12	0:05-0:10	0:04-0:05	0:04-0:06	0:02-0:05		
Below -10	below 14	Aluminum	0:05-0:08	0:06-0:07	0:04-0:06	0:02-0:04				

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

1 Type I fluid / water mixture must be selected so that the freezing point of the mixture is at least 10 °C (18 °F) below outside air temperature.
2 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected.
3 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
4 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
5 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
6 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
7 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE I FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 1A-90%. FAA 90 PERCENT ADJUSTED HOLDOVER TIME GUIDELINES FOR SAE TYPE I FLUID ON CRITICAL AIRCRAFT SURFACES COMPOSED PREDOMINANTLY OF COMPOSITES

Outside Air Temperature[1,2]		Wing Surface	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[3]			Freezing Drizzle[5]	Light Freezing Rain	Rain on Cold Soaked Wing[6]	Other[7]
				Very Light[4]	Light[4]	Moderate				
-3 and above	27 and above	Composite	0:08-0:14	0:11-0:14	0:05-0:11	0:03-0:05	0:07-0:12	0:02-0:05	0:01-0:05	
below -3 to -6	below 27 to 21	Composite	0:05-0:07	0:10-0:12	0:05-0:10	0:02-0:05	0:05-0:08	0:02-0:05	CAUTION: No holdover time guidelines exist	
below -6 to -10	below 21 to 14	Composite	0:04-0:07	0:08-0:11	0:05-0:08	0:02-0:05	0:04-0:06	0:02-0:05		
Below -10	below 14	Composite	0:04-0:06	0:06-0:07	0:04-0:06	0:02-0:04				

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

1 Type I fluid / water mixture must be selected so that the freezing point of the mixture is at least 10 °C (18 °F) below outside air temperature.
2 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected.
3 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
4 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
5 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
6 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
7 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE I FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 2-90%. FAA 90 PERCENT ADJUSTED HOLDOVER TIME GUIDELINES FOR SAE TYPE II FLUID

Outside Air Temperature[1]		Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	0:32-1:21	0:18-0:41	0:27-0:50	0:14-0:27	0:07-0:36	
		75/25	0:23-0:54	0:14-0:27	0:18-0:41	0:09-0:23	0:05-0:23	
		50/50	0:14-0:27	0:05-0:14	0:07-0:14	0:05-0:08	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:18-0:59	0:14-0:27	0:18-0:41[7]	0:09-0:18[7]		
		75/25	0:23-0:45	0:09-0:18	0:14-0:27[7]	0:07-0:14[7]		
Below -14 to -25 or LOUT	Below 7 to -13 or LOUT	100/0	0:14-0:32	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 2A-90%. FAA 90 PERCENT ADJUSTED TYPE II HOLDOVER TIME GUIDELINES FOR ABAX ECOWING 26

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	1:17-2:20	1:26-1:39	0:54-1:26	0:36-0:54	0:45-1:26	0:36-0:45	0:18-1:17	
		75/25	0:59-1:44	1:08-1:17	0:41-1:08	0:23-0:41	0:41-0:59	0:23-0:32	0:09-0:54	
		50/50	0:27-0:41	0:36-0:45	0:18-0:36	0:09-0:18	0:14-0:23	0:07-0:09	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:41-2:02	1:17-1:30	0:50-1:17	0:32-0:50	0:27-1:03[7]	0:14-0:32[7]		
		75/25	0:32-1:08	0:50-0:59	0:36-0:50	0:23-0:36	0:18-0:45[7]	0:14-0:23[7]		
below -14 to -25	below 7 to -13	100/0	0:23-0:41	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- ABAX ECOWING 26 TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 2B-90%. FAA 90 PERCENT ADJUSTED TYPE II HOLDOVER TIME GUIDELINES FOR AVIATION SHAANXI HI-TECH CLEANWING II

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	0:50-1:39	0:27-0:50	0:32-0:59	0:23-0:32	0:09-0:50	
		75/25	0:45-1:12	0:23-0:41	0:32-0:54	0:18-0:27	0:06-0:45	
		50/50	0:32-0:54	0:14-0:27	0:18-0:36	0:09-0:18	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:41-1:39	0:27-0:50	0:27-0:50[7]	0:18-0:23[7]		
		75/25	0:36-1:35	0:23-0:41	0:32-0:36[7]	0:18-0:23[7]		
below -14 to -29	below 7 to -20.2	100/0	0:18-0:45	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- AVIATION SHAANXI HI-TECH CLEANWING II TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 2C-90%. FAA 90 PERCENT ADJUSTED TYPE II HOLDOVER TIME GUIDELINES FOR CLARIANT SAFEWING MP II FLIGHT

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	3:09-3:36	2:20-2:47	1:26-2:20	0:54-1:26	1:12-1:48	0:41-1:17	0:09-1:21	
		75/25	1:39-2:29	2:20-2:51	1:12-2:20	0:36-1:12	1:03-1:21	0:27-0:50	0:05-0:45	
		50/50	0:50-1:35	0:41-0:50	0:23-0:41	0:09-0:23	0:18-0:27	0:09-0:14	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:50-1:35	1:39-1:57	0:59-1:39	0:36-0:59	0:32-1:21[7]	0:23-0:41[7]		
		75/25	0:23-0:59	1:12-1:30	0:36-1:12	0:18-0:36	0:23-1:03[7]	0:18-0:32[7]		
Below -14 to -29	Below 7 to -20.2	100/0	0:27-0:45	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT
- CLARIANT SAFEWING MP II FLIGHT TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 2D-90%. FAA 90 PERCENT ADJUSTED TYPE II HOLDOVER TIME GUIDELINES FOR CLARIANT SAFEWING MP II FLIGHT PLUS

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:24-3:36	0:45-1:39	1:17-1:48	0:41-0:54	0:14-1:48	
		75/25	2:20-3:36	0:54-1:35	1:26-1:48	0:45-1:08	0:14-1:08	
		50/50	0:59-2:06	0:14-0:23	0:27-0:59	0:14-0:18	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:36-2:06	0:32-1:08	0:32-1:17[7]	0:32-0:50[7]		
		75/25	0:27-1:35	0:50-1:30	0:23-1:03[7]	0:27-0:41[7]		
Below -14 to -29	Below 7 to -20.2	100/0	0:18-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT
- CLARIANT SAFEWING MP II FLIGHT PLUS TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 2E-90%. FAA 90 PERCENT ADJUSTED TYPE II HOLDOVER TIME GUIDELINES FOR CRYOTECH POLAR GUARD II

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:33-3:36	2:20-2:33	1:39-2:20	1:12-1:39	1:26-1:48	1:08-1:21	0:14-1:48	
		75/25	2:15-3:36	2:11-2:38	1:12-2:11	0:41-1:12	1:30-1:48	0:36-1:03	0:08-1:30	
		50/50	0:45-1:17	1:12-1:35	0:32-1:12	0:14-0:32	0:18-0:41	0:08-0:18	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:50-2:15	1:35-1:44	1:08-1:35	0:50-1:08	0:32-1:26[7]	0:32-0:41[7]		
		75/25	0:36-1:21	1:35-1:53	0:54-1:35	0:32-0:54	0:23-0:59[7]	0:32-0:41[7]		
Below -14 to -30.5	Below 7 to -22.9	100/0	0:23-0:45	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT
- CRYOTECH POLAR GUARD II TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 2F-90%. FAA 90 PERCENT ADJUSTED TYPE II HOLDOVER TIME GUIDELINES FOR KILFROST ABC-K PLUS

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:02-3:23	0:54-1:30	1:39-1:48	0:54-1:17	0:18-1:48	
		75/25	1:30-2:15	0:32-1:03	1:17-1:48	0:45-1:03	0:14-1:48	
		50/50	0:32-0:59	0:06-0:14	0:18-0:27	0:09-0:14	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:27-0:59	0:45-1:17	0:23-0:54[7]	0:14-0:32[7]		
		75/25	0:23-1:17	0:32-0:59	0:18-0:50[7]	0:08-0:27[7]		
below -14 to -29	below 7 to -20.2	100/0	0:27-0:50	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- KILFROST ABC-K PLUS TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 2G-90%. FAA 90 PERCENT ADJUSTED TYPE II HOLDOVER TIME GUIDELINES FOR LNT SOLUTIONS P250

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	1:57-3:36	3:00-3:00	1:35-3:00	0:50-1:35	1:26-1:48	0:45-1:17	0:14-1:48	
		75/25	1:39-2:20	2:33-3:00	1:17-2:33	0:41-1:17	1:12-1:26	0:36-0:54	0:09-1:39	
		50/50	0:32-0:45	0:32-0:32	0:27-0:32	0:14-0:27	0:18-0:32	0:14-0:18	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:41-2:06	2:51-3:00	1:30-2:51	0:45-1:30	0:23-1:12[7]	0:23-0:32[7]		
		75/25	0:32-1:35	2:33-3:00	1:17-2:33	0:41-1:17	0:18-1:08[7]	0:18-0:27[7]		
Below -14 to LOUT	Below 7 to LOUT	100/0	0:18-0:45	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT
- LNT SOLUTIONS P250 TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 2H-90%. FAA 90 PERCENT ADJUSTED TYPE II HOLDOVER TIME GUIDELINES FOR NEWAVE AEROCHEMICAL FCY-2

Outside Air Temperature[1]		Manufacturer Specific Type II Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	1:08-2:11	0:27-0:50	0:32-0:59	0:23-0:32	0:07-0:41	
		75/25	0:45-1:21	0:18-0:36	0:23-0:41	0:14-0:23	0:05-0:23	
		50/50	0:23-0:32	0:14-0:23	0:09-0:18	0:06-0:09	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:41-1:21	0:14-0:27	0:18-0:41[7]	0:14-0:18[7]		
		75/25	0:27-0:59	0:09-0:18	0:14-0:27[7]	0:07-0:14[7]		
below -14 to -28	below 7 to -18.4	100/0	0:23-0:32	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type II fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail.
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- NEWAVE AEROCHEMICAL FCY-2 TYPE II FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 3-90%. FAA 90 PERCENT ADJUSTED HOLDOVER TIME GUIDELINES FOR SAE TYPE III FLUIDS[1]

Outside Air Temperature[2]		Approximate Holdover Times Under Various Weather Conditions (hours: minutes)								
Degrees Celsius	Degrees Fahrenheit	Type III Fluid Concentration Neat Fluid/Water (Volume %/Volume %)	Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[3]			Freezing Drizzle[5]	Light Freezing Rain	Rain on Cold Soaked Wing[6]	Other[7]
				Very Light[4]	Light[4]	Moderate				
-3 and above	27 and above	100/0	0:18-0:36	0:32-0:36	0:18-0:32	0:09-0:18	0:09-0:18	0:07-0:09	0:05-0:18	
		75/25	0:14-0:27	0:23-0:32	0:14-0:23	0:07-0:14	0:07-0:14	0:05-0:09	0:02-0:09	
		50/50	0:09-0:18	0:14-0:18	0:07-0:14	0:04-0:07	0:05-0:08	0:04-0:05	CAUTION: No holdover time guidelines exist	
below -3 to -10	below 27 to 14	100/0	0:18-0:36	0:27-0:32	0:14-0:27	0:08-0:14	0:09-0:18	0:07-0:09		
		75/25[8]	0:14-0:27	0:23-0:27	0:09-0:23	0:06-0:09	0:08-0:11	0:05-0:08		
below -10	below 14	100/0	0:18-0:36	0:27-0:32	0:14-0:27	0:07-0:14				

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

1 Fluid must be applied unheated to use these holdover times. No holdover times exist for Type III fluid applied heated.
2 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type III fluid cannot be used.
3 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
4 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
5 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
6 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
7 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 9-90% provides allowance times for ice pellets and small hail).
8 For aircraft with rotation speeds less than 100 knots, these holdover times only apply to outside air temperatures of -9 °C (15.8 °F) and above.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST WILL REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE III FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4-90%. FAA 90 PERCENT ADJUSTED HOLDOVER TIME GUIDELINES FOR SAE TYPE IV FLUIDS

Outside Air Temperature[1]		Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	1:39-2:38	0:32-1:03	0:45-1:21	0:32-0:50	0:09-1:08	
		75/25	0:59-1:35	0:27-0:50	0:41-1:03	0:27-0:41	0:08-0:45	
		50/50	0:18-0:32	0:06-0:14	0:14-0:18	0:07-0:09	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:18-1:12	0:23-0:45	0:18-0:54[7]	0:09-0:23[7]		
		75/25[8]	0:23-0:45	0:18-0:36	0:14-0:59[7]	0:09-0:23[7]		
below -14 to -25 or LOUT	below 7 to -13 or LOUT	100/0[9]	0:14-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).
8 For Cryotech Polar Guard temperature is limited to -5.5 °C (22 °F).
9 For Cryotech Polar Guard and Clariant Max Flight 04, temperature is limited to -23.5 °C (-10.3 °F). If the fluid specific brand is unknown, all of the temperature limitations in this and the preceding note apply.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- SAE TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4A-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR ABAX AD-480

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	1:48-3:09	0:36-1:12	0:45-1:21	0:32-0:50	0:14-1:26	
		75/25	1:21-2:29	0:27-0:59	0:45-1:08	0:27-0:41	0:09-1:08	
		50/50	0:27-0:41	0:08-0:18	0:14-0:23	0:08-0:14	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:18-1:12	0:27-0:50	0:23-1:12[7]	0:14-0:27[7]		
		75/25	0:23-0:45	0:18-0:41	0:23-0:59[7]	0:14-0:27[7]		
below -14 to -26	below 7 to -14.8	100/0	0:14-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- ABAX AD-480 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4B-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR ABAX ECOWING AD-49

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	3:00-3:36	2:33-2:51	1:39-2:33	1:03-1:39	1:17-1:48	0:54-1:17	0:09-1:44	
		75/25	2:11-3:36	1:53-2:02	1:30-1:53	1:12-1:30	1:44-1:48	0:45-1:21	0:09-1:30	
		50/50	0:23-0:45	0:36-0:41	0:23-0:36	0:14-0:23	0:14-0:27	0:09-0:14	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:18-1:26	2:33-2:51	1:39-2:33	1:03-1:39	0:23-1:17[7]	0:18-0:23[7]		
		75/25	0:27-1:03	1:53-2:02	1:30-1:53	1:12-1:30	0:14-0:59[7]	0:14-0:23[7]		
below -14 to -26	below 7 to -14.8	100/0	0:23-0:36	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- ABAX ECOWING AD-49 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4C-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR CLARIANT MAX FLIGHT 04

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:24-3:36	3:00-3:00	2:29-3:00	1:17-2:29	1:48-1:48	1:03-1:21	0:18-1:48	
		75/25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		50/50	N/A	N/A	N/A	N/A	N/A	N/A	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:45-2:15	2:06-2:33	1:03-2:06	0:32-1:03	0:23-1:21[7]	0:18-0:36[7]		
		75/25	N/A	N/A	N/A	N/A	N/A	N/A		
below -14 to -23.5	below 7 to -10.3	100/0	0:18-0:41	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CLARIANT MAX FLIGHT 04 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4D-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR CLARIANT MAX FLIGHT SNEG

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:11-3:36	2:29-2:51	1:30-2:29	0:59-1:30	1:48-1:48	0:45-1:30	0:18-1:21	
		75/25	3:36-3:36	2:11-2:33	1:21-2:11	0:50-1:21	1:21-1:48	0:59-1:12	0:14-1:35	
		50/50	1:21-3:09	1:35-2:06	0:41-1:35	0:18-0:41	0:32-1:03	0:14-0:27	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:41-2:06	1:48-2:06	1:08-1:48	0:41-1:08	0:27-1:17[7]	0:23-0:36[7]		
		75/25	0:27-1:17	1:30-1:48	0:54-1:30	0:36-0:54	0:18-0:59[7]	0:18-0:36[7]		
below -14 to -29	below 7 to -20.2	100/0	0:18-0:45	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CLARIANT MAX FLIGHT SNEG TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4E-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR CLARIANT SAFEWING MP IV LAUNCH

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	3:36-3:36	2:33-3:00	1:35-2:33	0:59-1:35	1:21-1:48	0:54-1:30	0:14-1:30	
		75/25	3:18-3:36	2:47-3:00	1:35-2:47	0:54-1:35	1:30-1:48	0:41-1:08	0:09-1:35	
		50/50	1:17-2:29	1:17-1:30	0:41-1:17	0:23-0:41	0:27-0:45	0:18-0:23	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:54-1:44	1:57-2:15	1:12-1:57	0:45-1:12	0:32-1:30[7]	0:23-0:41[7]		
		75/25	0:36-1:12	2:11-2:38	1:17-2:11	0:41-1:17	0:23-1:03[7]	0:23-0:41[7]		
below -14 to -28.5	below 7 to -19.3	100/0	0:27-0:45	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CLARIANT SAFEWING MP IV LAUNCH TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4F-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR CLARIANT SAFEWING MP IV LAUNCH PLUS

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	3:32-3:36	3:00-3:00	1:53-3:00	0:50-1:53	1:48-1:48	0:54-1:48	0:18-1:48	
		75/25	3:32-3:36	3:00-3:00	1:44-3:00	0:45-1:44	1:48-1:48	1:12-1:17	0:18-1:39	
		50/50	1:08-1:39	1:26-1:48	0:41-1:26	0:18-0:41	0:23-0:54	0:14-0:18	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:50-2:02	2:56-3:00	1:17-2:56	0:36-1:17	0:23-1:26[7]	0:23-0:36[7]		
		75/25	0:36-1:48	2:38-3:00	1:08-2:38	0:27-1:08	0:18-0:59[7]	0:18-0:27[7]		
below -14 to -29	below 7 to -20.2	100/0	0:23-0:45	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CLARIANT SAFEWING MP IV LAUNCH PLUS TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4G-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR CRYOTECH POLAR GUARD

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:02-3:09	0:45-1:21	1:08-1:48	0:45-1:08	0:14-1:17	
		75/25	1:30-2:24	0:32-1:03	0:59-1:17	0:32-0:54	0:09-1:08	
		50/50	0:23-0:36	0:09-0:14	0:14-0:23	0:09-0:14	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:41-1:35	0:27-0:50	0:23-1:03[7]	0:14-0:32[7]		
		75/25[8]	0:32-1:21[8]	0:18-0:36[8]	0:23-0:59[8]	0:18-0:27[8]		
Below -14 to -23.5	Below 7 to -10.3	100/0	0:18-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).
8 Temperature is limited to -5.5 °C (22 °F) when using 75/25 dilution of this fluid.

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CRYOTECH POLAR GUARD TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4H-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR CRYOTECH POLAR GUARD ADVANCE

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	2:33-3:36	2:20-2:33	1:39-2:20	1:12-1:39	1:26-1:48	1:08-1:21	0:14-1:48	
		75/25	2:15-3:36	2:11-2:38	1:12-2:11	0:41-1:12	1:30-1:48	0:36-1:03	0:08-1:30	
		50/50	0:45-1:17	1:12-1:35	0:32-1:12	0:14-0:32	0:18-0:41	0:08-0:18	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:50-2:15	1:35-1:44	1:08-1:35	0:50-1:08	0:32-1:26[7]	0:32-0:41[7]		
		75/25	0:36-1:21	1:35-1:53	0:54-1:35	0:32-0:54	0:23-0:59[7]	0:32-0:41[7]		
Below -14 to -30.5	Below 7 to -22.9	100/0	0:23-0:45	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- CRYOTECH POLAR GUARD ADVANCE TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4I-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR DOW CHEMICAL UCAR™ ENDURANCE EG106

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	1:53-2:51	2:29-3:00	1:12-2:29	0:36-1:12	1:03-1:48	0:45-1:08	0:18-1:48	
		75/25	N/A	N/A	N/A	N/A	N/A	N/A	CAUTION: No holdover time guidelines exist	
		50/50	N/A	N/A	N/A	N/A	N/A	N/A		
below -3 to -14	below 27 to 7	100/0	1:39-3:00	1:57-2:29	0:59-1:57	0:27-0:59	0:50-1:39[7]	0:41-1:03[7]		
		75/25	N/A	N/A	N/A	N/A	N/A	N/A		
below -14 to -27	below 7 to -16.6	100/0	0:27-0:59	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- DOW CHEMICAL UCAR ENDURANCE EG106 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4J-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR DOW CHEMICAL UCAR™ FLIGHTGUARD AD-480

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	1:48-3:09	0:36-1:12	0:45-1:21	0:32-0:50	0:14-1:26	CAUTION: No holdover time guidelines exist
		75/25	1:21-2:29	0:27-0:59	0:45-1:08	0:27-0:41	0:09-1:08	
		50/50	0:27-0:41	0:08-0:18	0:14-0:23	0:08-0:14		
below -3 to -14	below 27 to 7	100/0	0:18-1:12	0:27-0:50	0:23-1:12[7]	0:14-0:27[7]		
		75/25	0:23-0:45	0:18-0:41	0:23-0:59[7]	0:14-0:27[7]		
below -14 to -26	below 7 to -14.8	100/0	0:14-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- DOW CHEMICAL UCAR FLIGHTGUARD AD-480 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4K-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR DOW CHEMICAL UCAR™ FLIGHTGUARD AD-49

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	3:00-3:36	2:33-2:51	1:39-2:33	1:03-1:39	1:17-1:48	0:54-1:17	0:09-1:44	
		75/25	2:11-3:36	1:53-2:02	1:30-1:53	1:12-1:30	1:44-1:48	0:45-1:21	0:09-1:30	
		50/50	0:23-0:45	0:36-0:41	0:23-0:36	0:14-0:23	0:14-0:27	0:09-0:14	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:18-1:26	2:33-2:51	1:39-2:33	1:03-1:39	0:23-1:17[7]	0:18-0:23[7]		
		75/25	0:27-1:03	1:53-2:02	1:30-1:53	1:12-1:30	0:14-0:59[7]	0:14-0:23[7]		
below -14 to -26	below 7 to -14.8	100/0	0:23-0:36	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- DOW CHEMICAL UCAR FLIGHTGUARD AD-49 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4L-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR KILFROST ABC-S

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	2:20-3:36	0:54-1:30	1:12-1:39	0:54-1:17	0:18-1:08	
		75/25	0:59-1:35	0:27-0:50	0:41-1:03	0:32-0:45	0:09-0:45	
		50/50	0:18-0:32	0:06-0:14	0:14-0:18	0:07-0:09	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:41-1:53	0:41-1:12	0:18-0:54[7]	0:09-0:27[7]		
		75/25	0:23-0:54	0:23-0:45	0:18-1:03[7]	0:09-0:32[7]		
below -14 to -28	below 7 to -18.4	100/0	0:18-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- KILFROST ABC-S TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4M-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR KILFROST ABC-S PLUS

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	1:57-3:36	3:00-3:00	1:53-3:00	1:08-1:53	1:39-1:48	0:59-1:48	0:23-1:48	
		75/25	1:17-2:24	1:53-2:11	1:08-1:53	0:41-1:08	0:54-1:12	0:27-0:45	0:09-1:12	
		50/50	0:27-0:50	0:54-1:03	0:27-0:54	0:14-0:27	0:14-0:36	0:14-0:18	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:50-3:09	2:38-3:00	1:35-2:38	0:54-1:35	0:23-1:26[7]	0:18-0:27[7]		
		75/25	0:41-1:39	1:35-1:48	0:54-1:35	0:32-0:54	0:18-1:03[7]	0:14-0:23[7]		
below -14 to -28	below 7 to -18.4	100/0	0:36-0:54	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- KILFROST ABC-S PLUS TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4N-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR LNT SOLUTIONS E450

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)					
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2,3]	Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
-3 and above	27 and above	100/0	1:39-2:38	0:32-1:03	1:26-1:48	0:50-1:12	0:23-1:48	CAUTION: No holdover time guidelines exist
		75/25	N/A	N/A	N/A	N/A	N/A	
		50/50	N/A	N/A	N/A	N/A		
below -3 to -14	below 27 to 7	100/0	1:21-3:32	0:23-0:45	1:35-1:48[7]	0:59-1:30[7]		
		75/25	N/A	N/A	N/A	N/A		
below -14 to LOUT	below 7 to LOUT	100/0	0:32-0:59	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- LNT SOLUTIONS E450 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 4O-90%. FAA 90 PERCENT ADJUSTED TYPE IV HOLDOVER TIME GUIDELINES FOR NEWAVE AEROCHEMICAL FCY 9311

Outside Air Temperature[1]		Manufacturer Specific Type IV Fluid Concentration Neat-Fluid/Water (Volume %/Volume %)	Approximate Holdover Times Under Various Weather Conditions (hours: minutes)							
Degrees Celsius	Degrees Fahrenheit		Freezing Fog or Ice Crystals	Snow, Snow Grains or Snow Pellets[2]			Freezing Drizzle[4]	Light Freezing Rain	Rain on Cold Soaked Wing[5]	Other[6]
				Very Light[3]	Light[3]	Moderate				
-3 and above	27 and above	100/0	1:44-3:36	2:06-2:38	1:03-2:06	0:32-1:03	1:03-1:48	0:36-0:59	0:14-1:17	
		75/25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
		50/50	N/A	N/A	N/A	N/A	N/A	N/A	CAUTION: No holdover time guidelines exist	
below -3 to -14	below 27 to 7	100/0	0:32-1:53	1:26-1:48	0:45-1:26	0:23-0:45	0:32-1:12[7]	0:18-0:32[7]		
		75/25	N/A	N/A	N/A	N/A	N/A	N/A		
below -14 to -29.5	below 7 to -21.1	100/0	0:27-0:50	0:36-0:45	0:27-0:36	0:14-0:27				

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

1 Ensure that the lowest operational use temperature (LOUT) of the fluid is respected. Consider use of Type I fluid when Type IV fluid cannot be used.
2 To determine snowfall intensity, the SNOWFALL INTENSITIES AS A FUNCTION OF PREVAILING VISIBILITY table (Table 1C) is required.
3 Use light freezing rain holdover times in conditions of very light or light snow mixed with light rain.
4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
5 No holdover time guidelines exist for this condition for 0 °C (32 °F) and below.
6 Heavy snow, ice pellets, moderate and heavy freezing rain, small hail and hail (Table 10-90% provides allowance times for ice pellets and small hail).
7 No holdover time guidelines exist for this condition below -10 °C (14 °F).

CAUTIONS:

- THE TIME OF PROTECTION WILL BE SHORTENED IN HEAVY WEATHER CONDITIONS. HEAVY PRECIPITATION RATES OR HIGH MOISTURE CONTENT, HIGH WIND VELOCITY, OR JET BLAST MAY REDUCE HOLDOVER TIME BELOW THE LOWEST TIME STATED IN THE RANGE. HOLDOVER TIME MAY BE REDUCED WHEN AIRCRAFT SKIN TEMPERATURE IS LOWER THAN OAT.
- NEWAVE AEROCHEMICAL FCY 9311 TYPE IV FLUID USED DURING GROUND DE/ANTI-ICING IS NOT INTENDED FOR AND DOES NOT PROVIDE PROTECTION DURING FLIGHT.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 9-90%. FAA ICE PELLET AND SMALL HAIL 90 PERCENT ADJUSTED ALLOWANCE TIMES FOR SAE TYPE III FLUIDS (2014-2015)

This table is for use with SAE Type III undiluted (100/0) fluids applied unheated only

Precipitation Type	Outside Air Temperature		
	-5°C and above	**Below -5 to -10°C**	**Below -10°C[1]**
Light Ice Pellets	9 minutes	9 minutes	**Caution: No allowance times currently exist**
Moderate Ice Pellets or Small Hail	5 minutes	5 minutes	
Light Ice Pellets Mixed with Light or Moderate Freezing Drizzle	6 minutes	5 minutes	
Light Ice Pellets Mixed with Light Freezing Rain	6 minutes	5 minutes	
Light Ice Pellets Mixed with Light Rain	6 minutes[2]		
Light Ice Pellets Mixed with Moderate Rain			
Light Ice Pellets Mixed with Light Snow	9 minutes	9 minutes	
Light Ice Pellets Mixed with Moderate Snow	9 minutes	9 minutes	

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

NOTES

1 Ensure that the lowest operational use temperature (LOUT) is respected.

2 No allowance times exist in this condition for temperatures below 0°C; consider use of light ice pellets mixed with light freezing rain.

CAUTIONS:

- FLUIDS USED DURING GROUND DE/ANTI-ICING DO NOT PROVIDE IN-FLIGHT ICING PROTECTION.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.

THIS TABLE IS FOR USE WHEN FLAPS/SLATS ARE DEPLOYED PRIOR TO DE/ANTI-ICING

TABLE 10-90%. FAA ICE PELLET AND SMALL HAIL 90 PERCENT ADJUSTED ALLOWANCE TIMES FOR SAE TYPE IV FLUIDS (2014-2015)

This table is for use with SAE Type IV undiluted (100/0) fluids only.
All Type IV fluids are propylene glycol based with the exception of Dow EG106 and LNT E450 which are ethylene glycol based.

Precipitation Type	Outside Air Temperature		
	-5°C and above	**Below -5 to -10°C**	**Below -10°C[1]**
Light Ice Pellets	45 minutes	27 minutes	27 minutes[2]
Moderate Ice Pellets or Small Hail	23 minutes[3]	9 minutes	9 minutes[2,4]
Light Ice Pellets Mixed with Light or Moderate Freezing Drizzle	23 minutes	9 minutes	**Caution: No allowance times currently exist**
Light Ice Pellets Mixed with Light Freezing Rain	23 minutes	9 minutes	
Light Ice Pellets Mixed with Light Rain	23 minutes[5]		
Light Ice Pellets Mixed with Moderate Rain	23 minutes[6]		
Light Ice Pellets Mixed with Light Snow	23 minutes	14 minutes	
Light Ice Pellets Mixed with Moderate Snow	9 minutes	6 minutes	

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

NOTES

1 Ensure that the lowest operational use temperature (LOUT) is respected.

2 No allowance times exist for propylene glycol (PG) fluids when used on aircraft with rotation speeds less than 115 knots. (For these aircraft, if the fluid type is not known, assume zero allowance time).

3 Allowance time is 15 minutes for propylene glycol (PG) fluids, or when the fluid type is unknown.

4 No allowance times exist for propylene glycol (PG) fluids in this condition for temperatures below -16°C.

5 No allowance times exist for this condition for temperatures below 0 °C; consider use of light ice pellets mixed with light freezing rain.

6 No allowance times exist in this condition for temperatures below 0 °C

CAUTIONS:

- FLUIDS USED DURING GROUND DE/ANTI-ICING DO NOT PROVIDE IN-FLIGHT ICING PROTECTION.
- THIS TABLE IS FOR DEPARTURE PLANNING ONLY AND SHOULD BE USED IN CONJUNCTION WITH PRETAKEOFF CHECK PROCEDURES.