
Incheon International Airport De-icing/Anti-icing Manual

Introduction

This document describes the general operational procedures provided by Incheon Int'l Airport Corporation, airlines and ground handlers for the de/anti-icing of aircraft during annual de/anti-icing period.

These procedures are intended to provide safe, orderly and efficient de/anti-icing of aircraft.

Vice President of Aerodrome Service Division,
Incheon International Airport Corporation

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Incheon International Airport De-icing/Anti-icing Procedure

Chapter 1 Overview

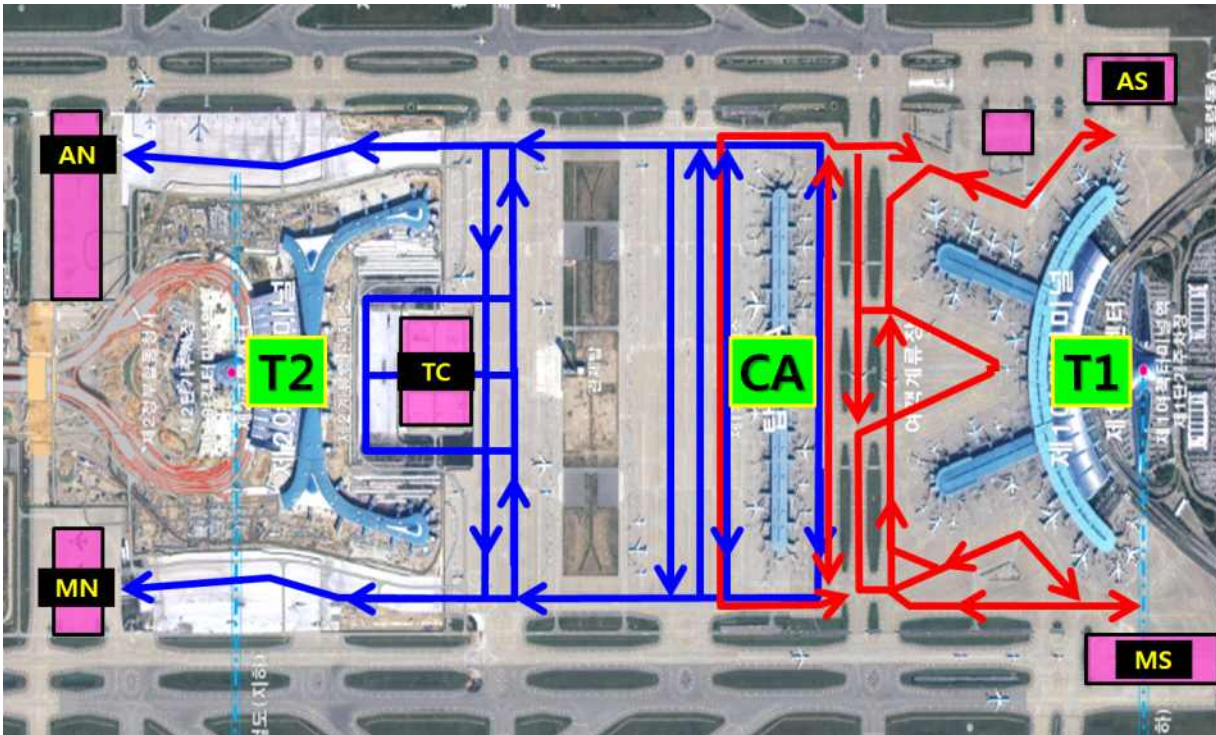
1. Purpose

- 1.1. The procedure is to specify the overall procedure to be performed by the Incheon International Airport Corporation (hereinafter referred to as the “Airport Corporation”) and airlines/service providers in relation to aircraft de-icing/anti-icing performed at the Incheon International Airport (hereinafter the “Incheon Airport”).

1. General

- 1.1. The Incheon Airport operates Passenger Terminal 1 and Passenger Terminal 2 independently as a basic concept in order to maintain efficient and stable airport operation and smooth traffic flow on the ground and to minimize mutual interference among aircraft moving on the ground at Passenger Terminal 1 and Passenger Terminal 2.
- 1.2. The Airport Corporation will implement a procedure for de/anti-icing based on the principle that aircraft departing from the Passenger Terminal 1 use de/anti-icing pads in the south, aircraft departing from the Passenger Terminal 2 use de/anti-icing pads in the north, aircraft departing from the concourse use de/anti-icing pads in both north and south. Overall arrangement is shown below in <Figure 1>.
- 1.3. All airlines flying from and to the Incheon Airport and all ground handling companies performing de/anti-icing in winter shall understand the basic intension and purpose of the independent operation, and in response, actively work together to create service environments that allow departing aircraft to use de/anti-icing pads in the closest proximity at each terminal.
- 1.4. If an airline/service provider cannot put in place the plan for using the closest de/anti-icing pad for an inevitable reason, it shall clearly notify the Airport Corporation of the reason and

faithfully cooperate to discuss alternatives.



<Figure 1. De/anti-icing Arrangement at the Incheon Airport

2. Scope of Application

2.1. This procedure applies to de/anti-icing performed under a multi-party agreement among de/anti-icing works at the Incheon Airport.

3. Procedure Management

3.1. The Airport Corporation and airlines/service providers are responsible for managing this procedure.

3.2. The Airport Corporation and airlines/service providers are responsible for reviewing the effectiveness and the validity of the content described in the procedure. They propose their opinions and have mutual consultation to review and reflect requirements if addition, revision or deletion is required.

3.3. To this end, the Airport Corporation/airlines/service providers may proceed with relevant consultation by requiring the convention of an ad hoc or periodic consultative body.

4. Reference

- 4.1. What is described in this procedure on de/anti-icing facility and its operation at the Incheon Airport is based on the Aeronautical Information Publication (hereinafter the “AIP”) and the Incheon Airport Airside Safety Manual (hereinafter the “ASM”). Provisions not mentioned in this procedure also follow those bases.
- 4.2. This procedure follows the de/anti-icing-related standards set forth by aircraft manufacturers and airworthiness authorities and manuals provided by individual aircraft manufacturers. Provisions not mentioned in this procedure also follow those bases.
- 4.3. AS6285A ‘Aircraft Ground Deicing/Anti-icing Process’
- 4.4. AS6286 ‘Training and Qualification Program for Deicing/Anti-icing of Aircraft on the Ground’
- 4.5. FAA ‘Standardized International Aircraft Ground Deice Program’

Chapter 2 De/Anti-icing Pad and Operation of De/Anti-icing Equipment

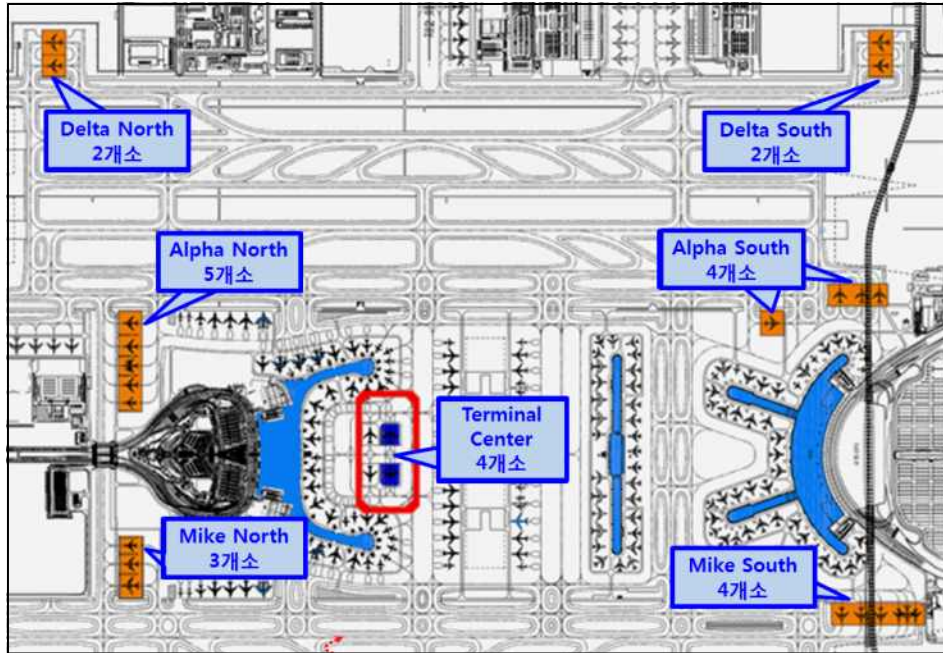
1. Overview of De/Anti-icing Pad

- 1.1. Incheon Apron Control Tower (including Apron Control Tower 1/2, hereinafter the “Apron Control Tower”) has the authority for access control of entering/leaving de/anti-icing pads at the Incheon Airport.
- 1.2. The current state of de/anti-icing pads at the Incheon Airport is shown in Table 1 below:

| Zone | | Pad # | F-Class Pad |
|----------|--------|---|---|
| Alpha | South | 821, 822, 823, 824 <small>(controlled by Incheon TWR)</small> , 825 | (A380) 823,824 (B748) 823,824,825 |
| | North | 801, 802, 803, 804, 805 | (A380) 801 (B748) 801,802 |
| Mike | South | 831, 832, 833, 834 | 831 |
| | North | 811, 812, 813 | 813 |
| Delta | South | 841, 842 | (A380) 842 (B748) 841,842 |
| | North | 851, 852 | (A380) 852 (B748) 841,842 |
| Terminal | Center | 814, 815, 816, 817 | De/anti-icing available only for Class 2Eng. E or below |

<Table1> Current State of De/Anti-icing Pads

- 1.3. De/anti-icing pads are divided by “Zone” (hereinafter “Zone”) and “Pad Number” and they are located as shown below in <Figure 1>.



<Figure1> Location of De/Anti-icing Zone

1.4. Detailed location of de/anti-icing pads (pad no.) and detailed information on VHF frequencies to be used are specified in AIP.

2. General Procedure for De/Anti-icing

2.1. This chapter defines the duty/responsibility/authority of the Apron Control Tower in the process of preparing and performing de/anti-icing.

2.2. The Apron Control Tower receives snow forecast from the Integrated Operation Center and then provides individual airlines/service providers with information necessary for the preparation for de/anti-icing situations by means of wired communication or text message.

2.3. The Apron Control Tower issues “De/Anti-icing Phase” taking into account overall de/anti-icing handling progress and communication in air traffic while de/anti-icing situation progresses.

2.4. The criteria and details of the issuance of De/Anti-icing Phase are shown in <Table 2> below:

| De/Anti-icing Phase | Issuance Criteria (EOBT – ATD on average) | Remarks |
|---------------------|---|--|
| Phase 1 (Blue) | Delay of less than 60 minutes | Phase 2 can be issued if delay is expected to worsen |

| De/Anti-icing Phase | Issuance Criteria (EOBT – ATD on average) | Remarks |
|-------------------------|---|--|
| Phase 2 (Yellow) | Delay of 60 minutes to less than 120 minutes | Phase 3 can be issued if delay is expected to worsen |
| Phase 3 (Orange) | Delay of 120 minutes to less than 240 minutes | Phase 4 can be issued if delay is expected to worsen |
| Phase 4 (Red) | Delay of more than 240 minutes | |

<Table 2> De/Anti-icing Phase

- 2.5. Airlines may provide passengers with information on departure delay with reference to De/Anti-icing Phases issued by the Apron Control Tower.
- 2.6. The Apron Control Tower delivers information on the allocation of de/anti-icing pad to individual airlines/service providers via the Integrated Information System (hereinafter the “IIS”) and may use another communication network (TRS, etc.), if necessary.

3. Allocation of De/Anti-icing Pad

- 3.1. This chapter defines the duty/responsibility/authority of the Apron Control Tower in respect of the allocation of de/anti-icing pads for de/anti-icing.
- 3.2. The Apron Control Tower allocates de/anti-icing pads (or zones) to airlines/service providers so that de/anti-icing works are performed in the assigned pad.
- 3.3. The Apron Control Tower considers the followings when allocating de/anti-icing pads.
 - 3.3.1. Efficiency of overall air traffic handling
 - 3.3.2. Priority of aircraft departure according to the air traffic flow management (hereinafter the “ATFM”)
 - 3.3.3. Efficiency of equipment of service providers
 - 3.3.4. Optimum movement path up to the departure runway after de-icing is completed
 - 3.3.5. Appropriate movement path of an aircraft to be de-iced
- 3.4. The Apron Control Tower issues an appropriate movement path and

provides traffic information so that an aircraft can move to the assigned de/anti-icing pad.

3.5. The Apron Control Tower may change the de/anti-icing pad already assigned in any of the following cases:

3.5.1. A change is necessary due to overall air traffic handling

3.5.2. The de/anti-icing pad is not prepared for de/anti-icing yet

3.5.3. A nearby de/anti-icing pad becomes available

3.5.4. A certain airline/service provider requests a change and it is possible to accept the request

3.5.5. It is deemed necessary for other reasons

3.6. The Apron Control Tower notifies the service provider of change in the assignment of de/anti-icing pad, if necessary, by using an available communication network (de-icing TRS, etc.).

3.7. The Apron Control Tower may assign and operate a staging area (hereinafter “Staging Area”) for each zone in the following cases and the de/anti-icing pad on standby is temporarily excluded from the de/anti-icing zone.

3.7.1. An aircraft needs to be on standby due to an adjustment of departure priority caused by the ATFM

3.7.2. A delay factor occurs due to a specific reason (maintenance, etc.) of an aircraft whose de-icing is complete

3.7.3. A reason arises that keeps a de-iced aircraft from leaving the de/anti-icing pad

3.7.4. It is deemed necessary for other reasons

4. De/Anti-icing Equipment on Standby

4.1. This chapter defines the duty/responsibility/authority of airlines/service providers in respect of standby of de/anti-icing equipment.

4.2. An airline/service provider maintains de/anti-icing equipment under their control to keep them in the optimized condition for well-ordered de/anti-icing operation in winter during which frequent de/anti-icing is expected.

4.3. An airline/service provider maintains the communication network (de-icing TRS, etc.) linked with the Apron Control Tower to keep it

in the optimized condition (available for reception/transmission) for the preparation of de/anti-icing operation.

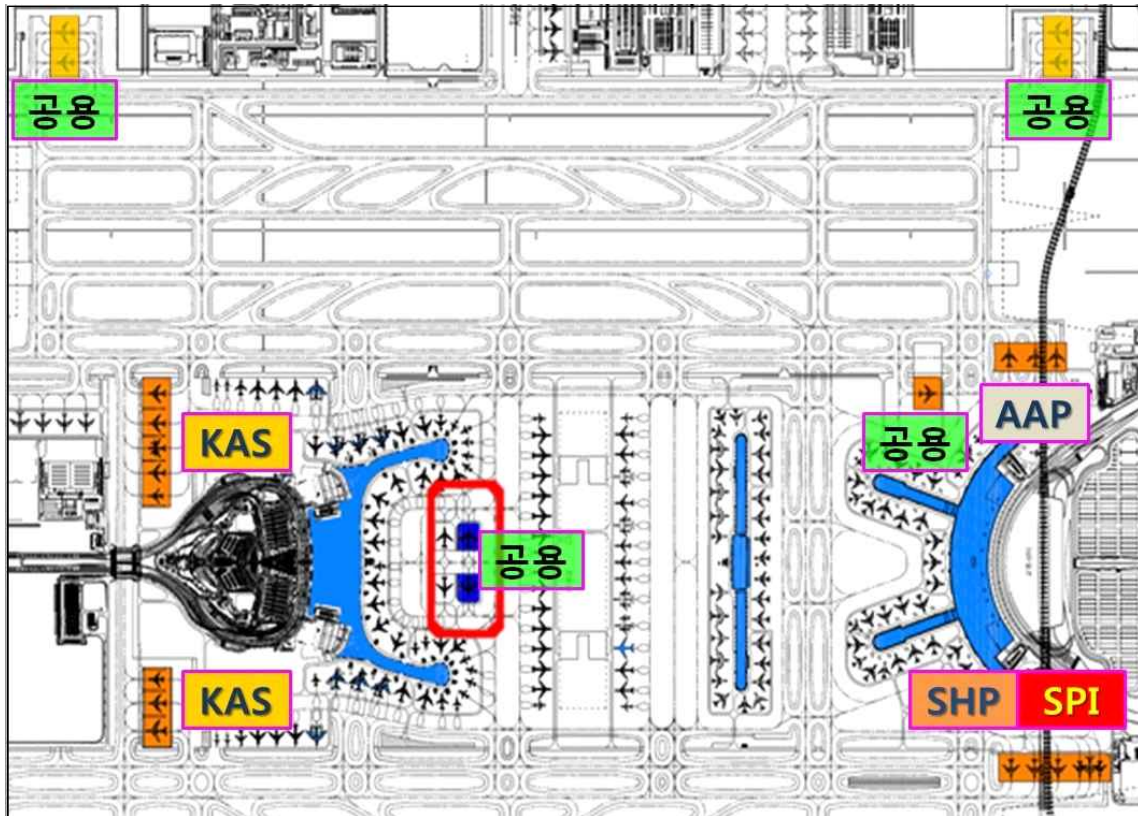
- 4.4. An airline/service provider prepares for the operation of de/anti-icing equipment as soon as possible upon the receipt of the information that de/anti-icing is expected (weather forecast, work schedule notification from the Apron Control Tower or airline).
- 4.5. As soon as an airline/service provider completes the preparation to dispatch de/anti-icing equipment, it notifies the Apron Control Tower of the following information through an available communication network (de-icing TRS, etc.).
 - 4.5.1. Location in which the de/anti-icing equipment is on standby (e.g. maintenance apron, cargo apron, etc.)
 - 4.5.2. Quantity of de/anti-icing equipment on standby (e.g. a total of 4 units of equipment, etc.)
 - 4.5.3. Estimated time required to dispatch (move) to the de/anti-icing pad
 - 4.5.4. Other information deemed necessary

5. Arrangement of De/Anti-icing Equipment

- 5.1. This chapter defines the duty/responsibility/authority of the Apron Control Tower/service provider in respect of the arrangement of de/anti-icing equipment.
- 5.2. The Apron Control Tower allocates a de/anti-icing pad (or de-icing zone) where the service provider's de/anti-icing equipment will perform the operation, taking into account the air traffic and operation situations, and notifies the service provider of the allocated pad through an available communication network (de-icing TRS, etc.).
- 5.3. The service provider moves the equipment to the de/anti-icing pad (or de-icing zone) allocated by the Apron Control Tower to prepare for the de/anti-icing operation, and in an inevitable case has separate consultation with the Apron Control Tower to adjust the allocation.
- 5.4. When the de/anti-icing equipment is located at the allocated de/anti-icing pad (or de-icing zone) and the preparation for de/anti-icing operation is complete, the service provider notifies the Apron Control Tower of the fact through an available communication

network (de-icing TRS, etc.).

5.5. The equipment arrangement of each service provider is shown in <Figure 3> below.



<Figure 3> Equipment arrangement of each service provider

4.6 The annual equipment arrangement per service provider is determined through discussions among the Airport Corporation, airlines and service providers before the winter season arrives every year and then is reflected in the revision of this manual.

4.7 Each year's equipment arrangement per service provider may be changed as necessary to maintain efficient airport operations and traffic flow, in which case service providers shall actively cooperate.

6. Information Exchange during De/Anti-icing

6.1. This chapter defines the duty/responsibility/authority and means required for information exchange between the Apron Control Tower and service providers in the course of de/anti-icing operation.

- 6.2. The Apron Control Tower and service providers use a dedicated TRS (hereinafter the “de-icing TRS”) for communication in the course of de/anti-icing operation in principle, and in an inevitable case may use an alternative means (wired/wireless communication, etc.).
- 6.3. The use of an alternative communication means for service providers is allowed only temporarily. Therefore, service providers must take necessary measures (equipment replacement, request for maintenance, etc.) rapidly in order to recover the de-icing TRS into normal service.
- 6.4. The service provider clearly maintains the standby of the de-icing TRS network for smooth communication of information. If it is not possible to keep the de-icing TRS network, it takes the following measures.
 - 6.4.1. Notify the Apron Control Tower by using an alternative communication means (wired/wireless communication, etc.)
 - 6.4.2. Take measures to normalize the de-icing TRS network (equipment replacement, request for maintenance, etc.)
 - 6.4.3. Notify the Apron Control Tower if the de-icing TRS is recovered
- 6.5. The Apron Control Tower may give service providers instructions required to smoothly proceed with de/anti-icing operation.
- 6.6. In case of any change (including the state of equipment movement) during de/anti-icing, the service provider shall notify the Apron Control Tower of such change including the following information.
 - 6.6.1. Overview of a situation (e.g. fill-up of fluid, rotation of personnel, etc.)
 - 6.6.2. Estimated recovery time (e.g. expected to take approx. 00 minutes)
 - 6.6.3. Other information deemed necessary
- 6.7. The Apron Control Tower and service providers notify each other of any unusual situation that takes place in the course of de/anti-icing as soon as possible.
- 6.8. If the number of de/anti-iced is expected to drop sharply or no more de/anti-icing is expected, the Apron Control Tower notifies service providers of the fact and adjusts the current arrangement of the equipment.
- 6.9. If the service provider adjusts the arrangement of the equipment

as directed by the Apron Control Tower or if de/anti-icing situation is terminated and the equipment is withdrawn from the de/anti-icing pad, the service provider notifies the Apron Control Tower of the fact.

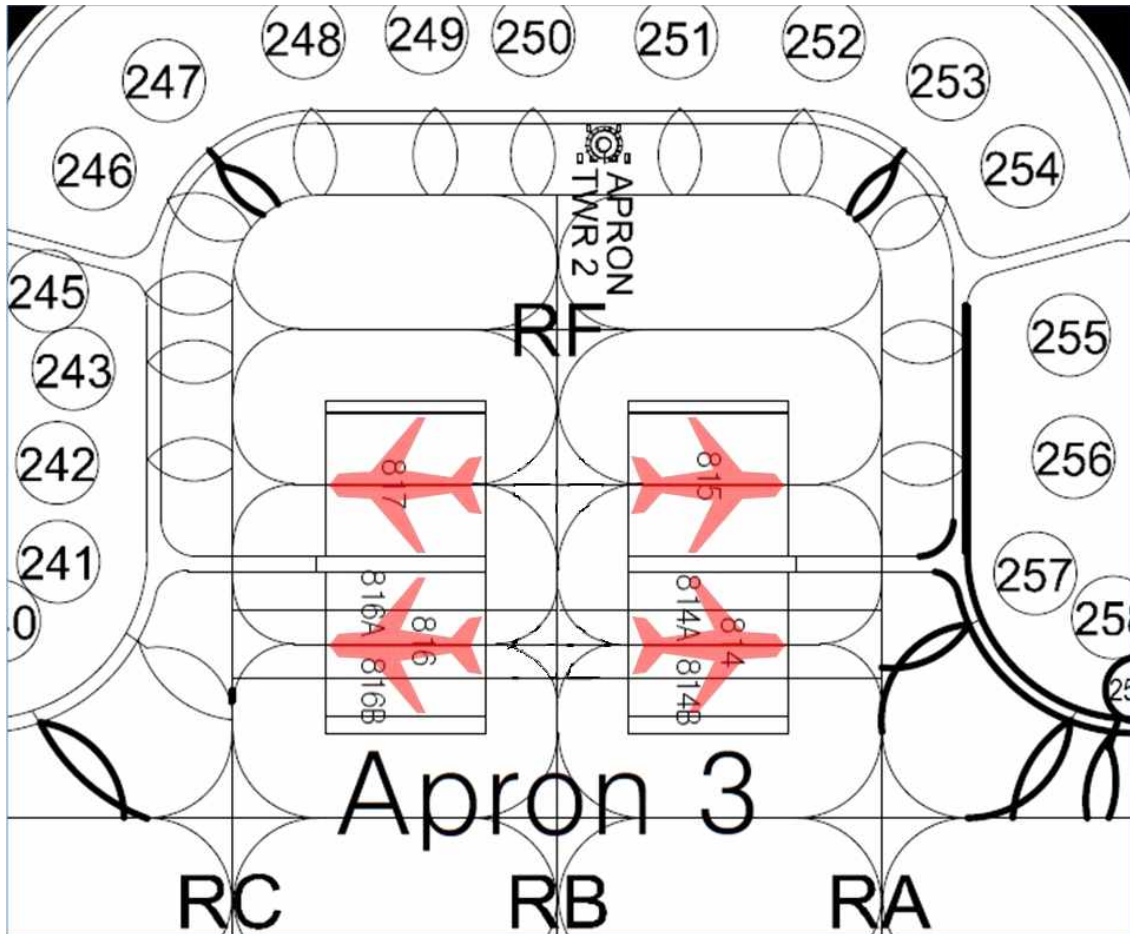
7. De/Anti-icing and Handling Priority

- 7.1. This chapter defines general duty/responsibility/authority of service providers at the de/anti-icing phase and the relevant duty/responsibility/authority of the Apron Control Tower in respect of the operation priority.
- 7.2. In case an aircraft approaches a de/anti-icing pad on standby, the service provider cooperates with related personnel to take appropriate ground safety measures for de/anti-icing and aircraft stand, and then performs de/anti-icing works.
- 7.3. The priority of de/anti-icing is based on de/anti-icing pad approach time. If any reason arises to change the priority, it shall be notified to the Apron Control Tower immediately.
- 7.4. If the preparation of de/anti-icing operation is insufficient and as a result it is not possible to start de/anti-icing after the aircraft approaches the de/anti-icing pad, the service provider notifies the Apron Control Tower of the fact immediately.
- 7.5. If a delay in de/anti-icing is attributable to an airline, the Apron Control Tower notifies the service provider to relocate the de/anti-icing equipment at the stand to the de/anti-icing pad with the next priority, and the service provider follows the direction of the Apron Control Tower.
- 7.6. The Apron Control Tower may prevent additional delay of another aircraft by lowering the priority of an aircraft whose de/anti-icing is delayed due to a reason attributable to the airline.

8. Operational procedure for de/anti-icing in multi-purpose apron

- 8.1 This chapter specifies the de/anti-icing operation procedure for multi-purpose apron (Terminal Center Zone, #814~817) located at the center of the Passenger Terminal 2 (Apron 3 area).

- 8.2 De/anti-icing at the multi-purpose apron (hereinafter “TC zone”) is available only for aircraft of Class 2 Engine E or below.
- 8.3 An Aircraft to be de/anti-iced at the TC zone must be aligned to nose itself toward the Passenger Terminal 2 direction (#814-#815:East, #816-#817:West) in order to prevent jet blast on personnel working near Passenger Terminal 2.
- 8.4 If an aircraft must nose itself toward a different direction due to de/anti-icing operation conditions or ground traffic conditions, the Apron Control Tower shall notify service providers of the fact and provide advice for the pilot (use of minimum power, etc.) so that there is no slipstream effects when the aircraft departs.
- 8.5 If de/anti-icing personnel and equipment need to pass through the aft side of the aircraft under the service, the service provider shall check aircraft taxi-out at the anti/icing pad on the back and if the taxi-out is expected, they shall not move.
- 8.6 In principle, service vehicles shall use GSE roads when they move between de/anti-icing pads in the east (#814-#815)/west(#816-#817) inside the TC zone.
- 8.7 However, an approval from the Apron Control Tower shall be delivered from the controlling department of the service provider to traverse a RB guiding line. In this case, such movement shall be made using the shortest route in a rapid manner.



<Figure 4> De/anti-icing aircraft line-up at the TC zone

Chapter 3 De/Anti-icing Operation

1. General Standards for De/Anti-icing

- 1.1. All the technical standards and procedures regarding de/anti-icing works follows the standards in the documents stated in the “Reference” in Article 4 of Chapter 1.
- 1.2. An aircraft to be de/anti-iced shall request de/anti-icing before departure, and the detailed procedure follows AIP and ASM.

2. De-icing

- 2.1. Provisions on de-icing methods, criteria/methods of spraying de-icing fluids, restrictions, aircraft condition after de-icing and so forth follow the documents stated in the “Reference” in Article 4 of Chapter 1.

3. Anti-icing

- 3.1. Provisions on anti-icing methods, criteria/methods of spraying anti-icing fluids, restrictions, aircraft condition after anti-icing and so forth follow the documents stated in the “Reference” in Article 4 of Chapter 1.
- 3.2. If anti-icing is performed in parallel with de-icing, only TWO-STEP is applied at the Incheon Airport.

4. Fluid

- 4.1. Only those fluids that satisfy the criteria in the documents stated in the “Reference” in Article of Chapter 1 must be used as de/anti-icing fluids.
- 4.2. Type I fluid
 - 4.2.1. Type 1 fluids are used only at the de-icing and the first step out of Two-Step.
 - 4.2.2. Each service provider prepares a fluid by diluting it according to an appropriate dilution ratio.
- 4.3. Type II or IV fluid
 - 4.3.1. Type II or IV fluids are used only at the anti-icing and the second step out of Two-Step.
 - 4.3.2. Each service provider prepares 100% undiluted fluids.

5. Post De-icing/Anti-icing Check

- 5.1. Post De-icing/Anti-icing check (hereinafter “post check”) shall be performed by qualified staff of the service provider. Details on the designation of qualified staff are specified in the Appendix 5 Scope of Qualified Staff in Each Airline.
- 5.2. A de/anti-iced aircraft is not cleared for flight departure if visual inspection is not performed through post check.
- 5.3. Post check shall cover wings, horizontal stabilizer (including all sides including upper/down side), vertical stabilizer, fuselage pilot heads, static ports, temperature and angle of attack sensors) as well as other areas where de/anti-icing works were deemed necessary and performed.
- 5.4. Post check shall be performed in a location that can secure sufficient visibility on the areas where de/anti-icing was performed (e.g. de-icing/anti-icing vehicle, ladder or other appropriate access means required).
- 5.5. Formed ice identified during post check shall be removed by additional de/anti-icing works, and then post checked performed again.
- 5.6. Flight crew of a de/anti-iced aircraft shall receive confirmation that post check was performed before take-off.
- 5.7. Aircraft of specific types may require additional inspection such as special clear-ice check (wing touch check, etc.). Such special check may not be replaced by post check and each airline must designate qualified staff for special check.
- 5.8. In case the service provider performs post check, the check may be performed according to a procedure separate from de/anti-icing. However, if it is included in the de/anti-icing works, the followings must be included. Also, if required by an airline, the service provider shall provide the post check method to be used during the winter season of the year.
 - 5.8.1. During de/anti-icing works, a spray man shall check in close proximity the aircraft surface to examine whether all ices are being removed (except for cold-soaked fuel frost on the lower surface of

wings permitted by an aircraft manufacturer and airworthiness authorities and fuselage light frost permitted by an aircraft manufacturer and airworthiness authorities). In addition, he/she shall check if a sufficient amount of fluid is being sprayed properly to form anti-icing fluid layer during anti-icing works.

5.8.2. In case a request for de/anti-icing of fuselage is not received, it must be checked if there is no ice formed on the fuselage (except for light frost permitted by an aircraft manufacturer and airworthiness authorities).

5.8.3. If ice is identified that exceeds an allowable limit, it shall be notified to flight crew immediately and removed by an additional de/anti-icing method and go through post check again.

5.8.4. After de/anti-icing works are completed, the service provider shall perform visual inspection in close proximity on the areas where de/anti-icing works were performed to make sure that all ice was removed (this step may be skipped if frost was removed in a meteorological situation where frost is no longer formed).

6. Communication Procedure

6.1. Qualified staff performing post check shall have a command of basic English for communication with flight crew.

6.2. For information on standard terminology for communication, refer to Appendix 3 Standard Phraseology and Appendix 4 ICAO Phonetics and Examples of Use.

6.3. Communication between qualified staff and flight crew must be written or verbal form. If de/anti-icing works are performed after the aircraft door is closed, flight interphone (headset) and VHF radio may be used. Electronic Message Board may be used as well in case of “Off stand” situation.

6.4. Flag hand signals other than “All Clear” signal may not be used.

6.5. If frost is removed before flight crew arrives and frost is not formed any longer, this step may be skipped.

6.6. Communication before starting De/anti-icing works

6.6.1. Before starting de/anti-icing works, the service provider shall get confirmation from flight crew (or qualified staff) on the location

where de/anti-icing is necessary (e.g. areas that need de/anti-icing works, parts, whether anti-icing is necessary, special requests, etc.).

6.6.2. The service provider shall inform that de/anti-icing works start so that flight crew can set the flight into de/anti-icing-available status (Surface, Controls, and Systems as per aircraft type requirements or recommended procedures). The service provider may not start de/anti-icing until flight crew completes the work.

6.6.3. If de/anti-icing is performed in absence of flight crew, the personnel designated by the airline performs the above-mentioned procedure.

6.7. Post De-icing/Anti-icing Communication

6.7.1. In case flight crew does not receive all the information including anti-icing code, the aircraft is not cleared for departure for flight operation.

6.7.2. All the information including anti-icing code must be transmitted by qualified staff. Once the work is completed, such information will include the information that all ice was removed, de/anti-icing complete and all pieces of equipment removed from the aircraft.

6.7.3. In addition, if anti-icing is performed, all the information that can be used to calculate the holdover time according to meteorological situations must be delivered.

6.7.4. If de/anti-icing works are suspended (in order to supplement fluids, or for other reasons), a reason for suspension, actions taken and estimated suspension time must be notified to flight crew.

6.7.5. After works are resumed, re-work is required if the holdover time on the de/anti-icing area before suspension is insufficient.

6.8. Anti-icing Code

6.8.1. The following information that consists of anti-icing code shall be recorded and notified to flight crew and shall include the last step (anti-icing) work in the Two-Step.

6.8.2. Anti-icing code may be omitted in case the holdover time does not have to apply (e.g. local frost prevention in cold-soaked wing areas, symmetrical local area de-icing, de-icing of specific areas (removal of impact ice in leading edges, etc.)

6.8.3. In this situation, it shall be notified to flight crew that only de-icing was performed and application of the holdover time is not

necessary. Also, the completion of post check shall be notified.

6.8.4. Anti-icing code report includes the followings (refer to Appendix 1):

- 6.8.4.1. The fluid Type (Type I, II, III, or IV)
- 6.8.4.2. The Fluid name, if necessary (manufacturer of the anti-icing fluid used and the name of the fluid) - This information on Type I fluid is unnecessary.
- 6.8.4.3. Fluid dilution ratio (e.g. 100% = 100% fluid, 75% = 75% fluid and 25% water)
- 6.8.4.4. Start time of the last step of TWO-STEP (anti-icing) (in local time at the departure airport, Hours and Minutes)
- 6.8.4.5. The name of equipment used for de/anti-icing, the number of workers, the amount of the fluid used
- 6.8.4.6. Performance date (e.g. YYYYMMDD, 20170609) - This information is for the purpose of recording and storing. It is selectively determined whether or not to deliver this information to flight crew).
- 6.8.4.7. Whether or not post de-icing/anti-icing check was complete - This must also include whether or not special check additionally required for certain types of aircraft was completed.

EXAMPLE:(Refer to Appendix 1 Template/Sample)

The last step of a de-icing/anti-icing procedure is the application of a mixture of 75% Type II fluid and 25% water, made by the Manufacturer as Brand X, commencing at 13:35 local time on 20 February 2016, is reported and recorded as follows: "TYPE II / 75% / MANUFACTURER, BRAND X / 1335 / 20FEB16 / POST DEICING/ANTIICING CHECK COMPLETED" - Sending anti-icing code to flight crew may be replaced by the following means. (e.g. written on paper, EMBs, ACARS, EFBs, etc.)

6.9. All Clear Signal

- 6.9.1. Flight crew shall receive from qualified staff the information that confirms that all de/anti-icing was completed and all the personnel and equipment removed before relocating or moving the aircraft.

7. Engines On De/Anti-icing Procedures

7.1. Purpose

- 7.1.1. The purpose of this manual is to provide guidance for the methods and procedures for performing engines on aircraft de/anti-icing at the Incheon International Airport in the Republic of Korea.
- 7.1.2. The procedures outlined in this manual maybe used under light to moderate de/anti-icing conditions.

7.2. De/anti-icing of aircraft with engines running

7.2.1. General

To maximize the holdover capabilities of the fluid used, the Incheon International Airport can receive a service to deice/anti-ice certain aircraft with engines running.

7.2.2. Airport authority approval

A service provider willing to provide the aforementioned service shall obtain approval from the Incheon International Airport Corporation.

7.2.3. Airline approval

The airline shall have provision for engines running de/anti-icing operations within their own approved program/procedures. Where permitted, the flight crew shall configure their aircraft for engines running de/anti-icing in accordance with their applicable procedures (i.e. Aircraft Flight Manual, Flight Ops Manual, etc.). Should these conditions not be met, then de/anti-icing shall be conducted with the engines off.

7.3. Equipment

7.3.1. Approved equipment

A service provider shall approve equipment to be used for engines on de/anti-icing. Approved for engines on de/anti-icing means that the equipment has been tested in live conditions to ensure it can withstand jet blast at idle power when in position behind the engines. It ensures that any original features attached to the equipment i.e. number plate, obstruction light etc. is secure and will not blow off.

Further measures may be required on equipment to secure attachments once tested in live conditions. Any equipment not listed must be tested and approved by a service provider before normal engines on operations commence.

Due to engine ingestion and FOD concerns, the de/anti-icing truck driver must ensure that there are no loose articles or unsecured pieces of equipment on the truck. The driver must also ensure that all truck doors, windows and access panels, including the hood are closed and properly secured. The Enclosed Cab Operator must

ensure that all loose articles and equipment are stowed and secured.

7.3.2. The aircraft types approved for engines on de/anti-icing are listed in Table 3.

| Narrow Body Aircraft | |
|----------------------|------------------------|
| Airbus | A318, A319, A320, A321 |
| Boeing | B737, B757 |

<Table 3> Aircraft types approved for engines on de/anti-icing

7.4. De/anti-icing zones and pads

Engines on de/anti-icing may be performed at all of the de/anti-icing zones and de/anti-icing pads.

7.5. Vehicle patterns

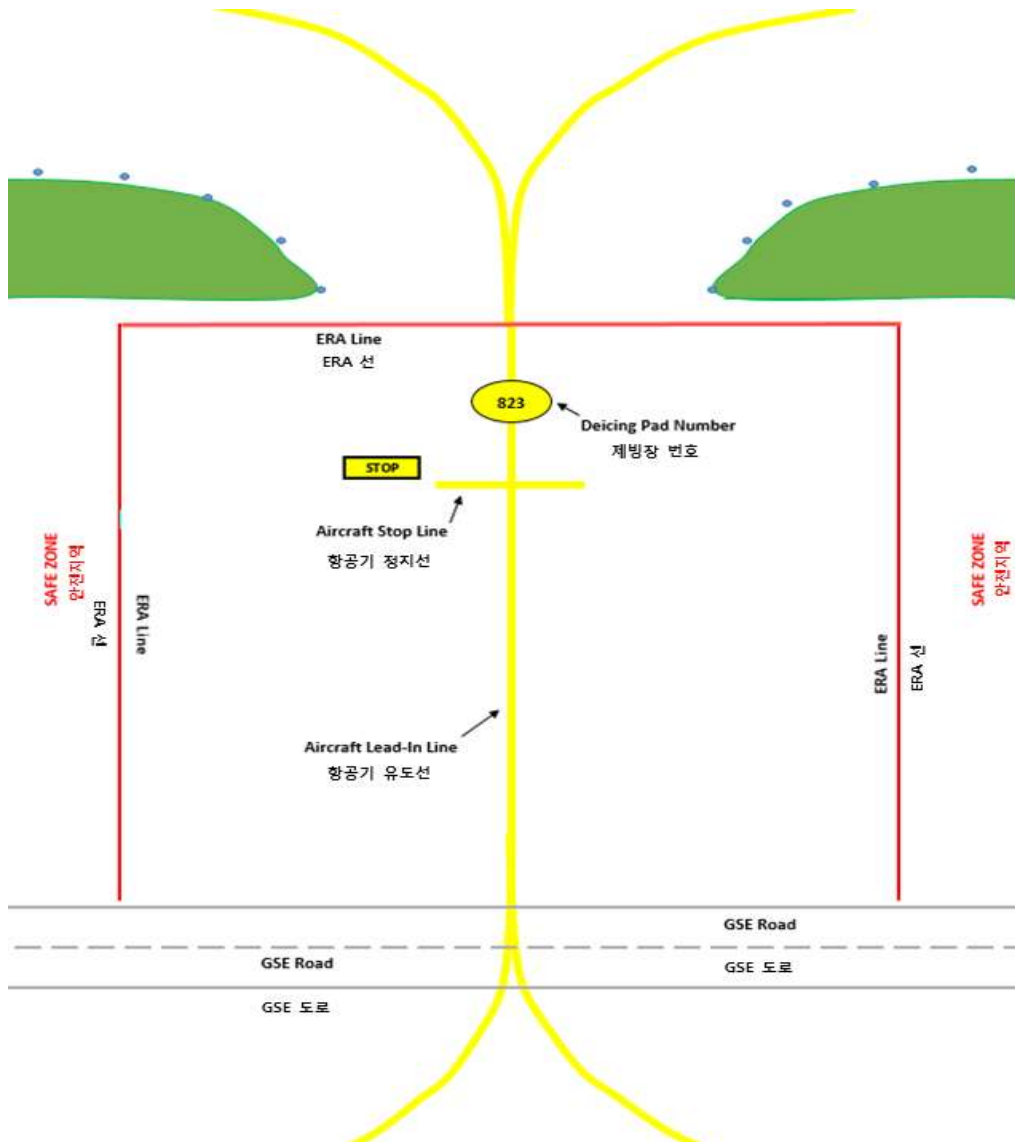
All personnel must exercise extreme caution when working around operating aircraft engines.

Hazard areas are present at the engine inlet as well as exhaust. The hazards around the exhaust are more obvious due to sensory clues such as noise, wind and heat. As much care shall be exercised around the inlet as the hazards may not be so apparent. Inlet vortices are normally only visible when water or steam exhaust is present in them.

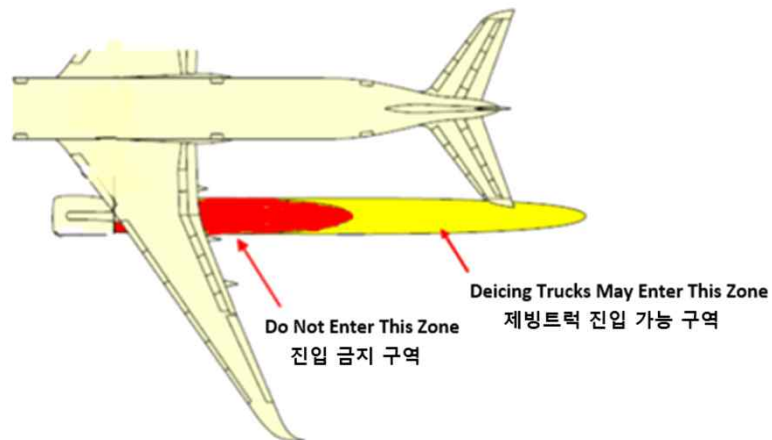
7.5.1. Engine exhaust

De/anti-icing operations are authorized in engine exhaust velocity of 160 km (100 mph) or less.

Operators may enter the authorized engine exhaust area when positioning for the tail or fuselage is not reachable from a position outside of the engine exhaust.



<Figure 5> De-icing pads markings

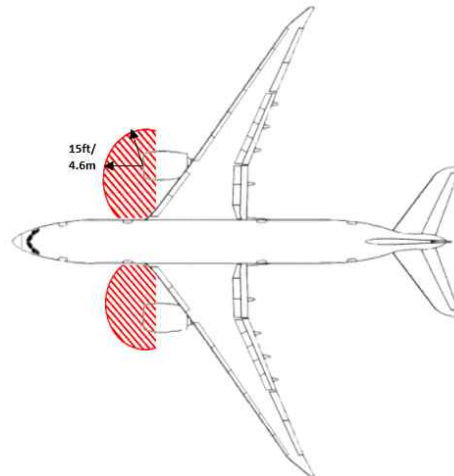


<Figure 6> Restricted areas during engines on de/anti-icing operations

Due to safety considerations, all operating engines must be maintained at ground idle thrust settings. These must not be changed without the express permission of the Ice man / Snow ball. This also includes the use of any engine systems, where such use causes an increase in engine thrust.

7.5.2. Engine inlet

When de/anti-icing aircraft with engines on the de/anti-icing truck must maintain a safe distance of at least 15 feet from the center of the engine intake, and all personnel are kept away from the dangerous areas at the front and the sides of the engine.



<그림7> 엔진 흡입구 제한 구역의 예

7.5.3. Movement of de/anti-icing equipment around aircraft

An important component of a safe and efficient de/anti-icing operation is the use of pre-determined equipment movement patterns around an aircraft.

These patterns ensure that operators become consistent in the handling of their equipment during de/anti-icing operations.

In cases of frost or very light snow ($\leq 1\text{cm}$ dry snow) where it can be determined that the contamination is removed instantly on contact due to the fluids thermal energy, and poses no threat of being forced into wing or stabilizer openings. The de/anti-icing vehicle may be positioned behind the wing and the fluid is applied in a light sweeping motion, from the highest point of the surface camber to the lowest.

7.6. Communication

7.6.1. Control

As per SAE ARP5660, positive control and communication is required during engines on de/anti-icing /anti-icing operations.

During engines on de/anti-icing operations, both verbal and visual communication are required to hold an aircraft until all personnel and equipment are safely away.

Continuous uninterrupted communication must be established and maintained during the entire de/anti-icing process.

7.6.2. Entering a de/anti-icing pad

The service provider's De-icing Coordinator ("Interphone Man") entering a de/anti-icing pad shall have a TRS (Channel: "Apron Tower 1" or "Apron Tower 2") capable of communicating with Iceman. All vehicle drivers entering a de/anti-icing pad shall have the service provider's own communication system or a TRS capable of communicating with Iceman. The process of accessing a de/anti-icing pad can start after Iceman informs via TRS that the aircraft has come to a full stop.

7.6.3. During operation at de/anti-icing pads

The service provider's De-icing Coordinator shall inform Iceman of any abnormal condition of the aircraft or any unusual situation during the operation. De-icing information (de/anti-icing start time, fluid, etc.) is directly delivered via interphone by the service provider or the airline.

7.6.4. Withdrawal from a de/anti-icing pad

After all the vehicles withdraw and position in the safe zone, the De-icing coordinator informs Iceman that all the equipment and personnel are in the safe zone. If any equipment operator wants to return to the de/anti-icing pad after Iceman is informed of the withdrawal of all the equipment and personnel, the operator shall hold position and contact Iceman. Under no circumstance may the operator approach the aircraft without clearance from Iceman.

7.7. Communication

The de/anti-icing trucks shall position in the designated safe zone. Iceman and Snowball are operated during engines on de/anti-icing operations.

7.7.1. Ice Man

Iceman shall monitor the stopping of an aircraft, safe entry and exit of operators, and any abnormal conditions, and communicate the related information.

7.7.2. Snowball (Visual hold vehicle)

When an aircraft stops at the de/anti-icing pad, Snowball shall take position in front of the aircraft as a visual stop sign. After completion of the de/anti-icing process, Snowball may leave the de/anti-icing pad only after confirming that all the operators and equipment have returned to the safe zone. Snowball's main role is to visually communicate to the flight crew that the aircraft shall not move when operators and equipment are on the de/anti-icing pad.

7.8. Engines on considerations

Engines on de/anti-icing is normally performed during conditions of Frost, Light and Medium Snow.

For severe weather conditions, service providers and airlines shall consider whether to de/anti-ice with engines shut down, due to potential safety and economic (fuel burn) concerns.

During gale warning or gusting conditions, engines off de/anti-icing shall be considered. (Refer to de/anti-icing equipment manufacturer's documentation for specific wind speed limitations.)

If special operations such as de/anti-icing of lower wing surface or undercarriage are required, the aircraft engines must be shut down. The de/anti-icing vehicle is positioned in front of the wing, and the ground reel is utilized.

Chapter 4 Training and Qualification

1. Purpose and Provision of Training

- 1.1. De/anti-icing works at the Incheon Airport must be performed by qualified personnel who completed appropriate training. A common course for initial and periodic training is provided jointly for airlines/service providers in order to secure the equal quality of de/anti-icing performance.
- 1.2. For content not covered by the common course, individual airlines/service providers provide their own training.

2. Target Trainees

- 2.1. Airline/service provider personnel performing de/anti-icing at the Incheon Airport are required to complete the initial and periodic training on de/anti-icing provided as a common course for airlines/service providers.

3. Qualification of Instructors

- 3.1. Those from airlines/service providers with at least three years of de/anti-icing and in-depth knowledge in the relevant area are designated as training instructor.
- 3.2. Individual airlines/service providers cooperate to make sure that the optimal personnel can be designated as instructors.

4. Operation of Training Course

- 4.1. The initial and regular training are jointly operated [under the agreement among](#) the Airport Corporation, airlines and service providers.
- 4.2. [In principle](#), each training course is provided annually before the arrival of the winter season.
- 4.3. The Airport Corporation provides an appropriate training venue to operate training courses.
- 4.4. Airport Operators/service providers designate necessary instructor personnel per training course and training content for each subject.
- 4.5. The Airport Corporation/airlines/service providers [discuss matters related to operating training courses before the winter season comes](#).

5. Training Subjects

- 5.1. Each training course shall consist of contents that enable trainees to acquire and maintain overall knowledge of de/anti-icing.
- 5.2. All training subjects shall consist of content that combines the existing procedures and newly added ones.
- 5.3. For personnel who actually perform de/anti-icing on aircraft, the training shall cover the theory on the relevant equipment and field exercise, which may be conducted separately by each airline/service provider.
- 5.4. Training subjects shall include the followings and other content may be added, if necessary:
 - 5.4.1. Application of holdover time of fluid per type/weather situation
 - 5.4.2. Methods and procedures for checking to detect icing contaminated area and de/anti-icing
 - 5.4.3. Roles and responsibilities of flight crew, maintenance mechanic in charge, dispatcher, ground personnel
 - 5.4.4. Check on aircraft surface contamination and critical area
 - 5.4.5. Fluid type, purpose, characteristics and effectiveness of applicable fluid
 - 5.4.6. Fluid handling and related function
 - 5.4.7. Understanding of meteorological phenomenon such as frost, ice, snow and slush and impacts of ice formation on aircraft function
 - 5.4.8. Equipment and facility (training by service providers)
 - 5.4.9. Safety precautions
 - 5.4.10. Communication between flight crew and ground crew

6. Evaluation and Qualification

- 6.1. Training course must include evaluation of each subject (theory/practice).
- 6.2. The pass criteria for evaluation on theory is defined as 75 scores out of 100 scores. Ground personnel who pass the evaluation on theory receives the training on equipment practice (by service providers) and are evaluated on the practice.
- 6.3. Practice training is provided by a service provider. Therefore,

service providers notify the Airport Corporation of the evaluation result after the evaluation is completed, if necessary.

6.4. Those who pass the evaluation are recognized as being qualified only for the winter season for which the evaluation was conducted.

6.5. Training and evaluation results of qualified personnel shall be separated recorded and maintained.

7. Management of Training Results

7.1. Each airline and service provider consult with each other to manage the following materials related to the operation of training courses:

7.1.1. Content formation of each subject in the entire training course (including materials/problems for evaluation)

7.1.2. Roster of airline/service provider instructors participating in the training course

7.1.3. Roster of airline/service provider trainees participating in the training course

7.1.4. Result of theory/practice evaluation of each subject

Chapter 5 De-icing Emergency Operation Team at Incheon Airport

1. Purpose and Overview

- 1.1. In case of large-scale de/anti-icing due to snowfall, De-icing Emergency Operation Team at the Incheon Airport (hereinafter “De-icing Emergency Operation Team”) is formed and in place for the purpose of smooth information exchange and situation handling.
- 1.2. The main duty of De-icing Emergency Operation Team is coordination among related departments for sharing of important information necessary for large-scale de/anti-icing stations caused by snowfall and smooth handling of abnormal situations.

2. Setup of De-icing Emergency Operation Team

- 2.1. De-icing Emergency Operation Team is located nearby the AS seats (Airside operation support) within the Integrated Operation Center (IOC) at the Incheon Airport and may be installed in a separate location in an inevitable case.
- 2.2. If a situation that requires a large-scale de/anti-icing due to snowfall is expected, the Airport Corporation decides to convene the De-icing Emergency Operation Team and notifies related airlines/service providers of the decision without delay.
- 2.3. Airlines/service providers notified of the convening of the team designate appropriate employees with necessary competency and dispatch them to De-icing Emergency Operation Team as soon as possible so that they can perform the work.
- 2.4. Roles of the Airport Corporation in De-icing Emergency Operation Team is performed by AS (Airside operation support) workers in the Integrated Operation Center (IOC).
- 2.5. Personnel of De-icing Emergency Operation Team is set up as follows. The setup may change in separate consultation with related departments (Airport Corporation/airline/service provider), if necessary.

<Table 4> Personnel Setup of De-icing Emergency Operation Team

| Type | Dept. in Charge | Head count | Remarks |
|--------------------------------|--|------------|---|
| ATC (Airport Corporation) | Apron Control Team or Apron Operation Team | 1 | Integrated Operation Center AS shift work |
| AOC-I | Airlines Operation Committee | 1 | - |
| Flight Operation (airline) | Flag carrier | 2 | Flag carriers such as KAL, AAR, etc. |
| Handling (service provider) | Ground handling company | 2 | Service providers such as KAS, AAP, etc. |

2.6. Airlines/service providers who intend to participate in the team may be a member of De-icing Emergency Operation Team in a separate consultation with the Airport Corporation.

3. Duty of De-icing Emergency Operation Team

3.1. De-icing Emergency Operation Team performs the following duties:

3.1.1. Sharing and dissemination of important information regarding de/anti-icing operation

3.1.2. Identification of de/anti-icing operation status and coordination

3.1.3. Identification of ground traffic flow at the airport during de/anti-icing operation

3.1.4. Coordination to handle abnormal situations immediately

3.1.5. Identification of progress and coordination regarding air traffic flow management

3.1.6. Coordination in implementing traffic adjustment program, if necessary

3.1.7. Other works deemed necessary

3.2. The Airport Corporation employee working for De-icing Emergency Operation Team prepares the De-icing Emergency Operation Team work log (hereinafter the “work log”) in accordance with the work log template in Appendix 6.

3.3. Airline/service provider employees who accepted to participate in De-icing Emergency Operation Team fill in their personal information in the work log and sign it.

3.4. The work log must include the following information:

- 3.4.1. Work date and time (team convening date, time when convening was issued/released, etc.)
- 3.4.2. Roster (name, company, position, work start/end time, personal contact information, etc.)
- 3.4.3. Details on how the situation was handled (situation start/end time, what was the situation, how it was handled, handling result, etc.)
- 3.4.4. Other information deemed necessary

3.5. The Airport Corporation employee working for De-icing Emergency Operation Team submits a copy of the work log to the Aerodrome Operations Group (Apron Control Team leader) and keeps the original work log in IOC after the team is dismissed.

4. De-icing Emergency Operation Team Duties Assignment

4.1. Each member of De-icing Emergency Operation Team has roles and responsibilities as shown below:

| Who | Duties Assignment | Remarks |
|----------------------------------|---|---|
| Control (Airport Corporation) | Identify de/anti-icing operation status and perform necessary coordination Identify departure/arrival flight status and perform necessary coordination Identify ground traffic flow situation at the airport and perform necessary coordination Perform necessary coordination in case of abnormal situation Perform necessary coordination if traffic needs to be adjusted Perform necessary coordination between the Apron Control Tower and De-icing Emergency Operation Team | Including contact with ATCC if traffic needs to be adjusted |
| AOC-I | Coordination with whole airlines(include foreign airlines) | Communicate with foreign airline |
| Flight Operation (Airline) | Identify departure/arrival flight status and perform necessary coordination Perform necessary coordination in case of abnormal situation Perform necessary coordination if traffic needs to be adjusted Perform necessary coordination between airline controlling departments and De-icing Emergency Operation Team (including other airlines) | Including contact with operation control department in other airlines |
| Handling (Service Provider) | Identify de/anti-icing operation status and perform necessary coordination Perform necessary coordination in case of abnormal situation Perform necessary coordination between de/anti-icing service providers and De-icing Emergency Operation Team (including other service providers) | Including contact with de/anti-icing control departments in other service providers |

<Table 5> Detailed R&R of De-icing Emergency Operation Team Members

5. Dismissal of De-icing Emergency Operation Team

- 5.1. The Airport Corporation decides the dismissal of De-icing Emergency Operation Team at the point of time when the operation of the team is deemed no longer necessary.
- 5.2. Members of De-icing Emergency Operation Team may request the dismissal of the team considering the overall situation of de/anti-icing without a decision by the Airport Corporation.

Chapter 6 De/Anti-icing Quality Audit

1. General

- 1.1. A service provider performing de/anti-icing at the Incheon Airport is responsible for maintaining the good quality of de/anti-icing.
- 1.2. Quality audit is a process to check if a de/anti-icing service provider maintains an acceptable level of de/anti-icing quality. It is conducted by an airline, the counterpart, or a third party to whom the airline delegated its responsibility and authority.
- 1.3. Detailed quality audit procedures such as audit types, processes, timeline, handling of results, etc. are subject to agreement between an airline and a service provider.

Chapter 7 Air Traffic Flow Management Program at Incheon Airport

1. Purpose and Overview

- 1.1. When de/anti-icing is performed during the winter season, air traffic flow management is implemented for stable and efficient operation of the Incheon Airport.
- 1.2. The program is intended to minimize the impact on ground traffic flow at the Incheon airport by adjusting the number of [arriving](#) flights at the airport.

2. Roles of Individual Institutions

- 2.1. If there is a snowfall forecast in winter, the Airport Corporation requests “traffic adjustment” to the Air Traffic Control Center (hereinafter the “ATCC”) through CDM meeting as shown below:

| Type | Content | Disseminated to/Requested to |
|--------------------------------|--|---|
| CDM regular meeting | ·If there is a snow forecast on the next day, a CDM regular meeting is held to disseminate Incheon Airport snowfall information. | Incheon Airport IOC (Integrated Operation Center) |
| Request for CDM Ad hoc meeting | ·If a chance of snowfall is 70% or higher and if it is at least 2 hours before traffic needs to be adjusted, or if unexpected snow starts, a CDM ad hoc meeting is requested through to ATCC and ATCC holds a CDM ad hoc meeting as requested. | Incheon Airport Apron Control Tower 1 |
| CDM ad hoc meeting | ·Snowfall, apron congestion, etc. are predicted and “Traffic Adjustment in Snow at Incheon Airport” in the attachment is requested. ·If it is at least 2 hours before traffic needs to be adjusted, or if unexpected snow starts, a request for stage change is made immediately to ATCC. | Incheon Airport Apron Control Tower 1 |

<Table 6> CDM Meeting Content and To Whom it is Disseminated/requested

- 2.2. If the Airport Corporation intends to change a traffic adjustment stage or terminate it, it follows the procedure described below:
 - 2.2.1. At least two hours before the timing when traffic adjustment stage needs to be modified, or in case of unpredicted snow, Incheon Airport Apron Control Tower 1 requests the stage change to the ATCC immediately via wired communication.
 - 2.2.2. If traffic adjustment needs to be terminated, Incheon Airport Apron

Control Tower 1 requests the termination to the ATCC immediately via wired communication.

2.3. Upon the receipt of a request for CDM regular meeting from Incheon Airport Apron Control Tower 1, the ATCC holds a CDM regular meeting immediately and selects which institutions will participate in the CDM regular meeting.

2.4. The ATCC applies traffic adjustment request from Incheon Airport Apron Control Tower 1 through a CDM ad hoc meeting as follows:

2.4.1. Flights arriving at the Incheon Airport: Take measures to ensure that the suggested number of arriving flights per hour can be applied as time separation (ATFM applied) at Incheon/Daegu Air Traffic Control Regional Offices (hereinafter the “ACC”).

2.4.2. Implementation of other air traffic separation measures that meet the requirements of Incheon Airport

2.5. The ATCC may preemptively control traffic volume even without the request of the Incheon Airport if snow is expected at the Incheon Airport.

2.6. Incheon / Daegu ACC consult with ATCC to conduct time separation (ATFM) of flights arriving at the Incheon Airport or other corresponding traffic separation while the traffic volume is controlled during snowfall at the Incheon Airport.

2.7. Airlines shall adjust passenger boarding time by taking into account their departing flights’ CTOT issued while traffic volume control is in place during snowfall at the Incheon Airport, and shall make every effort to comply with the CTOT for smooth airport operations.

3. Criteria for Air Traffic Flow Management in Snow at Incheon Airport

3.1. In case of snow at the Incheon Airport, traffic adjustment follows criteria by stage shown below:

| Classification | Arrival Ratio | No. of Arriving Flights/Hour |
|----------------|---------------|------------------------------|
| 1 | 50 % | 18~20 flights |
| 2 | 30 % | 10~12 flights |
| 3 | 20 % | 7~8 flights |
| 4 | 0 % | 0 flight |

<Table 7> Criteria for Traffic Adjustment by Stage

Chapter 8 Appendix

1. Anti-Icing Code Report

(for Airlines & De-icing/Anti-icing Service Providers)

| | | | | | | |
|-------------------|--------------------------------|----------------------------------|------------------|--------------------------|--|-------------------|
| Date | (YYY/MM/DD) | Station : | Reg No : | Flt No : | Pad No : | |
| Operation | Frost <input type="checkbox"/> | Ambient Temperature : °C(OAT) | Fluid Type | First Step : Type () | Fluid Mix. Rate | First Step : % |
| | Snow <input type="checkbox"/> | | | Final Step : Type () | | Final Step : % |
| Type of Equipment | | Number of Worker | Fluid quantity | Type() | (Liter/LB) | |
| | | | | Type() | (Liter/LB) | |
| Beginning Time | Complete Time | Beginning Time of Final Step | Service Provider | Operator | Mechanic Signature (Spray Man) & Report to Captain | |
| : | : | : | | | | |

<Sample>

| | | | | | | |
|-------------------|---|-------------------------------------|------------------|----------------------------|--|-----------------------|
| Date | (YYY/MM/DD) 2013-02-13 | Station : ICN | Reg No : HL7777 | Flt No : KE000 | Pad No : 801 | |
| Operation | Frost <input checked="" type="checkbox"/> | Ambient Temperature : -3 °C(OAT) | Fluid Type | First Step : Type (1) | Fluid Mix. Rate | First Step : 30 % |
| | Snow <input type="checkbox"/> | | | Final Step : Type (4) | | Final Step : 100 % |
| Type of Equipment | Elephant Beta-15 | Number of Worker | 6 | Fluid quantity | Type(1) | 400 (Liter/LB) |
| | | | | | Type(4) | 600 (Liter/LB) |
| Beginning Time | Complete Time | Beginning Time of Final Step | Service Provider | Operator | Mechanic Signature (Spray Man) & Report to Captain | |
| 9:30 | 10:15 | 9:35 | KAS | Hong Gil-dong | 838828 Lee Sun-shin | |

2. Standard Required Time for De/Anti-icing

| A/C Code | Frost | Dry snow | Wet snow |
|----------|-------|----------|----------|
| C | 0:25 | 0:25 | 0:30 |
| D | 0:25 | 0:25 | 0:30 |
| E | 0:30 | 0:30 | 0:35 |
| F | 0:30 | 0:30 | 0:35 |

3. Standard Phraseology

| Phraseology | Meaning |
|----------------------------|---|
| Acknowledge | Say that you have received and understood the transmission |
| Affirm(Affirmative) | A positive reply - Yes |
| Approved | Permission granted |
| Cancel | Annul the previously transmitted clearance(or message) |
| Check/Inspect | Verify something |
| Confirm | Make sure that something is done |
| Contact | Take radio contact with someone |
| Correct | The right way to proceed |
| Correction | Something said/informed wrongly and continued with the right message |
| Disregard | Do not note the previous message |
| Go ahead | Continue with transmission/procedure |
| How do you read | Verifying the transmission and readability |
| Maintain | Continue in accordance with the condition specified or in its literal sense |
| Monitor | Listen to the frequency |
| Negative | A negative reply - No |
| Over | My transmission is ended, and I expect a response from you |
| Out | This exchange of transmission is ended and no response is expected |
| Report | Inform of the procedure |
| Request | Ask for something |
| Roger | Have received and understood the message |
| Say again | Repeat the message |
| Speak slower | Reduce your rate of speech |
| Stand by | Wait for the transmission to continue after a moment |
| Unable | I cannot comply with your request, instruction or clearance |
| Verify | Confirm/check/inspect something |
| Wilco | I understand your message and will comply with it |

4. ICAO Phonetics and Sample

| ICAO Phonetics | | | |
|----------------|-----------------------|----------|------------------------|
| A | Alfa (al-fah) | S | Sierra (see-air-rah) |
| B | Bravo (brah-voh) | T | Tango (tang-go) |
| C | Charlie (char-lee) | U | Uniform (you-nee-form) |
| D | Delta (del-ta) | V | Victor (vik-tah) |
| E | Echo (eck-oh) | W | Whiskey (wis-key) |
| F | Foxtrot (foks-trot) | X | X-ray (ecks-ray) |
| G | Golf (golf) | Y | Yankee (yang-key) |
| H | Hotel (hoh-tel) | Z | Zulu (zoo-loo) |
| I | India (in-dee-ah) | 0 | Zero (zee-ro) |
| J | Juliet (jew-lee-et) | 1 | One (wun) |
| K | Kilo (key-loh) | 2 | Two (too) |
| L | Lima (lee-mah) | 3 | Three (tree) |
| M | Mike (mike) | 4 | Four (fow-er) |
| N | November (no-vem-ber) | 5 | Five (fife) |
| O | Oscar (oss-cah) | 6 | Six (six) |
| P | Papa (pah-pah) | 7 | Seven (sev-en) |
| Q | Quebec (keh-beck) | 8 | Eight (ait) |
| R | Romeo (row-me-oh) | 9 | Nine(r) (nin-er) |

| Sample | | | |
|------------------|---|-------------|---------------------------|
| 10 | One zero (wun, zee-ro) | 75 | Seven five (sev-en, fife) |
| 100 | Hundred (hand-red) | 1000 | Thousand (tau-send) |
| Frequency | 131.900 One Three One Decimal Niner Zero Zero | | |
| Time | 09:20 Zero Nine/Two Zero | | |

5. Scope of Qualified Staff of Each Airline

| # | Airline | Airline | Service Provider | GH | # | Airline | Airline | Service Provider | GH |
|----|---------|---------|------------------|-----|----|---------|---------|------------------|-----|
| 1 | AAL | | | AAP | 41 | FIN | O | | |
| 2 | AAR | O | | | 42 | GAP | | | |
| 3 | AAV | | | | 43 | GIA | | KE | |
| 4 | ACA | | | | 44 | HAL | | | |
| 5 | AFL | | | | 45 | HKE | | | |
| 6 | AFR | | KE | | 46 | HVN | O | | |
| 7 | AIC | | | | 47 | JAL | | | |
| 8 | AIH | | | | 48 | JCC | | | |
| 9 | AJX | O | | | 49 | JJA | O | | |
| 10 | AMU | | | | 50 | JNA | | | |
| 11 | AMX | | | | 51 | KAL | | | |
| 12 | ANA | O | | AAP | 52 | KHV | | | |
| 13 | APG | | | AAP | 53 | KLM | | KE | |
| 14 | APJ | | | SHP | 54 | KZR | | | |
| 15 | ASV | | | | 55 | LAO | | | |
| 16 | AZA | | | | 56 | LOT | | | |
| 17 | AZG | O | | | 57 | MAS | | | |
| 18 | BAW | | | | 58 | MDA | | | |
| 19 | CAL | | | | 59 | MGL | | | |
| 20 | CCA | | | | 60 | PAC | O | | |
| 21 | CDG | | | | 61 | PAL | | | |
| 22 | CEB | | | SHP | 62 | QTR | | OZ | |
| 23 | CES | | KE | | 63 | RBA | | | |
| 24 | CLX | | | | 64 | SBI | | | |
| 25 | CPA | O | | | 65 | SHU | | | AAP |
| 26 | CQH | | | | 66 | SIA | | | |
| 27 | CRK | | | | 67 | SWM | | | SHP |
| 28 | CSA | | | | 68 | SYL | | | |
| 29 | CSC | | | | 69 | TAX | | | |
| 30 | CSH | | KE | | 70 | TGW | | | |
| 31 | CSN | | | | 71 | THA | | KE | |
| 32 | CSZ | | | | 72 | THY | | | |
| 33 | CXA | | | | 73 | TWB | | | |
| 34 | DAL | | | SHP | 74 | UAE | | LH | |
| 35 | DLH | | | | 75 | UAL | O | | |
| 36 | ESR | | | | 76 | UIA | | | AAP |
| 37 | ETD | | LH | | 77 | UPS | | | AAP |
| 38 | ETH | | | SHP | 78 | UZB | | | |
| 39 | EVA | | | AAP | 79 | VJC | | | AAP |
| 40 | FDX | | | | 80 | XAX | | | |

6. De-icing Emergency Operation Team Work Log

| <De-icing Emergency Operation Team Work Log> | | | Convened on | 20 . . () | | |
|---|----------|----------|---------------------------|------------------|---------|-----------|
| | | | Issue time | : | | |
| | | | Dismissal time | : | | |
| Roster | | | | | | |
| Name | Company | Position | Work start time | Work end time | Contact | Signature |
| | | | : | : | | |
| | | | : | : | | |
| | | | : | : | | |
| | | | : | : | | |
| | | | : | : | | |
| | | | : | : | | |
| | | | : | : | | |
| Handling Status | | | | | | |
| Start time | End time | Handling | | | | |
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| <Other considerations> | | | | | | |

7. Confidentiality Pledge of De-icing Emergency Operation Team Member

I understand and agree that I will not disclose to others any security information including important and confidential information regarding airport operation that I obtained in the course of working at the De-icing Emergency Operation Team at the Incheon International Airport on ___(MM)__(DD), ____ (YYYY) without prior approval while or after I perform my duty at the team, and that if I disclose any important and confidential information, which lead to a significant problem or a notable hindrance to airport operation, I will be subject to punishment and will not raise any objection to a disciplinary action.

Date: (MM) (DD) (YYYY)

Affiliation :
Name : (Signature)
Date of Birth :

TO the President of the Incheon International Airport