

For Sample Questions Only)

TABLE 1 - SAE TYPE I FLUID HOLDOVER GUIDELINES FOR WINTER 2003-2004

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

OAT		Approximate Holdover Times Under Various Weather Conditions (minutes)								
°C	°F	Frost²	Freezing Fog	Very Light Snow¹	Light Snow¹	Moderate Snow¹	Freezing Drizzle³	Light Freezing Rain	Rain on Cold Soaked Wing	Other⁴
-3 and above	27 and above	45	11 - 17	18	11 - 18	6 - 11	9 - 13	4 - 6	2 - 5	
below -3 to -6	below 27 to 21	45	8 - 13	14	8 - 14	5 - 8	5 - 9	4 - 6		
below -6 to -10	below 21 to 14	45	6 - 10	11	6 - 11	4 - 6	4 - 7	2 - 5	CAUTION: No holdover time guidelines exist	
below -10	below 14	45	5 - 9	7	4 - 7	2 - 4				

°C = Degrees Celsius °F = Degrees Fahrenheit OAT = Outside Air Temperature FP = Freezing Point

NOTES

- 1 To use these times, the fluid must be heated to a minimum temperature providing 60°C (140°F) at the nozzle and an average rate of at least 1 L/m² (2 gal./100 sq. ft.) must be applied to deiced surfaces, OTHERWISE TIMES WILL BE SHORTER.
- 2 During conditions that apply to aircraft protection for ACTIVE FROST.
- 3 Use light freezing rain holdover times if positive identification of freezing

drizzle is not possible.

- 4 Heavy snow, snow pellets, ice pellets, moderate and heavy freezing rain, and hail.
- 5 Type I Fluid/Water Mixture is selected so that the FP of the mixture is at least 10°C (18°F) below OAT.

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 also be reduced when aircraft skin temperature is lower than OAT.**
- **The only acceptable decision criteria time is the shortest time within the applicable holdover time table cell.**
- **Fluids used during ground deicing do not provide ice protection during flight.**

(For Sample Questions Only)

TABLE 2 - SAE TYPE II FLUID HOLDOVER GUIDELINES FOR WINTER 2003-2004¹

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

OAT		Type II Fluid Concentration	Approximate Holdover Times Under Various Weather Conditions (hours:minutes)						
°C	°F	Neat Fluid/Water (Vol%/Vol%)	Frost ²	Freezing Fog	Snow	Freezing Drizzle ⁴	Light Freezing Rain	Rain on Cold Soaked Wing	Other ⁵
		100/0	12:00	0:35 - 1:30	0:20 - 0:55	0:30 - 0:55	0:15 - 0:30	0:05 - 0:40	
above 0	above 32	75/25	6:00	0:25 - 1:00	0:15 - 0:40	0:20 - 0:45	0:10 - 0:25	0:05 - 0:25	
		50/50	4:00	0:15 - 0:30	0:05 - 0:15	0:05 - 0:15	0:05 - 0:10		
		100/0	8:00	0:35 - 1:30	0:20 - 0:45	0:30 - 0:55	0:15 - 0:30	CAUTION:	
0 to -3	32 to 27	75/25	5:00	0:25 - 1:00	0:15 - 0:30	0:20 - 0:45	0:10 - 0:25	No holdover	
		50/50	3:00	0:15 - 0:30	0:05 - 0:15	0:05 - 0:15	0:05 - 0:10	time	
below -3 to -14	below 27 to 7	100/0	8:00	0:20 - 1:05	0:15 - 0:35	0:15 - 0:45 ³	0:10 - 0:25 ³	guidelines	
		75/25	5:00	0:20 - 0:55	0:15 - 0:25	0:15 - 0:30 ³	0:10 - 0:20 ³	exist	

below -14 to -25	below 7 to -13	100/0	8:00	0:15 - 0:20	0:15 - 0:30	
below -25	below -13	100/0	Type II fluid may be used below -25°C (-13°F) provided the freezing point of the fluid is at least 7°C (13°F) below the OAT and the aerodynamic acceptance criteria are met.			
			Consider use of Type I when Type II fluid cannot be used.			

°C = Degrees Celsius °F = Degrees Fahrenheit OAT
= Outside Air Temperature Vol = Volume

NOTES

- 1 Based on tests of neat fluids with the lowest viscosity deliverable on the aircraft, yet meeting Type II WSET and HHET.
- 2 During conditions that apply to aircraft protection for ACTIVE FROST.
- 3 The lowest use temperature is limited to -10°C (14°F).
- 4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
- 5 Heavy snow, snow pellets, ice pellets, moderate and heavy freezing rain, and hail.
- 6 Snow includes snow grains.
- 7 Ensure that the lowest operational use temperature (LOUT) is respected.

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 also be reduced when aircraft skin temperature is lower than OAT.**
- **The only acceptable decision criteria time is the shortest time within the applicable holdover time table cell.**
- **Fluids used during ground deicing do not provide ice protection during flight.**

For Sample Questions Only)

**TABLE 3 - SAE TYPE IV FLUID HOLDOVER GUIDELINES FOR WINTER
2003-2004¹**

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

OAT		Type IV Fluid Concentration	Approximate Holdover Times Under Various Weather Conditions (hours:minutes)						
°C	°F	Neat Fluid/Water (Vol%/Vol%)	Frost ²	Freezing Fog	Snow	Freezing Drizzle ⁴	Light Freezing Rain	Rain on Cold Soaked Wing	Other ⁵
		100/0	18:00	1:05 - 2:15	0:35 - 1:05	0:40 - 1:10	0:25 - 0:40	0:10 - 0:50	
above 0	above 32	75/25	6:00	1:05 - 1:45	0:30 - 1:05	0:35 - 0:50	0:15 - 0:30	0:05 - 0:35	
		50/50	4:00	0:15 - 0:35	0:05 - 0:20	0:10 - 0:20	0:05 - 0:10		
		100/0	12:00	1:05 - 2:15	0:30 - 0:55	0:40 - 1:10	0:25 - 0:40	CAUTION:	
0 to -3	32 to 27	75/25	5:00	1:05 - 1:45	0:25 - 0:50	0:35 - 0:50	0:15 - 0:30	No holdover	
		50/50	3:00	0:15 - 0:35	0:05 - 0:15	0:10 - 0:20	0:05 - 0:10	time	
below -3 to -14	below 27 to 7	100/0	12:00	0:20 - 1:20	0:20 - 0:40	0:20 - 0:45 ³	0:10 - 0:25 ³	guidelines	
		75/25	5:00	0:25 - 0:50	0:20 - 0:35	0:15 - 0:30 ³	0:10 - 0:20 ³	exist	

below -14 to -25	below 7 to -13	100/0	12:0 0	0:15 - 0:40	0:15 - 0:30	
below -25	below -13	100/0	Type IV fluid may be used below -25°C (-13°F) provided the freezing point of the fluid is at least 7°C (13°F) below the OAT and the aerodynamic acceptance criteria are met.			
			Consider use of Type I when Type IV fluid cannot be used.			

°C = Degrees Celsius °F = Degrees Fahrenheit OAT = Outside Air Temperature Vol = Volume

NOTES

- 1 Based on tests of neat fluids with the lowest viscosity deliverable on the aircraft, yet meeting Type IV WSET and HHET.
- 2 During conditions that apply to aircraft protection for ACTIVE FROST.
- 3 The lowest use temperature is limited to -10°C (14°F).
- 4 Use light freezing rain holdover times if positive identification of freezing drizzle is not possible.
- 5 Heavy snow, snow pellets, ice pellets, moderate and heavy freezing rain, and hail.
- 6 Snow includes snow grains.
- 7 Ensure that the lowest operational use temperature (LOUT) is respected.

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 also be reduced when aircraft skin temperature is lower than OAT.**
- **The only acceptable decision criteria time is the shortest time within the applicable holdover time table cell.**
- **Fluids used during ground deicing do not provide ice protection during flight.**

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TABLE 4 - VISIBILITY IN SNOW VS. SNOWFALL INTENSITY CHART¹

Lighting	Temperature Range		Visibility in Snow (Statute Miles)			
	°C	°F	Heavy	Moderate	Light	Very Light
Darkness	-1 and above	30 and above	≤ 1	> 1 to 2½	> 2½ to 4	> 4
	Below -1	Below 30	≤ ¾	> ¾ to 1½	> 1½ to 3	> 3
Daylight	-1 and above	30 and above	≤ ½	> ½ to 1½	> 1½ to 3	> 3
	Below -1	Below 30	≤ ¾	> ¾ to 7/8	> 7/8 to 2	> 2