US Airways Express Ground Deicing Manual

CHAPTER THREE

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US Airways Express Ground Deicing Manual

1. DEICING AIRCRAFT GENERAL

"Clean Aircraft Policy"

Deicing is the removal of snow, ice, and frost from an aircraft. This is necessary since even small amounts of contamination can disrupt the airflow and add significant weight to the aircraft. When disruption to the airflow occurs, lift is reduced which can reduce aircraft controllability and may even prevent it from becoming airborne. When ice accumulates on propellers, it acts to reduce thrust and may result in disturbing the balance of the propeller, which causes severe, violent vibrations to occur when the engine is operated.

Even a small amount of substance build up on aircraft surfaces can adversely affect aircraft performance. Tests have shown that the formation of snow, ice or frost on the leading edge of a wing can reduce lift by as much as 30% and increase drag by as much as 40%. These changes in lift and drag will increase stall speed, reduce controllability, and negatively alter flight characteristics.

No person may takeoff in an aircraft when frost, ice or snow is adhering to the wings, control surfaces, propellers, engine inlets, or other critical surfaces of the aircraft (14CFR 121.629). US Airways/US Airways Express is authorized to remove all contamination from the aircraft with the exception of allowing up to 1/8 inch of frost on the underside of the wings in the area of the fuel tank. The Pilot in Command is responsible for ensuring a clean aircraft. This is known as the "Clean Aircraft Policy".

Deicing and anti-icing can be accomplished in either a 1-step or 2-step process. A 1-step process involves deicing and anti-icing the aircraft with deicing fluid during a single application. The 2-step process involves deicing the aircraft as step 1, immediately followed by an application of an anti-icing fluid as step 2.

During active falling precipitation/deicing event when using Type I or Type III fluid, deicing may be accomplished following the 1-step method however anti-icing **must** follow the 2-step method regardless if the fluids used are the same.

Anti-icing is used as a means of extending holdover time when the possibility exists of aircraft surfaces refreezing.

The staggered application of Type I and Type IV fluid by aircraft section is an approved method of deicing/anti-icing for US Airways Express aircraft. Deicing operators must be aware of and avoid the possibility of overspray of Type I fluid on previously treated Type IV surfaces.

****WARNING****

An inspection for overspray of Type I fluid on anti-iced areas of the aircraft must occur during the post deice/anti-ice check. If over spray of Type I or contamination occurs in an area previously protected with Type IV, the contaminated section must be deiced/anti-iced again.

Efficiency considerations sometimes dictate a combination of ice removal methods. Heavy accumulations of snow may be more effectively removed using brooms, followed by a final cleaning with heated deicing fluid.

Aircraft deicing fluids are very soluble in water. However, the rate at which ice will absorb deicing fluid is very slow. If frost ice, or snow is adhering to the wing surface, that ice formation may be melted by repeated applications of aircraft deicing fluid. The process of melting this ice is greatly enhanced by the thermal energy of heated aircraft deicing fluid.

Deicing units should be checked prior to each operation to ensure an adequate quantity of fluid to complete the deicing/anti-icing application.

The operator of the spray equipment will report any changes such as abnormal foaming, lack of wetting or different color of deicing/anti-icing fluids to management immediately.

Prior to towing the deicer, driving the deicing truck, or deicing an aircraft, the Agent in Charge, Supervisor or Manager will hold a safety briefing with the deicing team members (driver, deicer, and guide person, if applicable) to discuss the policies and procedures outlined in this manual for the particular aircraft being deiced as well as the specific local procedures. An operational test of boom to truck headset communications must be conducted prior to each use. In the event of failure during use, back-up communication will be used (i.e., spraying the truck roof, hand signals, etc.). The use of an alternate means of communication (hand signals) should be temporary only until voice communication is restored.

To the greatest extent possible and practical, off-gate deicing should be accomplished for the safety of the cabin, aircraft stairs, ramp area, employees and passengers.

NOTE:
Ground deicing equipment will be operated in accordance with the appropriate equipment operating manual.

No heated water or water is permitted for use when removing any type of contamination such as, frost, ice, snow, slush, etc. Once a deicing event has been declared, a minimum temperature of 140°F or higher, is required prior to spraying onto critical aircraft surfaces. The fluid's temperature must be checked prior to deicing. When a self-heating deicing unit is available, a minimum truck gauge temperature reading of 160° F or higher is required.

Prior to the start of each deicing season, all Type I and Type III units will undergo a temperature gauge check to ensure proper operation. This check will be conducted by GSE and results maintained on file for one (1) year. The reason for this check is to validate that the gauge is recording correctly. An acceptable instrument or means used to accomplish this check would be the procurement of an instrument (thermometer) that does not require calibration. Regardless of the procedures used, the check must ensure the fluid is applied at a nominal temperature of 180 degrees F (+ or - 20 degrees of 180 degrees F) with a minimum of 140 degrees F and a maximum of 200 degrees F.

A. BROOMING

Brooming is used to brush snow accumulations off aircraft prior to spraying deicing/anti-icing fluid. The following "brooming" precautions are used:

(1) Use only a soft bristle broom.
(2) Do not stand on the aircraft. Sweep off only what can be reached safely considering weather conditions at the time.
(3) Sweep off fuselage accumulations when possible.
(4) Use extreme caution not to damage vortex generators, static wicks, antennas, pitot tubes, etc., when brooming.
(5) Never strike an aircraft to remove ice accumulation.
(6) Brooming to be accomplished only by personnel qualified in deicing/anti-icing procedures.

B. SPRAYING DEICING/ANTI-ICING FLUID

Spray the critical aircraft surfaces with enough fluid to wet the entire area(s) down, then let the snow, ice, or frost melt. (Definition of *Critical Aircraft Surfaces* is located in Chapter 8)

CAUTION

Do not spray fluid into intake or exhaust areas of engine nacelles, pitot tubes, static vents, aircraft ducts, APU ducts, or any other openings. These critical areas should be contaminant free prior to release from the deicing pad.

NOTE:

Do not try to blast or wash all the snow, ice, or frost off the wings and tail surfaces during the first spraying.

Surfaces to be anti-iced are those critical surfaces listed by fleet type in Section 5 of this manual.

It may be necessary to spray these surfaces a second time to ensure they are completely free of snow, ice, or frost. Up to 1/8 inch of frost is allowed on the underside of the wing between the front and rear spar if caused by cold soaked fuel. All other frost must be removed.

The removal of thick frozen snow or glazed ice is best accomplished by spraying hot deicing fluid in one spot until bare metal is exposed. The heat of the fluid will then lift the snow or ice from the aircraft surfaces without requiring melting, thus saving deicing fluid.

If frozen precipitation is falling, or there is a chance of aircraft surfaces re-freezing, anti-ice fluid application should be started immediately following deicing. Complete anti-icing as close to departure time as possible in order to achieve maximum holdover time. The anti-icing fluid should be applied equally to both sides of the aircraft in a uniform and symmetrical manner. The correct amount of fluid required will be visually indicated by the fluid just beginning to drip off the leading and trailing edges.

CAUTION

No passenger or cargo doors are to be directly sprayed with deicing fluid. This could result in hot deicing fluid entering the aircraft and causing injury to customers and crewmembers, or damaging luggage in the cargo bin.

CAUTION

Do not spray deicing/anti-icing fluid directly on any windows. If they must be cleaned, spray fluid above the window and allow to flow down. This will prevent the window seals from failing and allowing hot fluid to enter the cockpit or cabin.

Whenever possible, park the aircraft into the wind to prevent fluid from blowing back into the face of deicing personnel. This is particularly important with strong winds. Whenever possible, spray with the wind.

CAUTION
Under no circumstances should the spray be directed at the trailing edges of control surfaces. Such spray may force partially melted contamination into hinge mechanisms and under control shrouds with risk of later refreezing.

When aircraft have been taxied on wet or slushy taxiways, remove any accumulation of ice and/or slush from the landing gear components. If necessary, use wheel chocks to secure the aircraft and spray wheels and brakes to remove ice and slush.

Do not waste deicing/anti-icing fluid. Use as much fluid as is needed for each deicing/anti-icing operation, keeping in mind that the critical surfaces must be completely free of snow, ice and frost.

CAUTION
Do NOT spray hot brakes.

C. TOWER/BASKET UNIT

When a tower or basket unit is used, normally a minimum of two agents will be necessary. One agent will drive the unit or tug, the second will be on top of the tower or in the basket spraying. A third agent, if available, can assist in guiding the unit and relaying messages between the driver and agent spraying.

When an agent is in the basket, on top of the tower accessed by the ladder or operating in a bucket not 100% enclosed, a fall-restraint lanyard and full body harness are required. The deicing unit should not be moved when anyone is climbing or standing on the ladder.

A 10-foot clearance should be maintained at all times between the aircraft and the deicing truck/unit. A minimum of 5 feet should be allowed between the basket/cab and the aircraft.

The speed of the tug or truck should not exceed 5 mph.

CAUTION
If employees cannot see where they are going due to poor visibility, steam, rain, fog, etc., employees must remain stationary until it is determined that it is safe to move.

The same principle exists with communication; if the ability to speak or warn another employee of potential hazards is not possible, the operation must stop until communications are re-established.

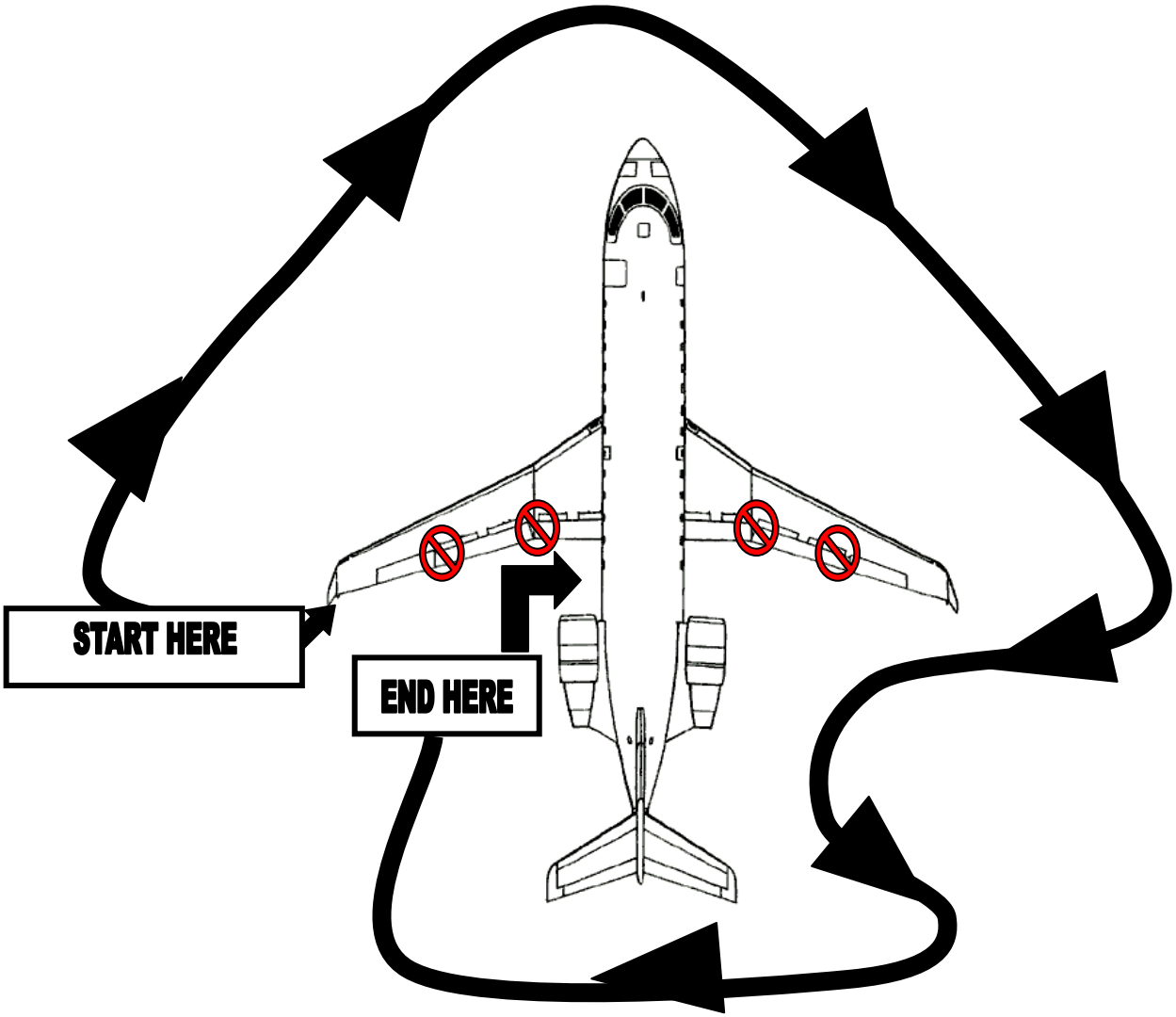
D. DEICING SPRAY SEQUENCE – SINGLE TRUCK APPLICATION

The sequence listed below is for representative purposes. It is obvious that all aircraft are not configured alike and general adherence to these items is intended. For instance, turbojet aircraft such as the ERJ and CRJ do not have wing-mounted engines or propellers.

The preferred deicing sequence will normally begin at the wing tip on the left side of the aircraft and work clockwise around the aircraft or as conditions or obstructions dictate. The tail and aft fuselage must be the last sections of the aircraft to be deiced.

(1)	a.	outer leading edge
	b.	top of outer wing
	c.	aileron, tab and horn area
(2)	a.	top of wing center section
	b.	flap and hinge points
	c.	slot between flap and wing
	d.	left wheel well area
(3)	a.	propeller and spinner
	b.	engine nacelle
	c.	inner wing leading edge and fairing
(4)	a.	top forward fuselage
	b.	left side of the fuselage
(5)	a.	nose section
(6)	a.	top forward fuselage
	b.	right side of the fuselage
(7)	a.	inner wing leading edge and fairing
	b.	engine nacelle
	c.	propeller and spinner
(8)	a.	right wheel well area
	b.	top of wing center section
	c.	slot between flap and wing
	d.	flap and hinge points
(9)	a.	outer leading edge
	b.	top of outer wing
	c.	aileron, tab and horn area
(10)	a.	top and aft fuselage
	b.	leading edge of vertical stabilizer
	c.	leading edge of horizontal stabilizer
(11)	a.	elevator hinge points
	b.	elevator, trim and spring tab and horn area
	c.	top of horizontal stabilizer (top **and** bottom on T-tail aircraft)
	d.	rudder
(12)	a.	leading edge of horizontal stabilizer
	b.	leading edge of vertical stabilizer
	c.	top and aft fuselage

DEICING SEQUENCE USING ONE DEICING TRUCK



= Fluid application shall be leading edge to trailing edge.

E. DEICING SPRAY SEQUENCE – TWO-TRUCK APPLICATION

(1) a. nose section

(2) a. left and right side of the fuselage
b. top forward fuselage

(3) a. propeller and spinner
b. engine nacelle
c. inner wing leading edge and fairing

(4) a. outer leading edge
b. top of outer wing
c. aileron, tab and horn area
d. top of outer wing
e. flap and hinge points
f. slot between flap and wing
g. top of wing center section

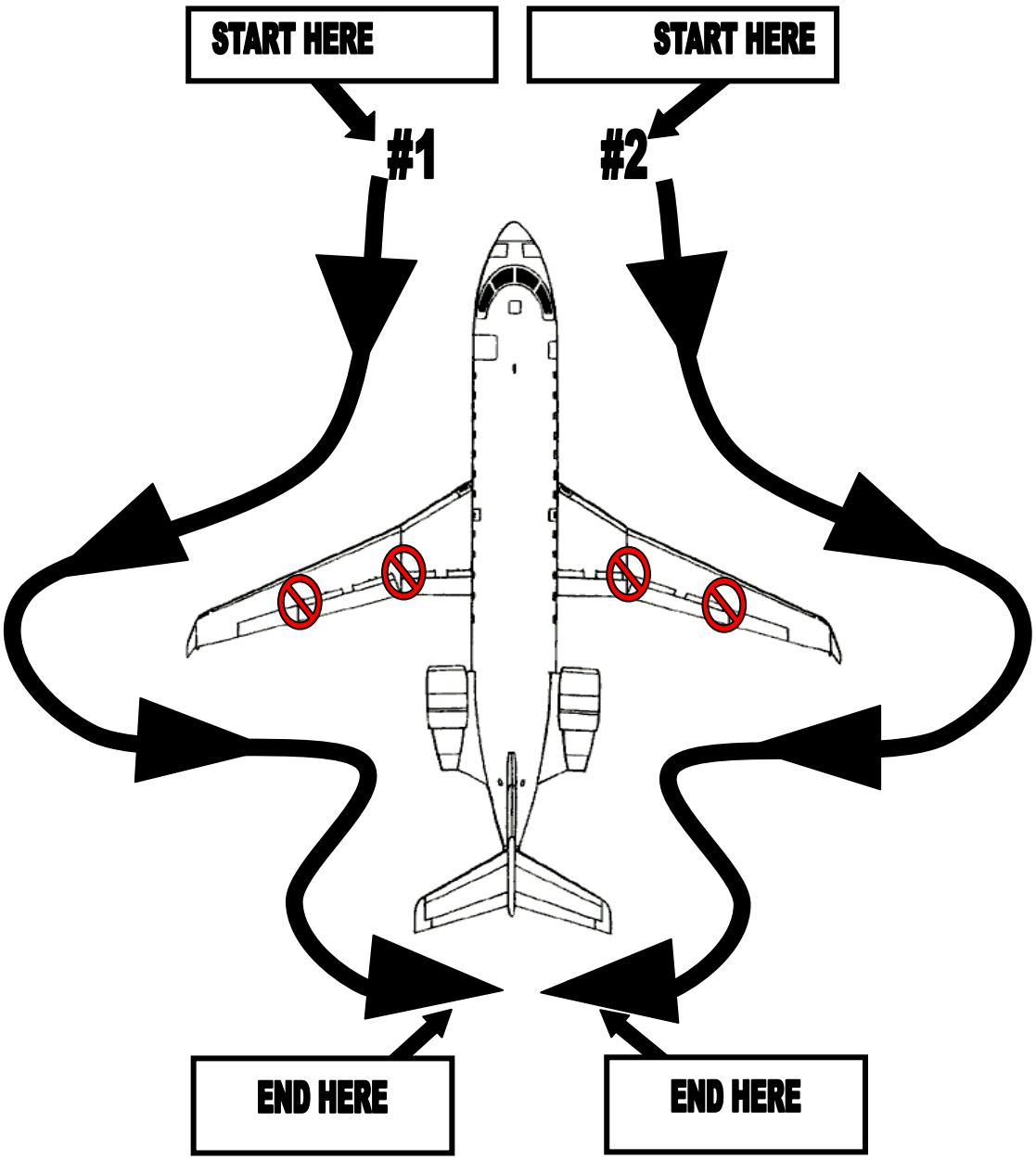
(5) a. top and aft fuselage
b. left and right wheel well area

(6) a. top and aft fuselage
b. leading edge of vertical stabilizer
c. leading edge of horizontal stabilizer

(7) a. elevator hinge points
b. elevator, trim and spring tab and horn area
c. top of horizontal stabilizer (top **and** bottom on T-tail aircraft)
d. rudder

NOTE
One person will be designated to transmit all required crew information.

DEICING SEQUENCE USING TWO DEICING TRUCKS



= Fluid application shall be leading edge to trailing edge.

F. DEICING SPRAY SEQUENCE – THREE-TRUCK APPLICATION

Truck 1

(1) a. left nose section
(2) a. left forward fuselage
b. left top forward fuselage
(3) a. left inner wing leading edge and fairing, left propeller and spinner, left engine nacelle
(4) a. left wing outer leading edge
b. left wing top of outer wing
(5) a. left aileron, tab and horn area
b. left top of outer wing
(6) a. left flap and hinge points
b. left slot between flap and wing
c. left top of wing center section
d. left top and aft fuselage
e. left wheel well area

Truck 2

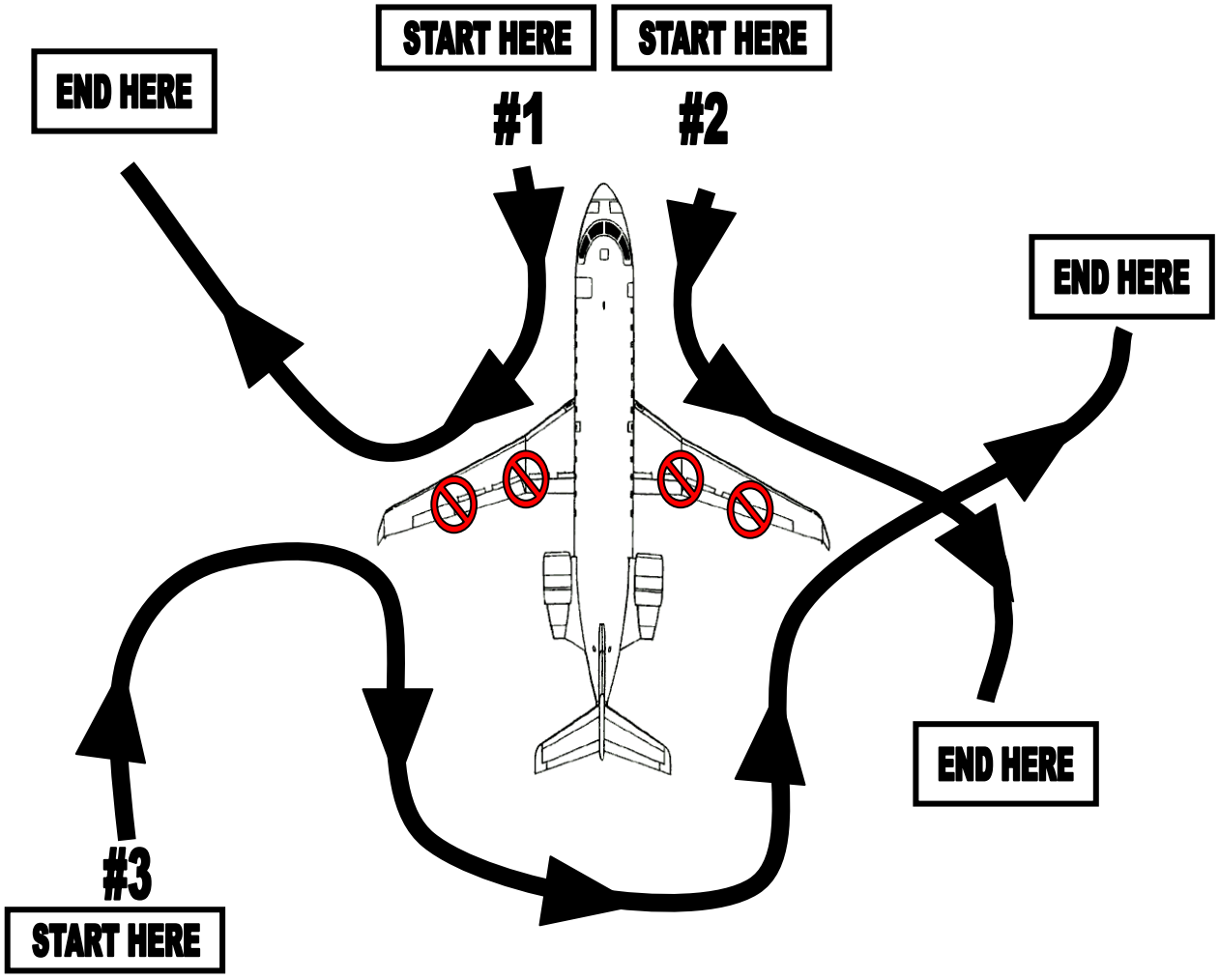
(1) a. right nose section
(2) a. right forward fuselage
b. right top forward fuselage
(3) a. right inner wing leading edge and fairing, right propeller and spinner, right engine nacelle
(4) a. right wing outer leading edge
b. right wing top of outer wing
(5) a. right aileron, tab and horn area
b. right top of outer wing
(6) a. right flap and hinge points
b. right slot between flap and wing
c. right top of wing center section
d. right top and aft fuselage
e. right wheel well area

Truck 3

(1) a. left leading edge of vertical stabilizer
b. left leading edge of horizontal stabilizer
(2) a. elevator hinge points
b. elevator, trim and spring tab and horn area
c. top of horizontal stabilizer (top **and** bottom on T-tail aircraft)
d. rudder
(3) a. right leading edge of vertical stabilizer
b. right leading edge of horizontal stabilizer

NOTE
One person will be designated to transmit all required crew information.

DEICING SEQUENCE USING THREE DEICING TRUCKS



= Fluid application shall be leading edge to trailing edge.

G. DEICING SPRAY SEQUENCE – FOUR-TRUCK APPLICATION

Truck 1

(1)	a.	left nose section
(2)	a.	left forward fuselage
	b.	left top forward fuselage
(3)	a.	left inner wing leading edge and fairing, left propeller and spinner, left engine nacelle
(4)	a.	left wing outer leading edge
	b.	left wing top of outer wing
(5)	a.	left aileron, tab and horn area
	b.	left top of outer wing
(6)	a.	left flap and hinge points
	b.	left slot between flap and wing
	c.	left top of wing center section
	d.	left top and aft fuselage
	e.	left wheel well area

Truck 2

(1)	a.	right nose section
(2)	a.	right forward fuselage
	b.	right top forward fuselage
(3)	a.	right inner wing leading edge and fairing, right propeller and spinner, right engine nacelle
(4)	a.	right wing outer leading edge
	b.	right wing top of outer wing
(5)	a.	right aileron, tab and horn area
	b.	right top of outer wing
(6)	a.	right flap and hinge points
	b.	right slot between flap and wing
	c.	right top of wing center section
	d.	right top and aft fuselage
	e.	right wheel well area

Truck 3

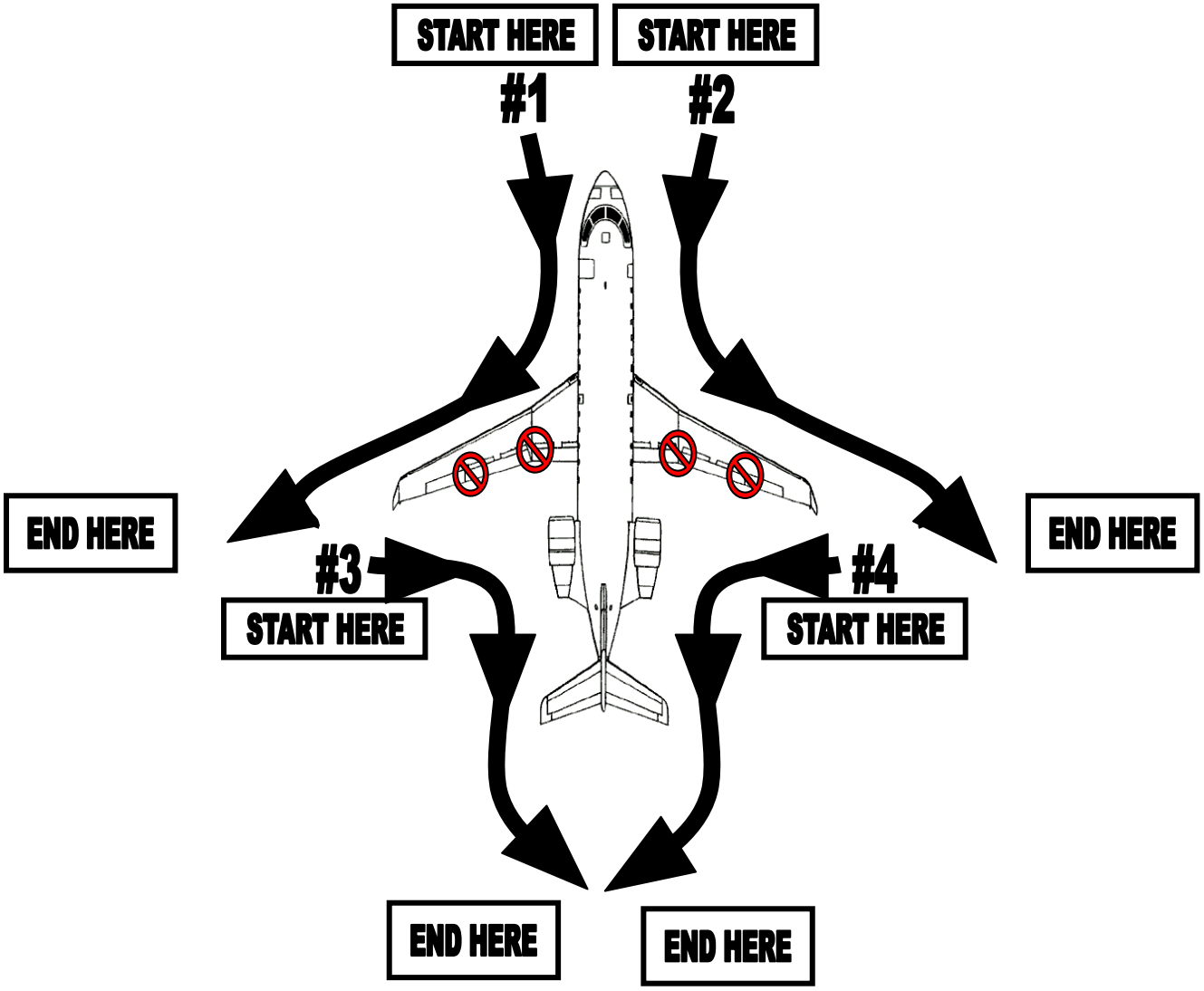
(1)	a.	left aft fuselage
	b.	left top fuselage
(2)	a.	left leading edge of vertical stabilizer
	b.	left leading edge of horizontal stabilizer
(3)	a.	elevator hinge points
	b.	elevator, trim and spring tab and horn area
	c.	top of horizontal stabilizer (top **and** bottom on T-tail aircraft)
	d.	left rudder

Truck 4

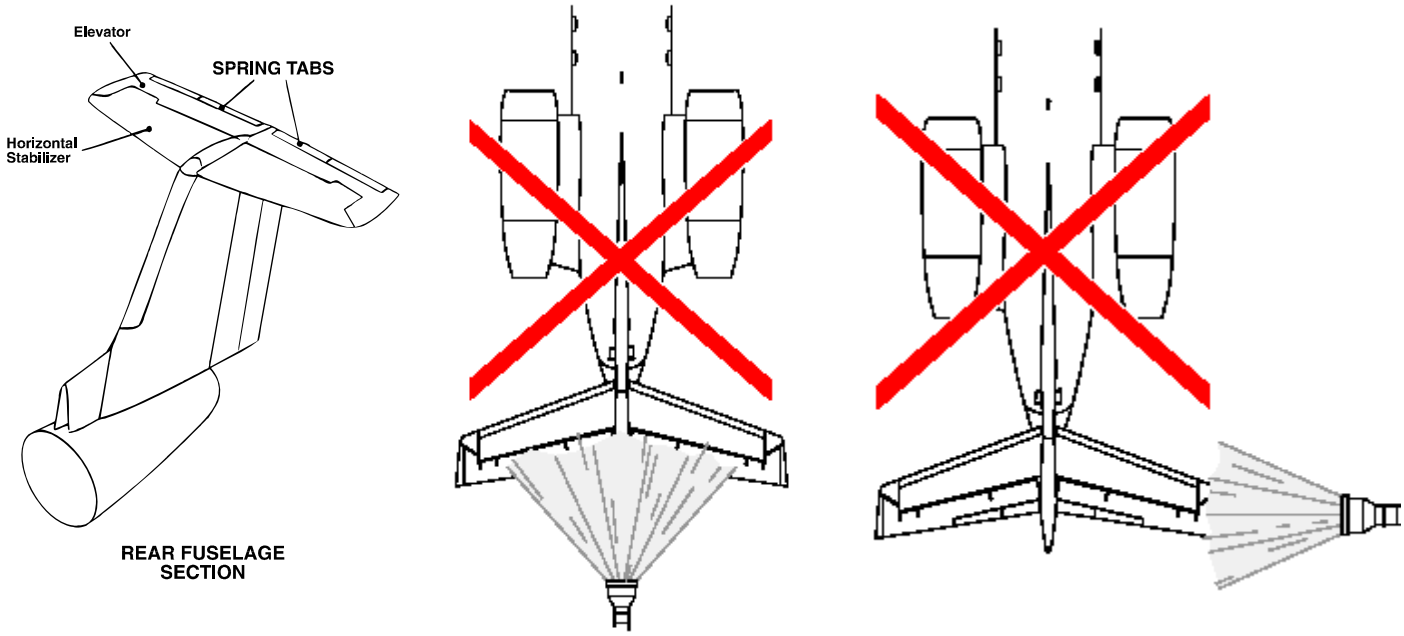
(1)	a.	right aft fuselage
	b.	right top fuselage
(2)	a.	right leading edge of vertical stabilizer
	b.	right leading edge of horizontal stabilizer
(3)	a.	elevator hinge points
	b.	elevator, trim and spring tab and horn area
	c.	top of horizontal stabilizer (top **and** bottom on T-tail aircraft)
	d.	right rudder

NOTE
One person will be designated to transmit all required crew information.

DEICING SEQUENCE USING FOUR DEICING TRUCKS



= Fluid application shall be leading edge to trailing edge.



H. CRITICAL AREAS TO SPRAY – ALL AIRCRAFT

(1) thoroughly deice tail and elevator areas, to include the slots between elevator and vertical tail assembly and elevator spring tab

CAUTION
Avoid back spraying and side spraying of the tail (including elevator, stabilizer, and rudder) to prevent glycol from entering the APU inlet.

(2) leading edge, all wing areas, and fuselage
(3) propellers and spinners (engines not running)

NOTE:

Spray from side to avoid spraying deicing fluid into engine air intake.

(4) landing gear and gear doors

CAUTION
Do not spray deicing fluid on hot brakes.

(5) aileron area

I. CAUTION AREAS (AVOID DIRECT SPRAY) – ALL AIRCRAFT

(1) engine air intake
(2) static ports and pitot tubes
- Deicing fluids in these areas could cause improper cockpit instruments readings.

CAUTION
Directly spraying these areas can cause personal injury, aircraft damage or inaccurate instrument readings.

(3) main landing gear proximity switches
(4) fresh air vents
(5) air conditioning inlets
(6) engine/APU exhaust area
(7) all doors and emergency exits
(8) refueling panels
(9) all windows
(10) aft side of propeller hubs
(11) APU air intake

J. CANADIAN DEICING PROCEDURES

For deicing at Canadian locations, US Airways Express has accepted the training and procedures as outlined in the International De/Anti-Icing Manual with respect to international ground deicing provisions of Part 121 operator-approved programs. The International De/Anti-Icing Manual can be found at www.usairways-express.com.

2. AIRCRAFT INSPECTIONS

A. POST DEICE/ANTI-ICE CHECK

All critical surfaces of the aircraft must be visually inspected before an aircraft is released for departure during icing conditions or when deicing/anti-icing has been completed. The inspection is to be performed from an elevated piece of equipment offering sufficient visibility of these parts. The aircraft must meet the "Clean Aircraft Policy" before being cleared to depart. Aircraft surfaces to inspect include:

(1) wings, tail and control surfaces (to include the elevator spring tab DHC-8)
(2) pitot heads, static ports, and angle of attack sensors
(3) engine inlets and intakes
(4) propellers
(5) air conditioning inlets, exhausts
(6) landing gear and landing gear doors
(7) fuel tank vents
(8) fuselage

This check should include any evidence of clear ice or fluid failure. Ground personnel performing these checks must be alert to the possibility that the fluids used may have “failed” or that clear ice has formed.

Anti-ice fluids are considered to have “failed” and to have lost their effectiveness when they become diluted with falling precipitation to the point where ice becomes visible in the fluid. When this occurs, the fluid begins to appear “opaque” rather than transparent and glossy and/or the inability to discern structural details (rivets, screws, seams) through the fluid becomes apparent.

Clear ice can form anytime aircraft skin temperature is below freezing and wet snow, rain, drizzle, fog, or high humidity is present. Aircraft skin temperature may drop below freezing:

After short time periods at altitude
When aircraft is parked in sub-freezing temperatures
Due to cold-soaked fuel

Relatively warm fuel may cause dry snow to melt and refreeze as skin temperature drops below freezing, forming an invisible ice layer beneath the snow. Snow falling on warm leading edges will melt, but may refreeze under certain conditions, forming "run-back" ice. (Formed when water runs back from the leading edge where it was formed by deicing, and subsequently freezes on moveable surfaces and interferes with their operation.)

Clear ice is extremely difficult to see and often requires touch to detect.

B. TACTILE CHECK/INSPECTION (ERJ-135/145 and CRJ-200 ONLY)

A physical post-deicing tactile (hands-on) check of both wings leading edges, wings forward upper surface and wings rear upper surface must be accomplished to ensure that the wings and control surfaces are free of contaminants (i.e., snow, ice, etc.).

This check is accomplished after deicing has been completed and if anti-icing is necessary, before anti-icing begins. Roughness due to adhering frozen contamination, especially frost, can, significantly affect the lift and handling characteristics of an aircraft. Hard wing aircraft in particular are sensitive to such contamination on the wing's leading edge. A problem for aircraft with rear-mounted engines is the risk of engine damage caused by frozen contamination shedding from the wings.

(1) A tactile check must be performed on all Embraer 135/145 and Canadair CRJ-200 aircraft.
(2) This check is accomplished after deicing has been completed and if anti-icing is necessary, before anti-icing begins.
(3) A tactile check must be accomplished from outside of the aircraft by qualified ground personnel trained in tactile inspection procedures.
(4) This is performed by physically touching the wings leading edges and an arm's length section of the upper wings surface to ensure surfaces are free of frost, ice and snow.
    a. Use a gloved hand on the surfaces across the wing's leading edge, wing's forward upper surface and wing's rear upper surface to determine that the wings are free from frost, ice, snow or slush.
    b. When performing a tactile check, you should be able to feel wing seams where two pieces of metal are joined or screw/rivet heads. If you cannot feel the differences in these surfaces, this is an indication that ice may be present and additional deicing is required.
(5) If the check cannot be accomplished because the individual performing the check cannot satisfactorily reach the area, the aircraft must not be dispatched. Another qualified individual must be contacted to perform the check and/or a suitable ladder may be required.

WARNING
During inspection of the wings rear upper surface with engines operating, it is IMPERATIVE that the inspecting agent remains clear of the engine intake danger area at all times.

CAUTION
A ladder may be used to view the area. The top area of the ladder must not be used as a step. Aluminum ladders are approved and must contain non skid (steps) devices to ensure positive footing. Caution must be observed when using in conditions of falling precipitation or glycol in the immediate area.

For safety reasons, wooden ladders are PROHIBITED. At no time is the ladder allowed to come in contact with the aircraft and if it does maintenance should be contacted.

CAUTION
When performing a tactile inspection of the wings rear upper surface, the inspecting agent should not touch the area between the extended flaps or aileron and the wing surface.

CAUTION
The tactile inspection should be of the center area, not around the edges of the flaps or ailerons. These areas are extremely dangerous and only require a visual inspection.

NOTE
It is recommended that a thin protective glove (i.e. latex, rubber or vinyl) is worn to complete tactile checks.

C. PRE-TAKEOFF CHECK

A pre-takeoff check is a required check that is accomplished by the flight crew anytime the aircraft has been deiced/anti-iced and a holdover time has been established. The flight crew procedures for this check may be found in the relevant Pilot's Operating Manual, Flight Operations Manual, or equivalent manual.

Aircraft representative surfaces must meet the "Clean Aircraft Policy" for the aircraft to be released for flight.

This procedure will not be conducted by ground personnel on US Airways Express aircraft.

D. PRE-TAKEOFF CONTAMINATION CHECK

In the event that the holdover time has been exceeded after deicing/anti-icing, or if freezing precipitation is falling and the aircraft has not been deiced or anti-iced, a pre-takeoff contamination check is required to be completed within 5 minutes prior to beginning takeoff.

If the aircraft has been treated with anti-icing fluid, aircraft surfaces should appear glossy, smooth, and wet. If these inspections indicate any accumulations of ice, snow, or frost on critical surfaces, the aircraft shall be returned for additional deicing and, where appropriate, additional anti-icing.

This procedure will not be conducted by ground personnel on US Airways Express aircraft.

CAUTION

Ice formation may be difficult to detect during conditions of freezing drizzle and light freezing rain. Strict adherence to Pre-Takeoff Check and Pre-Takeoff Contamination Check procedures in these conditions is especially important at night and in limited visibility conditions. If any doubt exists concerning the aircraft's conditions after completing either check, the aircraft cannot takeoff unless it is deiced again or it is determined that the aircraft is free of contamination.

3. COMMUNICATIONS TO FLIGHT CREW

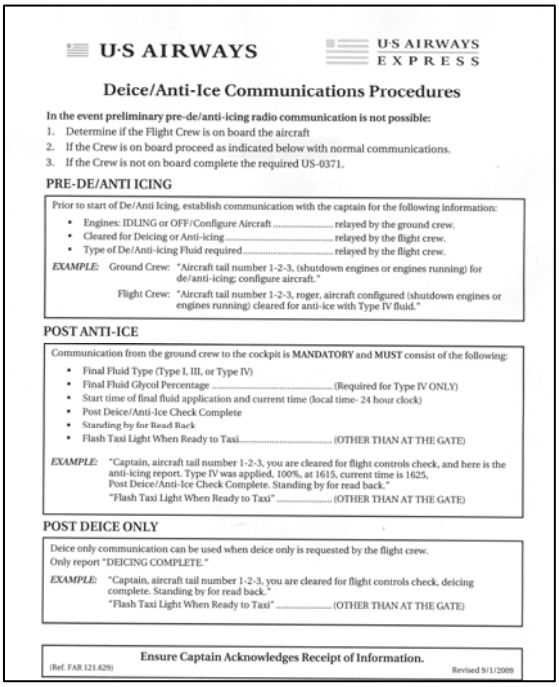
In the event preliminary pre-de/anti-icing radio communication is not possible, determine if the Flight Crew is on board the aircraft. If the Crew is on board proceed as indicated with normal communications. If the Crew is not on board, complete the required US-0371.

The individual who performs the deicing/anti-icing procedure and certifies the aircraft is clean and ready for departure, or the supervisor of the ground deicing activity (or his designee), will provide the following information to the flight crew:

(1) fluid type
(2) mixture ratio for Type III and Type IV fluid only
(3) the start time of the final deice/anti-ice application and the current time
(4) verification that the post application check has been completed, and that the aircraft is "clean and ready" for departure.

Stations will maintain a log of the individual(s) deicing aircraft. For instance, at stations where US Airways is the deicing contractor, the station will maintain a log of those working on the deicing vehicle.

US Airways/US Airways Express Communication Card



U·S AIRWAYS — U·S AIRWAYS EXPRESS

Deice/Anti-Ice Communications Procedures

In the event preliminary pre-de/anti-icing radio communication is not possible:

1. Determine if the Flight Crew is on board the aircraft
2. If the Crew is on board proceed as indicated below with normal communications.
3. If the Crew is not on board complete the required US-0371.

PRE-DE/ANTI ICING

Prior to start of De/Anti Icing, establish communication with the captain for the following information:

- Engines: IDLING or OFF/Configure Aircraft ..... relayed by the ground crew.
- Cleared for Deicing or Anti-icing ..... relayed by the flight crew.
- Type of De/Anti-icing Fluid required ..... relayed by the flight crew.

EXAMPLE: Ground Crew: "Aircraft tail number 1-2-3, (shutdown engines or engines running) for de/anti-icing; configure aircraft."

Flight Crew: "Aircraft tail number 1-2-3, roger, aircraft configured (shutdown engines or engines running) cleared for anti-ice with Type IV fluid."

POST ANTI-ICE

Communication from the ground crew to the cockpit is **MANDATORY** and **MUST** consist of the following:

- Final Fluid Type (Type I, III, or Type IV)
- Final Fluid Glycol Percentage ..... (Required for Type IV ONLY)
- Start time of final fluid application and current time (local time- 24 hour clock)
- Post Deice/Anti-Ice Check Complete
- Standing by for Read Back
- Flash Taxi Light When Ready to Taxi ..... (OTHER THAN AT THE GATE)

EXAMPLE: "Captain, aircraft tail number 1-2-3, you are cleared for flight controls check, and here is the anti-icing report. Type IV was applied, 100%, at 1615, current time is 1625, Post Deice/Anti-Ice Check Complete. Standing by for read back."
"Flash Taxi Light When Ready to Taxi" ..... (OTHER THAN AT THE GATE)

POST DEICE ONLY

Deice only communication can be used when deice only is requested by the flight crew.
Only report "DEICING COMPLETE."

EXAMPLE: "Captain, aircraft tail number 1-2-3, you are cleared for flight controls check, deicing complete. Standing by for read back."
"Flash Taxi Light When Ready to Taxi" ..... (OTHER THAN AT THE GATE)

Ensure Captain Acknowledges Receipt of Information.

(Ref. FAR 121.629) Revised 9/1/2009

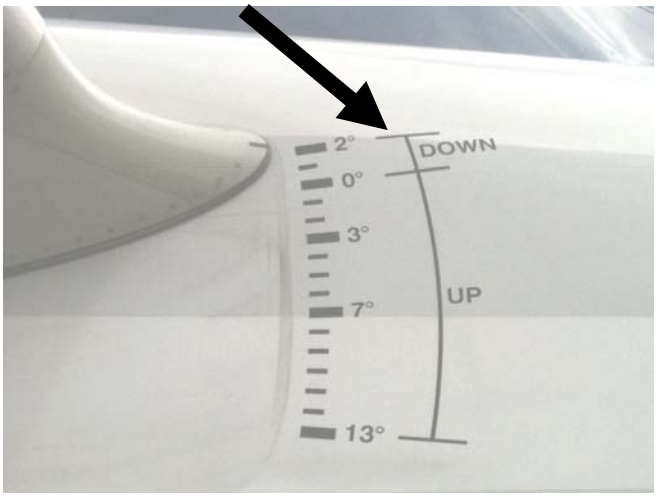
4. FIRST FLIGHT OF THE DAY

When an aircraft is parked outside overnight and heavy frost, snow, or ice is present on the critical surfaces, and there is no falling precipitation, deicing should be done automatically by station opening ground personnel as soon as possible, but no later than 45 minutes prior to scheduled departure time.

WARNING
The proper configuration of the EMB170/175 must be verified by the deicer before application of deicing/anti-icing fluid. If the aircraft is not configured properly, do not deice/anti-ice; wait for the flight crew to arrive and configure the aircraft.

On RON EMB170/175 aircraft, the flight crew will set the rear stabilizer in the full nose-down position when the OAT is 10°C (50°F) or less. Deicing personnel must visually check the rear stabilizer for proper configuration (as shown below) before deicing/anti-icing the aircraft.

Properly Configured Aircraft:
Rear stabilizer in the proper full nose-down position.



When deicing a Piedmont Dash-8 prior to the flight crew arrival, remove engine inlet plugs, if installed, and stow in cargo bin. For Mesa Dash-8 aircraft, remove engine inlet plugs, if installed, and retain at the station. In all cases, the prop tie/tether must be removed prior to deicing.

If snow or freezing rain is falling, or frost conditions exist, deicing and anti-icing should be accomplished as close to departure time as possible.

5. THROUGH OR TURN-AROUND AIRCRAFT

The Pilot-In-Command, if available, should be advised before beginning deicing the aircraft.

WARNING
The proper configuration of the EMB170/175 must be verified by the deicer before application of deicing/anti-icing fluid. If the aircraft is not configured properly, do not deice/anti-ice; wait for the flight crew to arrive and configure the aircraft.

The Pilot-In-Command may request the aircraft be sprayed with deicing/anti-icing fluid if the temperature is at or below the freezing point and the aircraft will be subjected to rain or icing conditions between ramp departure and takeoff.

Deicing/anti-icing is to be completed whenever requested by the Pilot-In-Command.

6. CAR WASH PROCEDURE

This operation is permissible because of an agreement between the host carrier (US Airways or US Airways Express) and the Airport Authority where designated. The following procedures shall apply:

A. OBJECTIVES

(1) Minimize aircraft exposure to ground icing conditions when aircraft otherwise may not be able to takeoff within holdover time.

(2) Expedite fleet deicing operations at the hub cities.

B. CONDITIONS:

(1) Radio communication between the boom/control room and aircraft shall be accomplished using the aircraft registration "N" number. The Sabre Ship ID is not normally used for this purpose.

(2) Application of these procedures must not jeopardize the safety of ground personnel or risk damage to ground equipment or aircraft.

(3) Deicing with an engine operating will not be conducted if, in the opinion of the ground deicing supervisor, ramp conditions are such that safety is jeopardized.

(4) If engines are shutdown for deicing, the flight crew must determine that ground personnel and equipment are clear of props and the area directly behind the engines prior to re-start.

C. GPU USAGE FOR DEICING OPERATIONS:

A GPU may be used during deicing operations when requested by the crew.

CAUTION
DO NOT spray fluid directly onto Ground Power Unit or the GPU access panel.

7. POLICY REGARDING DEICING/ANTI-ICING WITH ENGINES OPERATING

The flight crew will jointly make the determination with the deice crew that the engines will or will not be operated during deicing/anti-icing activities. Normally, this determination will be made verbally, via VHF radio, or face to face between the flight crew and the deice crew.

It is the preferred policy of US Airways Express that aircraft be deiced/anti-iced using one of the following to provide electrical power, in order of priority:

A. With engine(s) operating
B. If unable to operate an engine, a GPU connected to provide electrical power
C. Alternating engines –APPLIES TO TURBO-PROP AIRCRAFT ONLY
D. As last choice – with an operable APU providing electrical power

NOTE: Some airports do not allow aircraft engines to operate during deicing events. In these situations, the preferred method is a GPU connected to the aircraft. If a GPU is not available or is inoperative, the APU can be operated to avoid a cancellation.

At the station's discretion, aircraft may be deiced / anti-iced with one (preferred) or both engines running from an open bucket when:

- Ramp conditions permit
- Station has established a policy on when this will be permitted
- All deicing team members have received additional training stressing the hazards of running engines and the appropriate danger areas

CAUTION
When deicing turbo-prop aircraft with the engines running, the wing surfaces will be deiced from the trailing edge towards the leading edge. Deicing fluid is not to be sprayed on rotating propellers.

CAUTION
Prior to approaching an aircraft with engines running, check the operation of the lift device and ensure that emergency signals have been established between the driver and the lift operator, to be used in case of danger or equipment malfunction.

CAUTION
Due to the temperature and force of exhaust with engines at idle speed, a clearance of 20 feet must be maintained while in the area of the tail on regional jet aircraft. A clearance of 20 feet must be maintained from the engine on turbo-prop aircraft with engines operating.

8. PROCEDURES FOR DEICING/ANTI-ICING WITH ENGINES OPERATING

After repositioning to the Deice Pad, the engines are feathered or idled as appropriate to the situation. In either case, the crew will signal the deice crew that the parking brakes have been set.

After the "brakes set" signal has been given, deicing/anti-icing will be conducted in accordance with this manual except that the wing having an operating engine will be deiced from outside the propeller hazard area and/or from behind the wing.

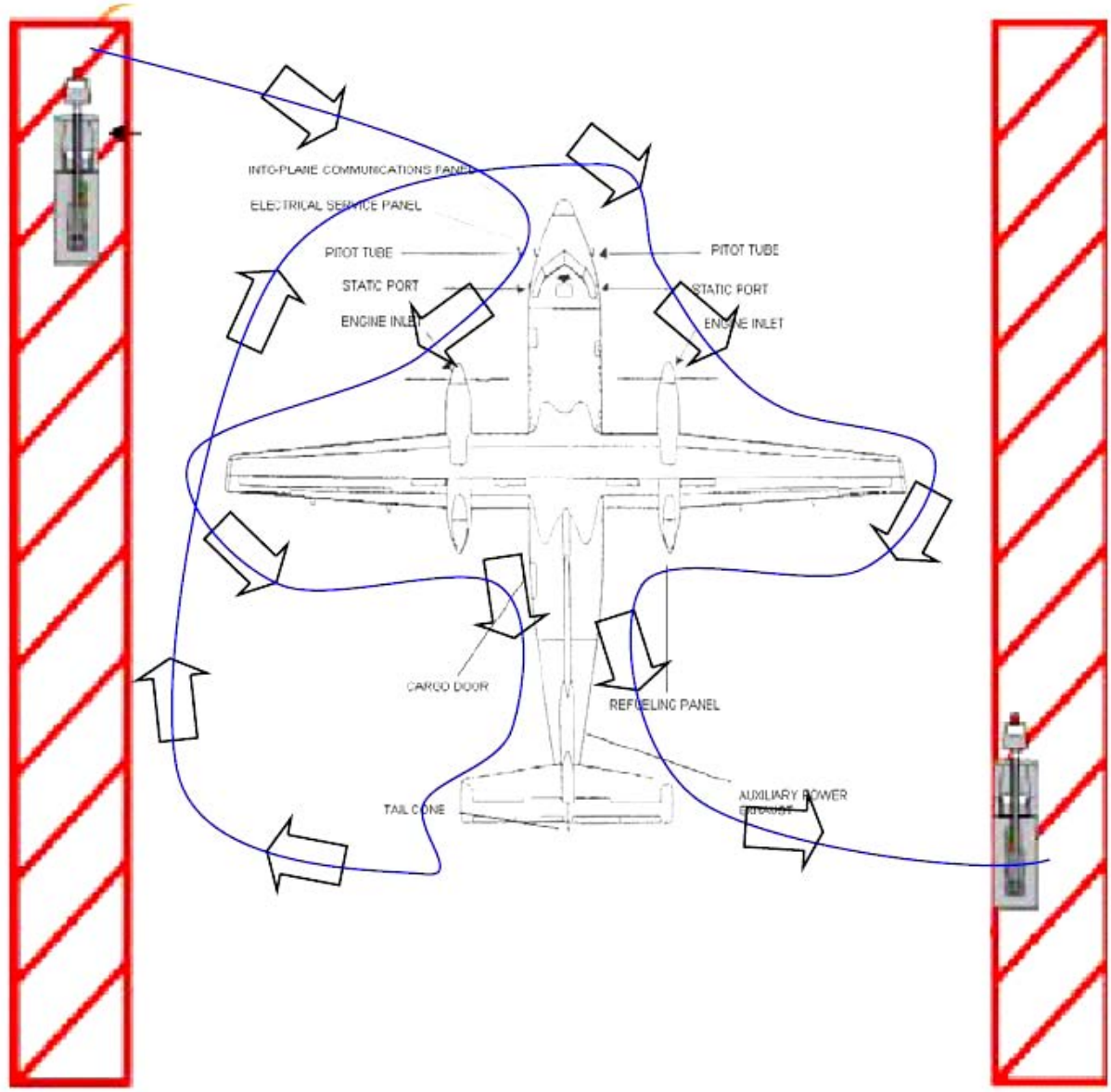
When performing deicing/anti-icing with alternating engines the following procedures are used: (THESE PROCEDURES APPLY TO TURBO-PROP AIRCRAFT ONLY).

- Deicing Crew advises Flight Deck Crew to shut down the left side (#1) engine prior to beginning to deice the left side.
- Upon completion of deicing the left side of the aircraft, move the deicing truck to the front of the aircraft. When in position, contact the Flight Deck Crew and advise them to start the #1 engine.

- When the #1 engine is started, advise the flight crew to shut down the right side (#2) engine.
- When the #2 engine has stopped, resume deicing the aircraft on the right side of the aircraft.
- When the right side is complete, move to clear of the aircraft (to Safety Area) and advise flight crew to start the #2 engine.

NOTE
As local conditions warrant, this procedure may be completed by starting the #2 engine first.

Suggested Sequence / Pattern for Deicing/Anti-icing with Alternating Engines:



Post deicing checks and communication requirements must be fulfilled prior to dispatch.

CAUTION

When braking action in the Deice Pad is considered poor, additional safety precautions will be implemented. At the discretion of the ground deicing supervisor, deicing will be conducted only on the side of the aircraft without an operating engine. The process is completed by alternating the operating engine after the first half of the aircraft is deiced. Coordination between ground and flight personnel must be accomplished before this procedure is used.

9. PROCEDURES FOR AIRCRAFT WINDSHIELDS OBSCURED BY SNOW/ICE

In the event that an aircraft windshield is obscured by snow or ice to the extent that the crew cannot see to reposition the aircraft for deicing, alternate measures must be put in place.

(a.) The station should request permission to deice the windshield only to allow the crew to move the aircraft
Or
(b.) The aircraft must be towed to the deicing pad

10. ADDITIONAL PRECAUTIONS

In the event that an aircraft's propellers are encased in ice, alternate measures must be put in place.

(a.) The station should request permission to deice the propellers encased in ice. Propellers encased in ice must be cleaned prior to any engine start (garden sprayer or light deicing fluid)
Or
(b.) The aircraft must be towed to the deicing pad

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