

ANNEX A

Guidelines for Holdover Times

Recommendations for
De-icing / Anti-icing
Aeroplanes on the Ground

31st Edition
August 2016

IMPORTANT NOTICE:

***This will be the last time this document
will be published. See for details the
Foreword in the main document.***

Holdover Time Tables

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The Guidelines for holdover times of Type III fluids have been removed (except for active frost) as these are no longer “generic”, but fluid specific (heated or unheated and different temperature ranges). Refer to the FAA and/or Transport Canada Holdover Time Guidelines on their websites.

Table 2 - Guidelines for holdover times anticipated for Type I fluid mixtures as a function of weather conditions and OAT
(Valid for metallic and composite surfaces)

OAT ⁽¹⁾		Approximate Holdover Times under various weather conditions (hours:minutes)					
°C	°F	Freezing Fog	Snow/ Snow Grains/ Snow Pellets ⁽²⁾	Freezing Drizzle ⁽³⁾	Light Freezing Rain	Rain on Cold Soaked Wing	Other ^{(4) (5)}
-3 and above	27 and above	00:09 - 0:16	0:03 - 0:06	0:08 - 0:13	0:02 - 0:05	0:01 - 0:05 ⁽⁶⁾	CAUTION: No Holdover Time Guidelines exist
below -3 to -6	below 27 to 21	0:06 - 0:08	0:02 - 0:05	0:05 - 0:09	0:02 - 0:05		
below -6 to -10	below 21 to 14	0:04 - 0:08	0:02 - 0:05	0:04 - 0:07	0:02 - 0:05		
below -10 <i>to LOUT</i>	below 14 <i>to LOUT</i>	0:04 - 0:07	0:02 - 0:04				

⁽¹⁾ *Type I fluids may be used below -10 °C (14 °F) down to their LOUT (fluid specific, fluid name must be known).*

⁽²⁾ In light "Rain and Snow" conditions use "Light Freezing Rain" holdover times

⁽³⁾ If positive identification of "Freezing Drizzle" is not possible use "Light Freezing Rain" holdover times

⁽⁴⁾ Other conditions are: Heavy snow, ice pellets, hail, moderate freezing rain and heavy freezing rain

⁽⁵⁾ For holdover times under active frost conditions see the separate frost table (Table 1)

⁽⁶⁾ No holdover time guidelines exist for this condition for 0 °C (32 °F) and below

Type I Fluid/water Mixture is selected so that the Freezing Point of the mixture is at least 10 °C (18 °F) below actual OAT

CAUTION: 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 also be reduced when the aeroplane skin temperature is lower than OAT.
Therefore, the indicated times should be used only in conjunction with a pre-takeoff check.

De-icing/anti-icing fluids used during ground de-icing/anti-icing are not intended for - and do not provide - protection during flight.

Holdover times in the table above can only be used when de-icing/anti-icing has been done with flaps/slats retracted.

Table 3 - Guidelines for holdover times anticipated for Type II fluid mixtures as a function of weather conditions and OAT
(Valid for metallic and composite surfaces)

OAT ⁽¹⁾		Type II Fluid Concentration Neat-Fluid/ Water (Vol %/Vol %)	Approximate Holdover Times under various weather conditions (hours:minutes)					
°C	°F		Freezing Fog	Snow/ Snow Grains/ Snow Pellets ⁽²⁾	Freezing Drizzle ⁽³⁾	Light Freezing Rain	Rain on Cold Soaked Wing	Other ⁽⁴⁾ ⁽⁵⁾
-3 and above	27 and above	100/0	0:35 - 1:30	0:20 - 0:45	0:30 - 1:00	0:15 - 0:30	0:07 - 0:40 ⁽⁶⁾	CAUTION: No Holdover Time Guidelines exist
		75/25	0:25 - 0:55	0:15 - 0:25	0:15 - 0:40	0:10 - 0:20	0:04 - 0:25 ⁽⁶⁾	
		50/50	0:15 - 0:25	0:05 - 0:10	0:08 - 0:15	0:05 - 0:09		
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	0:08 - 0:20	0:15 - 0:25 ⁽⁷⁾	0:08 - 0:15 ⁽⁷⁾		
below -14 to -22,5 or LOUT	below 7 to -8,5 or LOUT	100/0	0:20 - 0:35	0:08 - 0:10				

⁽¹⁾ *Type II fluids may be used below -22,5 °C (-8,5 °F) down to their LOUT (fluid specific, fluid name must be known).* Consider the use of Type I fluid when Type II fluid cannot be used.

⁽²⁾ In light "Rain and Snow" conditions use "Light Freezing Rain" holdover times

⁽³⁾ If positive identification of "Freezing Drizzle" is not possible use "Light Freezing Rain" holdover times

⁽⁴⁾ Other conditions are: Heavy snow, ice pellets, moderate and heavy freezing rain, hail

⁽⁵⁾ For holdover times under Active Frost conditions see the separate frost table (Table 1)

⁽⁶⁾ No holdover time guidelines exist for this condition for 0 °C (32 °F) and below

⁽⁷⁾ No holdover time guidelines exist for this condition below -10 °C (14 °F)

CAUTION: 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 also be reduced when the aeroplane skin temperature is lower than OAT.
Therefore, the indicated times should be used only in conjunction with a pre-takeoff check.

De-icing/anti-icing fluids used during ground de-icing/anti-icing are not intended for - and do not provide - protection during flight.

Holdover times in the table above can only be used when de-icing/anti-icing has been done with flaps/slats retracted.

Table 4 - Guidelines for holdover times anticipated for Type IV fluid mixtures as a function of weather conditions and OAT
(Valid for metallic and composite surfaces)

OAT ⁽¹⁾		Type IV Fluid Concentration Neat Fluid/ Water (Vol %/Vol %)	Approximate Holdover Times under various weather conditions (hours:minutes)					
°C	°F		Freezing Fog	Snow/ Snow Grains/ Snow Pellets ⁽²⁾	Freezing Drizzle ⁽³⁾	Light Freezing Rain	Rain on Cold Soaked Wing	Other ⁽⁴⁾ ⁽⁵⁾
-3 and above	27 and above	100/0	1:15 - 2:40	0:35 - 1:10	0:40 - 1:30	0:35 - 0:40	0:08 - 1:25 ⁽⁶⁾	CAUTION: No Holdover Time Guidelines exist
		75/25	1:25 - 2:40	0:45 - 1:15	0:50 - 1:20	0:30 - 0:45	0:09 - 1:15 ⁽⁶⁾	
		50/50	0:25 - 0:50	0:15 - 0:25	0:15 - 0:30	0:09 - 0:15		
below -3 to -14	below 27 to 7	100/0	0:20 - 1:35	0:25 - 0:45	0:25 - 1:20 ⁽⁷⁾	0:20 - 0:25 ⁽⁷⁾		
		75/25	0:30 - 1:10	0:20 - 0:45	0:15 - 1:05 ⁽⁷⁾	0:15 - 0:25 ⁽⁷⁾		
below -14 to -22,5 or LOU	below 7 to -8,5 or LOU	100/0	0:20 - 0:40	0:08 - 0:10				

⁽¹⁾ Type IV fluids may be used below -22,5 °C (-8,5 °F) down to their LOU (fluid specific, fluid name must be known). Consider the use of Type I fluid when Type IV fluid cannot be used.

⁽²⁾ In light "Rain and Snow" conditions use "Light Freezing Rain" holdover times

⁽³⁾ If positive identification of "Freezing Drizzle" is not possible use "Light Freezing Rain" holdover times

⁽⁴⁾ Other conditions are: Heavy snow, ice pellets, moderate and heavy freezing rain, hail

⁽⁵⁾ For holdover times under Active Frost conditions see the separate frost table (Table 1)

⁽⁶⁾ No holdover time guidelines exist for this condition for 0 °C (32 °F) and below

⁽⁷⁾ No holdover time guidelines exist for this condition below -10 °C (14 °F)

CAUTION: 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 also be reduced when the aeroplane skin temperature is lower than OAT.
Therefore, the indicated times should be used only in conjunction with a pre-takeoff check.

De-icing/anti-icing fluids used during ground de-icing/anti-icing are not intended for - and do not provide - protection during flight.

Holdover times in the table above can only be used when de-icing/anti-icing has been done with flaps/slats retracted.

