Infoservice

2024-2025
COLD WEATHER OPERATIONS

Bombardier

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FOREWORD

As another winter season approaches, with it comes our annual Cold Weather Operations Infoservice to help remind everyone of the operational difficulties that can accompany the colder temperatures.

The presence of ice, snow, slush, or water accumulation may have serious consequences on critical systems, such as the engines, APU, wings, landing gear and the sensing elements.

The recommendations contained in this newsletter supplement normal procedures and help ensure satisfactory operation of the aircraft and its systems in cold climatic conditions**. In case of any discrepancy between the aircraft manuals and the recommendations in this document, the aircraft manuals prevail.**

The first section of this document contains general guidelines applicable to Learjet, Challenger 300/350, Challenger 6XX series and Global series platforms. Additional precautions specific to each platform can be found further in the document, as well as references, definitions, useful links and contacts.

Please refer to and be familiar with the information contained in the Flight Manuals, Ground Deicing/Anti-Icing addendum, FCOM supplements and in the Chapter 12 of the AMM.

The revision bar next to the text shows the updates and changes since the last edition of the cold weather operations Infoservice.

For information about Challenger 850 cold weather operations, please consult RJ-SL-05-001 Rev H, Aircraft Winterization Recommendations and ISAR Winterization Edition.

Aircraft Winterization Recommendations RJ-SL-05-001 Rev H

iflymhirg links ISAR

DEFINITIONS AND GENERAL INFORMATION

- **DEICING** is a procedure by which ice, snow and/or frost is removed from the aircraft by applying hot water or a hot mixture of water and deicing fluid. Deicing may also be conducted by mechanical means for the removal of loose snow or contaminants from the airframe.

- **ANTI-ICING** consists of the application of an anti-icing fluid after deicing at recommended concentration levels to the aircraft surfaces to protect against the accumulation and adherence of ice, snow and/or frost. Prior to application of anti-icing fluids, the surfaces must be free of any accumulation of ice, snow and/or frost.

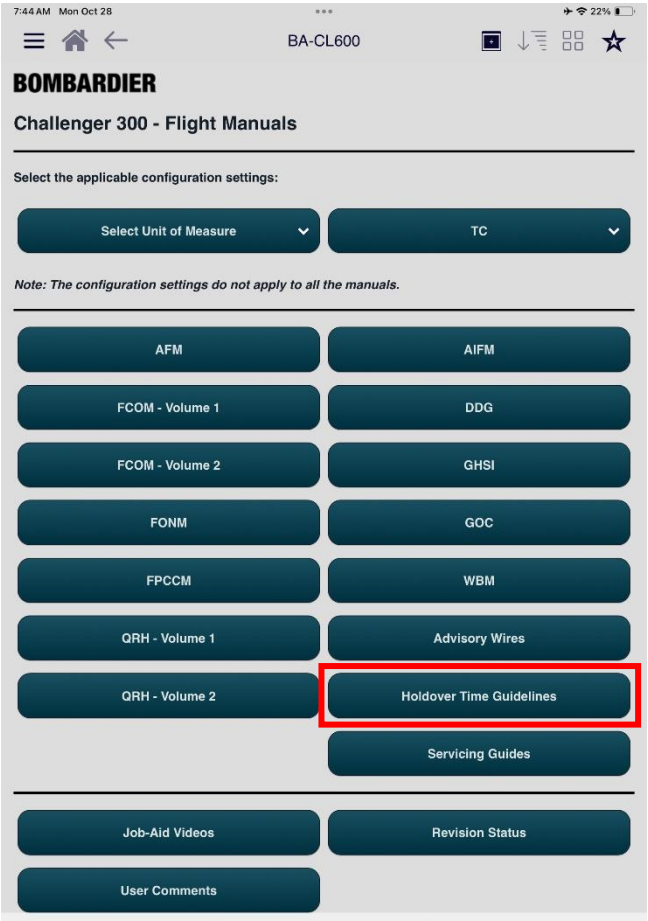
- **ONE-STEP DEICING/ANTI-ICING** consists of the application of a mixture of anti-icing fluid and hot water at the recommended concentration level necessary to provide a freezing point 10°C (18°F) below ambient temperature. This application takes into account the prevailing weather conditions, and removes ice, snow, and/or frost from the aircraft's surfaces and protects those surfaces from further contaminant accumulation for a limited duration.

- **TWO-STEP DEICING/ANTI-ICING** consists of deicing with hot water only or a mixture of hot water and deicing fluid, followed closely by an application of anti-icing fluid. Care must be taken not to allow the aircraft surfaces to re-freeze between the deicing and anti-icing processes. To delay re-freezing, the deicing fluid concentration should provide a freezing point not more than 3°C (5°F) above ambient temperature. If hot water alone is used the ambient temperature must be not less than - 3°C (27°F) and particular care should be taken against the possibility of refreezing on cold aircraft surfaces.

- **HOLDOVER TIME (HOT)** is the estimated time a deicing/anti-icing fluid will prevent ice, snow, and/or frost from forming or accumulating on the treated surfaces of an aircraft. The protection time is dependent upon the ambient and surface temperature, the type and intensity of precipitation and the type and concentration of fluid. Refer to Chapter 12 of the AMM for instructions and approximate holdover times. Reference to cold weather operations can also be found in the FCOM, Volume 1, Operating Limitations and the Supplements chapter. The Holdover Time obtained from the tables is only a guide to the expected safe period; flight crews should be aware of other factors, such as wind speed and direction, which can adversely affect anti-icing fluid performance.

NOTE: Please consult the latest official HOT data in the "Useful Links" section.

There have been significant changes to the flight Manuals and where we keep HOT (Hold Over Time) guidance relative to de-icing and anti-icing fluids. All hold over times have been removed from the Flight Manuals and a new icon in the Flight Deck APP contains all relevant HOT guidelines called Holdover Time Guidelines.



This enhancement has reduced the possible errors involved in re-formatting and republishing data. Additionally, all specific fluid HOT tables will be included and not just the general tables which were far more restrictive.

- **CLASSIFICATION AND USE OF TYPE I / II / III / IV FLUIDS**
  - Type I fluids (orange in color) are essentially deicing fluids, but also have some minimal anti-icing capability. Type I fluids are generally used heated, either diluted with water, or in concentrated form depending on the outside air temperature. They will shear or blow off the aircraft at relatively low airspeeds, however due to their low viscosity they possess the shortest set of HOTs.
  - Type II fluids (yellow in color) provide better anti-ice capabilities than Type I but require higher airspeeds to shear off. Type II fluids may also be used in the concentration supplied or be diluted with water depending on outside air temperature. They are generally applied when a long-elapsed time is anticipated between deicing and take-off.

- Type III fluids (bright yellow in color) has a longer holdover time than Type I but a lower viscosity than Type II or Type IV. The application procedure is the same as Type II and Type IV fluids. They are generally used on small commuter type aircraft with take-off speed that are roughly 60 knots or higher.
- Type IV fluids (green in color) meet the same specifications as Type II fluids but provide greater protection in most circumstances. They also have significantly longer HOTs.

ICING PRECAUTIONS AND PROCEDURES

- The following precautions and procedures regarding use of ANTI-ICING/DEICING fluids and ICING PRECAUTIONS in general are drawn from, but do not supersede, the relevant aircraft manuals.

INFRARED DEICING SYSTEMS

- Bombardier Aviation accepts the use of the Infrared Energy Deicing System as a deicing method. However, since the Infrared Energy System can support only the deicing process, aircraft requiring anti-icing protection will still need the application of an appropriate anti-icing Freezing Point Depressant (FPD) fluid.
- Infrared deicing is acceptable for use on aircraft when it follows the acceptable industry standard practices, such as SAE ARP 4737, and conforms to the applicable FAA documents, such as FAA Advisory Circular No. 150/5300-14B, and Advisory Circular No. 120-89.
- When deicing the aircraft using the Infrared Energy System, make sure to obey to all safety precautions as stated in SAE ARP 4737.
- When applicable, the Flight Crew Operating Manual (FCOM) and Aircraft Maintenance Manual (AMM) have been revised to include instructions for Infrared Energy Deicing.

EFFECTS OF ENVIRONMENTALLY FRIENDLY RUNWAY DEICING FLUIDS ON LANDING GEAR AND BRAKES

Environmentally friendly RDI (Runway Deicing) fluids, which contain potassium formate, acetate and other alkalis have been introduced at airports in different parts of the world. These products contribute to heightened in-service reports attesting to aircraft landing gear and undercarriage equipment/metal corrosion and related electrical component malfunctions. They also work as a carbon oxidation catalyst, which can lead to carbon disk deterioration and failure.

Basic aircraft actions for mitigating the effects of these RDIs include:

Landing Gear

- Clean and lubricate the landing gear per applicable AMM procedures at the earliest convenience after operation in such an environment.

Carbon Brakes

- Operators should be aware of the EASA (Information Bulletin No. 2008-19R2), FAA (SAIB NM-08-27R1) and TCCA (Service Difficulty Advisory AV2009-03) publications pertaining to the effects of environmentally friendly RDI fluids. These publications, which have been implemented in the AMMs, suggest performing a visual inspection of the brake unit at each tire change for obvious damage, distortion, missing elements or corrosion on aircraft operated to/from airports using Environmentally friendly RDI fluids.

General Airframe

- Perform aircraft soap-water washing, freshwater rinse and re-lubrication. This includes, but is not limited to, wheel wells, wing trailing edge and undercarriage areas exposed to runway deicing fluids. Ensure that this is performed in a dedicated area and/or that water is disposed or treated in accordance with the local environmental regulations.
- Increase frequency of inspection/application of protection of electrical equipment and connectors.
- Maintain the aircraft anti-corrosion protections (example: paint primer, corrosion inhibiting compound, etc.)

All Business aircraft platforms have produced a comprehensive Infoservice document for Environmental Corrosion Control and Prevention Guidelines to assist operators in protecting their aircraft against the harmful effects of environmental corrosion.

- Learjet 40/45
- Learjet 70/75
- Challenger 300 series
- Challenger 600 series
- Global Series
- Global 7500 Series

It lists all AMM/SPM tasks specific to inspecting, cleaning and/or polishing aircraft areas that are prone to corrosion when operating in harsh environments.

- It lists all Reference Instruction Letters (RILs), General Repair Engineering Orders (GREOs), In-Service Modification Summaries (ISMS), and vendor documentation currently available for operators to improve corrosion protection when operating in harsh environments.
- It also provides Reduced Scheduled Inspection Intervals to aid operators in detecting premature corrosion when operating in harsh environments.

Links can also be found at the end of this document.

GENERAL OPERATIONAL PRECAUTIONS

EXTERIOR PRE-FLIGHT INSPECTION

Snow and Ice Removal

- Regulatory Authorities require that crews use the “clean aircraft” concept: no pilot may take off in an aircraft that has a frozen contaminant (snow, ice, frost, slush, etc.…) adhering to the wings, stabilizer, or other critical surfaces.
- When cleaning off the aircraft, avoid forcing ice and snow into openings around flight control surfaces, air inlets of APU, engines and Ram Air inlet during removal procedures.
- Clear ice may be present below a layer of snow and slush. Visually check the aircraft to ensure removal of all ice after deicing/anti-icing procedures. In some instances, a tactile check will be required.

- Make sure that all control surfaces are clean and that all protective covers are removed including: pitot heads, static ports, AOA sensors, fuel tank vents, air conditioning inlets/exits and engines.

CAUTION: Conduct the exterior pre-flight inspection as defined in the applicable Aircraft Flight Manuals.

Always clean the aircraft in accordance with AMM procedures.

Landing Gear and Wheels

- Remove ice, snow, and dirt from; landing gear shock struts, latching mechanisms (up-locks/down-locks), electrical components, wheel wells and gear doors.
- Make sure that landing gear shock strut extension is correct.
- Make sure that tires are inflated to the correct pressure, and they are not frozen to the ground.
- An important fact to remember is that every 3 °C (5 °F) change in temperature will result in a corresponding 1% change in tire pressure. Do not reduce the inflation pressure of a cold tire that is subjected to frequent changes in ambient temperature.
- When tires are subject to ambient temperature differences between two locations more than 27 °C (50 °F), adjust the inflation pressure to the colder temperature before take−off. The minimum required inflation pressure must be maintained for the cooler climate; pressure can be readjusted in the warmer climate. Before returning to the cooler climate, adjust inflation pressure for the lower temperature.

Engines

- Carefully inspect engines for frozen precipitation in the fan duct and tailpipe. Under certain climatic conditions, ice can form on the back of fan blades and cause vibrations during start.

Fuel and Wings

- Pilots must be aware that cold fuel in the tanks may result in contamination on the wings. This condition can affect the upper and lower surfaces of the wing. If the fuel temperature is 0 °C (32 °F) or below it is possible to have clear ice or frost on the wing with the ambient temperature above freezing. In addition to the visual check, a tactile check of the wing rear upper surface should be done during the external walk-around inspection to determine that the wing is free of contamination when:
  - The outside air temperature is 5°C (41°F) or less, or
  - It cannot be determined that the wing fuel temperature is greater than 0°C (32°F) and there is visible moisture (rain, drizzle, sleet, snow, fog, or water) present on the wing, or
  - The difference between the dew point and outside air temperature is 3°C (5°F) or less, or
  - The atmospheric conditions have been conducive to frost formation.

Windows and Windshield

- Snow and ice should be removed from the transparencies as much as possible with a soft broom or brush. Do not use sharp objects when removing snow and ice. When cleaning, never use a dry cloth on a dry windshield surface.

- The windshield/side window heat systems should not be used to melt large amounts of snow and ice. Windshield heat should be selected to ON during initial power up only if the windshield is free of snow and ice.
- Operators should be diligent in ensuring the windshield and side window aerodynamic seals are inspected regularly. Look for lifting, cracking or separation from the outer ply. The prolonged exposure to cold, freezing precipitation and deicing fluids generally causes more transparency removals in the winter months.

CAUTION: If any doubt remains as to the aerodynamic cleanliness of your aircraft, request deicing/anti-icing or proceed to a deicing/anti-icing facility. NEVER assume that snow will blow off, as there could be a layer of ice under it. DO NOT underestimate the effect that even a thin layer of ice on wing surfaces can have.

PRE-TAXI PRECAUTIONS

- Review the Aircraft Flight Manual (AFM) regarding cold weather engine starts and use of Ground Power Units (GPUs). During engine starts in cold weather, engine acceleration can be much slower than normal and Inter Turbine Temperature (ITT) has a tendency to increase more rapidly due to slower spool-up. Higher than normal oil pressure can be expected which may exceed the maximum allowable transients.
- To ensure proper operation of aircraft interior components (exit signs, monitors, Cabin Entertainment System, etc.), it is suggested to warm the cabin interior prior to dispatch. This should be carried out when outside temperature reaches 10ºC (50ºF) or lower.
- When subjected to very cold temperatures or extreme temperature variations, the varnish finishing of the cabin interior may be prone to cracking. The use of any exterior and/or portable heating devices to heat the cabin may cause damage to the interior finish. To preserve the integrity of your aircraft interior, we recommend to only use the aircraft heating systems for cabin heating when preparing the aircraft in cold weather conditions.
- When operating at airports with minimal services, it might be necessary to physically go on the runway to accurately assess the runway conditions (i.e. high drifts, pools of slush, etc.)
- Per local regulatory requirements, apply altimetry cold temperature corrections/compensation to the published altitudes in order to ensure adequate departure obstacle clearance. This can be accomplished manually or automatically through the Flight Management System (FMS).

DEICING/ANTI-ICING PROCEDURES

- Deicing fluid should be applied until the surface is clean. Anti-icing fluid should be applied in an even coat.
- Refer to the flight manuals for the fluid applying sequence. Unless stated otherwise, the application of fluids should follow the sequence below:

    1. Horizontal stabilizer

    2. Vertical stabilizer

    3. Top of fuselage

    4. Sides of fuselage

    5. Wings

NOTE: On wings and stabilizers, application should always be from leading edge to trailing edge and from outer panels to inner panels.

Although the upper fuselage is not defined as a critical surface, it must nonetheless be de-iced to remove contamination, other than allowable frost, anytime the wing and tail surfaces require deicing (for Learjet refer to aircraft specific procedures).

- Do not spray fluid directly on cockpit or cabin windows, into engine or APU inlets, exhausts, brakes, probe inlets, scoops, vents, and drains.
- Do not direct a high-pressure stream of fluid perpendicular to aircraft surfaces, as it could damage them.
- Both wings and both horizontal stabilizers must receive equal and complete deicing and anti-icing treatment.
- Winglets are an integral part of the wing and are considered critical surfaces. They should be free of contamination. If fluid is used to clean the winglets, it should not be applied directly. A spray trajectory of at least 3 meters (10ft) is recommended to avoid possible damage from direct spray.
- Select bleed air “OFF” if engines or APU are running while deicing/anti-icing.

CAUTION: If possible, do not operate engines or APU during the deicing/anti-icing procedures (On Challenger 300/350 and Learjet 45/75 aircraft, the APU must be shut down during the deicing/anti-icing procedures - refer to Challenger 300/350 and Learjet sections).

- The decision to have the Flaps/Slats in the extended or retracted configuration during the deicing/anti-icing fluid application should be based on the potential presence of contamination of these surfaces (i.e. from a previous landing or from contaminated taxiways). The appropriate Holdover Time (HOT) Table to use is related to the Flap/Slat configuration used during and after the deicing/anti-icing process:
    - If Flaps/Slats are retracted for deicing/anti-icing and remain retracted for subsequent taxi and reconfigured only when ready for takeoff – use the **Standard HOT Guidelines** and Allowance Times
    - If Flaps/Slats are extended for deicing/anti-icing, then retracted for subsequent taxi and reconfigured only when ready for takeoff – use the **Standard HOT Guidelines** and Allowance Times
    - If Flaps/Slats are extended for deicing/anti-icing, then immediately reconfigured for takeoff before subsequent taxi – use the **76% Adjusted HOT Guidelines** and Allowance Times
- Know what type and concentration level of deicing/anti-icing fluid has been applied, so that you can determine the Hold Over Time (HOT).

WARNING: Even small accumulations of ice on the wing leading edge can change stall characteristics, stall speeds or stall warning margins prior to activation of the stick shaker, and/or pusher. These ice accumulations can also cause angle-of-attack indicator information to be unreliable, and if not removed could ultimately negate stall warning.

TAXIING

- Engine ignition should be “OFF” for taxi and set as required by the AFM Limitations section for takeoff. Igniters “ON” during taxi may mask an engine problem.

- In snowy/slushy conditions and if airport operations/local traffic permits, it is recommended to taxi on the runway. It may have less snow/slush than ramps and taxiways.
- If it is necessary to taxi on ice, snow, slush or water, taxi at reduced speed and allow greater distance for braking.
- Whenever possible, select flaps up while taxiing on snow or slush covered surfaces. Do not complete takeoff checklist until flaps are extended to takeoff setting.
- Nose wheel steering should be exercised in both directions during taxi.
- Avoid large steering inputs while taxiing at higher speeds on ice, snow, slush or water.
- Do not use high thrust or high taxi speed in order to avoid displacement of applied deicing/anti-icing fluids.
- Maintain sufficient separation between aircraft while taxiing to reduce the possibility of anti-icing fluid or snow/slush being sprayed onto your aircraft.
- During taxi, avoid using reverse thrust on snow or slush-covered runways, taxiways or ramps unless absolutely necessary. Using reverse thrust on snow/slush-covered ground can cause slush and water to become airborne. As a result, it can be drawn into the engine intakes or adhere to wings and other critical surfaces.

PRE-TAKEOFF CONDITIONS

- Accelerating the engines for a short period before takeoff can ensure better engine fan deicing.
- If the aircraft has been de-iced, make sure the HOT has not been exceeded. Refer to the Flight Manuals.
- Snow, slush or water on the runway will decrease acceleration and increase stopping distance. Runway requirements will be greater than on normal balanced field lengths. Refer to the Flight Manuals for operations on contaminated runways.
- Make sure that runway conditions are satisfactory at your alternate airport and be sure to have enough fuel for alternate airports in the event weather prohibits landing at your destination.

TAKEOFF PRECAUTIONS

- If anti-ice systems are required for takeoff, refer to the Flight Manuals for specific procedure.
- Engine and wing anti-ice should always be “ON” for takeoff when the OAT drops below a certain threshold and there is surface snow, ice, standing water, slush or visible moisture in any form. Refer to the Flight Manuals for the detailed procedures. (NOTE: This is NOT applicable to Learjet 60 aircraft - refer to Learjet section).
- When Type II, III and IV fluids are used, the wing anti-ice should be switched to “ON” just prior to increasing thrust for takeoff. Operation of the system during taxi may cause the Type II, III or IV fluid to dry and leave deposits on the wing surfaces. (NOTE: This is not applicable to the G7500 as the Wing Ice Protection System (WIPS) is not active on ground with the aircraft speed less than 60 kts,)

WARNING: Do not take off with frost, snow, or ice on the aircraft’s critical surfaces, including the horizontal stabilizer and elevators.

IN-FLIGHT PRECAUTIONS

- After takeoff from a snow-covered or slush-covered runway, if possible, delay retracting the landing gear to allow residual slush to be blown off.
- Keep informed of changing weather at destination and alternate airports.
- Avoid holding in icing conditions longer than necessary.
- Use anti-ice systems before entering icing conditions. Do not wait until ice has accumulated before selecting the anti-ice system “ON”.
- Anticipate the need for engine/nacelle anti-ice at all times, especially during low-speed hold, during approach in instrument meteorological conditions (IMC) or while flying through precipitation.

NOTE:

It is possible for anti-icing fluid to flow back to aerodynamically quiet areas of aircraft wings after takeoff where the residual fluid can partially freeze or appear thickened. Research indicates that this can occur on a regular basis but poses no risk to safety.
Anti-icing fluids are designed in such a way that most of the fluid will flow off aircraft wings, particularly from the leading edge. The leading edge is the most aerodynamically critical section of the wing whereas its trailing edge can accrue some residual fluid and remain acceptable for safe operations.

APPROACH

- Altimetry cold temperature correction/compensation is required when the reported ambient temperature on the airport surface is lower than that predicted by the standard atmosphere (ISA), or where temperature altitude correction is specified on the approach charts when the reported temperature is, “at or below” the temperature specified for that airport. Per local regulatory requirements, apply altimetry cold temperature corrections/compensation to the published altitudes in order to ensure adequate approach and missed approach obstacle clearance or when a temperature altitude correction is required on an approach. The temperature corrections/compensation can be accomplished manually or automatically through the Flight Management System (FMS).

LANDING PRECAUTIONS

- After touchdown, maintain directional control with the rudder as long as possible and use nose wheel steering with great care.
- Anticipate skidding and hydroplaning to occur, be prepared to make necessary corrections.
- During the landing roll and subsequent taxi, use the brakes to prevent progressive build-up of ice on the wheels and brakes. (NOTE: this is NOT applicable to Learjet 45/75 aircraft - refer to Learjet section)
- Let the anti-skid system do its work. Do not “pump” the brake pedals. The anti-skid system will monitor the onset of tire skidding and modulate brake pressures to achieve maximum braking.
- To prevent possible damage to flaps and wing trailing edges when landing in heavy slush or snow, do not retract flaps until the completion of the post-landing inspection and removal of any ice, snow, and dirt from slats/flaps and slat/flap tracks has been accomplished.

SHUTDOWN, POST-FLIGHT AND PARKING

- Parking the aircraft in a hangar is recommended during extreme cold weather conditions.
- When an aircraft must be parked outside in extremely cold or fluctuating freeze/thaw temperatures in addition to the normal shutdown and post-flight procedures perform the following:
  - Park the aircraft on a clear or sanded spot and into the wind if possible.
  - The use of aircraft protective covers is recommended as it will reduce the risk of snow and ice accumulation. The engine covers in particular are recommended to be installed to prevent accumulation inside the intake and exhaust.
- Remove ice, snow, and dirt from landing gear shock struts and wheel wells. Check gear doors, switches, wheels and tires.
- Chock main gear wheels before releasing the parking brake. Do not leave aircraft parked for extended periods in subfreezing weather with parking brake set.
- Following a landing on wet, snow or slush-covered runways and taxiways, tires should be inspected for flat spotting prior to the next flight.
- Snow should be removed from parked aircraft at regular intervals to prevent a large build-up and possible freezing to the aircraft surfaces.
- If the aircraft is to remain in subfreezing temperatures for an extended period, water and toilet systems are to be serviced as per Aircraft Maintenance Manual (AMM) requirement.
- Flight crews should familiarize themselves with the instructions and tooling necessary to purge the water system and refer to applicable Supplemental Maintenance Manuals (SMM).
- If the aircraft will be exposed to extremely cold temperatures for an extended period, it is recommended that the batteries be removed and stored in a warm area.
- Considerations should also be given to galley supplies that might be impacted by subfreezing temperatures, such as water bottles, soda cans, cartons of juice/milk, etc.

Aircraft parked without engine covers, allowing snow/ice accumulation inside the engine.

CAUTION: In certain conditions, residual anti-icing fluid can enter aerodynamically quiet areas, including cavities and gaps. With time and exposure, residual fluid may migrate to control surface components and linkages. These fluids, if not cleaned off, will gel, dry out, and eventually become a powder. There have been cases of this gel or powder re-hydrating during subsequent deicing/anti-icing procedures or in rain/snow conditions and swelling to greater than its original size. This substance can freeze and possibly interfere with flight controls. It is recommended to remove these fluids, gels or powder at the earliest convenience as good preventative measures.

FINAL THOUGHTS

- When operating in cold weather conditions, Flight Crews, Operations and Maintenance personnel must always pay particular attention to the hazards imposed by the weather. Always remember to “play it SAFE, play it CLEAN”.

PLATFORM SPECIFIC OPERATIONAL PRECAUTIONS

LEARJET SERIES

Pre-Taxi Precautions - Learjet 31/31A, Learjet 35/36, Learjet 40/45, Learjet 55 & Learjet 70/75 Aircraft Series

- Exceeding idle power with oil temperature below 30°C (86°F) is not recommended; however, if ambient temperature prevents attainment of 30°C (86°F), idle power may be exceeded, as required, to further warm the oil to normal operating limits prior to take-off.
- Remember that you may need to operate the engines for a minimum of three minutes in order to bring the hydraulic system up to normal operating temperature.

Pre-Taxi Precautions – Learjet 60/60XR

- If the engines are exposed to extremely cold temperatures (below -40°F [-40°C]) for an extended period, the engines should be preheated prior to attempting a start. For ambient temperatures between -40°F (-40°C) and -65°F (-54°C), direct warm air flow into each engine for a minimum of 30 minutes prior to engine start. Ensure that the engine oil temperature indicators indicate above -40°C before attempting a start.

Ramp Deicing/Anti-icing Procedures - Learjet 45, Learjet 60 & Learjet 75 Aircraft

- Operation of the APU during fluid deicing is prohibited. Ingestion of deicing fluid into an operating APU will contaminate the air conditioning system and cause objectionable fumes and odors to enter the airplane. This may also cause erratic operation or damage to the APU. It is also recommended that the application of deicing /anti-icing fluid be carried out with the engine shutdown.

CAUTION: Do not allow deicing fluid to come in contact with the brakes due to the potential for contamination and reduced braking effectiveness.

Taxiing -

- Only if taxi is to be accomplished through slush or snow, use the brakes to create some friction induced heating of the brake discs to prevent the brakes from freezing.

Taxiing - Learjet 60 aircraft only

- Do not operate nacelle heat system as system damage could occur:
  - For more than 5 seconds when the associated engine is not running.
  - For more than 30 seconds when static air temperature is above 15°C (59°F).
  - When engine RPM is greater than 65% N1 (except for takeoff)

In-Flight - Learjet 31/31A, Learjet 35/36, Learjet 55 & Learjet 60 Aircraft Series

- Wing anti-ice bleed air exits overboard through the center wing/wheel well area. If takeoff was made from a snow or slush covered runway, activation of wing anti-ice system for approximately 10 minutes may help clear moisture from the wheels and brakes.
- On aircraft with radome anti-icing, do not forget to use anti-icing in climb and descent to prevent radome icing.

In-Flight – Learjet 60 aircraft only

- It is not recommended to turn “ON” the Anti-Ice system at high engine power settings. Engine power settings should be reduced below Take-Off and maximum cruise power settings prior to turning “ON” the Anti-Ice system. Allow the bleed air system to stabilize prior to returning the engines to higher power settings.

- To prevent the possibility of one of the FMS units locking up in flight, do not use the FMS VSPD Data Base for landing calculations on Contaminated Runways. Please refer to Learjet 60XR AFM (FM-133A), TFM 2020-03 for prohibition statement.

Landing Precautions – All Learjet aircraft

- For landing on a slippery runway, minimum ground roll can be realized when the following procedure is used:
    - Final Approach Speed – VREF.
    - Make firm touchdown and extend spoilers immediately after touchdown.
    - Brakes – as required.

Post Flight – All Learjet aircraft

- Crew masks should be removed from the aircraft and stowed in a heated room when the temperature is expected to drop below -6.7°C (20°F) or the cabin should be warmed to at least -6.7°C (20°F) before flight.
- Salt type deicing products continue to be applied in Eastern Europe as well as other locations. After an aircraft is exposed to them, corrosion is a concern, especially in the wheel well areas. The best way to control this is by adhering to the corrosion control program, which is launched via an unscheduled maintenance item in Chapter 5-50-00 of the AMM, “Aircraft operations with-in salt influenced environments”. This directs one to cleaning instructions for removal of residue from those runway deicing products and application of corrosion preventive compounds, as a corrosion preventative measure.

Parking and Storage - Learjet 40/45, Learjet 70/75 Aircraft Series

- A pressurization system vacuum is supplied from the servo air system jet ejector pump that is located in the Air Cycle Machine (ACM) exhaust duct. During inclement weather, moisture may enter the jet ejector pump, servo air line and possibly the vacuum line. In freezing conditions, moisture in the vacuum line can freeze, preventing the outflow valves from opening and potentially cause the cabin to pressurize on the ground. This unintended pressurization can occur with the APU or the engines running and bleed air being supplied to the cabin, regardless of throttle position.
- When parking the aircraft outside, all protective covers should be utilized.

CHALLENGER 300/350/3500

Ramp Deicing/Anti-icing Procedures

- The APU must be shut down during the deicing/anti-icing procedures.
    - With the APU running, ingestion of deicing fluid through the APU intake can contaminate the air-conditioning system and cause objectionable odors to enter the cabin. Fluid ingestion may also cause erratic operation and possible damage to the APU.
    - To prevent smells or fumes from entering the cabin after deicing, it is recommended to leave the APU bleed OFF for take-off, climb and cruise.
    - When operating on battery power only, Cabin AC and DC power should be turned OFF. This will limit the power drain of the batteries and reduce the possibility of a Generator Overload (Amber GEN OVERLOAD CAS message) when a generator comes online. Cabin power can be turned ON after engines are restarted and main generator power becomes available.
    - Stab Trim should be positioned to 0 (aircraft nose down) to avoid deicing fluid from draining into the APU inlet.
- When applying de-ice/anti-ice fluid, flaps should be set to 30 degrees. After completing deicing/anti-icing, retract flaps to zero or set for takeoff as applicable.
- The flight controls on the Challenger 300/350/3500 aircraft are hydraulically powered, except for the ailerons. The mechanical portion of these systems (cables, pulleys, quadrants, etc.) could be affected by re-hydrated fluids, so care should be taken during periods of repeated use of Type II, III and Type IV anti-icing fluids. During these periods, periodically wash the aircraft with hot water or a diluted Type I fluid to rinse off any residual anti-icing fluids. Clean the top and bottom surfaces of wings, stabilizers and flight controls, with particular attention paid to flight control hinge points.

Taxiing

- If conditions exist that could result in the brakes being water-saturated, perform 7 consecutives brake applications from 20 knots to 5 knots. Perform the brake applications during the last mile/kilometer of taxi prior to the final stop or snub before takeoff. Do not drag the brakes. Warming of the brakes will reduce the chance of water-saturated brakes freezing at altitude and being locked for touchdown.

CAUTION: Very light braking or dragging the brakes may not warm all four brakes evenly and can cause excessive brake wear.

- Use both engines to taxi on slippery surfaces. Directional control may be difficult to maintain during one-engine taxi on a slick surface.
- The engine anti-ice system must be ON when taxiing in an OAT of 10°C (50 °F) or below if one of the following conditions exist:
    - Visible moisture in any form is present (such as fog with visibility of 1,500 m (one mile) or less, rain, snow, slush, sleet and ice crystals)
    - Operating on runways, ramps or taxiways where surface snow, ice, standing water or slush is present.
    - The wing anti-icing system must be ON when the OAT is 5°C (41 °F) or below when operating on ramps, taxiways, or runways where surface snow, ice, standing water, or slush is present.

Takeoff Precautions

- The wing anti-ice system must be ON for takeoff when OAT is 5°C (41 °F) or below if one of the following conditions exist:
    - Visible moisture in any form is present (such as fog with visibility of 1,500 m (one mile) or less, rain, snow, slush, sleet and ice crystals).
    - The runway is contaminated with surface snow, slush or standing water.

In-Flight Precautions

- Since hot engine bleed air is used to regulate cabin temperature, it may be difficult to maintain the selected temperature during reduced thrust operation such as idle descent due to the reduced engine bleed flow. For better cabin temperature control, it is recommended to operate above idle thrust during descent. Refer to FON ENVR-002-NC for further tips and guidance.
- Flaps should not be extended when holding in icing conditions.

Shutdown, Post-Flight and Parking

- If the aircraft is to remain in subfreezing temperatures for an extended period, follow the detailed steps to purge the potable water and waste system and prevent damage to system components. Refer to the Supplemental Maintenance Manual (SMM) Task 12-31-50-610-801 - Configuration for Cold Weather.

CAUTION: While the aircraft is parked in below freezing temperatures, the water pallet manual override drain valve should remain partially open after draining to prevent water from being trapped in the unit. Refer to Smart Fix for guidance.

- It is recommended to clean and lubricate the landing gear at the earliest convenience following operation at an airport using environmentally friendly Runway Deicing (RDI) fluids. Refer to Service letter (M-DT SL100-32-003 Rev.1, 2014-01-13) released by Safran Landing Systems with information pertaining to the effects of environmentally friendly Runway Deicing (RDI) fluids on the cadmium-protected components.

- Collins Aerospace has released a service letter (SL 2095, Rev. 1, 2009-12-22) with instructions for inspecting the brakes for evidence of catalytic oxidation and procedures if catalytic oxidation is found. The Aircraft Maintenance Manual (AMM) has been revised in accordance with this service letter. It contains instructions on how to inspect the brakes for catalytic oxidation at every wheel change.

CHALLENGER 600 SERIES

Exterior inspection

NOTE:

The Low Temperature Ground Wing Anti-Ice System (LTGWAIS) Service Bulletin is now available for most of the Challenger 6XX platforms to continue improving the Takeoff Safety Enhancement (TOSE). This has been mandated by Airworthiness Directives issued by TCCA and adopted by EASA The FAA has indicated they do not intend to mandate this action. (For more information, refer to Bombardier Advisory Wire AW600-30-2475, rev.5).

This system is designed to remove and prevent accumulation of ice/frost contamination on the leading edges, while the aircraft is on the ground prior to takeoff. It also ensures that the temperature on the leading edge is above freezing and below the maximum allowable for anti-icing fluid application during ground operation. An insufficient/low heat and overheat monitoring function is also implemented.

There is no added protection for the wing surfaces. The system will not provide full protection over the complete range of winter conditions (i.e. snow, slush, etc.), therefore crews must obey the normal winter operation procedures and AFM limitations.

Pre-Taxi Precautions – Challenger 604 & 605

Some operators have reported engine start failure during cold weather. If there is no evidence of engine rotation, then there is a possibility that the Air Start Valve (ASV) has remained closed due to freezing. The Flight Manuals state that “during cold weather operation it may be necessary to use ground heating to warm the ASV”.

NOTE:

To help preventing the ASV from freezing in the closed position, it is recommended that you comply with RIL CL-0042 prior to the cold weather season.

Taxiing

- Single engine taxi operations are prohibited if the OAT is 10 °C (50 °F) or below.
- If conditions exist that could result in water-saturated brakes, perform between 5 to 7 applications from 25 knots to 10 knots (FCOM 06-12-46). Perform the brake applications during the last mile/kilometer of taxi prior to the final stop or snub before takeoff; do not drag the brakes. Warming of the brakes will preclude the chance of water-saturated brakes freezing at altitude and being locked for touchdown.
- The wing anti-ice system must be selected ON for final taxi prior to takeoff if the OAT is 5°C (41°F) or below, unless Type II, III or IV anti-icing fluids have been applied. L (R) WING A/ICE caution messages may be posted or L HEAT or R HEAT lights may go out during taxi, but caution messages must be verified. WING A/ICE ON or WING/COWL A/ICE ON advisory message and L HEAT and R HEAT lights must be verified ON, prior to takeoff. If wing anti-ice is not required for takeoff it should be selected OFF just prior to takeoff.
- The engine cowl anti-ice system must be ON when taxiing in an OAT of 10°C (50 °F) or below if one of the following conditions exist:
    - Visible moisture in any form is present (such as fog with visibility of 1,500 m (one mile) or less, rain, snow, slush, sleet, and ice crystals)
    - Operating on runways, ramps or taxiways where surface snow, ice, standing water or slush is present.

- The Wing Anti-ice system must be ON when the OAT is 5°C (41°F) or below, and any of the following conditions are met:
    - Visible moisture in any form (such as clouds, fog or mist) is present below 400 feet from ground level.
    - The runway is wet or contaminated.
    - In the presence of any precipitation.

Takeoff Precautions

- Pilots should be aware that during the takeoff roll, any residual anti-ice fluid on the fuselage can flow back and may enter the APU intake. This can sometimes lead to an objectionable cabin odor and even possible fumes for a short period if bleed air for the ECS is being provided by the APU. If the odor or fumes persists, the Smoke/Fire/Fumes procedures in the Flight Manuals should be actioned as appropriate.
- If the crew suspects that fluid was possibly ingested by the APU, then as a precaution the “Unpressurized Take-Off” procedure from the FCOM supplement 06-02 should be used.

In-Flight Precautions.

- Additional Operating Limitations on the Wing Anti-Ice System have recently been incorporated into the Airplane Flight Manuals (AFM) and Operating Manuals (OM). The ice detectors on the aircraft require a minimum mass of ice accumulation to trigger an icing detection signal to the crew. Therefore, a thin layer of ice, like the texture of sandpaper, can gradually form on the wing leading edges without detection. Under this scenario, ice detection will be delayed relative to the ice contamination on the wing leading edges. Please refer to AW600-30-2592 REV.1 for further details, you are invited to get a copy on the Customer Portal.
- Using Cowl Anti-ice and Wing Anti-ice Systems affects engine and aircraft performance. It is recommended that operators familiarize themselves with the Ice and Rain Protection section and the Performance section of the AFM for applicable factors.
- Flaps should not be extended for holding in icing conditions.

Wing Anti-Ice System Additional Operating Limitations when in Icing Conditions

- New WING anti-ice limitations and COWL operating procedures have been added to the AFM.
  Refer to AW600-30-2592 for added information.

Shutdown, Post-Flight and Parking

- Safran Landing Systems has issued a Service Letter giving maintenance instructions for Landing Gear in contact with runway deicing products. This Service Letter provides recommendations in terms of Landing Gear cleaning after operation in snowy environment. It is recommended that operators familiarize themselves with this Service Letter ref. M-DT SLCL600/601/604/605/850-32-5, Initial Issue: Jan 20, 2010.

- Meggit Aircraft Braking Systems has issued a Service Letter giving maintenance instruction for the correct protection of the carbon disk stack when the wheel is removed and when the aircraft is washed or de-iced. It is recommended that operators familiarize themselves with this Service Letter ref. GS-SL-41.
- For detailed steps to purge the potable water and waste system and prevent damage to system components, refer to the Supplemental Maintenance Manual (SMM) Task 12-31-50-610-801 - Configuration for Cold Weather.

GLOBAL EXPRESS / XRS / 5000 / 6000 / 5500 / 6500

Ramp Deicing/Anti-icing Procedures

- If the APU is running, stab trim should be positioned to 0 (aircraft nose down) and rudder trim full left to avoid deicing fluid from draining into the APU inlet.

Taxiing

- If operating from runways or taxiways with standing water, puddles, snow or slush, use sufficient brake applications during taxi to warm the brakes to approximately 4 units on the Brake Temperature Monitoring System (BTMS) prior to takeoff. This will reduce the chance of water-saturated brakes freezing at altitude and being locked for landing on touchdown.
- When temperatures are less than 1°C (33.8°F), periodic increases in engine N1 are recommended. See FCOM for details of recommended procedure.
- The cowl anti-ice system must be ON when the temperature is 10 °C (50 °F) or below and visible moisture in any form is present (such as clouds, fog or mist) or when operating on runways, ramps, or taxiways where surface snow, ice, standing water, or slush is present.
- The wing anti-ice system must be ON for take-off when the OAT is 5 °C (41 °F) or below and visible moisture in any form is present (such as clouds, fog or mist) or when the runway is contaminated with surface snow, slush or standing water.
- Re-check full and free movement of the flight controls to ensure that no contaminants have impeded the movement of any control surfaces.

Takeoff Precautions

- During icing conditions do not increase to takeoff thrust until normal engine operation has been achieved and indications stabilized.
- Use of the wing anti-ice system in AUTO is prohibited.

CAUTION: When the Wing Anti-Ice is selected, there could be up to a 2-minute delay before the wing leading edges on the BLEED synoptic page display green (normal).

- Take-offs in icing conditions require extra diligence in the monitoring and cross-checking of the engine instruments, particularly Engine Pressure Ratio (EPR), to ensure that there is sufficient thrust available.

In-Flight Precautions

- Do not hold in icing conditions with slats extended.
- In icing conditions use landing and taxi lights where practical to minimize ice accumulation on that portion of the wing leading edge.
- For the last leg of the day, if the aircraft is to be parked outside in subfreezing conditions, consider purging the water system in flight before landing. It is also recommended to perform a line purge following the water system purge.

Landing Precautions

- Use maximum reverse thrust as soon as possible after touchdown. Thrust reversers are most effective at high speed. At low speed, minimize the intensity and duration of reverse thrust; however, maximum reverse thrust may be used to a complete stop in case of an emergency situation.

CAUTION: Use of thrust reversers on snow covered surfaces can create a white-out situation which can compromise the safety of the airplane and the passengers.

- Lower the nose wheel immediately, hold light forward control column pressure and apply brakes. Avoid aerodynamic braking.
- When landing, carry out a positive landing (no jumping or side slipping) to ensure initial wheel spin-up and breakout of frozen brakes if icing has occurred.
- During the landing roll and subsequent taxi, use the brakes to prevent progressive build-up of ice on the wheels and brakes. Verify Brake Temperature Monitoring System (BTMS) during taxi.

Shutdown, Post-Flight and Parking

- On aircraft 9002 to 9169 that have UV filters type NPS-A3, the units must be removed if the aircraft is to be parked in subfreezing conditions for prolonged period of time. Water inside the units can freeze and expand resulting in water leakage inside the aircraft.
- If the water system has not been purged during flight, perform a system purge. It is also recommended to perform a line purge following the water system purge.
- In order to prevent the possibility of water freezing the handrail's telescoping tubes, it is recommended to remove any standing water from the passenger door handrails with a cloth before closing it. Routine lubrication of the handrail telescopic struts in accordance with AMM Task 12-22-00-640-837 should help minimize the potential of water/ice adhering to the handrail as well as keep the handrails moving freely.
- It is recommended to clean and lubricate the landing gear at the earliest convenience following operation at an airport using environmentally friendly Runway Deicing (RDI) fluids. Refer to Service letter (MD-T SL700-32-010) released by Safran Landing Systems with information pertaining to the effects of environmentally friendly Runway Deicing (RDI) fluids on the cadmium-protected components.
- Collins Aerospace has released a service letter (SL 2095) with instructions for inspecting the brakes for evidence of catalytic oxidation and procedures if catalytic oxidation is found. The Aircraft Maintenance Manual (AMM) has been revised in accordance with this service letter. It contains instructions on how to inspect the brakes for catalytic oxidation at every wheel change.

GLOBAL 7500

Ramp Deicing/Anti-icing Procedures

- Bombardier recommends that deicing / anti-icing be performed with the APU and preferably engines off.
- If the APU is running, rudder trim should be set to full left to avoid deicing/anti-icing fluid from draining into the APU inlet.
- When applying deicing/anti-icing fluid, it is recommended that the stabilizer trim be set to full nose down. Following the application of deicing/anti-icing fluid, the stabilizer trim should be re-set at the appropriate takeoff setting.
- If the flaps require deicing, extend to (or leave at) FLAP 4 during the deicing procedure. Upon completion, retract to 0° or set for takeoff, as applicable.
    - During the application of anti-icing fluid, it is recommended that the flaps be set for takeoff. However, it may be necessary to retract the flaps during taxi.
    - Slats/Flaps retracted during the anti-icing procedure will not receive a protective film of anti-icing fluid and may freeze in precipitation or frost conditions.

Taxiing

- When operating from wet, snow covered or slush covered runways or taxiways, or following overnight parking in known icing conditions, in order to prevent freezing of the wheel brakes during taxi, use light brake applications to warm brakes before takeoff. Monitor BTMS during taxi.
- Following takeoff or landing on wet, snow or slush covered runways and taxiways, tires should be inspected for flat spots prior to the next flight.
- If the airplane is wet because it has been cleaned with hot water but there is no visible moisture in the air, then the wing is at the same risk of being contaminated as if the airplane was taxiing in slush or pooled water on taxiways/runways. The use of wing anti-ice is required for such conditions.
- The slats/flaps may need to be retracted to avoid contamination of the operating mechanism during taxiing in slush, standing water or drifting snow. If this is the case, the TAXI checklist should be completed/repeated AFTER the flaps have been set in the takeoff position.

In-Flight Precautions

- Do not hold in icing conditions with FLAP 1 or greater.
- Flaps should not be extended in icing conditions except as required for takeoff, approach and landing. However, if flaps are deployed in icing conditions for extended periods or in severe icing, light to moderate buffet may be encountered. No handling difficulties will result and normal landing flaps can be used. If the buffet is alleviated by reducing the flap setting, a landing in this configuration may be made at the discretion of the pilot.

Landing Precautions

- Landings on contaminated runways should be avoided in tailwind conditions, whenever possible.
- When operating from wet, snow covered or slush covered taxiways, the following steps are applicable in order to prevent freezing of the wheel brakes;
    - When landing, carry out a positive landing to ensure initial wheel spin-up and breakout of frozen brakes if icing has occurred.
    - During the landing roll and subsequent taxi, use the brakes to prevent progressive build-up of ice on the wheels and brakes. Monitor BTMS during taxi.
- Use maximum reverse thrust as soon as possible after touchdown. Thrust reversers are most effective at high speed. At low speed, minimize the intensity and duration of reverse thrust; however, maximum reverse thrust may be used to a complete stop in case of an emergency situation.

CAUTION: Use of thrust reversers on snow covered surfaces can create a white-out situation which can compromise the safety of the airplane and the passengers.

- DO NOT pump the brakes as this will only diminish braking effectiveness. Apply brakes normally with steadily increasing pressure, allowing the anti-skid system to modulate brake pressures to obtain maximum braking.
- Lower the nosewheel immediately and hold light forward side stick controller pressure.
- Maintain directional control with the rudder as long as possible and use nosewheel steering with extreme care.

Shutdown, Post-Flight and Parking

- For Global 7500, if the APU is running, the Fuel Tank Inerting System (FTIS) will be operational. Special care should be taken around the FTIS exhaust to avoid deicing fluid from entering.
- If the water system was purged before landing, it must be purged again in order to drain any residual water that may be trapped in the lines.
- Water/waste: Flush the waste line (Flush toilet system)
- Ref: SAMP Cold Soak Procedure for the Water System BD700-A-J12-16-00-03AAA-226A-A
- If the airplane is exposed to temperatures −20°C (−28°F) or below for greater than 10 hours, the airplane batteries should be removed from the airplane and stored in a warm area.
- For appropriate parking preparation, refer to Cold Weather Parking – Handling, AMP or GHSI BD700-A-J12-31-01-00AAA-170A-A,

FAA RUNWAY ASSESSMENT AND CONDITION REPORTING

SAFO 16009, Runway Assessment and Condition Reporting, Effective October 1, 2016

- Following recommendations from the Takeoff and Landing Performance Assessment (TALPA) Aviation Rulemaking Committee, a methodology for conveying actual runway conditions is being implemented.
- Since October 1, 2016, the FAA has implemented the use of the Runway Condition Assessment Matrix (RCAM) which is used by airport operators to perform assessments of runway conditions and by pilots to interpret reported runway conditions. The RCAM is presented in a standardized format and replaces subjective judgments of runway surface conditions with objective assessments tied directly to contaminant type and depth categories.
- The airport operator will use the RCAM to assess paved runway surfaces, report contaminants present, and through the assistance of the Federal Notices to Airmen (NOTAM) System, determine the numerical Runway Condition Codes (RwyCC) based on the RCAM. RwyCCs will replace Mu reports which will no longer be published in the NOTAM system.
- Pilot braking action reports continue to be solicited and used in assessing braking performance. Pilot braking action reports describe conditions as Good, Good to Medium, Medium, Medium to Poor, or Poor. This harmonizes the National Aviation Services (NAS) with ICAO standards.
- It is no longer acceptable for a federally obligated airport to report a NIL braking action condition. NIL conditions on any surface require the closure of that surface. These surfaces will not be opened until the airport operator is satisfied that the NIL braking condition no longer exists.
- The RCAM braking action codes and definitions are shown in the table on p.23. The Assessment Criteria is associated with how an airport operator conducts and reports a runway condition assessment for a paved runway. The Control/Braking Assessment Criteria is associated with the pilot's experience with braking action.
- The aircraft operator will use the pilot's version of the RCAM to assess the effects of a given contaminant(s) as indicated by the associated RwyCC prior to landing or departing. The RwyCC cannot be adjusted by aircraft operators. However, the airport operator may adjust (downgrade or upgrade) the RwyCC based on multiple variables in their overall assessment.
- When an airport condition (FICON) NOTAM includes RwyCCs, it is an indicator that more than 25% of the overall runway coverage or cleared width is contaminated and performance impacts are likely. When a runway is less than 25% contaminated, RwyCCs will not be generated, and performance impacts are less likely
- Operators should also periodically check the FAA's Web site on Runway Condition Assessment Reporting for more information: http://www.faa.gov/about/initiatives/talpa/

Runway Condition Assessment Matrix (RCAM)

Assessment Criteria		Control/Braking Assessment Criteria	
Runway Condition Description	**RwyCC**	**Deceleration or Directional Control Observation**	**Pilot Reported Braking Action**
• Dry	**6**	---	---
• Frost • Wet (Includes damp and 1/8 inch depth or less of water) ***1/8 inch (3mm) depth or less of:*** • Slush • Dry Snow • Wet Snow	**5**	Braking deceleration is normal for the wheel braking effort applied AND directional control is normal.	Good
-15°C and Colder outside air temperature: • Compacted Snow	**4**	Braking deceleration OR directional control is between Good and Medium.	Good to Medium
• Slippery When Wet (wet runway) • Dry Snow or Wet Snow (any depth) over Compacted Snow ***Greater than 1/8 inch (3 mm) depth of:*** • Dry Snow • Wet Snow ***Warmer than -15°C outside air temperature:*** • Compacted Snow	**3**	Braking deceleration is noticeably reduced for the wheel braking effort applied OR directional control is noticeably reduced.	Medium
Greater than 1/8 inch(3 mm) depth of: • Water • Slush	**2**	Braking deceleration OR directional control is between Medium and Poor.	Medium to Poor
• Ice	**1**	Braking deceleration is significantly reduced for the wheel braking effort applied OR directional control is significantly reduced.	Poor
• Wet Ice • Slush over Ice • Water over Compacted Snow • Dry Snow or Wet Snow over Ice	**0**	Braking deceleration is minimal to non-existent for the wheel braking effort applied OR directional control is uncertain.	Nil

EASA Landing Distance at Time of Arrival (LDTA)

- EASA have implemented requirements for the in-flight check of the landing distance at time of arrival (LDTA). Bombardier released Operational Landing Distance (OLD) information in the Flight Manuals
- The updates to the Bombardier Flight Manuals refer to LDTA as Operational Landing Distance (OLD).

Guidance for OLD assessment is available in the pertinent FCOM-1 & QRH

Highlights on 2024 – 2025 Holdover Time (HOT) Tables

Transport Canada and FAA have released their 2024 – 2025 HOT publications. These publications can be accessed directly from the Transport Canada and FAA websites via the corresponding links provided below. The following is a brief summary of the notable changes made this year. Both TCCA and FAA guidelines have seen similar changes. The full document should be consulted and reviewed for changes specific to your own operations and confirmed to be current through the relevant website. Note, generic HOT tables are no longer published by Bombardier in our FCOMs. Customers can continue to obtain this information directly from the latest Transport Canada and FAA publications.

Below are the highlights and changes for 2024-2025:

Holdover Time Tables

- Fluid specific HOT guidelines have been created for four new fluids: ALAB International PROFLIGHT PG4 (Type IV), Chongqing Joba Chemical Co FW-IV (Type IV), MKS DevO Chemicals COREICEPHOB TYPE-IV PG (Type IV), and Shaanxi Cleanway Cleansurface IV (Type IV).
- Fluid specific HOT Guidelines have been adjusted for two existing fluids: MKS DevO Chemicals COREICEPHOB Type II (Type II) and ALAB International PROFLIGHT EG4.
- The HOT guidelines for Clariant Safewing MP II FLIGHT PLUS (Type II), JSC RCP Nordix Defrost PG 2 (Type II), AllClear ClearWing ECO (Type IV), Clariant Max Flight AVIA (Type IV), Clariant Max Flight SNEG (Type IV), and Clariant Safewing EG IV NORTH (Type IV) have been removed.
- Increases have been made to the Type II generic holdover times in freezing drizzle and in light freezing rain at -3°C and above, as a result of the removed fluids.
- Increases have been made to the Type IV generic holdover times in snow and in freezing fog below -8 to -14°C as a result of removed fluids.
- Several decreases have been made to the Type IV generic holdover times in snow and in freezing fog as a result of the newly added fluids.
- A new “Snow mixed with Freezing Fog” column has been added to all Type I, II, III, and IV HOT tables with fluid specific values. The Generic “Snow mixed with Freezing Fog” table has been removed.
- A note was added in all Type I, II, III, and IV HOT tables indicating that the visibility table must be used in conditions of snow mixed with freezing fog in order to confirm the snowfall intensity.
- The Type I column in the Active Frost HOT table has been split into two to separate aluminum and composite HOTs.
- A caution relating to cold-soaked wing with the use of 50/50 fluids from the Type II/IV fluid application table was added to the Type II and IV fluid HOT table cautions.
- A caution relating to shortened protection times in heavy weather conditions that applies to all Type I, II, III, and IV HOT tables has been updated to include blowing snow.

- A caution was removed for all Type IV fluids indicating that the HOT tables are for use with aircraft conforming to the SAE AS5900 high speed aerodynamic test criterion.

Allowance times tables

- The table “List of Fluid Validated for Use with Allowance Times” was added indicating which Type III and IV fluids are validated for use with which allowance times.
- The condition Moderate Ice Pellets Mixed with Moderate Snow has been added to the Type IV allowance time tables.
- The condition Light Ice Pellets Mixed with Light Rain and Light Snow has been added to the Type IV allowance time tables.
- The condition Light Ice Pellets Mixed with Light Freezing Rain and Light Snow has been added to the Type IV allowance time tables.
- A new “Above 0°C” column was added to all allowance time tables and the tables were restructured accordingly. Notes limiting certain conditions to above 0°C have been removed.
- The Light Ice Pellets and Moderate Ice Pellets allowance times for Type IV EG fluids have been expanded in temperature below -5 to -10°C.
- The precipitation type column and the METAR codes column have been merged into a single column.
- The small hail note was updated to provide clarity and the corresponding small hail METAR codes have been added to all conditions in the tables.
- The note regarding the 90-minute rule has been updated to add clarity and to include the new allowance time conditions.

Supplemental Guidance

- The list of fluids (Tables 49, 50, 51 and 52) has been updated to reflect the latest information available on all de/anti-icing fluids.

Links to HOTs:

- TCCA: Transport Canada Holdover Time (HOT) Guidelines – Winter 2024– 2025
- FAA: FAA Holdover Time Guidelines, Winter 2024-2025

Highlights in 2024 – 2025 Guidelines for Winter Operations

Both TCCA and FAA have updated their guidance documents for aircraft ground icing operations. The links to the corresponding documents are provided below for reference.

TCCA: Guidelines for Aircraft Ground Icing Operations – TP14052E

In October 2024, Transport Canada released the 9th edition of the winter operations guidelines. Changes in the 9th edition which may be of interest to operators include:

- Updated guidance on fluid application to ensure proper coverage
- Updated ice pellet and small hail allowance time operational guidance
- Updates on the use of Holdover Time Determination Systems (HOTDS)
- Updates on the use of Degree-Specific Holdover Times (DSHOT)

- Link: Guidelines for Aircraft Ground Icing Operations – TP14052, Edition 9, October 2024

FAA: Ground Deicing Program Documents for Winter 2024-25

The FAA guidance documents to be used with the HOT guidelines were updated in August 2024. The two documents are FAA-Approved Deicing Program for Winter 2024–2025 – N 8900.708 and Ground Deicing Program General Information Issue 2. Changes to these documents for 2024-25 are editorial in nature.

Link: FAA-Approved Deicing Program Updates, Winter 2024-2025 – N 8900.708
Link: FAA Ground Deicing Program Issue 2, August 2024

USEFUL LINKS

Environmental Corrosion Control and Prevention Guidelines

Link to Infoservice letter for each model aircraft:

- Learjet 40/45
- Learjet 70/75
- Challenger 300 series
- Challenger 600 series
- Global Series
- Global 7500 Series

Federal Aviation Administration (FAA)

A winter operations reference page can be found at the following link:

- FAA AC 120-89 - Ground Deicing Using Infrared Energy
- FAA SAFO 06002
- FAA SAFO 09004
- FAA InFO 22002 - Cold Temperature Airports
- FAA InFO 22003 - Aircraft Ground Deicing Program
- Notices to Airmen publication (NATP)
  (Ref. Part 4, Graphic Notices, Section 1, General GEN17000, Cold Temperature Restricted Airports)

Transport Canada

- Deicing/Anti-icing Fluids
- For any other information contact: http://www.tc.gc.ca/eng/contact-us.htm
- Email: questions@tc.gc.ca
- TP 14371E (2024-2 or later addition) Aeronautical Information Manual (AIM)

European Aviation Safety Agency (EASA)
You can find some information on the EASA website at:
- http://ad.easa.europa.eu/search/sib-docs/simple

National Aeronautics and Space Administration (NASA)
A tutorial is available on the NASA website that gives operational guidelines for cold weather operations.
- NASA Aircraft Icing Training

Training Website

Please note Bombardier has migrated the Cold Weather Operations training and awareness material to our Customer Portal. The following are now available on the Portal under the Training Tab.

- Winter Operations Awareness
- Takeoff Safety Enhancement
- Ice Awareness: Pre-flight Considerations
- HOT Holdover Time Guidelines

Website: Bombardier Customer Portal: Training

Learjet 40/45/XR & Learjet 60/60XR Smart Card Handbook

Deicing Guidelines for the Learjet 40/45/XR and Learjet 60/60XR aircraft models have been created and are part of the Smart Card Handbook. Handbooks are available for ordering through Technical Publications at: lj.tech.pubs.orders@aero.bombardier.com

Deicing/Anti-icing Application Guide and Water Service Reference Guide
is available for download on Bombardier's Customer Portal website.

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Information published in the Infoservice is considered accurate.

However, the information contained in Technical Manuals takes precedence at all times.

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