Afton Airpark Winter Operations Guide and Recommended Procedures

Airpark Snow Removal

With the current number of aircraft based at the airpark, it is not unrealistic for five or more days to go by without an aircraft passing thru the gate between the airpark and the airport. Until there are more pilots and aircraft based at the airpark, need for access is unpredictable. It costs the HOA $295 each time we plow. Because of this we have established criteria that provides defined guidance to our snow removal contractor for when to plow. The contractor has assured us that a pilot personally calling to ensure the airpark is plowed when they need access is not a problem.

Please contact Dustin Haderlie at Triple-H Landscaping (307-248-1243) anytime there is a question as to the condition of the airpark taxiway surfaces or to arrange for your route to be plowed prior to your departure or arrival.

The Airpark will be plowed based on the criteria in the paragraph below. It is based on both the amount of snow accumulation that the board thinks will become a problem for residents and aircraft operations, and is also based on what is legal under the Federal Aviation Regulations for aircraft operations to resume after snowfall in Afton.

“[The Airpark shall be plowed] when snowfall has ceased and total snow accumulation is greater than 1 inch on the taxiways, and greater than 2 inches on the roadways. Contractor agrees that in the event snow is falling and the Afton Lincoln County airport is closed, plowing will not be performed until the airport is again open, and weather is suitable for the takeoff and landing of aircraft, including weather better than the RNAV (GPS) RWY 16 approach minimum of a 1000 ft ceiling and 1 ¼ mile visibility as reported on the AWOS (VHF freq 119.025 or by calling 307-885-2654), unless further snow accumulation would impede the ability for later snow removal. Snow removal on private property within the boundaries of the Afton Airpark subdivision is governed under separate agreement between Contractor and lot owners and is not covered by this agreement.”

Snow Removal on Privately Owned Aprons.

Mechanical Snow removal, by plow or broom is the first choice and preferred method to remove contamination. Mechanical removal is preferred when outside air temperatures are 15 deg Fahrenheit or lower, lending to dry snow that does not bond to the underlying surface.

When snow and ice has bonded with the moisture in the underlying surface, or to prevent a bond from forming, a deicer may be used. Proper selection of the deicer is important for both the aircraft and equipment that will operate on the paved surface and
for the surrounding environment. Formally approved deicer specifications for use in the aviation environment are SAE AMS 1435 (liquid) and SAE AMS 1431 (solid).

Urea is generally considered ok on airframes, but because it is almost 50% nitrogen, its not recommended for environmental reasons. Do not use any chloride salts. Sodium Acetate and Potassium Acetate are the two more commonly used around aircraft.

**Ground De/Anti-Icing Procedures**

**Definitions**

**Anti-Icing** – A procedure that, for a limited time, protects against formation of frost or ice, or accumulation of slush or snow on treated surfaces. Anti-icing fluids do not protect against contamination once the aircraft is airborne.

**Clean Aircraft Concept** – The aircraft critical surfaces will be completely clear of snow, frost, or ice before takeoff.

**Critical Aircraft Surfaces** – These surfaces are described in the applicable AFM, or other manufacturer-developed documents. Generally, critical surfaces are considered to be:

- Wings, stabilizers, control surfaces (including flaps, slats, trim tabs and their hinges)
- Engine inlets
- Pitot, static, angle of attack and temperature sensors
- Windshields
- Any other surface specified in the applicable AFM (including advisory information)

**Deicing** – A procedure that removes frost, ice, slush, or snow from aircraft surfaces. This procedure may use fluids, mechanical means, or surface heating to remove icing contaminants. Deicing does not protect against formation/accumulation of subsequent contamination.

**De/Anti-Icing** – A procedure that combines both deicing and anti-icing and is performed in either a one or two-step process.

- **One Step** – Accomplished with heated anti-icing fluid mixtures. The mixture deices and remains on the aircraft surfaces to provide anti-icing protection.
• **Two Step** – Consists of a deicing step and an anti-icing step. This procedure is used when Type II or IV fluid is available, or if the HOT for Type I fluid is likely to be exceeded. During this process, a headed deicing fluid is applied first, followed by a cold anti-icing fluid application, normally within 3 minutes of the completion of the first application.

**Hold Over Time (HOT)** – HOT is an estimate of the time de/anti-icing fluid will prevent the formation of frost or ice or the accumulation of snow on treated surfaces. The time begins at the start for the final fluid application and ends when the fluid loses its effectiveness.

**Engine Start**

Check for free movement of propellers and fans, and remove all ice deposits from the engine intake prior to starting the engine. Ice formation in the inlet duct can block rotation of the fan on turbine-powered aircraft, resulting in engine damage during the start.

**Aircraft Deicing**

The Afton Airpark HOA strongly encourages adherence to the “clean aircraft” concept, meaning no person may takeoff an aircraft when snow, ice, or frost is adhering to the propellers, wings, empennage, stabilizing or control surfaces, windshield, fuselage upper surfaces on aircraft with center mounted engine(s), engine or flight instrument systems. Ultimate determination if an aircraft complies with the “clean aircraft” concept rests with PI. However, this concept is also memorialized in FAR sections 91.527, 135.227 and 121.629. Even small amounts of these contaminants can result in an unpredictable degradation in performance and flight characteristics of the aircraft.

Clear ice can form any time the aircraft skin temperature is below freezing and wet snow, rain, drizzle, fog, or high humidity are present. Even short periods at high altitude or cold-soaked fuel tanks are some factors that may cool aircraft skin temperature below freezing.

Direct sunlight may cause dry snow to melt and refreeze if skin temperature is below freezing, forming an invisible ice layer beneath the snow. Snow falling on warm leading edges will melt, but may refreeze.

Snow falling on aircraft removed from a warm hanger, will melt and may refreeze on the aircraft surface if temperatures are below freezing.

Additional information can be found in the following Advisory Circulars:

- **AC 120-60, Ground Deicing and Anti-Icing Program**

**Application of Deicing and Anti-ice fluids**
The Anti-ice and Deicing fluids you are most likely to encounter are SAE AMS Type I and SAE AMS Type IV fluid.

SAE Type I fluids are formulated to melt snow, frost and ice while covering surfaces uniformly on parked aircraft. They commonly contain propylene glycol, however, most formulations are proprietary. Type I fluid is typically sprayed on hot and at high pressure. Though it is recommended to be heated to 130-180 deg F, and diluted 50/50 with water, there is no standard for its temperature prior to application, nor the percentage the type I fluid is diluted. It provides little if any holdover time against refreezing and ice or snow build-up during active precipitation or frost forming conditions. It is usually dyed orange to aid in identification and in application.

SAE Type IV fluids are formulated to prevent ice build-up when applied to clean aircraft during frozen precipitation, such as snow, freezing precipitation, such as freezing drizzle or frost conditions or when these conditions are forecasted. Type IV fluid can also reduce deicing time and reduce the amount of fluid required to remove ice accumulation when used in conjunction with a Type I fluid. When applied after Type I deicing fluid, Type IV fluid will offer greater “holdover” protection times and use less fluid. Type IV fluids meet the same AMS standards as type II fluids, but they provide a longer holdover time. They are typically dyed green to aid identification and in the application of a consistent layer of fluid.

Use of Holdover Timetables

FAA Published holdover times are only an estimate of the time that deicing or anti-ice fluid will provide protection against the formation of frost and ice, and from accumulation of snow on a treated aircraft surface. The holdover time begins when the final application of fluid COMMENCES and expires when the deicing or anti-ice fluid is no longer effective. Unless participating in an FAA approved ground deicing program, the use of the Holdover Timetables is only a recommendation for best practice. The current FAA Holdover Timetables can be found on the Afton Airpark website at www.wordpress.aftonairpark.com under the Resources tab by selecting Winter Ops.

Determine the precipitation type and intensity and use the appropriate HOT table to determine the nominal HOT range for the applicable fluid.

HOT tables do not cover the following weather conditions:

- Moderate or heavy freezing rain (FZRA)
- Heavy freezing drizzle (+FZDZ/PFZDZ)
- Ice pellets (PL)
- Heavy Snow (+SN/PSN)
- Unknown Precipitation (UP)
After application of deicing and or anti-ice fluids a visual and or tactile check should be performed by the pilot to ensure that all critical aircraft surface have been cleaned of any contamination. Additionally, a pre-takeoff contamination check should be performed within five minutes of commencing the takeoff roll.

Once fluid has been applied, heated aircraft surfaces should not be activated until just prior to takeoff to prevent the degradation of the fluid and its effectiveness as a result of being heated.

**DEICING AND ANTI-ICE IS NOT AVAILABLE AT THE AFTON LINCOLN COUNTY AIRPORT.**

**Taxi operations**

Operation on contaminated taxiways should be done with extra care. Black ice can exist by itself or under snow cover and can exist in sunlight as well as on overcast days. Braking ability on ice covered taxiways and aprons can be nil and turns must be made at a very slow speed and with caution to avoid sliding sideways and departing the paved surface. Consider in advance what options might exist should you be unable to stop the aircraft, such as reverse thrust devices. When in doubt, stop the aircraft and call for a tug.

On low wing aircraft where flaps are used for takeoff, and snow or slush is present on the taxi route to the active runway, consideration should be given to leaving the flaps up and delaying the before taxi checklist until reaching the hold short position. This practice will provide some protection to the flap tracks and linkages that may be exposed to contamination when the flaps are extended, reducing the possibility of failure due to freezing.

**Takeoff**

When operating aircraft with retractable landing gear consideration should be given to leaving the landing gear down for an extended period of time after takeoff (ie. Until 1,000 ft AGL) to allow the accelerated airflow to blow contamination clear of the brakes and landing gear.

**TAKEOFF IS NOT RECOMMENDED FROM AFTON AIRPORT WHEN SNOW IS FALLING.**

**Landing**

Tail icing may cause the elevator to feel sluggish at approach airspeeds. Consider landing with reduced flap settings and increased approach speeds if practical. Refer to your specific AFM for performance adjustments for the new configuration.
Braking Action

Runway contamination due to snow, ice, slush or a combination may lead to decreased braking performance. Many airports have equipment that can measure the effects of runway contamination and estimate its effects on an aircraft’s ability to stop. Many airports also have the airport manager driving his truck down the runway and providing his best estimate of braking action. Use your best judgment and extra caution in these cases.

In the United States the braking condition of the runway is usually reported with a numerical Mu ($\mu = \text{mew}$) value. The Mu scale range represents friction values of 0-100, with 0 the lowest and 100 the highest friction value. The U.S. uses Mu values expressed as whole numbers. ICAO expressed the value in decimal figures (“.40” vs. “40”). Canadian Runway Friction Index (CRFI) values are approximately equal to Mu values.

When the Mu value for any one-third of an active runway is 40 or less, a report is issued to the pilots. The report identifies the runway, time of measurement, type of measuring device, Mu value for each zone, and type of contaminant (e.g., wet, dry snow.)

Runway Mu values may vary significantly for the same contaminant condition due to measuring techniques, equipment calibration, effects of contamination on the friction measuring device, and time elapsed since measurement.

The table below lists ICAO codes for braking action and their definition as it applies to braking.

<table>
<thead>
<tr>
<th>Braking Action</th>
<th>Estimated Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Term</strong></td>
<td><strong>Definition</strong></td>
</tr>
</tbody>
</table>
| Good           | Braking deceleration is normal for the wheel braking effort applied. Directional control is normal. | • Water depth of 1/8” or less  
• $\Delta$ρονο λέον της την 3/4 ιν δεπτη  
• Compacted snow with OAT at or below 15 C | 5 | 40 & above |
| Good to Medium | Braking deceleration is noticeably reduced for the wheel braking effort applied. Directional control may be slightly reduced. | • Dry snow 3/4” or greater in depth  
• Sanded snow  
• Sanded ice  
• Compacted snow with OAT above 15 C | 4 | 39 - 36 |
| Medium (Fair)  | Braking deceleration is significantly reduced for the wheel braking effort applied. Potential for hydroplaning exists. Directional control may be significantly | • Wet snow  
• Slush  
• Water depth more than 1/8”  
• Ice (not melting) | 3 | 35 - 30 |
| Medium to Poor |                                                                      | 2 | 29 - 26 |
| Poor           | Braking deceleration is significantly reduced for the wheel braking effort applied. Potential for hydroplaning exists. Directional control may be significantly | • Wet snow  
• Slush  
• Water depth more than 1/8”  
• Ice (not melting) | 1 | 25 - 21 |
| Nil | Braking deceleration is minimal to nonexistent for the wheel braking effort applied. Directional control may be uncertain. Note: Taxi, takeoff, and landing operations in Nil conditions are prohibited. | Ice (melting) • Wet Ice | 9 | 20 & below |

NOTE:
Mu greater than .40 is reported in whole numbers (5, 6, etc). A “good” Mu report may indicate only half the braking effectiveness of a dry runway. Nil braking indicates idle thrust is more than braking capability.
Conditions specified as “Nil” braking action are not considered safe.
Do not operate on surfaces reported as Nil.
Further, the ICAO term “Unreliable” approximates Nil.

Operations in Colder than Standard Conditions

It is not uncommon in the winter for a temperature inversion to exist in Star Valley and temperatures near and on the surface to be well below standard temperatures.

Standard Temperature on the surface in Afton is 37.3 deg F or 3 deg C

Standard Temperature at RNAV minimums is 34.5 deg F or 1 deg C.

When these conditions exist, it is necessary to use cold weather temperature correction procedures. The crucial values to consider are standard temperature versus the ambient (at altitude) temperature. It is this “difference” that causes the error in indicated altitude. When the air is warmer than standard, you are higher than your altimeter indicates. Subsequently, when the air is colder than standard you are lower than indicated. It is the magnitude of this “difference” that determines the magnitude of the error. When flying into a cooler air mass while maintaining a constant indicated altitude, you are losing true altitude. However, flying into a cooler air mass does not necessarily mean you will be lower than indicated if the difference is still on the plus side. For example, while flying at 10,000 feet (where STANDARD temperature is -5 degrees Celsius (C)), the outside air temperature cools from +5 degrees C to 0 degrees C, the temperature error will nevertheless cause the aircraft to be HIGHER than indicated. It is the extreme “cold” difference that normally would be of concern to the pilot. Also, when flying in cold conditions over mountainous terrain, the pilot should exercise caution in flight planning both in regard to route and altitude to ensure adequate enroute and terminal area terrain clearance.

The FAA has published a list of Cold Temperature Restricted Airports in the United States, with the temperatures when corrections must be applied and the phases of the
Pilots are responsible to compensate for cold temperature altimetry errors when operating into an airport with any published cold temperature restriction and a reported airport temperature at or below the published temperature restriction. Pilots must ensure compensating aircraft are correcting on the proper segment or segments of the approach. Manually correct if compensating aircraft system is inoperable. Pilots manually correcting, are responsible to calculate and apply a cold temperature altitude correction derived from table below to the affected approach segment or segments. Pilots must advise the cold temperature altitude correction to Air Traffic Control (ATC). Pilots are not required to advise ATC of a cold temperature altitude correction inside of the final approach fix.

The table below is derived from ICAO formulas and indicates how much error can exist when the temperature is extremely cold. To use the table, find the reported temperature in the left column, and then read across the top row to locate the height above the airport/reporting station (i.e., subtract the airport/reporting elevation from the intended flight altitude). The intersection of the column and row is how much lower the aircraft may actually be as a result of the possible cold temperature induced error.

Further information can be found in the Airman’s Information Manual 7-2-3 (d)

**ICAO Cold Temperature Error Table**

<table>
<thead>
<tr>
<th>Height Above Airport in Feet</th>
<th>200</th>
<th>300</th>
<th>400</th>
<th>500</th>
<th>600</th>
<th>700</th>
<th>800</th>
<th>900</th>
<th>1000</th>
<th>1500</th>
<th>2000</th>
<th>3000</th>
<th>4000</th>
<th>5000</th>
</tr>
</thead>
<tbody>
<tr>
<td>+10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>90</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>20</td>
<td>20</td>
<td>30</td>
<td>30</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>60</td>
<td>90</td>
<td>120</td>
<td>170</td>
<td>230</td>
<td>280</td>
</tr>
<tr>
<td>-10</td>
<td>20</td>
<td>30</td>
<td>40</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>80</td>
<td>90</td>
<td>100</td>
<td>150</td>
<td>200</td>
<td>290</td>
<td>390</td>
<td>490</td>
</tr>
<tr>
<td>-20</td>
<td>30</td>
<td>50</td>
<td>60</td>
<td>70</td>
<td>90</td>
<td>100</td>
<td>120</td>
<td>130</td>
<td>140</td>
<td>210</td>
<td>280</td>
<td>420</td>
<td>570</td>
<td>710</td>
</tr>
<tr>
<td>-30</td>
<td>40</td>
<td>60</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>140</td>
<td>150</td>
<td>170</td>
<td>190</td>
<td>280</td>
<td>380</td>
<td>570</td>
<td>760</td>
<td>950</td>
</tr>
<tr>
<td>-40</td>
<td>50</td>
<td>80</td>
<td>100</td>
<td>120</td>
<td>150</td>
<td>170</td>
<td>190</td>
<td>220</td>
<td>240</td>
<td>360</td>
<td>480</td>
<td>720</td>
<td>970</td>
<td>1210</td>
</tr>
<tr>
<td>-50</td>
<td>60</td>
<td>90</td>
<td>120</td>
<td>150</td>
<td>180</td>
<td>210</td>
<td>240</td>
<td>270</td>
<td>300</td>
<td>450</td>
<td>590</td>
<td>890</td>
<td>1190</td>
<td>1500</td>
</tr>
</tbody>
</table>