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**Civil Engineering**

**SNOW AND ICE CONTROL**



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This instruction provides guidelines and procedures for the Air Force Snow and Ice Control Program. It implements Air Force policy directive (AFPD) 32-10, *Air Force Installations and Facilities*. This publication applies to all Air Force, Air Force Reserve Command (AFRC), and Air National Guard (ANG) units and personnel. This publication may be supplemented at any level, but all direct Supplements must be routed to the Office of Primary Responsibility (OPR) of this publication for coordination prior to certification approval. The authorities to waive wing/unit level requirement in this publication are identified with a Tier (“T-0, T-1, T-2, T-3”) number following the compliance statement. See Air Force Instruction (AFI) 33-360, *Publications and Forms Management*, for a description of the authorities associated with the Tier numbers. Submit requests for waivers through the chain of command to the appropriate Tier waiver approval authority, or alternately, to the Publication OPR for nontiered compliance items. Refer recommended changes and questions about this publication to the OPR using the AF Form 847, *Recommendation for Change of Publication*; route AF Forms 847 from the field through the appropriate functional chain of command. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with Air Force Manual (AFMAN) 33-363, *Management of Records*, and disposed of in accordance with the Air Force Records Disposition Schedule (RDS) located in the Air Force Records Information Management System (AFRIMS). The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force.

**SUMMARY OF CHANGES**

This document has been substantially revised and must be completely reviewed. Major changes include the addition of Tier waiver authority requirements, updated office symbols, and updated references.

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## Chapter 1

### KEY INSTRUCTIONS

#### 1.1. Applying the Snow and Ice Control Plan (S&ICP).

1.1.1. **Ground Support.** Installations with over 150 millimeters (6 inches) of average annual snowfall will maintain a S&ICP and form a snow and ice control committee (S&ICC). For installations which receive less than 150 millimeters (6 inches) of average annual snowfall, the installation commander will create plans and committees to meet their specific needs. **(T-1)**

1.1.2. **Aircraft Support.** Specific anti-icing/deicing procedures for aircraft maintenance are maintained in the technical orders (TO) for each type of aircraft. A forum similar to the S&ICC should be used to coordinate the aircraft anti-icing/deicing program. **Note:** Aircraft anti-icing/deicing products and general procedures are listed in TO 42C-1-2, *Anti-Icing, Deicing and Defrosting of Parked Aircraft*.

**1.2. Snow and Ice Control (S&IC) Objective.** Begin runway S&IC operations removal just prior to, or at the onset of, snowfall or icing conditions to provide continuous bare pavement. Installations without a flying mission will establish when S&IC operations should begin according to mission requirements. The snow control center (SCC), command post, Airfield Management (AM), and Air Traffic Control Tower (ATCT) must maintain close communications at all times. **(T-3)**

**1.3. Supporting the Mission.** Maintain continuous mission capability by removing snow and ice from airfield and base pavements. Judge the success of the program by the safe movement of aircraft and vehicles during inclement winter weather.

**1.4. Prioritizing Snow Removal.** S&IC from all paved surfaces typically cannot be accomplished simultaneously; therefore, three priorities are established to ensure S&IC operations are accomplished in order of relative mission importance and publicized to avoid misunderstandings among base agencies. Priorities can be changed when directed by the S&ICC chair, in the best interest of flight safety and/or airfield mission requirements. Joint basing priorities will be determined during the S&ICC meeting. **(T-1)** Maps will be color-coded in the following manner: Priority 1: Red; Priority 2: Yellow; Priority 3: Green. **(T-2)**. For safe operation of vehicles and equipment, establish a primary access route to and from the airfield. **(T-2)**. Establish priorities in accordance with the following guidelines. **(T-2)**. **(Note:** Priority areas may be different for those bases without an active airfield. Joint base operations will comply with this instruction as much as possible, taking into account multiple missions and/or runways. **(T-1)** The S&ICP should be flexible to allow for separate mission operations: **(T3)**

1.4.1. Priority 1 (Red):

1.4.1.1. Primary active runway and associated underrun/overrun.

1.4.1.2. Primary runway accesses to taxiways and alert facilities.

1.4.1.3. Apron accesses to taxiways.

1.4.1.4. Aircraft rescue and firefighting equipment lanes.

1.4.1.5. Access roads to and from emergency facilities, e.g., hospital and fire emergency services, special weapons/ammunition storage facilities, aircraft refueling points, aircraft arresting systems and other primary mission facilities.

1.4.1.6. For safe operations, establish Navigational Aids (NAVAIDS) for the primary active runway and associated access roads to and from the runway and to emergency facilities, e.g., hospital, fire emergency services.

1.4.2. Priority 2 (Yellow):

1.4.2.1. Secondary runways and associated underrun/overrun, and taxiways.

1.4.2.2. Aircraft parking aprons and remaining aircraft movement areas.

1.4.2.3. Access roads to secondary mission facilities and primary base streets.

1.4.2.4. NAVAIDS and/or associated access roads not categorized as Priority 1.

1.4.3. Priority 3 (Green):

1.4.3.1. All other areas, including military family housing. Privatized family housing (PFH) area S&IC obligations will be determined during the S&ICC meeting and will be in accordance with ground lease, operating agreement and other military family housing privatization (MFHP) transaction documents.

**1.5. Using References and Resources.** All S&IC activities that affect the environment must comply with AFPD 32-70, *Environmental Quality*. (T-2) Allowance Standard (AS) 464, *Civil Engineer – Operations Flight Support Equipment*, and AS 010, *Vehicles Owned by the United States Air Force for Permanent Bases*, help determine the type and amount of equipment authorized for S&IC. Federal Aviation Administration Advisory Circular (FAA AC) 150/5200-30C, *Airport Winter Safety and Operations*, and FAA AC 150/5220-20, *Airport Snow and Ice Control Equipment*, use abrasives (sand) only in emergency conditions to improve traction on airfield surfaces. Guidance on pollution prevention/best management practices (P2/BMP) is available at the Environmental Protection Agency website for Pollution, Prevention, Best Practices, and Conservation: <http://www.epa.gov/oecaagct/tpol.html>. If possible, S&IC vehicle operators should review the “Snow and Ice Control Techniques” training available at the Air Force Civil Engineer Center (AFCEC) Civil Engineer Virtual Learning Center (VLC): <https://afcesa.csd.disa.mil>. Installations that receive more than 900 millimeters (36 inches) of average annual snowfall, as stated in the surface observation climatic summary maintained by the local weather flight or supporting operational weather squadron (for the entire reporting period), will earn a manpower variance for S&IC (see AFI 38-201, *Management of Manpower Requirements and Authorizations*). Use this earned manpower to hire extra workers. (T-3) Installations may also use service contracts to augment their snow removal team, as approved by the Base Civil Engineer (BCE).

## Chapter 2

### RESPONSIBILITIES

**2.1. The Director of Civil Engineers (AF/A4C).** Maintains policy oversight for airfield anti-icing/deicing and assigns operational management responsibilities to the AFCEC.

**2.2. AFCEC:**

2.2.1. Recommends procedures for administering the S&ICP for the Air Force.

2.2.2. Evaluates and approves products for use on installation airfields.

2.2.3. Provides technical assistance to the MAJCOMs and keeps them informed of new deicing technologies.

2.2.4. Responsible for providing all airfield anti-icing/deicing and S&IC information. Updated copies of all references in this instruction (e.g., TOs, AFPDs, FAA guidance, and authorized deicing chemicals) are available on the Civil Engineer S&IC website at <https://cs3.eis.af.mil/sites/OO-EN-CE-A6/24048/OO-MS-CE-50/default.aspx>

**2.3. MAJCOMs:**

2.3.1. Review Air Force installation and non-Air Force requests for use of particular airfield anti-icing/deicing products. Forward requests to the designated MAJCOM for the affected aircraft, or if they are the Lead Command (for affected aircraft); forward the request to the appropriate Program Manager (PM). If a requested product is not approved, MAJCOMs will forward the request to AFCEC/COO for processing. MAJCOMs will send a coordinated response back to the base with approved memos for implementation at the S&ICC. Approved memos will be listed as attachments to the S&ICP. If a requested product is not approved or an aircraft is not listed on the Aeronautical Systems Center Runway and Deicing Community of Practice, MAJCOMs will forward the request to AFCEC/COO. PMs are responsible for determining how anti-icing/deicing product may affect their aircraft.

2.3.2. Where a product is approved by one PM and disapproved by another PM on the same installation, the host MAJCOM will take the lead and resolve the issue with the PMs. MAJCOMs will forward requests for anti-icing/deicing product to AFCEC/COO for review and approval.

2.3.3. Validate, prioritize, and submit airfield anti-icing/deicing program funding requirements to AF/A4C.

2.3.4. Validate, prioritize, and submit airfield anti-icing/deicing capability needs to Air Force Material Command.

**2.4. Installations:**

2.4.1. **Snow and Ice Control Plan (S&ICP).** Each installation will create an S&ICP in accordance with this instruction. **(T-1)** The S&ICP will include procedures from this instruction but should be tailored to meet local needs. **(T-2)** Attach snowfall history, equipment and attachment inventory, team composition, material and parts levels, and color-coded maps. **(T-2)** The S&ICP should be reviewed annually and revised as necessary. The installation commander will give final approval to the base S&ICP. **(T-2)** The service

provider for S&IC operations will ensure adequate information is provided in the base S&ICP to effectively achieve mission requirements. **(T-2)**

**2.4.2. Snow and Ice Control Committee (S&ICC) Members.** Paragraph 2.6 lists the representatives who make up the S&ICC membership. Select additional representatives from major tenant organizations and PFH PO. **(T-3)**

**2.4.3. Snow and Ice Control Committee (S&ICC) Meetings.** Each installation is responsible for holding at least two S&ICC meetings each year. Conduct a pre-season meeting between 1 September and 15 October and a post-season meeting between 15 April and 31 May. Installations which do not receive enough snow to warrant a physical meeting may elect to conduct the pre-season and post season meetings electronically. **(T-3)** The S&ICC will review:

2.4.3.1. Snow removal priorities. **(T-3)**

2.4.3.2. Organizational responsibilities. **(T-3)**

2.4.3.3. Problems encountered during the previous seasons. **(T-3)**

2.4.3.4. Contract needs for emergency S&IC. **(T-3)**

2.4.3.5. Levels of spare parts, materials, and deicing products. **(T-3)**

2.4.3.6. Manning (augmentee) requirements. **(T-3)**

2.4.3.7. Snow removal equipment status. **(T-3)**

2.4.3.8. Off-season rebuild program/depot repair needs. **(T-3)**

2.4.3.9. Product consumption and impacts on aircraft, airfield infrastructure, and the environment. **(T-3)**

**2.4.4. Internal Working Group.** The S&ICC may form an internal working group to coordinate details on issues not requiring approval by the entire S&ICC.

**2.4.5. Primary Aircraft Authorization.** Before using any airfield anti-icing/deicing products, the installation will obtain approval for their primary aircraft authorization (PAA) from the appropriate PM(s), coordinated through AFCEC/COO. If there is more than one PAA at a particular installation, approval is required from each PAA PM. Requests will be routed through the appropriate MAJCOM for review and action and the S&ICC will ensure that tenant aircraft are considered in the request. **(T-2)**

**2.5. Non-Air-Force-Owned Installations (Other Services and Commercial).** Units with aircraft based at non-Air-Force-owned installations (i.e., other Services and commercial airfields) will advise the MAJCOM of the airfield anti-icing/deicing products being used (since the unit will not have any input as to the anti-icing/deicing product being used). **(T-2)** Unapproved deicing products may have to be used at non-Air-Force-owned installations.

**2.5.1. Program Managers.**

2.5.1.1. Upon receipt of a MAJCOM request to use an airfield anti-icing/deicing product, evaluate the impact of the desired/requested airfield anti-icing/deicing product on the performance of systems for which they are responsible. Provide the requesting MAJCOM with a recommendation on the advisability of proceeding based on assessments of

potential adverse impacts of the system's operational safety, suitability, and effectiveness. **(T1)** The assessments should consider, at a minimum, adverse operational or maintenance impacts and additions to or increases in environmental, safety, and occupational health (ESOH) risks. As necessary, provide recommended mitigations to identified adverse impacts or ESOH risk increases or additions. Include recommended mitigations and the projected costs, schedule, and performance impacts that the MAJCOM will need to approve in order to implement the mitigations. **(T-1)**

2.5.1.2. Upon notification by a MAJCOM of airfield anti-icing/deicing products being used at a non-Air-Force-owned installation, recommend adjustments to maintenance activities and/or inspection intervals and/or operational restrictions to mitigate, if possible, any impact of the airfield anti-icing/deicing product. **(T-1)**

2.5.1.3. Provide AFCEC/COO with analysis and evaluation data for any anti-icing/deicing product used on non-Air Force owned installations hosting AF owned aircraft. **(T-2)**

**2.6. Snow and Ice Control Committee (S&ICC) Members.** The following compose the S&ICC membership and will perform the described functions at Air Force installations:

2.6.1. **Installation Commander.** The installation commander forms and chairs the S&ICC and appoints additional members as needed. When snow removal conditions warrant SCC activation, the heavy repair superintendent will assume control authority for snow control operations for both the airfield and main base. Control PFH areas in accordance with military family housing privatization transition documents. **(T-2)**

2.6.2. **Mission Support Group Commander.** The mission support group (MSG) commander activates the S&ICP when needed. **(T-2)**

2.6.3. Base Civil Engineer (BCE):

2.6.3.1. Coordinates installation S&IC activities. **(T-2)**

2.6.3.2. Requests a manpower variance when authorized. **(T-2)**

2.6.3.3. Approves requests for snow removal service contracts when justified. **(T-2)**

2.6.3.4. Approves S&IC equipment for multiple uses and ensures new construction complies with paragraph 3.5. **(T-2)**

2.6.4. Civil Engineer Installation Management Flight:

2.6.4.1. Briefs the S&ICC on the environmental impact of aircraft and airfield deicing products at the pre- and post-season meetings. **(T-2)**

2.6.4.2. Provides storm water (SW) program oversight to ensure operational procedures minimize potential impacts of aircraft and airfield deicing products; identifies environmental requirements to contain and control SW runoff for programming by installation; programs for environmental funds to ensure requirements comply with current environmental programming guidance. The organization using mission-essential anti-icing/deicing products is responsible for environmental cleanup of these products. **(T-2)**



2.6.4.3. Reviews all snow dump locations for environmental impacts from runoff flow, monitoring requirements, annual maintenance, and product usage. **(T-2)**

2.6.4.4. Ensures guidance on P2/BMPs is disseminated to personnel conducting airfield deicing. **(T-2)**

2.6.4.5. Performs annual evaluation of implementation status and effectiveness of P2/BMPs and recommends to the S&ICC actions to improve effectiveness. **(T-2)**

2.6.5. Civil Engineer Operations Flight:

2.6.5.1. Provides adequate facilities, equipment, materials, and trained personnel for the S&ICP. **(T-2)**

2.6.5.2. Provides recommended changes as necessary to the snow removal fleet and S&ICP to the S&ICC. **(T-2)**

2.6.5.3. Implements S&ICC changes to fleet and S&ICP. **(T-2)**

2.6.5.4. Inspects airfield infrastructure for corrosion or deterioration caused by deicing chemicals; reports findings and recommendations to the S&ICC. **(T-2)**

2.6.5.5. Coordinates product use and application locations with the environmental flight. **(T-2)**

2.6.6. Civil Engineer Heavy Repair Element:

2.6.6.1. Prepares the S&ICP. **(T-2)**

2.6.6.2. Prepares for, performs, and follows up on S&IC activities. **(T-2)**

2.6.6.3. Complies with the instructions in chapters 3 and 4 of this instruction. **(T-2)**

2.6.6.4. Plans the S&ICC meetings and publishes minutes. **(T-2)**

2.6.7. Logistics Readiness Squadron:

2.6.7.1. Develops and runs the post-season rehabilitation program for S&IC equipment. **(T-2)**

2.6.7.2. Provides around-the-clock support during S&IC operations. **(T-2)**

2.6.7.3. Provides around-the-clock support to snow removal operations for the maintenance and repair of all S&IC vehicles, including immediate repair response for all breakdowns that occur during snow and ice removal operations; coordinates the start and end dates of the post-season rehabilitation program response with civil engineers and S&IC. **(T-2)**

2.6.7.4. Establishes minimum stock levels of vehicle parts for S&IC vehicles. **(T-2)**

2.6.7.5. Promptly procures requested equipment and supplies for S&IC. **(T-2)**

2.6.7.6. Provides minimum special levels of spare parts for S&IC equipment. **(T-2)**

2.6.7.7. Provides priority fuel support to airfield snow removal equipment on site as requested. **(T-2)**

2.6.8. Security Forces Squadron:

2.6.8.1. Enforces BCE restricted parking notices during S&IC operations. **(T-2)**

2.6.8.2. Coordinates with CE Snow Control to develop efficient and effective snow/ice control procedures for all areas that require the use sign/countersign and/or pre-announcement coordination without hindering installation security. CE Snow Control will maintain surveillance of snow control personnel within restricted areas and purge areas after operations are completed. **(T-2)**

2.6.8.3. Provide snow removal and airfield management personnel unimpeded access to controlled/restricted areas within the airfield environment when S&IC operations are ongoing. **(T-2)**

2.6.9. Communications Squadron:

2.6.9.1. Provides mobile radio and telephone communications for S&IC operations. **(T-2)**

2.6.9.2. Reviews requests for managing personal wireless communication systems (PWCS) in accordance with AFI 33-106, *Managing High Frequency Radios, Personal Wireless Communication Systems, and the Military Affiliate Radio System*. **(T-1)**

2.6.9.3. Repairs communication equipment for S&IC operations using established priority repair lists in unit or base directives. **(T-2)**

2.6.10. Contracting Officer:

2.6.10.1. Administers contracts for emergency equipment rental or repair. **(T-2)**

2.6.10.2. Promptly procures parts and supplies for S&IC operations. **(T-2)**

2.6.10.3. Sets up emergency procurement procedures for abnormal duty hours. **(T-2)**

2.6.11. Operations Group Commander:

2.6.11.1. Sets snow removal priorities for flying operations (normally through AM) and provides timely weather information for S&IC operations. **(T-2)**

2.6.11.2. Sets minimum runway condition readings (RCR) for departing and arriving aircraft. **(T-2)**

2.6.12. Airfield Management (AM):

2.6.12.1. In close coordination with ATCT, SCC, flying operations, and aircraft maintenance organizations, directs S&IC priorities to ensure a safe, efficient and effective airfield operating environment. **(T-2)**

2.6.12.2. Determine and report Runway Surface Conditions (RSC) and Runway Condition Readings RCR) in accordance with AFI 13-204v3, *Airfield Operations Procedures and Programs* and TO 33-1-23, *Equipment and Procedures for Obtaining Runway Condition Readings*. **(T-1)**

2.6.12.3. Coordinates with ATCT to transfer the controlled movement area (runway) clearance access to the airfield snow removal supervisor when requested during snow removal operations. **(T-2)**

2.6.12.4. Assists with training and licensing of snow removal equipment operators as outlined in AFI 13-213, *Airfield Driving* and wing airfield driving instruction and/or supplement. **(T-1)**

2.6.12.5. Processes NOTAMs in accordance with AFI 11-208 (IP) and AFI 13-204v3. **(T-0)**

2.6.13. Weather Flight (or supporting Operational Weather Squadron in absence of local support):

2.6.13.1. Provides weather forecasting and support, as required, during S&IC operations. Severe Weather Action Plan procedures according to AFI 15-128, *Air Force Weather Roles and Responsibilities*, may be required to mitigate instances when the airfield may be closed (possibly due to winter weather). **(T-2)**

2.6.13.2. Notifies the SCC when forecasts predict snow or ice accumulation. **(T-2)**

2.6.13.3. Notifies the SCC and AMOPS of significant changes to a previous forecast. **(T-2)**

2.6.13.4. Provides information on request by the SCC or BCE. **(T-2)**

2.6.13.5. Provides necessary data for pavement temperature forecasts at installations where runway ice detection systems operate. **(T-2)**

2.6.14. **Maintenance Group Commander:** The subject matter expert briefs the S&ICC on actual and potential impacts of deicing products on aircraft and weapon systems, and reports on maintenance activities conducted to mitigate these impacts. **(T-2)**

2.6.15. Maintenance Operations Control Center:

2.6.15.1. Coordinates aircraft movement schedule through SCC through AMOPS at least 6 hours prior to movement. **(T-2)**

2.6.15.2. Develops parking plans in coordination with the airfield manager to be used during S&IC operations. **(T-2)**

2.6.15.3. Directs maintenance activities to: **(T-2)**

2.6.15.3.1. Clear all removable items not in use (e.g., tools, fire extinguishers, wheel chocks and aerospace ground equipment) from parking ramps to a designated area. **(T-2)**

2.6.15.3.2. Clear snow from around permanently installed airfield equipment in the vicinity of the aircraft. **(T-2)**

2.6.15.3.3. Remove aircraft from areas to be cleared, when feasible. **(T-2)**

2.6.16. Command Post:

2.6.16.1. Implements procedures for significant weather mission impacts in accordance with AFI 10-206, *Operational Reporting*, and local supplement; execute base notification, including delayed reporting, early release, base closures, and road condition updates via the installation notification and warning system. **(T-1)**

2.6.17. Safety:

2.6.17.1. Reviews the S&ICP to ensure planned operations are safe (in accordance with paragraph 3.1.2). **(T-2)**

2.6.17.2. Publicizes to all assigned personnel snow and ice hazard information and the precautions to take when encountering S&IC equipment. **(T-2)**

2.6.17.3. Evaluates effectiveness of S&IC activities at maintaining or rapidly reestablishing runway conditions required for safe flying operations; reports any recommendations to the S&ICC. **(T-2)**

## Chapter 3

### SNOW AND ICE CONTROL (S&IC) PREPARATIONS

#### 3.1. Operator Readiness.

3.1.1. **Training.** Give higher priority to training after winters with below-average snowfall. Provide the following:

3.1.1.1. VLC training: <https://afcesa.csd.disa.mil>. Ensure each member of the S&IC team reviews the training course “Snow and Ice Control Techniques” at least once prior to the beginning of the snow season. The service provider will ensure snow removal operators are adequately trained, the training is documented, and training is reviewed annually. **(T-3)**

3.1.1.2. Formal classroom lectures, discussion periods, and Web-based training. **(T-3)**

3.1.1.3. Provide hands-on operation training for all S&IC equipment. Perform practice runs with the equipment using typical operation scenarios. Substitute water for liquid deicers to reproduce realistic operations. **(T-3)**

3.1.1.4. Contracted operations must be familiar with the S&ICP and will follow the requirements of the specific S&ICP for the installation as approved by the BCE. **(T-3)**

3.1.1.5. Instruct all operators on effective and efficient anti-icing/deicing methods with minimal product use. Instruction must cover product usage issues, personal safety, P2/BMPs, environmental impact, and impact on aircraft, weapon systems, and airfield infrastructure. **(T-3)**

3.1.1.6. Tabletop exercises using miniature equipment on airdrome layouts to simulate operations and reduce training costs. **(T-3)**

3.1.1.7. Operator maintenance responsibilities, including fuel, fluid, supply locations, repair techniques, and heavy equipment maintenance reporting procedures. **(T-3)**

3.1.1.8. Instruct the operators on communication procedures and right-of-way information. Each operator must be trained on the procedures to follow if the radio signal is lost between the operator, snow control, the ATCT, and the airfield snow removal lead. **(T-3)**

3.1.1.9. Details of the S&ICP, emphasizing the order of priorities. **(T-3)**

3.1.1.10. Conduct both a daytime and nighttime airfield and base familiarization tour, highlighting locations where problems are likely. The airfield and base familiarization tour should identify such obstructions as aircraft airfield lighting systems, aircraft arresting cables and recessed arresting systems, aircraft fuel hydrant and valve pits, fire hydrants, railroad crossings, utility holes, curb and gutter systems, and any other obstructions that may be covered and difficult to see during snow removal operations. **(T-3)**

3.1.1.11. Define the following information: duty location, duty hours, duty uniform, shift schedules, and notification procedures. **(T-3)**

3.1.1.12. Permit attendance at technology-sharing seminars and workshops with other military bases and governmental agencies (e.g., Snow Symposium in Buffalo, New York). **(T-3)**

3.1.2. Safety and Health.

3.1.2.1. Units must comply with all vehicle licensing, personal protective equipment, and medical requirement policies. All equipment operators, military or civilian, must meet minimum training requirements before licensing. Employ over-hires early enough to allow time for medical clearance examinations and operator training. **(T-3)**

3.1.2.2. S&IC operations and working conditions are hazardous. Anticipate damage to snow equipment and attachments due to hidden obstructions; damage can be minimized by educating operators ahead of time on these hidden hazards. Ensure all personnel comply with established safety procedures when operating deicing equipment. **(T-3)**

**3.2. Snow Removal Readiness.** All equipment must be mechanically sound and operational by 1 September. Equipment status must be available for the pre-season meeting. Heated storage facilities should be used to increase equipment life, reduce maintenance costs, and ensure rapid response. **(T-3)**

3.2.1. Perform pre-season operational checks, including practice runs that resemble real winter operations as closely as possible. Report all discrepancies to logistics (vehicle maintenance) for corrective actions. **(T-3)**

3.2.2. Install, inspect, and perform operational tests on all snow control radios. **(T-3)**

3.2.3. Conduct run-up and operational checks when the temperature drops below freezing. **(T-3)**

3.2.4. Adjust and calibrate all S&IC equipment attachments. Load ballast and install tire chains (if necessary) prior to S&IC operations. **(T-3)**

3.2.5. Equip each vehicle with required support materials such as shovels, shear pins, ice scrapers, fire extinguisher, and tool kits as required. **(T-3)**

3.2.6. Use wear-resistant tungsten carbide cutting edges to reduce maintenance. **(T-3)**  
**CAUTION:** Tungsten carbide cutting edges may be incompatible with some in-pavement lighting fixtures.

3.2.7. Use broom cores with steel or poly bristles, or a combination of both. **(T-3)**  
**CAUTION:** Loss of steel bristles increases foreign object damage potential, so minimize loss by trying various brands and storing snow brooms indoors. It is not necessary or cost-effective to replace steel bristles with poly bristles until after they are worn down. Magnetic sweepers should be used to remove steel bristle residue from the airfield.

3.2.8. Place vehicle call signs, airfield and base maps, snow removal priorities, operator manuals, and/or spreader settings in the equipment for the operator's reference. **(T-3)**

**3.3. Obtaining Materials and Parts.** The heavy repair superintendent procures adequate shop stocks of S&IC supplies by 15 September each year. Establish minimum levels for each item, arrange for on-call items, and identify shortages by 31 May each year. **(T-3)**

**3.4. Protecting Air Force Property.** The heavy repair superintendent, in conjunction with representatives from AM, flying operations, aircraft maintenance and other organizations deemed appropriate, specifies "safety zones" around key assets and includes this information in the S&ICP. Snow removal vehicles will not operate within these safety zones. **(T-2)**

3.4.1. **Environment.** The heavy repair superintendent works cooperatively with the asset management flight chief to ensure applications of anti-icing/deicing products are in accordance with local, state, and Clean Water Act (CWA) SW provisions. The military family housing privatization project owner (MFHP PO) must comply with all applicable laws including CWA SW provisions. **(T-0)** The Air Force assumes no enforcement or supervisory responsibilities. The MFHP PO will be liable for all costs associated with compliance. **(T2)**

3.4.2. **Infrastructure.** Infrastructure crews mark all obstructions that could damage or be damaged by S&IC equipment. During the pre-season inspection, emphasis must be placed on marking drainage culverts, catch basins, manhole covers, fire hydrants, airfield lighting, electrical/electronic equipment enclosures, parking lot edges, curbs, and roadway drop-offs. **(T2)**

3.4.3. **Airfield Lighting.** Non-metal markers may be used to identify taxiway lights. FAA AC 150/5345-53C, *Airport Lighting Equipment Certification Program*, provides the name and address of marker manufacturers (these manufacturers do not supply markers suitable for identifying taxiway lights buried in snow). If you experience excessive damage to in-pavement taxiway lights, consider purchasing "snowplow-resistant" lighting. Also watch for corrosion and deterioration of underground cables that may result from long-term or excessive use of non-urea ice control products.

3.4.4. **Facilities.** S&IC equipment operators will maintain sufficient clearance around facilities to prevent damaging the facility and/or snow removal equipment. Operators will observe the safe clearance distances as specified in the installation's S&ICP. **(T-2)**

**3.5. Streamlining Operations.** Civil engineer personnel should be aware of snow removal physical constraints. Bumper blocks, elevated utility manholes in pavements, congested or enclosed parking arrangements, lack of road shoulders, and dead-end or cul-de-sac streets can severely hamper operations. Minimize these adverse conditions through continuous and coordinated communication. The programs flight chief and chief of the project management element shall coordinate maintainability checklists and drawings for upcoming projects with operations flight S&IC equipment operators. **(T-3)**

**3.6. Establishing the Snow Control Center (SCC).** The SCC is a focal point for all S&IC activities. Equip the SCC with:

3.6.1. At least two class "A" telephone extensions for calling snow removal personnel. **(T-1)**

3.6.2. At least one radio transceiver or remote. A dedicated net channel should be established for snow removal communications, when possible. **(T-1)**

3.6.3. Dispatch boards displaying the nomenclature, vehicle registration numbers, operator, vehicle status, radio call sign, vehicle's dispatched location, and any comments. **(T-1)**

3.6.4. Airfield and main base maps with color-coded priorities, status, and runway surface conditions. **(T-1)**

3.6.5. Personnel rosters showing duty status and recall information. **(T-1)**

3.6.6. Charts identifying current weather conditions and the forecast. **(T-1)**

3.6.7. Alternate sources of equipment and personnel to support contingencies. Include instructions for renting equipment or Department of Defense (DOD) mutual support agreements with regional active or reserve units. **(T-1)**



## Chapter 4

### SNOW AND ICE CONTROL OPERATIONS

**4.1. Maintaining Communications.** All personnel operating in the controlled movement area will maintain two-way radio communication with the ATCT. Radios equipped with headsets may be used to offset the high noise levels generated by snow removal equipment. ATCT requests to clear off the runway must allow enough time for the snow team supervisor to physically check the entire runway. The S&ICP must outline specific procedures when the radio signal is lost between the ATCT and a snow removal vehicle operator. All operators must be trained in these specific procedures. **(T-3)**

**4.2. Facility Managers.** Facility managers or OPR are tasked with clearing snow from around their facility using shovels, small rotary blowers, or small tractor-mounted plows. This includes removing snow from areas around aircraft hangars and shelters, grounding points, parked aircraft (within defined safety zone), NAVAIDs, the aircraft arresting system building, and other areas that cannot safely be cleared using larger snow removal equipment. Facility managers are responsible for clearing snow from nearby fire hydrants and the faces of all facility signs. Facility managers will use only approved deicing chemicals near the airfield. **(T-3)**

**4.3. Airfield Ice Control.** The BCE will select individuals in the S&IC chain of command to make airfield pavement deicing decisions. Selection will be based on duty position, experience, and environmental awareness. The decision to use ice control chemicals will be based on the weather forecast, flying schedule, and environmental considerations. The SCC should carefully monitor both use and issue of ice control chemicals and log the quantities and locations used. Refer to paragraph 5.4. **(T-3)**

**4.3.1. Ice-Control Products.** Use only installation-approved products on the airfield for anti-icing/deicing. Consult your installation's asset management flight chief to ensure products comply with all federal, state, and local environmental policies. Hazardous material purchases and accumulation of expired shelf life materials should be minimized. **(T-3)** **CAUTION:** The National Stock Number for ice control product is a generic stock number encompassing all anti-icing/deicing chemicals. Installations must ensure all deicing chemicals are compatible when purchasing additional products.

**4.3.2. Anti-icing/Deicing Products Storage.** Anti-icing/deicing products should be stored in an enclosed shelter, if possible. A properly stored anti-icing/deicing product reduces degradation caused by exposure to the weather. Storing solids or abrasives under shelter prevents moisture absorption that may freeze the stockpile in cold weather. **(T-3)** Liquid ice-control—products stored in tanks must comply with AFI 32-7001, *Environmental Management*. **(T-1)** Potassium acetate product should be stored in polyethylene or stainless-steel tanks. Use of potassium acetate as an anti-icing agent is recommended as an excellent means of reducing total product usage. **(T-3)**

**4.3.3. Environmental Impact.** Minimize use of ice control product to protect the environment, aircraft and weapon systems, and airfield infrastructure, weapon storage areas, missile alert and launch facilities, and to control the cost of airfield deicing activities.

**4.3.3.1.** Minimize the use of glycol-based products. Urea-based Anti-icing/deicing products will not be used on Air Force installations. Rely on alternative materials that are

safer for the environment, such as potassium acetate, sodium formate, and sodium acetate. Excessive glycol and urea use could degrade waterways. **CAUTION:** Ensure potassium acetate is used as recommended by the manufacturer. There are documented cases of potassium acetate causing increased groundwater contamination and adversely effecting underground electrical circuits where the insulation is in poor condition.

4.3.4. **Abrasives.** Use abrasives (sand) as necessary to improve traction on airfield surfaces. Excerpts from FAA AC 150/5200-30C for abrasives use is stated in paragraphs 4.3.4.1 and 4.3.4.2. **(T-2)**

4.3.4.1. All sands do not perform the same. In general, the greater the quantity of sand applied, the greater the increase in traction. Fine sands show superior performance on warmer ice (>20 Fahrenheit [ $^{\circ}$ F] [-7 Celsius ( $^{\circ}$ C)]), while coarser sands show superior performance on colder ice (<15  $^{\circ}$ F [-9  $^{\circ}$ C]). For the purpose of this guidance, sand retained on a #30 sieve is considered “coarse,” and sand passing through a #30 sieve is considered “fine”.

4.3.4.2. Table 4.1 provides the standard gradation for sand. Friction-improving material applied to airfield pavements will consist of washed granular particles free of stones, loam, clay debris, and chloride salts or other corrosive substances. The pH of the water solution containing the material must be approximately neutral (pH 7). Material must meet the following gradation using standard sieves conforming to American Society for Testing and Materials (ASTM) E11, *Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves*.

**Table 4.1. Standard Gradation for Sand.**

Sieve Designation	Percent by Weight Passing
0.04	100
8	97–100
16	30–60
50	0–10
80	0–2

**4.4. Snow Clearing Principles.** Snow clearing principles outlined in FAA AC 150/5200-30, *Airport Winter Safety and Operations* shall be employed. **(T-0)**

**4.5. Snow Disposal.** The S&ICP will specify how and where large quantities of snow are to be disposed. Two common approaches are as follows:

4.5.1. **Melting Pits or Portable Melters.** At those locations where large snow fall events occur, CE should consider the installation of melting pits or procurement of portable melters as an efficient and economical solution to expensive snow hauling.

4.5.2. **Identifying Disposal Sites.** If there is insufficient space for storing snow near areas to be cleared and no melting or flushing means are available, hauling to a disposal site may be necessary. If deemed necessary, the disposal site should be selected before winter sets in and

identified in the S&ICP. The selection process should at least consider the following: (1) disposal sites do not compromise aircraft operations, airfield NAVAIDs, airfield traffic, and ATCT operations such as ATCT line-of-sight requirements; (2) sites have adequate drainage capability; and (3) sites offer, if required, environmental mitigation of captured chemicals. **(T-2)**

JUDITH A. FEDDER, Lieutenant General, USAF  
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## Attachment 1

### GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

#### *References*

AFI 10-206, *Operational Reporting*, 6 September 2011

AFI 13-204V3, *Airfield Operations Procedures and Programs*, 1 September 2010 AFI 32-7001, *Environmental Management*, 4 November 2011

AFI 13-213, *Airfield Driving*, 1 June 2011

AFI 15-128, *Air Force Weather Roles and Responsibilities*, 7 February 2011

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AFI 33-360, *Publications and Forms Management*, 25 September 2013

AFMAN 33-363, *Management of Records*, 1 March 2008 AFMS 44EO, *Operations Flight*

AFPD 32-10, *Installations and Facilities*, 4 March 2010

AFPD 32-70, *Environmental Quality*, 20 July 1994

AS 010, *Vehicles Owned by the United States Air Force for Permanent Bases*, 2009 AS 464, *Civil Engineer – Operations Flight Support Equipment*

ASTM E11, *Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves*, 2009,

<http://www.astm.org/index.shtml>

FAA AC 150/5200-30C, *Airport Winter Safety and Operations*, 9 December 2008,

[http://www.faa.gov/airports/resources/advisory\\_circulars/](http://www.faa.gov/airports/resources/advisory_circulars/)

FAA AC 150/5220-20, *Airport Snow and Ice Control Equipment*, 30 June 1992

FAA AC 150/5345-53C, *Airport Lighting Equipment Certification Program*, 30 September 2005

FHWA *Manual of Practice for an Effective Anti-Icing Program*, June 1996,

<http://www.fhwa.dot.gov/reports/mopeap/eapcov.htm>

SAE AMS 1431C, *Compound, Solid Runway and Taxiway Deicing/Anti-Icing*, September 2010

SAE AMS 1435B, *Fluid, Generic, Deicing/Anti-Icing Runways and Taxiways*, September 2010

TO 33-1-23, *Equipment and Procedures for Obtaining Runway Condition Readings*, 30 November 2006

TO 42C-1-2, *Anti-Icing, Deicing, and Defrosting of Parked Aircraft*

#### *Prescribed Forms*

None

#### *Adopted Forms*

AF Form 847, *Recommendation for Change of Publication*

*Abbreviations and Acronyms*

°C—degree Celsius

°F—degree Fahrenheit

**AAS**—aircraft arresting system

**AFCEC**—Air Force Civil Engineer Center

**AFI**—Air Force instruction

**AFM**—airfield manager

**AFMAN**—Air Force manual

**AFMS**—Air Force manpower standard

**AFPD**—Air Force policy directive

**AFRC**—Air Force Reserve Command

**AM**—airfield management

**AMOPS**—airfield management operations

**AMS**—Aerospace Material Specification

**ANG**—Air National Guard

**AS**—allowance standard

**ASC**—Aeronautical Systems Center

**ASTM**—American Society for Testing and Materials

**ATCT**—air traffic control tower

**BCE**—base civil engineer

**CWA**—Clean Water Act

**ESOH**—environmental, safety, and occupational health

**FAA AC**—Federal Aviation Administration Advisory Circular

**MAJCOM/A3**—major command directorate of operations

**MAJCOM**—major command

**MFH**—military family housing

**MFHP**—military family housing privatization

**MFHPTD**—military family housing privatization transition documents

**NAVAID**—navigational aid

**NOTAM**—Notice To Airmen

**OCONUS**—outside the continental United States

**OPR**—office of primary responsibility

**P2/BMP**—pollution prevention/best management practices

**PAA**—primary aircraft authorization

**PFH**—privatized family housing

**pH**—Log(base 10) of the hydrogen ion concentration; measure of the acidity or basicity of a solution

**PO**—project owner

**RCR**—runway condition reading

**RSC**—runway surface condition

**S&ICC**—snow and ice control committee

**S&ICP**—snow and ice control plan

**S&IC**—snow and ice control

**SAE AMS**—Society of Automotive Engineers Aerospace Material Specification

**SAF/AQR**—Deputy Assistant Secretary of the Air Force for Acquisition (Science, Technology, and Engineering)

**SCC**—snow control center

**SW**—storm water

**TO**—technical order

**AF/A4C**—Director of Civil Engineers

**VLC**—Virtual Learning Center

**WSA**—weapons storage area

## Attachment 2

## USING ICE CONTROL CHEMICALS ON AIRFIELD PAVEMENTS

**A2.1. Solid Anti-Icing and Deicing Chemicals.** All solid chemicals for airfield use (other than urea) must be certified to Society of Automotive Engineers Aerospace Material Specification (SAE AMS) 1431C, *Compound, Solid Runway and Taxiway Deicing/Anti-Icing*.

**Table A2.1. Sodium Formate — Kilograms per 100 Square Meters (Pounds per 1,000 Square Feet).**

Ice Thickness	Pavement Temperature		
	-1.1 °C (30 °F)	-3.9 °C (25 °F)	-6.7 °C (20 °F)
Less than 0.8 mm (0.03125 in.)	3.9 (8)	5.4 (11)	14.2 (29)
0.8 mm to 3.2 mm (0.03125 in. to 0.125 in.)	6.8 (14)	14.2 (29)	30.3 (62)
3.2 mm to 6.4 mm (0.125 in. to 0.25 in.)	30.3 (62)	42 (86)	65.9 (135)

**Table A2.2. Sodium Acetate — Kilograms per 100 Square Meters (Pounds per 1,000 Square Feet).**

Ice Thickness	Pavement Temperature		
	-1.1 °C (30 °F)	-3.9 °C (25 °F)	-6.7 °C (20 °F)
Less than 0.8 mm (0.03125 in.)	4.9 (10)	7.3 (15)	18.1 (37)
0.8 mm to 3.2 mm (0.03125 in. to 0.125 in.)	8.8 (18)	18.1 (37)	38.1 (78)
3.2 mm to 6.4 mm (0.125 in. to 0.25 in.)	38.1 (78)	53.7 (110)	85 (174)

**A2.2. Liquid Anti-Icing and Deicing Chemicals.** All liquid chemicals for airfield use (other than isopropyl alcohol and propylene alcohol) must be certified to SAE AMS 1435B, 1435B, *Fluid, Generic, Deicing/Anti-Icing Runways and Taxiways*. **CAUTION:** Do not allow any mixing or blending of deicing products from different manufacturers in storage and dispensing tanks. This could affect the chemistry of the originally certified products and the product would then require re-testing to ensure it satisfies SAE AMS 1435B.

**Table A2.3. Potassium Acetate — Kilograms per 100 Square Meters (Gallons per 1,000 Square Feet (See Note)).**

Ice Thickness	Pavement Temperature		
	-1.1 °C (30 °F)	-3.9 °C (25 °F)	-6.7 °C (20 °F)
Less than 0.8 mm (0.03125 in.)	0.44 (0.9)	0.59 (1.2)	0.88 (1.8)

0.8 mm to 3.2 mm (0.03125 in. to 0.125 in.)	0.59 (1.2)	0.88 (1.8)	1.46 (3.0)
3.2 mm to 6.4 mm (0.125 in. to 0.25 in.)	0.88 (1.8)	1.32 (2.7)	2.93 (6.0)
<b>Note:</b> When freezing conditions are expected, potassium acetate may be used as an anti-icer at the rate of 2 liters per 100 square meters (0.5 gallon per 1,000 square feet).			

A2.2.1. **Ethylene Glycol.** Ethylene glycol will not be used for any deicing activities because of its highly toxic nature.