

Aircraft Icing Training: Glossary

Above Ground Level (AGL) Altitude Altitude expressed in feet measured above ground level.

Accretion The growth of ice on aircraft surfaces in flight as a result of the collision with supercooled liquid water cloud droplets.

Active Frost: Frost that actively grows in mass and thickness. This phenomenon occurs when aircraft surfaces are at or below freezing (0°C) AND at or below dew point.

Aerodynamic Acceptance Test Laboratory test that establish if deicing and anti-icing fluids meet flow off requirements during takeoff ground acceleration and climb.

Aeronautical Information Manual (AIM) A primary FAA publication whose purpose is to instruct airmen about operating in the National Airspace System of the U.S. It provides basic flight information, ATC Procedures and general instructional information concerning health, medical facts, factors affecting flight safety, accident and hazard reporting, and types of aeronautical charts and their use.

Air mass A widespread body of air in which its homogeneous properties were established while that air was over a particular region of the earth's surface and that undergoes specific modifications while moving away from its source region.

Air Operator: The holder of an air operator certificate.

Air Operator Certificate: A certificate issued under the CARs that authorizes the holder of the certificate to operate a commercial air service.

Aircraft Deicing Facility A facility where:

- frost, snow or ice are removed (deicing) from an aircraft in order to provide clean surfaces; and/or
- Critical surfaces of the aircraft receive protection (anti-icing) against the formation of frost or ice, or the accumulation of snow or slush for a limited period of time.
- Fluid Storage, Equipment Maintenance, Environmental Mitigation, Control Centre programs are in place.

Aircraft Deicing Pad: A designated area on an aircraft deicing facility intended to be used for parking an aircraft to conduct deicing or anti-icing activities, consisting of an inner area for the parking of an aircraft to receive deicing/anti-icing treatment. On a centralized deicing facility, the aircraft deicing pad also includes an outer area for maneuvering deicing vehicles (safe zone). The outer area provides the vehicle lane width necessary for deicing vehicles to safely perform during the deicing operation.

AIRMET In-flight weather advisories issued only to amend the area forecast concerning weather phenomena that are of operational interest to all aircraft and potentially hazardous to aircraft having limited capability because of lack of equipment, instrumentation, or pilot qualifications. AIRMETs concern weather of less severity than that covered by SIGMETs or Convective SIGMETs. AIRMETs cover moderate icing, moderate turbulence, sustained winds of 30 knots or more at the surface, widespread areas of ceilings less than 1,000 feet and/or visibility less than 3 miles, and extensive mountain obscurement.

Airspeed The speed of an aircraft relative to its surrounding air mass. The unqualified term "airspeed" means one of the following: Indicated Airspeed- The speed shown on the aircraft airspeed indicator. This is the speed used in pilot/controller communications under the general term "airspeed." True Airspeed- The airspeed of an aircraft relative to undisturbed air. Used primarily in flight planning and en route portion of flight. When used in pilot/controller communications, it is referred to as "true airspeed" and not shortened to "airspeed."

Altitude The height of a level, point, or object measured in feet Above Ground Level (AGL) or from Mean Sea Level (MSL.) AGL Altitude- Altitude expressed in feet measured above ground level. MSL Altitude- Altitude expressed in feet measured from mean sea level. Indicated Altitude- The altitude as shown by an altimeter. On a pressure or barometric altimeter it is altitude as shown uncorrected for instrument error and uncompensated for variation from standard atmospheric conditions.

Anti-icing A precautionary procedure that provides protection against the formation of frost and/or ice and the accumulation of slush and/or snow on treated surfaces of an aircraft for a period of time during active frost, frozen precipitation, and freezing precipitation.

The application of a freezing point depressant to a surface either following deicing or in anticipation of subsequent winter precipitation is intended to protect the critical surfaces from ice adherence for a limited period of time. The fluid is capable of absorbing freezing or frozen precipitation until the fluid freezing point coincides with the

ambient temperature. Once this fluid freezing point has been reached, the fluid is no longer capable of protecting the aircraft from ground icing conditions.

- Anti-icing Fluid**
1. type I fluid;
 2. mixture of water and type I fluid;
 3. type II fluid or type IV fluid;
 4. mixture of water and type II or type IV fluid.

NOTE: Anti-icing fluid is normally applied unheated on clean aircraft surfaces, but may be applied heated.

Approach Clearance Authorization by ATC for a pilot to conduct an instrument approach. The type of instrument approach for which a clearance and other pertinent information is provided in the approach clearance when required.

Approach Speed The recommended speed contained in aircraft manuals used by pilots when making an approach to landing. This speed will vary for different segments of an approach as well as for aircraft weight and configuration.

Apron That part of an aerodrome, other than the maneuvering area, intended to accommodate the loading and unloading of passengers and cargo, the refueling, servicing, maintenance and parking of aircraft, and any movement of aircraft, vehicles and pedestrians necessary for such purposes.

Automated Surface Observation System (ASOS) / Automated Weather Observation System (AWOS) A suite of sensors which measure, collect, and disseminate weather data to help meteorologists, pilots, and flight dispatchers prepare and monitor weather forecasts, plan flight routes, and provide necessary information for correct takeoffs and landings. The basic difference between these two automated weather systems is that the ASOS is comprised of a standard suite of weather sensors and is a product of a National Weather Service (NWS), Department of Defense (DoD), and Federal Aviation Administration (FAA) joint venture. The AWOS is a suite of weather sensors of many different configurations that are procured by the FAA or purchased by individuals, groups, airports, etc.

Automatic Terminal Information Service (ATIS) The continuous broadcast of recorded noncontrol information in selected terminal areas. Its purpose is to improve controller effectiveness and to relieve frequency congestion by automating the repetitive transmission of essential but routine information; e.g., "Los Angeles information Alfa. One three zero zero Coordinated Universal Time. Weather, measured ceiling two thousand overcast, visibility three, haze, smoke, temperature seven one, dew point five seven, wind two five zero at five, altimeter two niner niner six. I-L-S Runway Two Five Left approach in use, Runway Two Five Right closed, advise you have Alfa."

Aviation Weather Service Program Aviation weather service provided by the National Weather Service (NWS) and the Federal Aviation Administration (FAA) that collects and disseminates pertinent weather information for pilots, aircraft operators, and ATC. Available aviation weather reports and forecasts are displayed at NWS offices and FAA Flight Service Stations (FSS).

Below Minimums Weather conditions below the minimums prescribed by regulation for the particular action involved (e.g., landing minimums, takeoff minimums).

Braking Action A report of conditions on the airport movement area providing a pilot with a degree/quality of braking that might be expected. Braking action is reported in terms of good, fair, poor, or nil.

Braking Action Advisories When tower controllers have received runway braking action reports which include the terms "poor" or "nil," or whenever weather conditions are conducive to deteriorating or rapidly changing runway braking conditions, the tower will include on the ATIS broadcast the statement, "BRAKING ACTION ADVISORIES ARE IN EFFECT." During the time Braking Action Advisories are in effect, ATC will issue the latest braking action report for the runway in use to each arriving and departing aircraft. Pilots should be prepared for deteriorating braking conditions and should request current runway condition information if not volunteered by controllers. Pilots should also be prepared to provide a descriptive runway condition report to controllers after landing.

Carburetor Ice Ice formed in the carburetor due to the effects of lowered temperature by decreased air pressure and fuel vaporization in the presence of significant water vapor (high humidity). Note that carburetor ice rarely occurs in a low humidity environment, e.g., winter months in the northern part of the country.

Ceiling The heights above the earth's surface of the lowest layer of clouds or obscuring phenomena that is reported as "broken," "overcast," or "obscuration," and not classified as "thin" or "partial."

Celsius A temperature scale where 0 is the freezing point of water and 100 is the boiling point of water. To convert Celsius to Fahrenheit: $F = (9/5) \times C + 32$.

Center Weather Advisory (CWA) An unscheduled weather advisory issued by Center Weather Service Unit

meteorologists for ATC use to alert pilots of existing or anticipated adverse weather conditions within the next 2 hours. A CWA may modify or redefine a SIGMET.

Central Deicing Facility (CDF) A Transport Canada approved facility at an airport for the purpose of conducting deicing and anti-icing operations.

Charts A map used in air navigation containing all or part of the following: topographic features, hazards and obstructions, navigation aids, navigation routes, designated airspace, and airports. For specifics on some commonly used aeronautical charts see: Sectional Aeronautical Charts, VFR Terminal Area Charts, World Aeronautical Charts, En Route Low Altitude Charts, En Route High Altitude Charts, Instrument Approach Procedures, Instrument Departure Procedures, and Standard Terminal Arrival Charts.

Check An examination of an item against a relevant standard by a trained and qualified person.

Clean Aircraft Concept When conditions exist during ground operations that are conducive to aircraft icing, no person shall conduct or attempt to conduct a take-off in an aircraft that has frost, ice or snow adhering to any of its critical surfaces.

Clear (or Glaze) Ice Clear ice is also called glaze ice. This ice type appears lumpy and translucent or clear and smooth. It results from supercooled liquid water droplets striking the surface but not freezing immediately upon contact. Clear ice tends to form horns or other complex shapes which can significantly disrupt the airflow.

Climbout That portion of flight operation between takeoff and the initial cruising altitude.

Cloud A cloud is a visible accumulation of minute water droplets and/or ice particles in the atmosphere above the Earth's surface. Cloud differs from ground fog, fog, or ice fog only in that the latter are, by definition, in contact with the Earth's surface.

Collision-Coalescence The theory of large cloud droplet formation in which smaller droplets continue to collide and join together until a significantly larger droplet is formed.

Cold-soak Effect: The wings of aircraft are said to be "cold-soaked" when they contain very cold fuel as a result of having just landed after a flight at high altitude or from having been re-fuelled with very cold fuel. Whenever precipitation falls on a cold-soaked aircraft when on the ground, clear icing may occur. Even in ambient temperatures between -2°C and +15°C, ice or frost can form in the presence of visible moisture or high humidity if the aircraft structure remains at 0°C or below. Clear ice is very difficult to be detected visually and may break loose during or after takeoff. The following factors contribute to cold-soaking: temperature and quantity of fuel in fuel cells, type and location of fuel cells, length of time at high altitude flights, temperature of re-fuelled fuel and time since re-fuelling.

Cold Soaking Ice can form even when the outside air temperature (OAT) is well above 0°C (32°F). An aircraft equipped with wing fuel tanks may have fuel that is at a sufficiently low temperature such that it lowers the wing skin temperature to below the freezing point of water. If an aircraft has been at a high altitude, where cold temperature prevails, for a period of time, the aircraft's major structural components such as the wing, tail and fuselage will assume the lower temperature, which will often be below the freezing point. This phenomenon is known as cold soaking. While on the ground, the cold soaked aircraft will cause ice to form when liquid water, either as condensation from the atmosphere or as rain, comes in contact with critical surfaces.

Contaminated Runway A runway is considered contaminated whenever standing water, ice, snow, slush, frost in any form, heavy rubber, or other substances are present. A runway is contaminated with respect to rubber deposits or other friction-degrading substances when the average friction value for any 500-foot segment of the runway within the ALD fails below the recommended minimum friction level and the average friction value in the adjacent 500-foot segments falls below the maintenance planning friction level.

Contamination Any frost, ice, slush or snow that adheres to the critical surfaces of an aircraft.

Contamination Check Check of aircraft surfaces for contamination to establish the need for de-icing.

Convective SIGMET A weather advisory concerning convective weather significant to the safety of all aircraft. Convective SIGMETs are issued for tornadoes, lines of thunderstorms, embedded thunderstorms of any intensity level, areas of thunderstorms greater than or equal to VIP level 4 with an area coverage of 4/10 (40%) or more, and hail 3/4 inch or greater.

Coordinated Universal Time (UTC) Formerly Greenwich Mean Time, also known as Z or ZULU time, UTC is the international time standard.

Critical Surfaces The wings, control surfaces, rotors, propellers, horizontal stabilizers, vertical stabilizers or any other stabilizing surface on an aircraft and, in the case of an aircraft that has rear-mounted engines, includes the upper surface of its fuselage.

Critical Surface Inspection: A critical surface inspection is a pre-flight external inspection of critical surfaces conducted by a qualified person as specified in CAR Part VI, subsection 602.11(5), to determine if they are contaminated by frost, ice, snow or slush. This inspection is mandatory whenever ground icing conditions exist and, if the aircraft is deiced / anti-iced with fluid, must take place immediately after the final, application of fluid or where an approved alternative method of deicing is used, upon completion of this process. After the inspection, a report completed by a qualified individual must be submitted to the pilot-in-command.

Critical Surface Inspection Report: This report must be made to the pilot-in-command and, if applicable, state the time at which the last full application of deicing or anti-icing fluid began, the type of fluid used, the ratio of the fluid mixture. Should the standard documented method not be used, the sequence in which the critical surfaces were deiced or anti-iced must be stated. In addition, the report must confirm that all critical surfaces are free of contamination.

Cumuliform or Cumulous CloudsThe theory of large cloud droplet formation in which smaller droplets continue to collide and join together until a significantly larger droplet is formed.

Defrosting The forms of ice protection that remove existing accreted ice from aircraft surfaces, such as pneumatic boots. Compare to anti-icing.

Deicing Deicing is a procedure by which frost, ice, slush or snow is removed from an aircraft to render it free of contamination.

Deicing is a general term for the removal of ice, snow, slush or frost from an aircraft's critical surfaces, by mechanical means, by the use of heat, or by the use of a heated fluid or a combination thereof. When frost, snow or ice is adhering to a surface, the surface must be heated and fluid pressure used to remove the contaminant.

- Deicing Fluid** a) heated water;
b) type I fluid;
c) mixture of water and type I fluid;
d) type II or type IV fluid;
e) mixture of water and type II or type IV fluid.

NOTE: De-icing fluid is normally applied heated in order to assure maximum efficiency.

Deicing Operator The organization providing de/anti-icing related services to air operators at a given location. The Deicing Operator may be a qualified third party, another airline, or the Air Operator. The Deicing Operator must provide a service in accordance with the air operator's approved ground icing program, where such a program exists.

Deposition A process where water vapor turns directly to ice upon contact with a surface, and does not pass through a liquid state.

Deviations A departure from a current clearance, such as an off course maneuver to avoid weather or turbulence. Where specifically authorized in the FARs and requested by the pilot, ATC may permit pilots to deviate from certain regulations.

Dew Point The temperature at which water vapor will begin to condense. The relative humidity at the dew point is 100 percent.

Direct User Access Terminal (DUAT) A computer terminal where pilots can directly access meteorologic and aeronautical information, plus file a flight plan without the assistance of an FSS.

EmergencyA distress or an urgency condition.

En Route High Altitude ChartsProvide aeronautical information for en route instrument navigation (IFR) in the high altitude stratum. Information includes the portrayal of jet routes, identification and frequencies of radio aids, selected airports, distances, time zones, special use airspace, and related information.

En Route Low Altitude Charts Provide aeronautical information for en route instrument navigation (IFR) in the low altitude stratum. Information includes the portrayal of airways, limits of controlled airspace, position identification and frequencies of radio aids, selected airports, minimum en route and minimum obstruction clearance altitudes, airway distances, reporting points, restricted areas, and related data. Area charts, which are a part of this series, furnish terminal data at a larger scale in congested areas.

Fahrenheit A temperature scale where 32 degrees is the freezing point of water and 212 degrees is the boiling point of water. To convert Fahrenheit to Celsius: $C = (5/9) * (F - 32)$.

Final Approach That part of an instrument approach procedure which commences at the specified final approach fix or point, or where such a fix or point is not specified, at the end of the last procedure turn, base turn or inbound turn of a racetrack procedure, if specified; or at the point of interception of the last track specified in the approach procedure; and ends at a point in the vicinity of an aerodrome from which a landing can be made; or a missed approach procedure is initiated.

Fix A geographical position determined by visual reference to the surface, by reference to one or more radio NAVAIDs, by celestial plotting, or by another navigational device.

Flameout An emergency condition caused by the complete loss of turbine engine power.

Flight Level Altitudes flown with the altimeter set to 29.92 inches Hg. Each is stated in three digits that represent hundreds of feet. For example, flight level (FL) 250 represents a barometric altimeter indication of 25,000 feet; FL 255, an indication of 25,500 feet.

Flight Service Station (FSS) Air traffic facilities which provide pilot briefing, en route communications and VFR search and rescue services, assist lost aircraft and aircraft in emergency situations, relay ATC clearances, originate Notices to Airmen, broadcast aviation weather and NAS information, receive and process IFR flight plans, and monitor NAVAIDs. In addition, at selected locations, FSSs provide En Route Flight Advisory Service (Flight Watch), take weather observations, issue airport advisories, and advise Customs and Immigration of transborder flights.

Fluid Deicing/Anti-icing Methods: These are methods of using acceptable fluids for the removal of frozen contamination from an aircraft's critical surfaces and then for preventing the formation and/or accumulation of contamination on an aircraft for a limited period of time. The details are contained in The Society of Automotive Engineers (SAE) document ARP4737, entitled: "Aircraft deicing/anti-icing Methods".

Fluid Dryout Fluid residue that may remain in aerodynamically quiet areas throughout a flight.

Fluid Endurance Time Endurance times of anti-icing fluids are measured in laboratory and field tests under specific contamination and temperature conditions using flat test plates in accordance with the SAE documents AMS 1424 & AMS 1428. These tests are considered to replicate the failure of fluid during aircraft operations.

Fluid Failure.

Typically, in the case of snow, a layer of snow eventually accumulates on the surface of the fluid and is no longer being absorbed by the fluid. The appearance of a build up becomes evident. There is a distinct loss of shine or gloss on the surface of the fluid.

Fluid Failure Typically, in the case of snow, a layer of snow eventually accumulates on the surface of the fluid and is no longer being absorbed by the fluid. The appearance of a build up becomes evident. There is a distinct loss of shine or gloss on the surface of the fluid. In the case of freezing precipitation, usually only a reduction in shine or gloss on the surface results, and it is particularly difficult to detect.

Forced Air Deicing Method This is a method of deicing using a concentrated flow of air under pressure to remove contamination from an aircraft, which may be used in conjunction with deicing fluids.

Foreign Object Damage (FOD) Term used to describe damage done to an aircraft due to collision with small foreign objects.

Freezing Drizzle Fairly uniform precipitation composed exclusively of fine drops (diameter less than 0.5 mm [0.02in]) very close together which freezes upon impact with the ground or other exposed objects.

Freezing Fog A suspension of numerous minute water droplets which freezes upon impact with ground or other exposed objects, generally reducing the horizontal visibility at the earth's surface to less than 1 km (5/8 mile).

Freezing Level As used in aviation forecasts, the altitude (in feet MSL) at which water freezes.

Freezing Rain: Droplets of rain that freeze immediately on contact with structures or vehicles.

Freezing Point Depressant (FPD) Fluids The generic term applied to all types of deicing fluids.

Front A boundary between air masses of different temperatures and moisture.

Frost/Hoar Frost Ice crystals that form from ice saturated air saturated with vapor at temperatures below 0°C (32°F) by direct sublimation/depotion on the ground or other exposed objects.

Frozen Contaminants: Frozen contaminants include light freezing rain, freezing rain, freezing drizzle, frost, ice, ice pellets, snow, snow grains, and slush.

Fuel Remaining A phrase used by either pilots or controllers when relating to the fuel remaining on board until actual fuel exhaustion. When transmitting such information in response to either a controller question or pilot initiated cautionary advisory to air traffic control, pilots will state the APPROXIMATE NUMBER OF MINUTES the flight can continue with the fuel remaining. All reserve fuel SHOULD BE INCLUDED in the time stated, as should an allowance for established fuel gauge system error.

Ground Ice Detection System (GIDS): A system designed to detect frozen contaminants on an aircraft. These systems can be either ground based or aircraft based systems. GIDS may be either a spot sensor or an area sensor system. If approved by Transport Canada, such a system may be used as an alternative to other inspection methods.

Ground Icing: Structural icing that occurs on an aircraft on the ground, usually produced by snow or frost.

Ground Icing Conditions: With due regard to aircraft skin temperature and weather conditions, ground icing conditions exist when frost, ice, or snow is adhering or may adhere to the critical surfaces of an aircraft. Ground Icing Conditions also exist when active frost, frozen or freezing precipitation is reported or observed.

Ground Icing Operations Program: A Ground Icing Operations Program consists of a set of procedures, guidelines, and processes, documented in manuals, which ensure that an Air Operator's aircraft does not depart with frost, ice, snow or slush adhering to critical surfaces. This program is mandatory for CAR 705 operations and must be approved by Transport Canada.

Ground Speed: The speed of an aircraft relative to the surface of the earth.

Hail: Precipitation consisting of small balls or pieces of ice with a diameter ranging from 5 mm to greater than 50 mm falling either separately or agglomerated.

High (Pressure System): Area of high pressure completely surrounded by lower pressure.

High Humidity Endurance Test (HHET): A laboratory test that measures endurance time of anti-icing fluid under conditions of high humidity. This test is intended to simulate frost conditions.

Hoarfrost: A uniform, thin white deposit of fine crystalline texture that forms on exposed surfaces during calm, cloudless nights when the temperature falls below freezing and the humidity of the air at the surface is close to the saturation point. It is not associated with precipitation. The deposit is thin enough that the underlying surface features, such as paint lines, markings or lettering can be distinguished.

Holdover Time (HOT): Holdover time is the estimated time that an application of anti-icing fluid is effective in preventing frost, ice, slush or snow from adhering to treated surfaces. Holdover time is calculated as the beginning with the final application of the anti-icing fluid, and as expiring when the fluid is no longer effective, as measured in endurance time tests and published in "Holdover Time Guidelines".

Holdover Time Guidelines: Holdover Time Tables are referred to as Holdover Time Guidelines because this term more appropriately represents their function in providing guidance to flight crew and the need for the flight crew to use judgment in their interpretation.

Fluid holdover times, as published by , Commercial and Business Aviation, Transport Canada are found published in "Holdover Time Guidelines" as tables and may be used either as guidelines or decision-making criteria in assessing whether it is safe to take off. When holdover times are used as decision-making criteria, only the lowest time value in a cell shall be used. The procedures to be followed after the holdover time has expired must be clearly documented. The use of holdover time guidelines is mandatory if they are part of the Air Operator's approved ground icing program.

Hold Procedure: A predetermined maneuver that keeps aircraft within a specified airspace while awaiting further clearance from air traffic control. Also used during ground operations to keep aircraft within a specified area or at a specified point while awaiting further clearance from air traffic control.

Holding Fix: A specified fix identifiable to a pilot by NAVAIDs or visual reference to the ground used as a reference point in establishing and maintaining the position of an aircraft while holding.

Horizontal Extent: The horizontal distance of an icing encounter. Generally, icing encounters in stratus clouds have a greater horizontal extent than in cumulus clouds.

Ice: The solid form of water. Clear Ice is often difficult to detect visually on an aircraft's critical surfaces. It can be present in a transparent form, which may make the aircraft's critical surfaces appear to be wet.

Ice Bridging: A myth for modern equipment. The concern was that ice would form a sheath at the inflated extent of the boot, and remain there. Subsequent boot cycles would be unable to remove this ice. Bridging may have occurred with very early boot technology that had wide tubes and slow inflation/deflation rates. However, there is no evidence that modern pneumatic boots have ever had this problem.

Icehouse: A specially equipped control center, located within a Central Deicing Facility, to control and monitor all operations associated with the facility.

Ice Pellets: These are a type of precipitation consisting of transparent or translucent pellets of ice, 5 mm or less in diameter. They may be spherical, irregular, or (rarely) conical in shape. Ice pellets usually bounce when hitting hard ground, and make a sound upon impact.

Ice Protection Equipment: Equipment used to remove and/or prevent the accretion of ice on an aircraft. You are guaranteed that the equipment has been demonstrated to provide adequate ice protection only if the aircraft is certified for flight into known icing conditions. Some ice protection equipment has only been demonstrated to be airworthy and not demonstrated to provide adequate ice protection.

Icing Intensity: See Trace Icing, Light Icing, Moderate Icing, or Severe Icing.

Icing Types: See Clear (or glaze) Ice, Mixed Ice, or Rime Ice.

Indicated Airspeed: The speed shown on the aircraft airspeed indicator. This is the speed used in pilot/controller communications under the general term "airspeed."

Indicated Altitude: The altitude as shown by an altimeter. On a pressure or barometric altimeter it is altitude as shown uncorrected for instrument error and uncompensated for variation from standard atmospheric conditions.

Infrared Heat Deicing Method: A method of deicing using infrared (IR) thermal energy.

Instrument Approach Procedures (IAP) Charts: Portrays the aeronautical data which is required to execute an instrument approach to an airport. These charts depict the procedures, including all related data, and the airport diagram. Each procedure is designated for use with a specific type of electronic navigation system including NDB, TACAN, VOR, ILS/MLS, and RNAV. These charts are identified by the type of navigational aid(s) that provide final approach guidance.

Instrument Departure Procedure (DP) Charts: Designed to expedite clearance delivery and to facilitate transition between takeoff and en route operations. Each DP is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.

Instrument Flight Rules (IFR): FARs that govern flight in instrument meteorologic conditions-flight by reference to aircraft instruments.

Instrument Meteorological Conditions: Meteorological conditions expressed in terms of visibility, distance from cloud, and ceiling less than the minima specified for visual meteorological conditions.

Intercycle Ice: Ice that consists of Residual Ice, plus ice accreted between boot cycles.

Inversion: Atmospheric condition where temperature increases with altitude.

Jet Stream: A migrating stream of high-speed winds present at high altitudes.

Light Freezing Rain: Precipitation of liquid water particles which freezes upon impact with the ground or other exposed objects, either in the form of drops of more than 0.5 mm (0.02 inch) or smaller drops which, in contrast to drizzle, are widely separated. Measured intensity of liquid water particles is up to 2.5 mm/hour (0.10 inch/hour) or 25 grams/dm²/hour with a maximum of 0.25 mm (0.01 inch) in 6 minutes.

Light Icing: The rate of accumulation may create a problem if flight is prolonged in this environment (over 1 hour).

Occasional use of deicing/anti-icing equipment removes/prevents accumulation.

Liquid Water Content (LWC): The total mass of water contained in all the liquid cloud droplets within a unit volume of cloud. Units of LWC are usually grams of water per cubic meter of air (g/m³).

Low (Pressure System): An area of low pressure completely surrounded by higher pressure.

Low-level Wind Shear: Wind shear that occurs within 2000 feet of the surface.

Lowest Operational Use Temperature (LOUT): For a given fluid is the higher of the lowest temperature at which the fluid meets the aerodynamic acceptance test for a given aircraft type, or the actual freezing point of the fluid plus a freezing point buffer of 7°C for type I or 10°C for type II III & IV.

Mean Sea Level (MSL) Altitude: Altitude expressed in feet measured from mean sea level.

Maneuvering Area: That part of an aerodrome to be used for the take-off, landing and taxiing of aircraft, excluding aprons.

Median Volumetric Diameter (MVD): The droplet diameter that divides the total amount of water in half; half the water volume will be in larger droplets and half in smaller droplets.

Micron: One-millionth of a meter or one-thousandth of a millimeter.

Minimum En Route IFR Altitude (MEA): The lowest published altitude between radio fixes that assures acceptable navigational signal coverage and meets obstacle clearance requirements between those fixes. The MEA prescribed for a Federal airway or segment thereof, area navigation low or high route, or other direct route applies to the entire width of the airway, segment, or route between the radio fixes defining the airway, segment, or route.

Minimums: Minimum weather condition requirements established for a particular operation or type of operation (e.g., IFR takeoff or landing, alternate airport for IFR flight plans, VFR flight, etc.).

Missed Approach: A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. The route of flight and altitude are shown on instrument approach procedure charts. A pilot executing a missed approach prior to the Missed Approach Point (MAP) must continue along the final approach to the MAP. The pilot may climb immediately to the altitude specified in the missed approach procedure. At locations where ATC radar service is provided, the pilot should conform to radar vectors when provided by ATC in lieu of the published missed approach procedure.

Mixed Ice: The ice type that appears clear near the stagnation line turning to white rime near the edges. It occurs at conditions between those that form pure clear and pure rime ice. Similar to clear ice, mixed ice accretions can significantly disrupt airflow and cause handling and performance problems.

Mixed Icing Conditions: An atmospheric environment where supercooled liquid water and ice crystals coexist.

Moderate and Heavy Freezing Rain: Precipitation of liquid water particles which freezes upon impact with the ground or other exposed objects, either in the form of drops of more than 0.5 mm (0.02 inch) or smaller drops which, in contrast to drizzle, are widely separated. Measured intensity of liquid water particles is more than 2.5 mm/hour (0.10 inch/hour) or 25 grams/dm²/hour.

Moderate Icing: The rate of accumulation is such that even short encounters become potentially hazardous and use of deicing/anti-icing equipment or flight diversion is necessary.

Notice to Airmen (NOTAM): A notice containing information (not known sufficiently in advance to publicize by other means) concerning the establishment, condition, or change in any component (facility, service, or procedure of, or hazard in the National Airspace System) the timely knowledge of which is essential to personnel concerned with flight operations.

Obstacle: An existing object, object of natural growth, or terrain at a fixed geographical location or which may be expected at a fixed location within a prescribed area with reference to which vertical clearance is or must be provided during flight operation.

Occluded Front: Occur when an air mass is trapped between two colder air masses and is forced to higher altitudes. Occluded fronts may combine characteristics of both warm and cold fronts.

Orographic: The air temperature indicated by the aircraft's temperature probe. Depending upon the temperature probe design, Outside Air Temperature (OAT) will be somewhere in the range between the Static Air Temperature (SAT) and the Total Air Temperature (TAT). Flight computers may correct OAT to read either SAT or TAT. (see also Static Air Temperature and Total Air Temperature).

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Pilot Briefing: A service provided by the FSS to assist pilots in flight planning. Briefing items may include weather information, NOTAMS, military activities, flow control information, and other items as requested.

Pilot-in-Command (PIC): The pilot responsible for the operation and safety of an aircraft during flight time.

Pilot Briefing: A service provided by an FSS to assist pilots with flight planning. Briefing items may include weather information, notices to airmen (NOTAMs), military activities, flow control information, and other items, as requested.

Pilot's Discretion: A service provided by an FSS to assist pilots with flight planning. Briefing items may include weather information, notices to airmen (NOTAMs), military activities, flow control information, and other items, as requested.

Pilot Report (PIREP): A report of meteorological phenomena encountered by aircraft in flight.

Precipitation: The rate at which precipitation is either measure or judge to be falling. Winter precipitation is a key factor in estimating the Holdover Time for an anti-icing fluid. It is the indication of moisture content.

Precipitation Rate: Any or all of the forms of water particles, whether liquid or solid, that fall from the atmosphere and reach the ground.

Pre-Takeoff Check: A check, after deicing application, to ensure all aircraft surfaces are free of frozen contaminants.

Pre-Takeoff Contamination Inspection: An inspection conducted by a qualified person, immediately prior to take-off, to determine if an aircraft's critical surfaces are contaminated by frost, ice, slush or snow. This inspection is mandatory under some circumstances.

Pre-Takeoff Contamination Inspection Report: This report must be made to the pilot-in-command and, when a documented inspection method has not been used, must describe how the inspection was conducted. The report must also confirm that all critical surfaces are free of contamination.

Relative Humidity: The ratio, expressed as a percentage, of water vapor present compared with the maximum amount possible at the present temperature.

Representative Surface: Surfaces which can be readily and clearly observed by flight crew during day and night operations, and which are suitable for judging whether or not critical surfaces are contaminated. Examination of one or more representative aircraft surfaces may be used for the Pre-Take-off Contamination Inspection, if a tactile examination is not required. Transport Canada must approve the use of these aircraft specific surfaces.

Residual Ice: Ice that remains on the boot immediately after a boot inflation and deflation.

Rime Ice: The ice type that appears rough, milky and opaque. Rime ice is formed by the instantaneous freezing of supercooled droplets as they strike the aircraft.

Runback: Icing that occurs when liquid water impacts an aircraft surface, flows aft past the impact region, and then freezes. This can occur at near freezing temperatures, with very high liquid water levels, or when a thermal ice protection system doesn't evaporate the impacting water.

Sectional Aeronautical Charts: (1:500,000) Designed for visual navigation of slow or medium speed aircraft. Topographic information on these charts features the portrayal of relief and a judicious selection of visual checkpoints for VFR flight. Aeronautical information includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.

Service Provider: The organization providing de/anti-icing related services to air operators at a given location. The Service Provider may be a qualified third party, another airline, or the Air Operator. The Service Provider must provide

a service in accordance with the air operator's approved ground icing program, where such a program exists.

Severe Icing: The rate of accumulation is such that deicing/anti-icing equipment fails to reduce or control the hazard. Immediate flight diversion is necessary.

SIGMET: A SIGnificant METeorological advisory that warns of phenomena that affect all aircraft. SIGMET advisories cover severe and extreme turbulence, severe icing, and widespread dust or sandstorms that reduce visibility to less than 3 miles.

Slush: Snow that has a water content exceeding its freely drained condition such that it takes on fluid properties (e.g., flowing and splashing).

Snow: A porous, permeable aggregate of ice grains that can be predominantly single crystals or close groupings of several crystals.

Snow Grains: Precipitation that comprises very small white and opaque grains of ice. These grains are fairly flat or elongated; their diameter is less than 1 mm. When they hit hard ground, they do not bounce or shatter.

Snow Pellets: Precipitation which consists of white and opaque grains of ice. These grains are spherical or sometimes conical; their diameter is about 2-5 mm. Grains are brittle, easily crushed. They do bounce and break on hard ground.

Stabilator: A tail surface that acts as both stabilizer and control surface. The moveable surface can minimize the local angle of attack, so this form of tail surface is considered to be less susceptible to tail stall than a standard horizontal stabilizer.

Stability: The property of an air mass to resist vertical displacement from its initial position. If an air mass is stable, then an outside force is required to raise it for cloud formation. On the other hand, unstable air is buoyant and can rise to initiate cloud formation.

Staging Bay: A dedicated area behind and adjacent to each deicing bay, where aircraft await approval to enter the deicing bay.

Standard Terminal Arrival (STAR) Charts: Designed to expedite air traffic control arrival procedures and to facilitate transition between en route and instrument approach operations. Each STAR procedure is presented as a separate chart and may serve a single airport or more than one airport in a given geographical location.

Static Air Temperature (SAT): The ambient temperature of air. Static Air Temperature (SAT) is measured with little or no air motion past the temperature probe. This is the air temperature that commonly appears in weather forecasts and reports. SAT aloft is typically measured by balloon (See also Outside Air Temperature and Total Air Temperature).

Stratiform or Stratus Clouds: Clouds of extensive horizontal development and a stable air mass.

Sublimation: A process where ice turns directly into water vapor without passing through a liquid state.

Supercooled: Water that remains in the liquid state even though temperatures are below 0°C. Cloud droplets can exist as a liquid at temperatures down to about -40°C.

Supercooled Large Droplets (SLD): Supercooled cloud droplets, freezing drizzle, or freezing rain with a Mean Volumetric Diameter greater than 50 microns. Due to their relatively large size and high mass, SLD are particularly hazardous to aircraft since they can impact the aircraft surfaces outside the ice protected regions.

Supercooled Liquid Water (SLW): Liquid water at temperatures below 0°C. SLW is found in clouds, freezing drizzle, and freezing rain in the atmosphere. This water freezes on aircraft surfaces. Most aircraft icing occurs in supercooled clouds, which consist of SLW, sometimes with ice crystals.

Supermental Weather Service Location: An airport facility staffed with contract personnel who take weather observations and provide current local weather to pilots via telephone or radio.

Tactile Inspection: An inspection requiring a person to physically contact specific aircraft surfaces. Tactile inspections, under certain circumstances, may be the only way of confirming that the critical surfaces of an aircraft are not contaminated. For some aircraft, tactile inspections are mandatory, as part of the deicing/anti-icing inspection process, to ensure that the critical surfaces are free of frozen contaminants.

Taxiway: A defined path on a land aerodrome established for the taxiing of aircraft and intended to provide a link

between one part of the aerodrome and another.

Temperature Inversion: Atmospheric condition where temperature increases with altitude.

Terminal Deicing Facility: A deicing facility for one or several aircraft located at or near the terminal or other location where aircraft loading activity normally takes place.

Terminal Area: A general term used to describe airspace in which approach control service or airport traffic control service is provided.

Total Air Temperature (TAT): Kinetic heating causes the Total (or Ram) Air Temperature (TAT) to be warmer than the Static Air Temperature (SAT). For example, if the SAT is -2C, an aircraft traveling at 250 knots would observe a TAT of approximately +5C. TAT is close to the temperature of the wing leading edge, which also experiences ram rise (see also Static Air Temperature and Outside Air Temperature).

Tower: A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. Authorizes aircraft to land or takeoff at the airport controlled by the tower or to transit the Class D airspace area regardless of flight plan or weather conditions (IFR or VFR). A tower may also provide approach control services (radar or nonradar).

Trace Icing: Ice becomes perceptible. Rate of accumulation is slightly greater than the rate of sublimation. Deicing/anti-icing equipment is not utilized unless encountered for an extended period of time (over 1 hour).

Trimable Stabilizer: A horizontal stabilizer that can be pitched to trim the elevator. This surface movement can minimize the local angle of attack, so this form of tail surface is considered to be less susceptible to tail stall than a standard horizontal stabilizer.

True Airspeed: The airspeed of an aircraft relative to undisturbed air. Used primarily in flight planning and en route portion of flight. When used in pilot/controller communications, it is referred to as "true airspeed" and not shortened to "airspeed."

Turbojet Aircraft: An aircraft in which thrust is produced entirely by the force of the air expelled by the engine. The engine's main components are an inlet, a compressor, a combustion chamber, a turbine, and a nozzle. The turbine drives the compressor.

Turboprop Aircraft: An aircraft in which thrust is produced primarily by a propeller. The engine's main components are an inlet, a compressor, a combustion chamber, a turbine, and a nozzle. Typically there is a split turbine that drives both the compressor and the propeller.

Urgency: A condition of being concerned about safety and of requiring timely but not immediate assistance; a potential distress condition.

Vector: A heading issued to an aircraft to provide navigational guidance by radar.

VFR Terminal Area Charts: (1:250,000) Depict Class B airspace which provides for the control or segregation of all the aircraft within Class B airspace. The chart depicts topographic information and aeronautical information that includes visual and radio aids to navigation, airports, controlled airspace, restricted areas, obstructions, and related data.

Visibility: The ability, as determined by atmospheric conditions and expressed in units of distance, to see and identify prominent unlighted objects by day and prominent lighted objects by night. Visibility is reported as statute miles, hundreds of feet or meters.

Visible Moisture: Moisture in the form of clouds or precipitation.

Visual Flight Rules (VFR): FARs that govern flight in visual meteorological conditions-flight by reference to the natural horizon and surface.

Visual Flight Rules (VFR) Conditions: Weather conditions equal to or better than the minimum for flight under visual flight rules. The term may be used as an ATC clearance/instruction only when: an IFR aircraft requests a climb/descent in VFR conditions, the clearance will result in noise abatement benefits where part of the IFR departure route does not conform to an FAA approved noise abatement route or altitude, or a pilot has requested a practice instrument approach and is not on an IFR flight plan.

VOR: A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360 degrees in azimuth, oriented from magnetic north. Used as the basis for navigation in the National Airspace System. The VOR periodically identifies itself by Morse Code and may have an additional voice identification feature. Voice features may be used by ATC or FSS for transmitting instructions/information to pilots.

Water Vapor: The gas phase of water.

Water Spray Endurance Test (WSET): A laboratory test that measures the endurance time of anti-icing fluids under conditions of light freezing precipitation. This test is used to classify and to certify fluids according to SAE AMS specifications.

Wind Shear: Any rapid, horizontal, or vertical change in wind direction or speed.

World Aeronautical Charts (WAC): (1:1,000,000) Provide a standard series of aeronautical charts covering land areas of the world at a size and scale convenient for navigation by moderate speed aircraft. Topographic information includes cities and towns, principal roads, railroads, distinctive landmarks, drainage, and relief. Aeronautical information includes visual and radio aids to navigation, airports, airways, restricted areas, obstructions, and other pertinent data.