

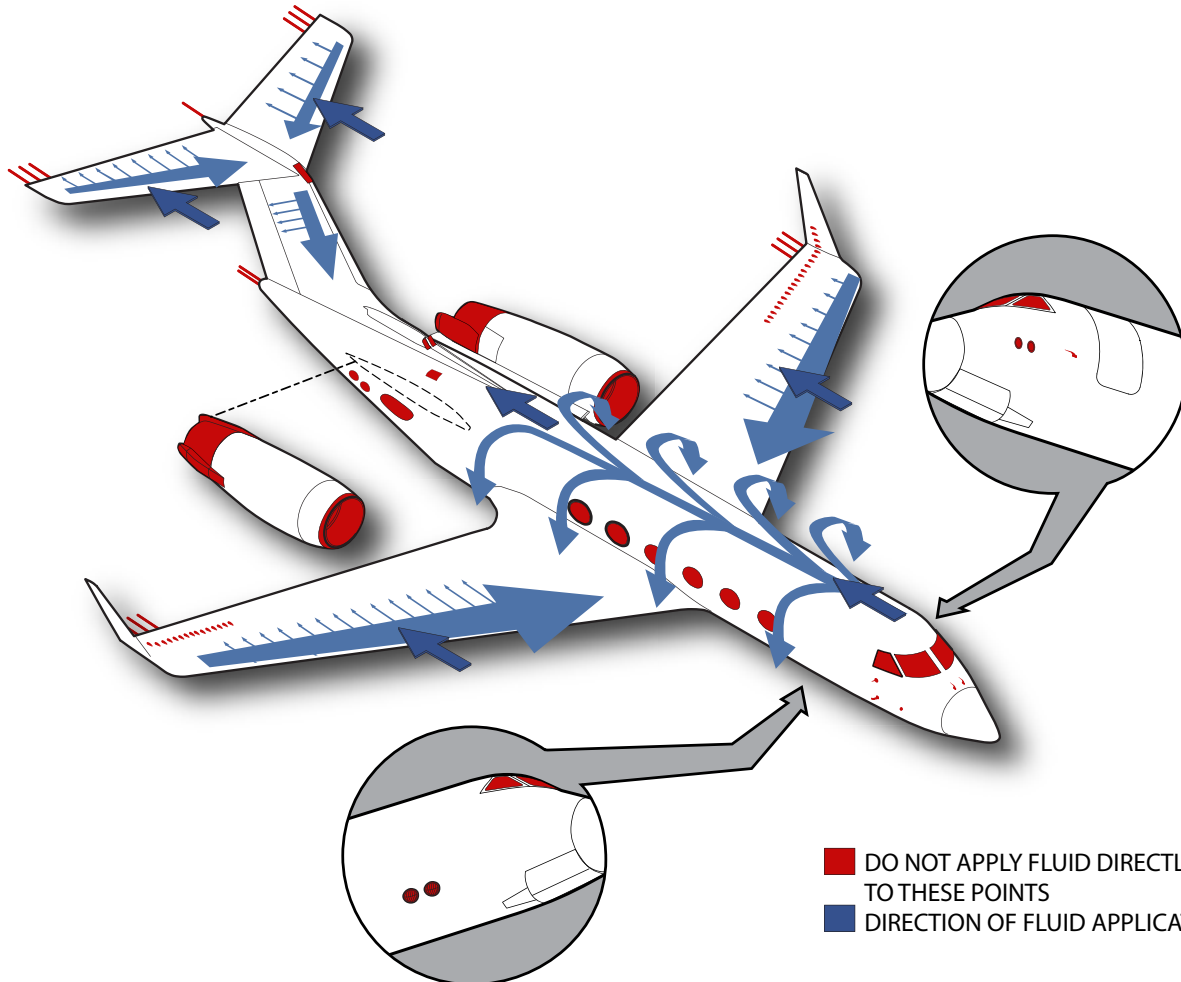
This guide is for the assistance of ground personnel only. In case of conflict between this guide and the Aircraft Maintenance Manual and / or Airplane Flight Manual, the Aircraft Maintenance Manual and / or Airplane Flight Manual shall take precedence.

General

1. Close doors and windows. Install covers and plugs as necessary.
2. Avoid excessive pressure (300 psi or greater) when applying fluid. Pressure should be adjusted to be able to traverse distance from nozzle to aircraft without damaging paint or structure.
3. Always spray from nose to tail and top to bottom to prevent fluid accumulation in sheltered areas.
4. Never spray deicing / anti-icing fluid or water on or into any air inlet or exhaust area, open tubes or ports (i.e., pitot tubes, static ports, total air temperature probe, AOA probes, vents, engine / APU, etc.). Never spray against trailing edge of wings or control surfaces. Avoid direct spraying of vortex generators and static wicks.
5. Spray wing and tail surfaces from tip to root.
6. Spray along top centerline and then outboard, letting the fluid cascade down and across the windows.
7. Avoid spraying heated fluids directly onto cabin and cockpit windows.
8. Removal of underwing frost in excess of 1/8 inch thickness and all frost on leading edges and upper surfaces is recommended. Depending on atmospheric conditions, it is recommended wings be anti-iced before takeoff.
9. Aircraft must be sprayed symmetrically, both wings and tail must be treated and not one side only.

Process

1. Deicing / anti-icing may be accomplished using either one step or two step process. Standard practice is to deice and if required, anti-ice before takeoff.
2. The one step process is application of heated, diluted deicing / anti-icing fluid, both to remove frost, snow and / or ice and provide very limited anti-icing protection. This protection can be enhanced by use of cold fluids or by use of techniques to cool heated fluid during deicing process. A technique commonly used is spraying a final coat of deicing fluid using very a fine mist, in arched trajectory to cool fluid before contact. This produces a thicker fluid film to enhance anti-icing effectiveness. Care must be exercised when using this technique to ensure freezing has not occurred within fluid previously applied.
3. The two step process involves both deicing and anti-icing. First step (deicing step) is accomplished by using hot water or hot mixture of FPD and water. Ambient weather conditions and type of accumulation to be removed must be considered in determining which deicing fluid to use. Second step (anti-icing step) involves applying full strength Type I or stronger mixture of SAE or ISO Type II and water at cooler temperatures to critical surfaces. If heated water alone is used in deicing process, second step must be accomplished before refreezing occurs, generally within 3 minutes after beginning of deicing step. If necessary, this process is conducted area by area to prevent refreezing.



- DO NOT APPLY FLUID DIRECTLY TO THESE POINTS
- DIRECTION OF FLUID APPLICATION

Deicing

- For optimum deicing, requirement is even film of deicing fluid to be applied on all surfaces. Type I and / or Type II fluids should be applied as specified by manufacturer recommendations or table below. Economical results are obtained by starting on highest part of fuselage, wings, etc. and covering evenly from there toward lower sections.
- Remove heavy accumulations of snow or ice.
- If nose of aircraft has been deiced, it must be wiped down with isopropyl alcohol to ensure no fluid runs back on windshield.
- Closely inspect and clean areas on and under wiper blades.
- A fine mist of deicer solution repeated two or three times over affected area is more effective than solid stream.
- Apply deicing fluid to lower surface of ailerons, horizontal stabilizer, elevator and landing gear when wet snow conditions exist or when aircraft will use slushy taxiways or runways.
- After completion of deicing, a complete operational check of flight controls is mandatory. Ensure engine controls and AOA probes operate freely.

Anti-icing

- It is not recommended to use diluted deicing fluid for anti-icing, melting snow will further dilute the solution and refreezing will take place.
- For optimum anti-icing, requirement is even film of anti-icing fluid to be applied on all surfaces. Type I and / or Type II fluids should be applied as specified by manufacturer recommendations or table below. Economical results are obtained by starting on highest part of fuselage, wings, etc. and covering evenly from there toward lower sections.
- Correct amount of fluid has been applied when fluid just starts to run off.
- If nose of aircraft has been anti-iced, it must be wiped down to ensure no fluid runs back on windshield. Closely inspect and clean areas on and under wiper blades.
- If fluid cannot be applied before onset of light frost, anti-icing solution can still be applied and produce expected results.
- Heavy frozen deposits shall be removed by deicing procedure, followed by application of cold anti-icing solution.
- After completion of anti-icing, a complete operational check of flight controls is mandatory. Ensure engine controls and AOA probes operate freely.

FAA AC 120-58 Guidelines for Application of SAE Anti-icing / Deicing Fluids

Fluid Type	OAT	One Step Process Deicing / Anti-icing	Two Step Process	
			Step 1: Deicing	Step 2: Anti-icing ^{(1), (2)}
Type I ⁽³⁾	> -3°C (27°F)	Mix of fluid and water heated to 60°C (140°F) minimum at the nozzle, with a freeze point of at least 10°C (18°F) below OAT	Heated water or mix of fluid and water heated to 60°C (140°F) minimum at the nozzle	Mix of fluid and water heated to 60°C (140°F) minimum at the nozzle, with a freeze point of at least 10°C (18°F) below OAT
	< -3°C (27°F)		Freezing point of heated fluid mixture shall not be more than 3°C (5°F) above OAT	
Type II, III or IV	> -3°C (27°F)	50 / 50 Heated ⁽⁴⁾ Type II, III or IV	Water heated or a heated mix of Type I, II, III or IV and water	50 / 50 Type II, III or IV
	< -3°C (27°F) > -14°C (7°F)	75 / 25 Heated ⁽⁴⁾ Type II, III or IV	Heated suitable mix of Type I, II, III or IV and water with freezing point not more than 3°C (5°F) above actual OAT	75 / 25 Type II, III or IV
	< -14°C (7°F) > -25°C (-13°F)	100 / 0 Heated ⁽⁴⁾ Type II, III or IV		100 / 0 Type II, III or IV
	< -25°C (-13°F)	<p>SAE Type II/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 OAT and that aerodynamic acceptance criteria are met.</p> <p>SAE Type III fluid may be used below -10°C (14°F) provided the freezing point of the fluid is at least 7°C (13°F) below OAT and aerodynamic acceptance criteria are met.</p> <p>Consider the use of SAE Type I when Type II, III, or IV fluid cannot be used.</p>		

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 TYPE 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.

ONLY THE TYPE III OR TYPE IV FLUIDS SPECIFIED IN THE AIRPLANE FLIGHT MANUAL ARE RECOMMENDED FOR USE ON GULFSTREAM AIRPLANES. THE USE OF OTHER TYPE III OR TYPE IV FLUIDS MUST BE APPROVED IN WRITING BY THE GULFSTREAM ENGINEERING DEPARTMENT.

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 recommendations.

To use Type I holdover time guidelines in snow conditions, at least 1 liter per square meter (2 gal. per 100 square feet) fluid must be applied to the deiced surfaces.

- To be applied before first step fluid freezes, typically within 3 minutes.
- Fluids must only be used at temperatures above their Lowest Operational Use Temperature (LOUT).
- This table is applicable for the use of Type I Holdover Time Guidelines. If holdover times are not required, a temperature of 60°C (140°F) at the nozzle is desirable.
- Clean aircraft may be anti-iced with unheated Type II, III, or IV fluid.