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| FSI-25-001 | <b>운항표준정보</b> | All Fleets  |
| SELOI      |               | 01 AUG 2025                                                                                    |

## RTO 에 대한 이해

### 1. 아시아나항공 RTO 고속 이륙 중단 사례

- ICN 공항 이륙 활주 중 PFD 상의 AIRSPEED 가 FLUCUATION 과 동시에 MAXIMUM SPEED 로 진입하는 것을 보고 RTO 실시함.
- HKG 공항 이륙 활주 중 VI 근처에서 DOOR ENTRY L1 EICAS MSG 시현되어 RTO 실시함.
- BRU 공항 이륙 활주 중 90 kt 부근에서 "LOUD BANG" SOUND 2 회 발생하여 UNSAFE 상황으로 판단 RTO 실시함.
- CJU 공항 이륙 활주 중 THRUST CONTROL 이양 단계에서 MASTER CAUTION SINGLE CHIME 후 L/T가 나타났다 사라졌으며, EWD 상에 ECAM "NAV GPWS TERR DET FAULT" MSG가 INHIBIT 되지 않고 이륙 활주 중 시현되어 남아있는 것을 확인하였으며, 100KT 이하에서 ECAM CAUTION ACTIVATED 된 것으로 판단하여 RTO 실시함.

※ 공통점 : 위 사례들은, **80 kt** 이전에 비정상 상황이 발생했으나, **80 kt** 이후 고속에서 이륙 중단 조작이 시작되었던 사례입니다.

### 2. RTO (Rejected Takeoff) 란?

- Rejected Takeoff 은 항공기가 활주로에 정대하여 이륙을 위한 Takeoff thrust 가 Set 된 후 (이륙 추력에 도달한 시점 이후) 이륙결심속도(V1) 이하의 속도에서 이륙을 중단하는 것을 의미합니다.(FOM 8.2.10)
- RTO 의 결정권은 전적으로 PIC 에게 있으며, PIC 는 최대한으로 감속 조치를 하여 항공기를 활주로 내에 멈출 수 있는 준비가 되어 있어야 하고, POM/QRH 에 명시된 RTO 절차를 수행해야 합니다.(FOM 6.3.1)
- RTO 는 전세계에서 약 3,000 편당 1 건으로 발생하며, 이 중 약 2%는 120 kt 이상에서의 고속에서 수행되었습니다. (FAA, AC 120-62 Takeoff Safety Training Aid)

### 3. RTO 수행 시 Speed 의 중요성

- 저속 이륙 중단과 고속 이륙 중단의 제작사별 기준 속도:

## 80 kt(Boeing) / 100 kt (Airbus)

### ● Low Speed RTO (저속 이륙 중단)

- 80 kt (또는 100kt) 이전에 중대한 결함이나 비정상 상황 발생으로 실시하는 이륙 중단입니다.(POM)
- FMA 에 HOLD (Boeing 기종)가 표시되기 전에는, 반드시 **Auto Throttle** 을 **Disconnect** 해야 합니다.(POM)
- Slippery 활주로에서 저속 이륙 중단 시에는 방향 제어가 중요합니다.

### ● High Speed RTO (고속 이륙 중단)


- 80 kt(또는 100 kt)에서 V1 사이에서 실시하는 이륙 중단입니다.
- 속도가 **V1** 에 가까워질수록 이륙 중단에 더 많은 위험이 수반되므로, **Engine Fail, Engine Fire** 등 심각한 상황인 경우에만 고속 이륙 중단을 실시 해야 합니다.
- 이륙 중단 조작은 반드시 V1 이전(by V1)에 시작 되어야 하며, V1 초과 후에는 Runway Excursion 이 발생 할 수 있으므로, Continue Takeoff 를 실시해야 합니다.
- 고속 이륙 중단 시, Brake 의 Kinetics energy에서 Thermal energy로의 전환으로 인해, Tire blowout 또는 화재를 유발 할 수 있으므로, 이에 대한 확실한 준비가 되어 있어야 합니다.


## 4. RTO 관련 승무원 고려 사항

- RTO 조건에 해당되는 경우에는 즉시 이륙을 중단해야 합니다.
- Low Speed RTO 에 해당하는 조건에서, 인지 또는 조작 시작 지연으로 인하여, 고속 상태에서의 **RTO** 가 되지 않도록 해야 합니다.
- Low Speed RTO 결심속도 이전에 발생한 RTO 조건의 Factor 가 **Low Speed RTO** 결심속도 이후에 인지되었을 경우, 해당 Factor 가 High Speed RTO 조건에 해당되지 않는다면 **High Speed** 상태에서 **RTO** 를 실시하여서는 안됩니다.
- RTO 조건을 확인하기 위해 이륙 중단 조작이 지체되어서는 안됩니다
- MEL Deferred 항목으로 인한 EICAS MSG 또는 OAT 10 °C 근처에서 'ENG ANTI-ICE ON' MSG 등 이륙 중단이 불필요한 상황은 승무원 상호간 사전 브리핑을 통해 RTO 하지 않고 계속 이륙하여야 합니다.

- PM 은 계기를 (Engine, PFD, EICAS MSG 등) 적극적으로 모니터를 해야 하며, RTO 조건 발생 시, 이를 반드시 **Callout** 해야 합니다.
- 이륙 중단 시에는 반드시 Power Idle, Directional Control, Max Brakes, Speedbrakes & Available thrust reverse 가 적용 되어야 합니다.
- 장비 결함으로 인한 이륙 중단일 경우, 해당 모든 MEL 을 적용하여 제한 사항 및 한계치 준수 여부를 결정합니다.  
(해당 사항은 비행 종료 전, Flight & Maintenance Logbook 에 반드시 기록)
- 이륙 중단 후, Ramp return 또는 재 이륙은 승무원간 CRM 과 OCC 협의 후 결정합니다. (FOM 8.2.13)

운항기술표준 담당

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| FSI-25-002                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | <b>운항표준정보</b> | All Fleets  |
| SELOI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |               | 01 AUG 2025                                                                                    |
| GPS 수신 불량으로 인한 EGPWS 오작동 사례                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |               |                                                                                                |
| <p>1. 발생 사례</p> <ul style="list-style-type: none"> <li>- FL311 으로 순항중 "TERRAIN TERRAIN PULL UP" Warning 발생</li> </ul> <p>2. 발생 원인</p> <ul style="list-style-type: none"> <li>- GPS 가 위성 수신범위에서 벗어나거나 간섭으로 인해 Signal 이 Lost 되는 경우 시간/날짜, 위치의 오류가 발생할 수 있으며 이는 FMS, EGPWS, ADS-B, Datalink 에 영향을 미칠수 있습니다.</li> <li>- 일반적으로 간섭이 사라진 이후 GPS 는 복구가 되나, 간혹 특정 상황에서는 오류 상태로 유지될 수 있습니다.</li> <li>- GPS 가 제대로 복구되지 않은 경우 FMS, EGPWS, ADS-B, Datalink 에 영향을 주고 이는 ADS-B, GPS 관련 경고 message 를 시현 할 수 있습니다.</li> <li>- 특히 반복적인 간섭이 발생한 후 <b>드물게 거짓된(Spurious) EGPWS TERRAIN PULL UP 경고를 유발</b> 할 수 있습니다.</li> </ul> <p>※ 현재 제작사에서 해당 System 의 오류를 조사 중이며, 조사가 완료되는 대로 System 보완 조치 예정입니다.</p> <p style="text-align: center;"><b>운항기술표준 담당</b></p> |               |                                                                                                |

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| FSI-25-003 | <b>운항표준정보</b> | All Fleets  |
| SELOI      |               | 01 AUG 2025                                                                                    |

## Taxi Route Awareness 에 대한 이해

### 1. 배 경

- TAXIWAY/RUNWAY INCURSION 예방을 위해, 최근 발생한 타사 사례를 중심으로 한 Best Practice 를 공유 드립니다.

### 2. 타사 사례별 Best Practice

#### ▣ 사례 1 : ORD 공항에서 Ground 허가 없이 taxiway 진입

- Taxi 시작 전 혹은 Taxiing 중 ATC 지시에 대한 기장의 Taxi Route 브리핑에서 Clearance Limit, 관제 이양 지점에 대한 상호 확인(기장/부기장)이 필요합니다.
- 차트 상에 표시된 taxiway 와 외부 sign 및 marking 을 비교 확인하여야 합니다.
- Taxi Route Awareness 시 기장이 주도적으로 수행하고 부기장의 response 가 없는 경우에는 stop 후 정확한 내용을 확인하도록 합니다.
- 부기장은 "Negative", "Stop", "Slowdown" 등 상황에 맞는 적절한 Callout 으로 항공기를 정지 시키거나 속도를 줄이도록 조언하여 시간적 여유를 확보합니다.

#### ▣ 사례 2 : CJU 에서 관제사의 허가 없이 RWY 31 정지선을 일부 넘어간 사례

- 이착륙 Briefing 시 예상되는 모든 **Taxi Route** 에 대해 브리핑하며, Jepp FD Pro 의 AMM 을 활용(예상되는 taxi route 표시 등)함으로써 상호간의 Situation Awareness 를 증진 할 수 있습니다.
- Taxi Instruction 수령 후 최초 Briefing 내용과 다를 경우 AMM 을 활용하여, 발부된 Taxi Route 및 **Clearance Limit** 을 상호 정확하게 인지한 후 Taxi 를 시작합니다.
- 기장의 Taxi intention callout 이 없거나 허가 받은 경로와 다른 Intention 을 Callout 할 경우 부기장은 반드시 **Assertive** 하게 조언해야 합니다.
- 특히 Taxi 중 선회 및 Stop 이 요구되는 시점에서 부기장은 항공기의 경로를 Monitor 하 는 것에 집중하며 **head-down** 을 최소화합니다.

- 활주로를 cross/hold short 해야 하는 taxi route 가 포함된 경우에는 기장/부기장의 상호 confirm 이 반드시 필요합니다. (아래 General Callout 예시 참조)

➤ **Runway hold short** (예시)

| <b>CAPT</b>                                                                                                                                                                                                                                                                                                                                         | <b>F/O</b>                                                                                                                            |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <p>Call <b>"Approaching P, right turn, hold short of Runway 31"</b><br/>           Check the Clearance Limit Point</p> <p>Call <b>"LEFT CLEAR"</b><br/>           Call <b>"Runway 31 holding position marking check"</b><br/>           Holding position marking should be checked visually.<br/>           Point at the runway sign if needed.</p> | <p>Call <b>"P check, right turn, hold short of Runway 31"</b><br/>           Call <b>"RIGHT CLEAR"</b></p> <p>Call <b>"CHECK"</b></p> |

➤ **Runway crossing** (예시)

| <b>CAPT</b>                                                                                                                                                                                                                                                                                                                                             | <b>F/O</b>                                                                                                                                                                                                                                                                                            |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Call <b>"Approaching P, right turn, crossing Runway 31"</b></p> <p>Call <b>"LEFT CLEAR"</b><br/>           Call <b>"Runway 31 holding position sign check"</b><br/>           Holding position sign should be checked visually.<br/>           Point at the runway sign if needed.</p> <p><b>"RUNWAY CLEAR"</b></p> <p>Check no stop bar lights.</p> | <p>Call <b>"P check, right turn, crossing Runway 31"</b><br/>           Call <b>"RIGHT CLEAR"</b></p> <p>Call <b>"Runway 31 CHECK"</b></p> <p><b>"FINAL CLEAR"</b>(Confirm no traffic on short final)<br/>           Position STROBE light switch to ON.<br/>           Check no stop bar lights.</p> |



➤ **AMM** 활용 예시 (Gate #10 to RWY 24L for departure)




> AMM 활용 예시 (Gate #10 to RWY 24L for departure)



- 어떠한 상황에서도 쾌적성, 정시성, 경제성을 위한 재촉, 서두름 등으로 안전성이 저해되어서는 안된다.
- Hope for the Best, Prepare for the worst.

운항기술표준 담당

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| FSI-25-004                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | <b>운항표준정보</b> | All Fleets  |
| SELOI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               | 01 AUG 2025                                                                                    |
| <b>T/O &amp; L/D BRIEFING</b> 에 대한 이해                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |               |                                                                                                |
| <p><b>1. 배 경</b></p> <ul style="list-style-type: none"> <li>● 최근 T/O &amp; L/D Briefing 시 반드시 확인되어야 할 항목이 생략되어 EVENT 로 연결된 사례들이 발생되었습니다.</li> <li>● 또한 Crew Briefing 을 단순 Reading 하는 ‘형식적인 브리핑’으로 인한 ‘<b>THREAT</b> 관리 미흡도 지속 발체되고 있어 효과적이고 명확한 브리핑에 대한 이해가 요구됩니다.</li> </ul> <p><b>2. 목 적</b></p> <div style="border: 1px solid black; padding: 10px;"> <ul style="list-style-type: none"> <li>➢ Critical Phase 에서 Threat 을 예측하고 관리</li> <li>➢ 항공기의 공항 출 / 도착 단계에서, 표준운항절차의 보조적 역할 수행</li> <li>➢ 운항 관련 지식을 승무원 상호 간 Review 하여 운항 중 실시간 적용</li> <li>➢ 운항승무원 상호 공유된 Mental Picture 를 수립</li> <li>➢ 예측 가능한 위험요소에 대한 절차 수행 계획을 명확하게 수립하고 동승 승무원과 공유</li> <li>➢ 각각의 역할과 책임 등의 업무분담사항들을 확인 (PF, PM 이 서로의 역할을 미리 준비)</li> </ul> </div> <p><b>3. 효과적인 브리핑에 대한 이해</b></p> <p><b>가. Expected Threat</b></p> <div style="border: 1px solid black; padding: 10px;"> <ul style="list-style-type: none"> <li>➢ 공항 특성 (approach 종류 및 각도, 짧은 Taxi, Intersection 이나 선회구간이 많이 포함된 Taxi, Altitude Constraint 가 포함된 SID(특히 낮은 고도), 이륙 즉시 선회가 요구되는 SID)</li> <li>➢ Crosswind/ Tailwind, 모든 형태의 강수, Icing Condition, 저시정 등 악기상</li> <li>➢ Aircraft design, MEL (O) Procedure</li> <li>➢ NOTAM</li> <li>➢ Pilot (피로, 공항 및 업무 친숙도)</li> </ul> </div> |               |                                                                                                |

- 핵심은 주어진 상황에서의 Threat 을 예측하고 이에 효과적으로 대응하는 Plan 을 세우는 것입니다.
- Threat 은 매 비행마다 다르며 ATIS, Flight Plan, NOTAM 등 주어진 정보 안에 숨어 있습니다.
- 브리핑은 현재 Condition 의 Threat 에 대한 Response 를 Crew 상호간 미리 계획하는 것입니다.

#### 나. Unexpected Threat

- 예상치 못한 활주로 변경, G/A 및 low level off, 항공기 Malfunction
- Flare 단계에서 갑작스러운 Wind Factor 변화
- 접근 중, GPWS Caution 'Glideslope' 또는 'Sink Rate' 발령
- Long Flare, Bounced Landing, bird strike 등

- **Unexpected Threat** 대비 방안은 발생할 수 있는 돌발 상황을 지속적으로 재검토하여 사전에 준비하는 것입니다.
- 따라서 Unexpected Threat 에 대한 상황 인식 및 위기 관리를 위한 브리핑을 수행해야 합니다. ● 예기치 못한 위험은 경고 없이 발생합니다. 대부분의 이벤트들이 unexpected threat 들을 잘 관리하지 않아 발생했으므로 이에 대한 철저한 브리핑이 필요하겠습니다.

#### 다. 브리핑의 원칙: **Practical, Relevant, Concise**

- 찾아낸 Threat 에 대한 PF 와 PM 의 구체적 **Course of Action** 을 세우는 것이 브리핑의 첫 번째 원칙인 '**Practical**' 입니다. 즉 단순히 Approach Chart 를 읽기만 하는 것이 아니라 Automation mode 운용 계획, PM 이 중점적으로 Monitoring 할 요소 등 구체적인 Crew Action 을 정하는 것이 브리핑입니다.
- 브리핑은 모든 비정상상황에 대한 가정이 아니라 현재의 조건에서 가장 발생 가능성(Probability)과 강도(Severity)가 큰 Risk 를 발체하여 이에 대한 Response 를 준비하는 것이며, 현재 Condition 의 Threat 에 대한(**Relevant**) **Response** 를 Crew 상호간 미리 계획하는 것입니다.
- 브리핑을 Simple 하게 한다는 것은 핵심항목을 구체적으로 브리핑 한다는 것입니다. '선택과 집중' 을 적용하여, 주어진 상황에서 무엇이 중요한지를 가려내는 능력이 브리핑 역량의 핵심입니다. 나열식, 암송식 브리핑은 Time pressure 를 가중시키고 정상 절차수행에 Distraction 요소로 작용합니다. 해당 비행의

Unexpected Threat 을 찾아내고 이에 대비하는 구체적 **Plan** 을 간결하고 핵심적으로 브리핑 하는 것이 **Concise Briefing** 입니다.

- 다른 중요한 내용을 놓칠 수도 있으므로, 특정 내용에 대해 과도하게 **Fixation** 이 되면 안됩니다. ● Flight Time 이 짧은 구간에서 출발 전 예상되는 접근 절차로 L/D 브리핑을 수행하고 강하 전 변경/추가 사항만 브리핑하는 것도 한 가지 **Workload management** 사례입니다.

#### 4. 브리핑 수행 기법 (FCRM 1.16.2)

- 대화의 형식으로 진행하며 필요한 부분은 질문과 답변의 형식으로 Briefing 을 수행합니다.
- 각 비행 단계에 대한 일반적인 사항을 매번 반복하는 형식적인 **Briefing** 이 되어서는 안 되며, 운항에 영향을 미칠 가능성이 있는 특이사항 등에 중점을 두고 브리핑하는 것이 효과적 결과를 가져옵니다.
- Briefing 은 Takeoff, Departure, Approach and Landing 단계에서의 특별한 위험요소와 더불어 **PF** 와 **PM** 모두 이해할 수 있도록 진행되어야 합니다.
- PF 는 자신의 비행 계획과 조작을 설명하고, PM 에게 무엇을 언제 어떻게 **Monitor** 하고 조연해 줄 것인지 Briefing 합니다.
- PM 은 PF 의 Briefing 을 경청하고 의문사항이 있을 경우 이를 해소하기 위해 적극적으로 질문해야 합니다.
- PM 은 PF 가 착안하지 못한 사항 또는 잘못된 절차를 적용하려는 경우에는 자신의 지식과 경험에 비추어 더 좋은 방법이나 생각을 조언 합니다.
- PF 는 PM 에게 Briefing 시 적절히 임무를 분담하게 하여 적극적으로 비행에 참여하게 합니다 .
- **Motion Study (RTO, G/A 등)** 를 실시함으로써 긴박한 상황 에서도 반사적으로 절차를 정확히 수행할 수 있도록 합니다.
- 불가피한 상황에 의하여 회사의 표준절차에서 벗어난 절차(비상 상황 등)를 의도적으로 수행할 필요가 있을 경우, Briefing 시 이를 명확하게 언급해야 합니다.
- 예상치 못한 이착륙 활주로, 기상조건, ATC Clearance 등의 변경사항이 있을 경우 반드시 **Briefing** 을 통하여 재검토 해야 합니다.

운항기술표준 담당

|            |               |                                                                                                |
|------------|---------------|------------------------------------------------------------------------------------------------|
| FSI-25-005 | <b>운항표준정보</b> | All Fleets  |
| SELOI      |               | 01 AUG 2025                                                                                    |

## FIXED CRUISE SPEED 에 대한 이해 및 운영

### 1. 배경

- 최근 OFP(Operation Flight Plan) 상에 “Cost Index” 없이 Fixed Mach Number 만 제공됨에 따른 혼란 발생
- 동계시즌 미 동부 출발 운항편에 대한 Fixed Cruise Speed 운영이 예상됨에 따른 운항승무원 이해증진 및 운영방법 안내 필요

### 2. Cruise Speed 운영에 대한 이해 (Cost Index vs Fixed Speed Schedule)

- Flight Planning (OFP)
  - 비행계획 시 적용되는 Speed Schedule 은 항공기의 운영 제한치 내에서 작성될 수 있으며, Cruise 단계의 속도는 순항속도 및 연료를 고려한 CI(Cost Index) 값 또는 필요 시 지정된 속도 (Mach Speed)로 제공되어 질 수 있음.
  - 단, OFP 에 CI 와 Mach Speed 가 동시 표기 불가함에 따라 둘 중 1개만 선택 표기가 가능

예) CRZ-50(Cost Index 50) or CRZ-M85(Fixed cruise speed M.85) (FOM S5.10)

- Pre- light 단계 (Performance data 생성)
  - 항공기의 Performance data 생성을 위해서는 A/C Weight, Fuel reserves, Cost Index 및 Cruise Altitude 가 필수적으로 입력되어야 함.  
(POM 5.3-Performance data – set, Enter the Cost INDEX)
  - 즉, Fixed Cruise Speed 를 운영 시에도 항공기의 Pre-Flight set 을 위해서는 “Cost Index” 값이 제공되어야 함.

금번 사례는 Fixed Speed Schedule 로 운영하기 위해 OFP 생성 시 System 적으로 “Cost Index” 값이 미 제공 되어진 사례임.

☞ 향후 Fixed Cruise Speed 제공 시 OFP Head 에 Cost Index 제공 예정

### 3. Cruise Speed Schedule 운영 안내

- Case 1 : Cost Index 값으로 계획시 (CRZ-50)

- 해당 CI 적용하여 Cruise Speed 운영

● Case 2 : Fixed Mach Speed 로 계획시 (CRZ-M.85)

- OFP Head 에 제공 된 CI 값을 FMS 에 입력 후 CRZ page 에 Fixed Mach speed 를 입력 운영

참조) FMS 입력 방법 (예: B777)


- COST INDEX Field 에 주어진 CI 값 또는 OFP Head 에 제공된 CI 값 입력  
(0~999까지 입력 가능) Ref.) LRC(Long Range Cruise) = CI 180

- 제공된 CI 값 입력 후 Cruise Page 의 SEL SPD Field 에 제공된 Fixed Mach Speed 값 입력

(예: CI 150. M.85) (아래 사진 참조)



운항기술표준 담당

|            |               |                                                                                          |
|------------|---------------|------------------------------------------------------------------------------------------|
| FSI-25-007 | <b>운항표준정보</b> | B777  |
| SELOI      |               | 01 AUG 2025                                                                              |

## EGPWS False Warning 에 대한 이해

### 1. 기종별 발생 사례

- B777F, 중국(우루무치) FIR내 순항 중 'ADS-B OUT L'와 'ADS-B OUT R' MSG가 교대로 시현됨. 곧이어 'RWY POS' MSG가 시현되고 EGPWS "TERRAIN, TERRAIN, PULL UP" Warning 발령됨
- B787-9, Rhein FIR 내 순항 중 'TERR POS' MSG 시현됨. 관제사 지시에 의해 CRZ 강하 시작하여 FL300 통과 직후 EGPWS "TERRAIN, TERRAIN, PULL UP" Warning 발령됨
- B747-8F, HKG 공항 이륙 후 상승 중 'Transponder L, R' checklist 수행 중 "TERRAIN, TERRAIN, PULL UP" Warning 발령됨  
 ※ 공통점: MSG 시현 후, POM 절차 'GPS Signal Interference' 미수행 또는 일부 수행 (EGPWS off (Terrain Override)되지 않음) 상태에서 "TERRAIN TERRAIN PULL UP" Warning 발령됨.

### 2. 발생 원인

- GPS Signal Interference 종류 중 하나인 Spoofing으로 인한 Position Error

### 3. GPS Signal Interference 관련 내용

- GPS Signal Interference 종류
  - Jamming : Signal loss (신호 교란으로 인한 GPS 정보 방해)
  - Spoofing : Fake signal (jamming과 달리 Inconsistent or erroneous data를 제공하므로 잘못된 항공기 위치 정보를 인식하게 함)
- GPS Signal Interference에 영향받을 수 있는 항공기 시스템
  - Inertial Reference System, FMS, GPWS Look-Ahead Terrain, ADS-B, Time/Clock, Datalink, fuel prediction 등
- GPS Signal Interference 관련하여 조종석에서 발생 가능한 현상
  - ADS-B : "TRANSPONDER (B747)", "ADS-B OUT (B777, B787)" EICAS 메시지 시현, TRANSPONDER FAIL LIGHT (B737)
  - GPWS Look-Ahead Terrain : EGPWS의 잘못된 pull-up alert 발생("TERRAIN TERRAIN, PULL UP") 가능
  - Datalink 문제, Fuel prediction 오류 등 다수

- GPS 간섭지역을 벗어난 이후라도, 관련 장비에 남아있는 비정상 GPS data(Spoofing 등) 영향으로 동일현상(“PULL UP” Warning)이 재 발생 할 수 있습니다.

#### 4. 정비 조치 현황

- 정비본부에서는 GPS 간섭현상이 발생했던 항공기에 대해서 ‘GPS 위치 정보 기반 시스템 Reset’ 작업을 하고 있습니다. ‘GPS 위치 정보 기반 시스템’ Reset 작업은 해당 항공기의 이전 비행에 발생된 GPS Interference에 대한 정비 절차입니다.
- 제작사는 이 Reset 작업이 안된 항공기에서는 거짓된(Spurious) EGPWS “TERRAIN TERRAIN PULL UP” 경고 유발 가능성이 있음을 알려왔습니다.
- 해당 정비 조치는 승무원의 비행 후 Logging을 근거로 하고 있습니다.


#### 5. 절차 수행 시 고려사항

잠재적인 위험이 존재하는 지역의 주위를 운항할 때 지형에 대한 운항승무원의 인식은 중요하며, 장애물로부터 적절한 Clearance를 확보하기 위해 모든 가용한 자원을 동원하여 계획을 수립하고 이행하는 것은 기장의 책임입니다.(FOM 11.8.1)

- FOM에 명시된 대로 “TERRAIN TERRAIN, PULL UP” 등의 EGPWS Warning 발생 시 승무원은 지체없이 회피기동을 수행하여야 합니다. 하지만 이는 시스템에 문제가 없다는 전제하에 해당됩니다.
- 최근 사례 에서처럼, System 신뢰성에 영향을 미치는 기술적인 문제점으로 인해 부정확한 Warning이 발생하는 경우, Escape maneuver 수행 시 안전에 위해가 되는 아래 상황에 유의하여야 합니다.
  - 가. RVSM 고도에서 공중 충돌 위험
  - 나. 고고도에서의 급격한 기동에 의한 실속 가능성
  - 다. 상승 중 HEAVY WEIGHT 에서의 속도 감속
- 갑작스런 False PULL UP warning 발생에 대비하여 아래 내용이 사전에 확인되어 있어야 합니다.
  - 가. 관련 내용에 대한 충분한 사전 브리핑
  - 나. 항공기의 Lateral, vertical 비행 경로에 대한 실시간 확인
  - 다. 비행 경로 상 MSA(MEA, Minimum Sector Altitude 등)에 대한 위치 파악
- 상황 판단이 되지 않거나 지상 충돌이 의심스러울 경우 즉시 회피조작을 실시하여야 합니다.
- 비행 중 GPS Interference POM 절차 수행 후 GPS 간섭을 벗어나서 GPS 수신 상태가 정상으로 판단되면 모든 기재 취급을 원위치 하여야 합니다. GPS 수신 상태의 정상 여부는 POS REF 페이지에서 확인 가능합니다.

- 정확한 'GPS Signal Interference' POM 절차수행을 통해 False "PULL UP" Warning 발생을 방지할 수 있습니다.
- GPS 간섭 현상 발생 시 비행 후 Flight & Maintenance Log 에 \_\_\_\_\_ 기록할 것을 강조 드립니다.

운항기술표준 담당

|              |               |                                                                                                 |
|--------------|---------------|-------------------------------------------------------------------------------------------------|
| FSI-25-008R2 | <b>운항표준정보</b> | A321,A330,A350,B777                                                                             |
| SELOI        |               | 12 DEC 2025  |

## AAR TAILORED 접근 절차

### 1. 개요

VISUAL/CIRCLING 접근 시 FMS 에 탑재된 AAR TAILORED 접근 절차(예: V34R)를 선택한 후 NAV(LNAV) Mode 를 사용하여 경로를 유지하는 접근절차임

### 2. 적용 시 고려사항

**CAUTION**

TAILORED 접근 절차는 FMS NDB(Nav Data Base)에 해당 절차가 탑재되어 있는 경우에만 적용함

**CAUTION**

The Tailored Visual/Circling approach procedure (e.g. FUK RWY34R, PUS RWY18L/R) shall only be conducted by flight crew who have successfully **completed the corresponding training in the simulator.**

| 구분       | SIM Training | 절차 수행 가능 여부 | 부기장 조종 위임 가능여부 |
|----------|--------------|-------------|----------------|
| 기장 & 부기장 | ○            | ○           | ○              |
| 기장 Only  | ○            | ○           | X              |
| 부기장 Only | ○            | X           | X              |
| 기장 & 부기장 | X            | X           | X              |

### 3. 적용 공항 및 접근 절차

- A321 : PUS, FUK, KMI, KMJ, UBJ, [HND](#)

- A330: PUS, FUK, [HND](#) / A350, B777 : PUS, FUK

※ 공항별 세부 접근절차는 별도파일(**AAR TAILORED 접근 절차**) 참조

- Crewworld : Crewboard → FLIGHT → 운항표준정보
- Portable EFB : Contents APP → Flight Operations Manual → Standards & Evaluations → NOTICE

**운항기술표준 담당**

|            |               |                                                                                                 |
|------------|---------------|-------------------------------------------------------------------------------------------------|
| FSI-25-010 | <b>운항표준정보</b> | A330                                                                                            |
| SELOI      |               | 17 SEP 2025  |

**PAR (Precision Approach Radar) APPROACH**

1. 배 경

KEOZ 통합에 따른 POM 개정시 기존 PAR APPROACH 절차 삭제로 적용 절차에 대한 필요.

2. 적용절차

**GENERAL**

Precision Approach Radar (PAR) approach is one in which a controller provides highly accurate navigational guidance in azimuth and elevation to a pilot. Pilots are given headings to fly, to direct them to, and keep their aircraft aligned with the extended centerline of the landing runway.

\* Airport Surveillance Radar (ASR) approach is one in which a controller provides navigational guidance in azimuth only. It can control the azimuth until the Missed Approach Point (MAP) and instructs the pilot to down to the Minimum Descent Altitude (MDA). The pilot will be advised of the recommended altitude until the landing runway threshold or the MAP. The pilot should provide the aircraft's approach category to an air traffic controller (ATC) and the ATC should inform the Minimum Descent Altitude to the pilot before the descent.

**Lost Communication Procedure**

Advise the pilot that if radio communications are lost for a specified time interval (not more than 1 min) on vector to final approach, 15 secs on a ASR final approach, or 5 secs on a PAR final approach to:

- Attempt contact on a secondary or a tower frequency.
- Proceed in accordance with visual flight rules if possible.
- Proceed with an approved non-radar approach, or execute the specific lost communications procedure for the radar approach being used.
- "IF NO TRANSMISSIONS ARE RECEIVED FOR (time interval) IN THE PATTERN

OR FIVE/FIFTEEN SECS ON FINAL APPROACH, ATTEMPT CONTACT ON (frequency), AND PROCEED VFR. IF UNABLE PROCEED WITH (nonradar approach), MAINTAIN (altitude) UNTIL ESTABLISHED ON/OVER FIX/NAVAID/ APPROACH PROCEDURE.

- If a controller did not mention about the lost communication procedure, it is automatically authorized based on the published procedures and the navigational equipment should be properly set before an approach.

### **TRANSITION TO FINAL COURSE**

The final course is about 8 miles from the touch down point and the Dog Leg is considered as the Transition to the final course.

Turning and descending should be performed immediately upon the receiving instruction and a standard turning angle should be performed. However, the turning angle should not be exceeded 30 degrees.

The meteorological information provided by the ATC is altimeter, ceiling, and visibility. Visibility will be provided when the visibility is less than 3 miles and ceiling will be provided when less than whichever is higher between ceiling 1500 ft (civil airport 1000 ft) and the MDA of circling approach.

### **APPROACH PREPARATIONS**

PERF Page..... Complete/Check | PM  
*Insert DA in PERF Page.*

RAD NAV Page..... Complete/Check | PM  
*Insert useful NAVAID (VOR/NDB) in RAD NAV Page and set the selected VOR or NDB on EFIS control panel.*

PROG Page..... Complete/Check | PM  
*Insert Landing runway in PROG Page.*

### **APPROACH METHOD**

ATC controller will provide Azimuth and Glide Path information to the pilot and

lead to the landing runway.

ASR controller will lead the airplane until final approach course and on final approach course, final controller will control Azimuth and Glide path.

## **APPROACH PROCEDURES**

AUTOPILOT..... ON | PF

*In principle, use autopilot until change to manual flight for landing.*

HDG-V/S(TRK-FPA) Mode.....SELECT | PF

*HDG-V/S or TRK-FPA Mode can be used. When using TRK-FPA Mode, change the mode before intercepting final approach course.*

LANDING CONFIGURATION.....COMPLETE | PM

*Landing Configuration should be completed before Begin Descent.*

BEFORE LANDING CHECKLIST ..... COMPLETE | BOTH

*- Before Landing Checklist should be completed before Begin Descent.*

*- In principle, Before Landing Checklist should be Read & Response, but when ATC advises "DO NOT ACKNOWLEDGE FURTHER TRANSMISSION" for receiving radio, PM will perform the checklist and report to the captain with hand signal.*

DESCENT..... INITIATE | PF

*- When ATC advises "Begin Descent", descend by using V/S or FPA. Recommended descent rate for 3°Glide Path is, about  $1/2 GS \times 10 fpm$ . ( $2.5^\circ$ Glide path =  $1/2 GS \times 10 - 100 fpm$ )*

*- Under manual flight during final approach phase, all turns should be made with bank of actual turning to be made. (ex:  $5^\circ$ Bank for  $5^\circ$  turn) Bank should not exceed Half Rate Turn for maximum. ( $1.5^\circ/sec$ : appx.  $11^\circ$  bank for 140knots and  $12.5^\circ$  bank for 160knots)*

*- When the airplane deviates from normal glide path, ATC controller will provide information in terms of "Slightly" or "Well".*

GO AROUND ALTITUDE ..... SET | PF-PM

*PF (AP-On) or PM (AP-Off) sets Go around altitude when ATC controller advises "Begin Descent".*

**At ENTERED MINIMUM+100FT**

HUNDRED ABOVE..... MONITOR/ANNOUNCE | PM

**At ENTERED MINIMUM**

DA (DH) will be decided by altimeter or ATC advised altitude, whichever comes first.

MINIMUM..... MONITOR/ANNOUNCE | PM

LANDING or GO AROUND.....ANNOUNCE | PF

- The DH is the height at which a decision must be made during PAR instrument approach either to continue the approach or to execute a missed approach.

The MAP will be advised by ATC. (At or Above DH(A) or before MAP) :

**"FIELD (RUNWAY) INSIGHT, PROCEED VISUALLY"**

"AT DECISION HEIGHT" or "OVER MISSED APPROACH POINT" is called by ATC :

**"PROCEED VISUALLY" or "MISSED APPROACH"**

**MANUAL FLIGHT**

AUTOPILOT..... DISCONNECT | PF

*Change to manual flight when receiving L/D clearance and visual cues are identified. Continue using PAR information until landing.*

FLIGHT DIRECTORS ..... OFF | PM

*Turn FDs off when changing to Manual Flight.*

**CONTROLLER PROCEDURE ON FINAL**

Glide Path Notification

When an approaching aircraft is near the Glide Path (about 10 secs to 30 secs prior to the final descending point), the controller should inform the pilot.

" APPROACHING GLIDE PATH "

#### Decision Altitude Notification

The controller should inform the DA upon the pilot's request.

" DECISION ALTITUDE (Mean Sea Level in feet) "

#### Descent Instruction

An instruction should be given when an aircraft is at the final descending point.

" BEGIN DESCENT " (for PAR)

" (Number) MILES FROM RUNWAY/AIRPORT. DESCEND TO YOUR MINIMUM DESCENT ALTITUDE. "(for ASR)

#### Glide Path and Course Information

An aircraft should be informed the course guidance information when an approaching aircraft is on glidepath and on course, and frequently informed the deviation from glidepath or course.

Also it should be informed the tendency of the flight path as the need arises.

" HEADING (---) "

" ON GLIDEPATH "

" ON COURSE "

" SLIGHTLY/WELL ABOVE/BELOW GLIDEPATH "

" SLIGHTLY/WELL LEFT/RIGHT OF COURSE "

" GOING ABOVE/BELOW GLIDEPATH "

" GOING LEFT/RIGHT OF COURSE "

" ABOVE/BELOW GLIDEPATH AND COMING DOWN/UP RAPIDLY/SLOWLY "

" ABOVE/BELOW GLIDEPATH AND HOLDING "

#### Distance from the Touchdown point

During the final approach phase, a controller should notice the distance from the

touchdown point to a pilot for every one-mile.

" (---) MILES FROM TOUCHDOWN "

#### Decision Height

A controller should notice to a pilot when he/she approaches at the decision height.

" AT DECISION HEIGHT "

운항기술표준 담당

|            |               |                                                                                                |
|------------|---------------|------------------------------------------------------------------------------------------------|
| FSI-25-009 | <b>운항표준정보</b> | All Fleets  |
| SELOI      |               | 08 AUG 2025                                                                                    |

## P/B 중 TAXI LIGHT 사용 주의

### 1. 배 경

#### 가. FOM 6.2.3.9 Disconnect 절차

기장은 이를 확인한 후 응답으로 Landing Light/Taxi Light/Turn off Light 를 1 회 점멸 (On then Off) 한다.

나. Tow truck driver 또는 지상조업자가 Taxi Light 에 노출되었을 경우 망막손상 또는 일시적 시력상실의 상해를 입을 가능성이 있음.


#### 다. 사례

- CSX RAMP 에서 항공기의 Beacon light ON 상태에서 지상조업자가 Towing bar 를 연결하려고 할 때 항공기 Taxi Light 가 ON 되어 안구에 피해가 발생하였으며, CSX 공항 RAMP 관리 조업사로부터 항의를 받음. (2019.XX)
- LHR 공항에서 항공기 Push Back 을 위해 지상조업사 인원들이 항공기 아래에서 대기 중, Taxi Light 가 ON 되어 지상조업자가 시야에 불편을 초래. (2025.01)
- PVG 공항에서 출발이 지연되자 조업사 호출목적으로 Taxi Light ON/OFF 함, 조업사가 눈부심을 호소하여 다른 조업사로 변경 후 Push Back 함. (2025.05)

### 2. 조치사항

- 인천공항 1 터미널 Pushback Point 3 에서 지상조업자가 항공기의 정면에서 위치하여 TAXI LIGHT 의 사용으로 피해가 발생할 것으로 예상될 시 반드시 Turn off Light 를 사용하고 기종 특성상 불가할 경우 수신호 등 적절한 대체 수단을 사용한다.
- 조업사 호출목적의 Taxi Light 등의 사용은 금지한다.

**운항기술표준 담당**

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |               |                                                                                                |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|------------------------------------------------------------------------------------------------|
| FSI-25-011                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | <b>운항표준정보</b> | All Fleets  |
| SELOI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |               | 4 DEC 2025                                                                                     |
| <b>De/Anti icing Reference Handbook</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |               |                                                                                                |
| <p><b>1. 배 경</b></p> <ul style="list-style-type: none"> <li>● 비행 준비 및 Briefing 단계에서 De/Anti Icing Procedure 적용 예상 시 참조 가능한 통합 자료 필요</li> <li>● 2025-2026 INCHEON DE-ICING FACILITIES &amp; PROCEDURES 신규 발간</li> </ul> <p><b>2. 참고자료의 구성</b></p> <ul style="list-style-type: none"> <li>● Main Page 를 비행 단계 별로 구성</li> <li>● 비행 단계 별로 분류하여 사용이 용이하도록 하였으며, 관련 자료는 링크가 되도록 구성</li> <li>● <a href="#">파란색 글씨</a>로 된 부분은 링크 됨</li> <li>● 해당 절차 확인 후 <a href="#">파란색 "END OF ____"</a> 를 누르면 Main Page 로 복귀</li> <li>● Background Information 의 국지 절차는 ICN 공항 만 수록 <ul style="list-style-type: none"> <li>- 4 엔진 항공기(A380)는 Inboard Engines(2 개) OFF 상태로 De-Icing 절차 수행하고 기종별 관련 절차를 참고하시기 바랍니다.</li> </ul> </li> </ul> <p><b>3. 참고자료의 사용</b></p> <ul style="list-style-type: none"> <li>● 기종별 De/Anti Icing Reference Handbook 은 개인 portable EFB(iPAD)의 Notice-Standard-Flight Standard Information 에서 활용</li> <li>● 본 내용은 참고자료임. 기종 별 세부절차는 최신 FCOM/POM 내용이 우선 함.</li> </ul> <p><b>4. 첨부자료</b></p> <ul style="list-style-type: none"> <li>● A321 De/Anti Icing Reference Handbook</li> <li>● A330 De/Anti Icing Reference Handbook</li> <li>● A350 De/Anti Icing Reference Handbook</li> </ul> |               |                                                                                                |

- A380 De/Anti Icing Reference Handbook
- B777 De/Anti Icing Reference Handbook

운항기술표준 담당

# A321 DE/ANTI-ICING REFERENCE HANDBOOK

## De/Anti-Icing Background information and Policies

Refer to [ICN AIP](#) and [ICN AFile](#) for De-icing operational procedure

Refer to FOM Chapter 4.2 for more detail

## Before Fluid Spraying

In all situations, **it is responsibility of the Captain to decide** if the ground crew must de-ice/anti-ice the aircraft, and/or if additional deicing/anti-icing treatment are required

## [De/Anti-Icing Procedure](#)

## Upon Completion of the Spraying Operation

## [After De/Anti-Icing Procedure](#)

## [Holdover time starts when the final application begins](#)

in Either the one step or two step procedure

**Use Holdover Time Guidelines in the Aviator**

## During TAXI

## [TAXI CONSIDERATIONS](#)

## Before Take Off

## [TAKEOFF DECISION](#)



2025-2026

# ICN De/Anti-icing procedure Pilot Brief Sheet

Issued by: Apron Control Team  
Download at: [www.airport.kr](http://www.airport.kr)

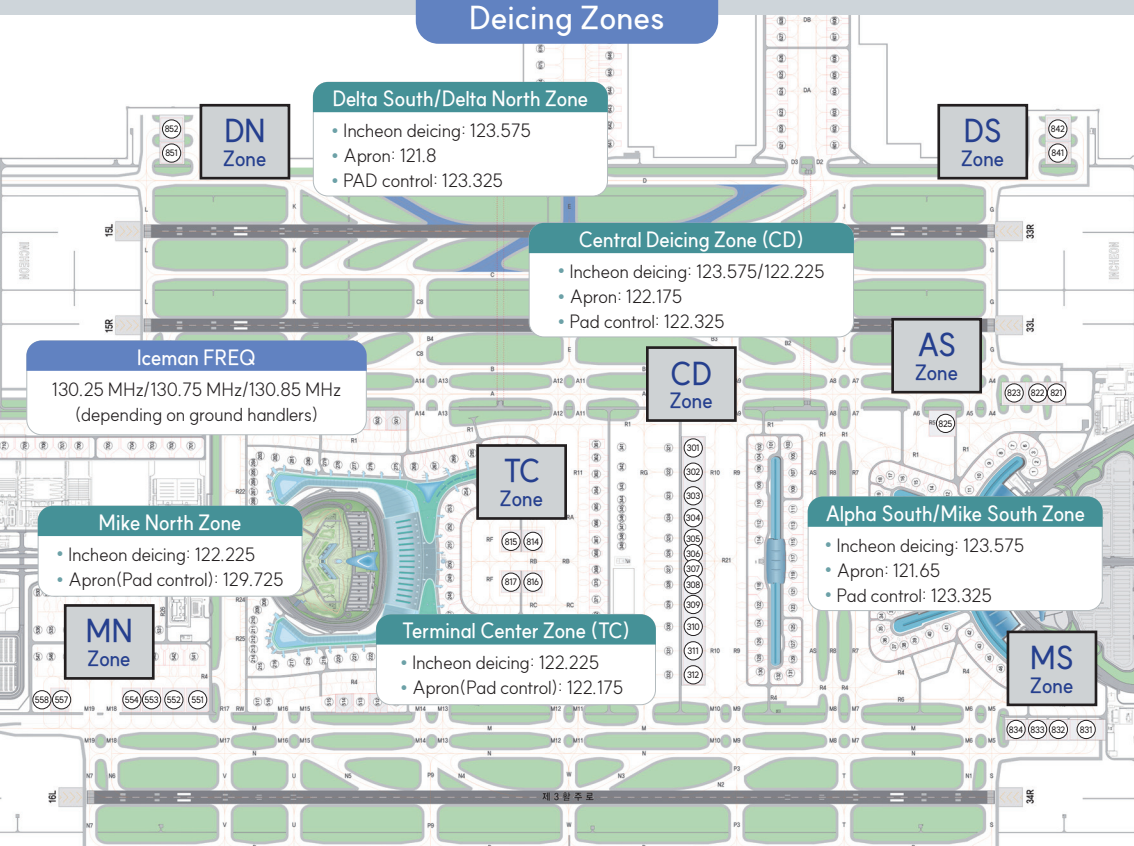


Incheon Airport

- ◆ De/Anti-icing operations are performed only in the remote de-icing pads.
- ◆ ENG ON deicing is available on all de-icing pads.
- ◆ For safety and ground handlers' operational reasons, ENG OFF de/anti-icing may be applied.
- ◆ All communication with Ice-man in the deicing pad is via VHF radio.
- ◆ The Iceman frequency is guided by Apron(Pad control), depending on ground handlers.

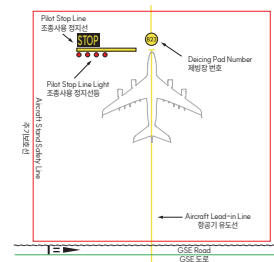


## Deicing Zones



Aircraft should stop when **pilot's stop line** aligns with the captain's shoulder line

- ◆ This marking is located on all de-icing pads to help aircraft stop without marshal service.
- ◆ The transverse bar indicates the cockpit stop position.



### CAUTION

Engine power should not be exceed GND idle in deicing pad at all times.

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

### Before De-icing Operation

- 1 When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- 2 Incheon Deicing will assign the de-icing zone and de-icing pad.
- 3 Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

### Entry Procedure

- 4 When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- 5 Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- 6 After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

### De-icing Procedure

- 7 Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- 8 When contact Iceman, report the de-icing pad number and parking brake set.
- 9 Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- 10 The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- 11 Iceman will inform "De-icing starts now"
- 12 To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery. (Engines on) When de-icing is started, contact Incheon Delivery (Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- 13 After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1 de-icing fluid has been applied, "hold over time does not apply".
- 14 (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

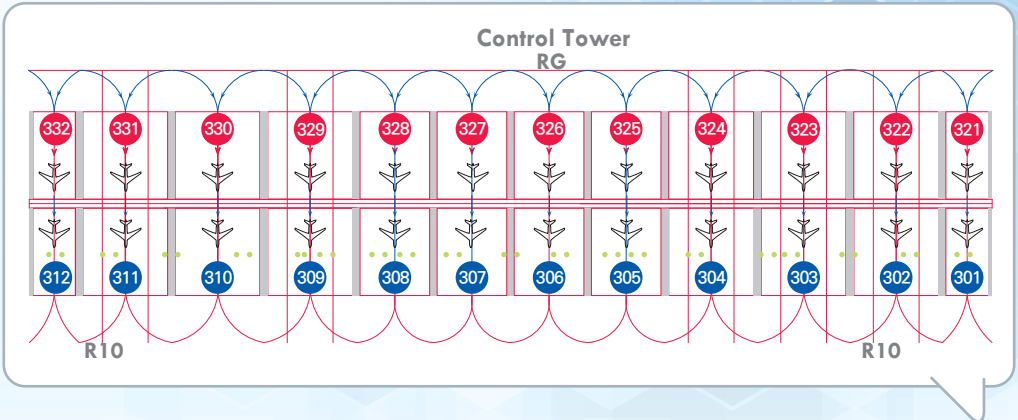
### Exit Procedure

- 15 Contact Pad Control and request for taxi.
- 16 Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

# CENTRAL DEICING ZONE(CD) Operation Procedure

Taxi to deicing pad #301 ~ #312 via holding bay #321 ~ #332

When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.



## When aircraft approaches de-icing pad

FLIGHT CREW



Aircraft approaches  
De-icing pad

PAD CONTROL (Apron)



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Stop bar lights on  
(by ICE MAN)

Pad control (Apron), (CALL SIGN),  
approaching de-icing pad #834

(CALL SIGN), Pad control (Apron).  
Continue taxi to de-icing pad #834  
(then hold abeam the stop line.)  
Report parking brake set.

Taxi to de-icing pad #834, report  
parking brake set, (CALL SIGN).

Pad control (Apron), (CALL SIGN),  
parking brake set.

(CALL SIGN),  
contact ICEMAN 130.85



Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request ENG ON deicing, Type 1 & Type 4, wings and tail deicing.

Engine set to ground idle and report ready for deicing, (CALL SIGN).

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② [EX] Wings & Tail / Full-body

ENG ON deicing may not be possible, due to weather and safety reasons (ENG OFF deicing ↗ page 9)

ICE MAN, (CALL SIGN), now ready for deicing.

Contact delivery 121.6, monitor ice man frequency, (CALL SIGN).

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, Type 1 & Type 4, wings & tail, ENG ON deicing, engine set to ground idle, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), deicing starts now, contact delivery 121.6, monitor ice man frequency.

Contact Clearance Delivery by voice regardless of PDC



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

we are ready for information,  
(CALL SIGN).

Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft, (CALL SIGN).

**NOTE: ANTI-ICING CODE**

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN,  
Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft.

**If only TYPE I is applied:**

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df-plus at 50%, started at 1340~ (upon pilot request)



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Ready to taxi, (CALL SIGN).

Contact pad control 123.325,  
(CALL SIGN).

**CAUTION: DO NOT TAXI  
IF STOP BAR LIGHTS ON**

(CALL SIGN), ICE MAN,  
Report ready to taxi.

(CALL SIGN), hold position and  
contact pad control 123.325 for  
taxi.

STOP BAR LIGHTS OFF





## When aircraft approaching de-icing pad

FLIGHT CREW



When Aircraft approaches  
De-icing pad

PAD CONTROL



Stop bar lights on  
(by ICE MAN)

ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Pad control, (CALL SIGN)  
Approaching de-icing zone MIKE SOUTH (MS).

(CALL SIGN), Pad control.  
Your de-icing pad #834.  
Continue taxi to de-icing pad #834.  
(then hold abeam the stop line)  
Report parking brake set.

Roger, taxi to de-icing pad #834,  
(CALL SIGN).

Pad control, (CALL SIGN),  
parking brake set.

(CALL SIGN),  
roger, contact ICEMAN 130.85



Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request *Type 1 & Type 4, wings and tail* deicing ENG SHUT DOWN deicing.

**DO NOT SHUT DOWN ENGINES UNTIL INSTRUCTED BY ICE MAN FOR GROUND SAFETY**

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② Wings & Tail or Full-body

Shut down engines now, report ready for deicing, (CALL SIGN)

ICE MAN, (CALL SIGN), now ready for deicing.

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, *Type 1 & Type 4, wings & tail*, shut down engines now, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), ICEMAN, deicing starts now.





Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICEMAN



We are ready for information.  
(CALL SIGN).

Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time,* post deicing check completed, all personnel and equipment are clear of aircraft. (CALL SIGN).

**NOTE: ANTI-ICING CODE**  
(Appropriate anti-icing code)

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN.

Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time,* post deicing check completed, all personnel and equipment are clear of aircraft.

**If only TYPE I is applied:**

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df- plus at 50%, started at 1340~ (upon pilot request)



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Contact C/D 121.6, (CALL SIGN).

Contact Clearance Delivery by voice regardless of PDC

After getting clearance, re-contact ice man frequency after ATC clearance.

ICE MAN, (CALL SIGN), we have ATC clearance. Request engines start up.

Engines start up approved, report ready to taxi. (CALL SIGN).

ICE MAN, (CALL SIGN). Ready to taxi.

Contact pad control 123.325 (CALL SIGN).

**CAUTION: DO NOT TAXI IF STOP BAR LIGHTS ON**

(CALL SIGN), ICE MAN. contact C/D 121.6 (for ATC clearance).

(CALL SIGN), Engines start up approved. Report ready to taxi.

(CALL SIGN), hold position and contact pad control 123.325 for taxi.

STOP BAR LIGHTS OFF



4. De-icing operations

4.1 Issuance of de/anti-icing operations phase

| Phase            | Application of phase                                                                  |
|------------------|---------------------------------------------------------------------------------------|
| BLUE (Phase 1)   | Initiated when snow begins and de-icing request are received.                         |
| YELLOW (Phase 2) | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft or more.  |
| ORANGE (Phase 3) | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft or more.  |
| RED (Phase 4)    | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft or more. |

Note : The de/anti-icing operation phase may be adjusted depending on de-icing capacity or prevailing traffic conditions.

4.2 De-icing zones and pads

De-icing pads assignment will be made as pad-group.

1. A South zone : 821, 822, 823, 825 pads
2. M South zone : 831, 832, 833, 834 pads
3. M North zone : 551, 552, 553, 554, 557, 558 pads
4. T Center zone : 814, 815, 816, 817 pads
5. Central De-icing zone : 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312 pads
6. D South zone : 841, 842 pads
7. D North zone : 851, 852 pads

4.3 De-icing operational procedures

1. De-icing requests and cancellations are possible through A-CDM portal system by AO or via radio communication with Incheon De-icing by flight crew.
2. Engine on de-icing is available on all de-icing pads and ACFT types applicable for engine on de-icing depend on AO or GHA.
3. Technical de-icing (landing gear, brakes, inside LE- or TE-flaps, under wing, engine inlets, fan blades and sensors/ static ports/ pitot probes) should be performed by engine off.
4. For safety and GHA's operational reasons(weather conditions, etc.), engine off de-icing can be applied.
5. On the de-icing pads ACFT shall hold abeam the stop line which indicates the cockpit stop position or follow the advice of the marshaller.
6. Aircrew shall control the throttle carefully, avoiding the exhausted gas causing damage to support personnel and equipment, when aircraft exit the de-icing stands.
7. During the engine on de-icing, aircrew shall keep the engine idle and set the brake. ACFT hold position until Pad Control give the taxi instruction.
8. The detailed de-icing procedures are given on the 'Incheon International Airport Pilot De-icing Guide'. The guide is available for download on the official website([www.airport.kr/co\\_en/4415/subview.do](http://www.airport.kr/co_en/4415/subview.do)).

| FREQ                                                                                                                                                             | Call Sign               | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 128.65 MHz, 344.2 MHz<br>(ATIS)                                                                                                                                  | Incheon INTL<br>Airport | - Acknowledge "De/Anti-icing Phase" by ATIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.575 MHz (Apron 1, Apron 2,<br>Cargos)<br>122.225 MHz (Apron 3, 4)                                                                                            | Incheon De-icing        | - Contact when ready for pushback.<br>- Advise "Aircraft De-icing required and Engine On/Off De-icing".<br>- De-icing zones assignment.                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.65 MHz (Apron 1)<br>121.8 MHz (Apron 2, Cargos)<br>122.175 MHz (Apron 3)<br>129.725 MHz (Apron 3)<br>123.675 MHz (Apron 4)                                   | Incheon Apron           | - Set Mode A code to 2000.<br>- Select XPNDR or AUTO.<br>- Contact the frequency according to the controller's instruction.<br>- Pushback & taxi to De-icing zones.                                                                                                                                                                                                                                                                                                                                            |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (Central De-icing zone,<br>M North zone)           | Pad Control             | - De-icing pads assignment.<br>- Taxi to De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Ice Man frequency is guided by Pad Control.<br>- Enter the pad and report the brake set to Ice Man. Do not shut down engines until instructed by Ice Man for ground safety.<br>- Monitor Ice Man until De-icing is completed.                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.6 MHz                                                                                                                                                        | Incheon Delivery        | - (Engine Off) Once de-icing is completed, contact Incheon delivery to get ATC clearance. Report "Engine Off De-icing and De-icing completed" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- (Engine On) Once de-icing is started, contact Incheon delivery to get ATC clearance. Report "Engine On De-icing and De-icing started" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- Set Mode A assigned by ATC.<br>- Select XPNDR or AUTO. |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Re-contact Ice Man and Report start engine and ready to taxi.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (M North zone)<br>121.8 MHz(Central De-icing zone) | Pad Control             | - Taxi out from De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

NOTE 1 : The de-icing pad will be appropriately assigned by Incheon Apron or Pad Control when aircraft approaches to de-icing zone.

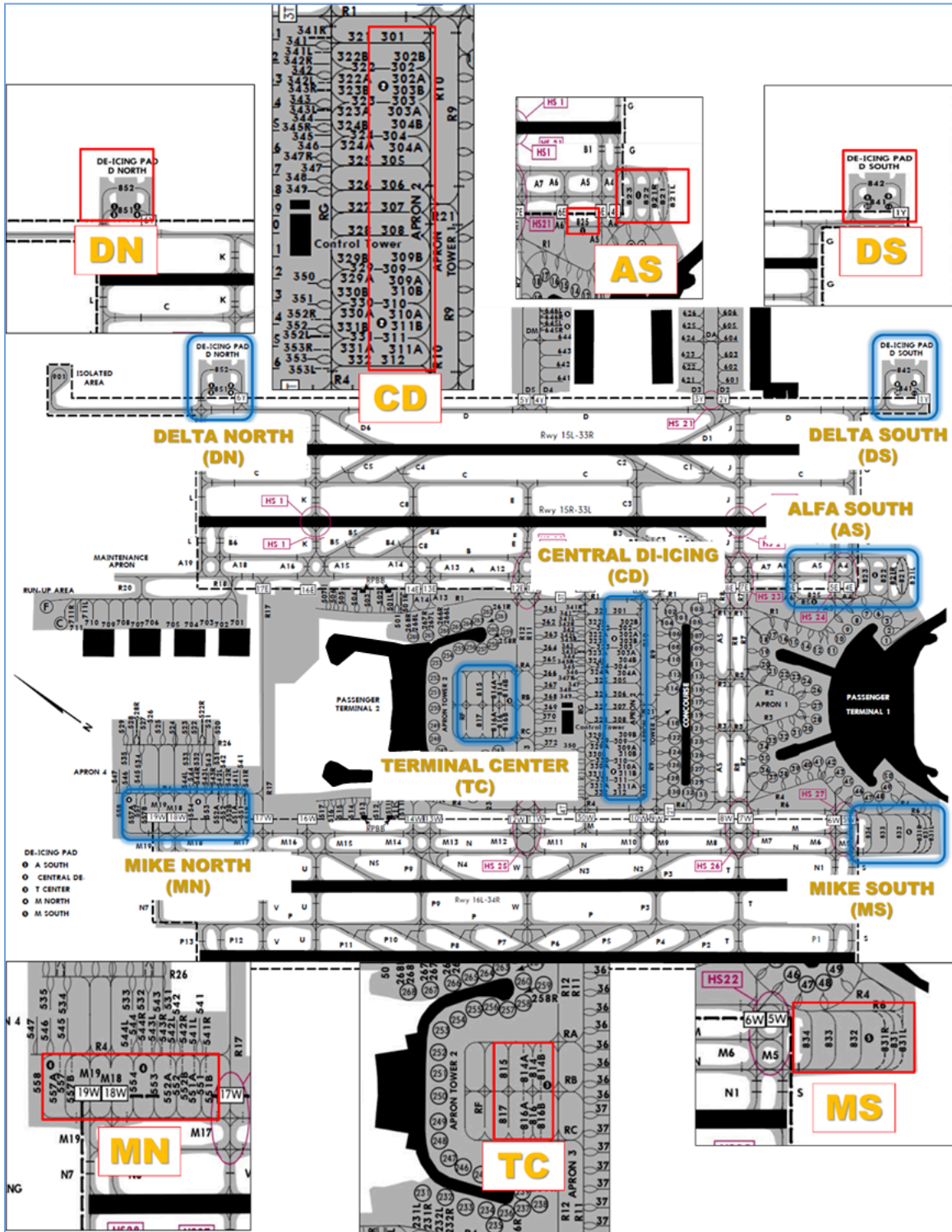
NOTE 2 : Flight crews shall monitor and maintain radio contact, otherwise re-sequenced as a result of no response to 3 successive calls.

NOTE 3 : This procedures can be changed by Incheon Apron according to the volume of de-icing traffic.

NOTE 4 : Flight crews need extra caution when entering and leaving the de-icing pad, since there are GSE roads in front of or behind the de-icing pad.

# Supplementary Information

- 2025-2026 winter season De/Anti-icing

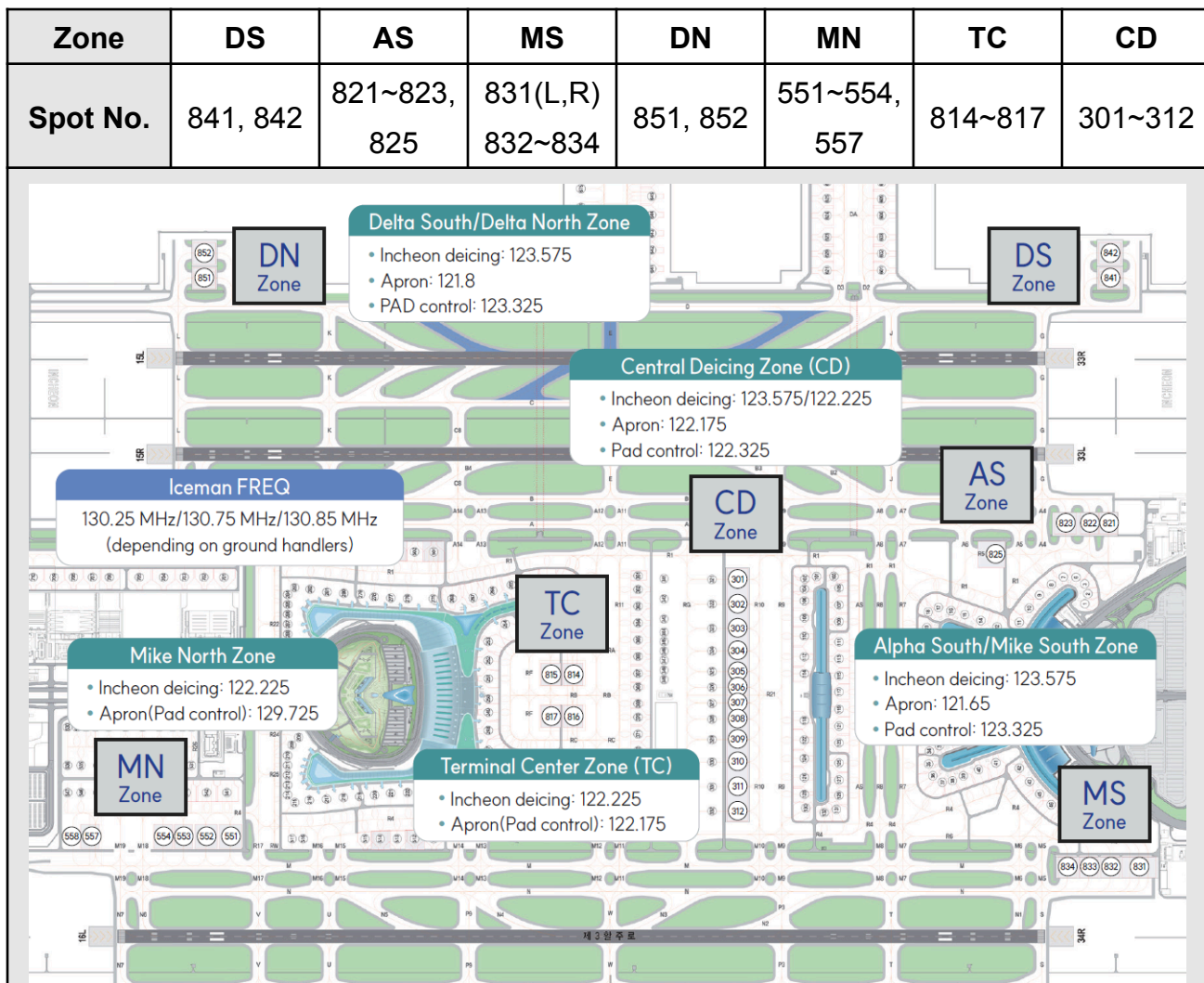


- De / Anti-icing pre-application procedures
  - ▶ When De / Anti-icing is required, apply in advance and check results through the Company Radio (“Asiana ICN”) (System application results will be delivered immediately upon application)
  - ▶ Based on departure time, application is recommended at least 40 minutes in advance.
  - ▶ Exception procedure
    - If the above general procedure is not possible, share with Company Radio first and request action.
    - Prior to cargo aircraft door closing, share the information through the Load Master (Face-to-face delivery)
    - Cancellation procedure after completion of pre-application: Notify a cancellation intention via radio communication with Incheon De-icing by flight crew.
    - New application process after TOBT (including after P/B): Direct action by flight crew, Notify an application intention to Company Radio & Airport’s apron
    - After completing the pre-application, re-application is not necessary due to non-compliance with the TOBT Window.
- "Ice Phase" will be acknowledged by ATIS

| De/Anti-icing Phase | Application of Phase                                                          |
|---------------------|-------------------------------------------------------------------------------|
| Phase 1 (Blue)      | Initiated when snow begins and de-icing request are received.                 |
| Phase 2 (Yellow)    | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft.  |
| Phase 3 (Orange)    | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft.  |
| Phase 4 (Red)       | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft. |

- De/Anti-icing operations are performed only in the remote De-icing pads.

- De-icing Pad location and frequency.



- ENG on and ENG off De/Anti-icing are both available.

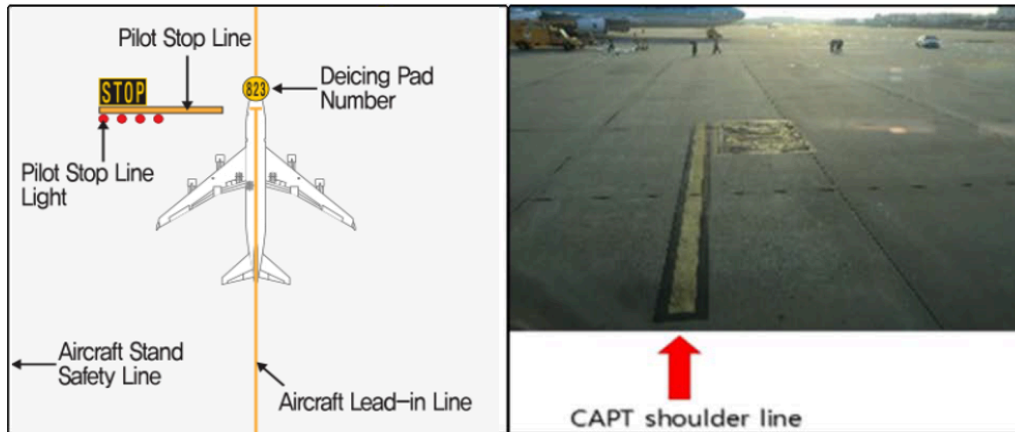
► **ENG ON De-icing available type:**

- 2-ENG aircrafts: A321, A330, A350, B777
- 4-ENG aircrafts: A380

**Note: For 4-ENG aircrafts (A380) ENG ON De-icing, Outboard ENG on and Inboard ENG off is basic procedure. ICE HOUSE(MAN) will notify this when entering de-icing pads.**

► **ENG ON De-icing is available on all de-icing pads.**

- Pilot Stop Line



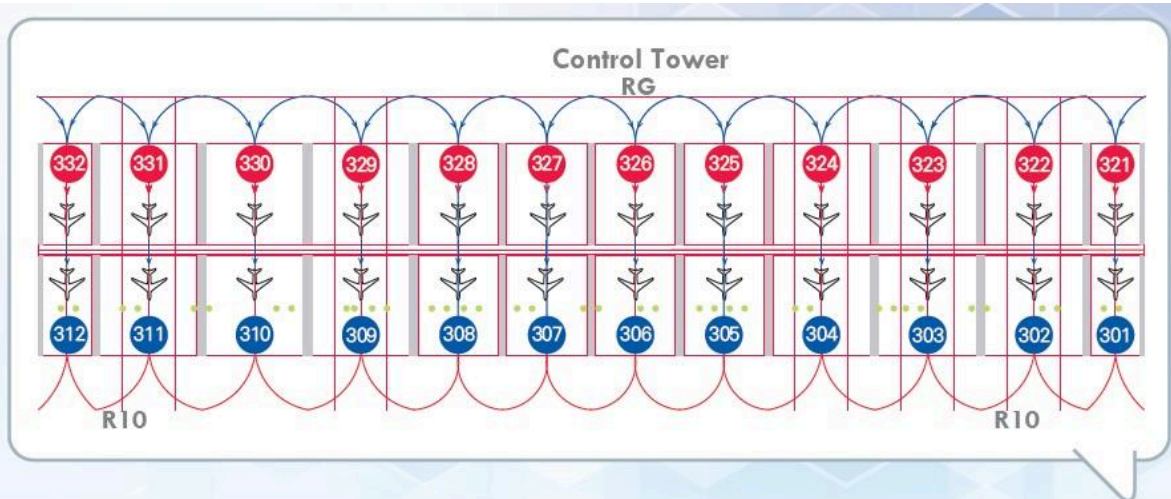
- ▶ This marking is located on all de-icing pads to help stop without marshal service.
- ▶ The transverse bar indicates the cockpit stop position.
- ▶ Aircraft proceed into the assigned de-icing pad and hold abeam the stop line.

***WARNING: Do not increase engines power exceed GND idle at all times in de-icing pad.***

***CAUTION: Be cautious of identifying the PSL(Pilot Stop Line) when entering de-icing pad, especially in wet /snow condition.***

- Central De-icing zone(CD) operation procedure.

- ▶ Taxi to de-icing pad #301 ~ #312 via holding bay #321 ~ #332.
- ▶ When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332.
- ▶ EMB(Electronic Message Board) will be conducted on pad #301 and #312.



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.

## - De/Anti-icing operational procedure

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

### Before De-icing Operation

- ① When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- ② Incheon Deicing will assign the de-icing zone and de-icing pad.
- ③ Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

### Entry Procedure

- ④ When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- ⑤ Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- ⑥ After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

### De-icing Procedure

- ⑦ Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- ⑧ When contact Iceman, report the de-icing pad number and parking brake set.
- ⑨ Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- ⑩ The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- ⑪ Iceman will inform "De-icing starts now"
- ⑫ To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery.  
(Engines on) When de-icing is started, contact Incheon Delivery  
(Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- ⑬ After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1 de-icing fluid has been applied, "hold over time does not apply".
- ⑭ (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

### Exit Procedure

- ⑮ Contact Pad Control and request for taxi.
- ⑯ Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

***Note:** If OCC designates operationally limited flight due to curfew of destination airport or crew duty time control, the crews should request pushback immediately when fully ready for pushback. (Passenger boarding has been completed and doors are closed) and change the pushback sequence in coordination with ATC to avoid exceeding the operational limitation of flight or crew.*

**END OF RKSI AFILE**

## **Before Fluid Spraying With Engine(S) Stopped Or Running**

**CAUTION!** - Make sure that the low or high-pressure ground connectors **do not supply any external air to the aircraft.**

- If it is necessary for the ground crew to repeatedly anti-ice the aircraft, **they must deice the surfaces** with a hot fluid mixture **before applying a new layer of anti-icing fluid.**

**CAUTION!** - The ground crew should take care when spraying deicing fluid, and make sure that the engines and APU **do not ingest any fluid.**

- **Do not move flaps, slats, ailerons, spoilers or elevators, if they are not free of ice.**
- **Always ensure that both left and right side of the aircraft receive the same complete and symmetrical deicing/anti-icing treatment.**

COMMUNICATION WITH GROUND CREW.....ESTABLISH

DEICING/ANTI-ICING FLUIDS TYPE.....CHECK APPROPRIATE

DO NOT START THE ENGINES DURING FLUID SPRAYING

CAB PRESS MODE SEL..... CHECK AUTO

ENG 1 BLEED..... OFF

ENG 2 BLEED..... OFF

APU BLEED..... OFF

DITCHING pushbutton..... ON

**Note:** 1. If the **VENT AVNCS SYS FAULT** alert appears, reset the AEVC circuit breaker at the end of the aircraft deicing/anti-icing procedure.

AIR COND/AVNCS/VENT/MONG Y17 on 122 VU.

2. For passenger comfort reason, it is not recommended to operate on ground with both PACKS set to OFF for more than 20 min.

THRUST LEVERS..... CHECK IDLE

"AIRCRAFT PREPARED FOR SPRAYING"..... INFORM GND CREW

**END OF BEFORE FLUID SPRAYING**

## Upon Completion Of The Spraying Operation

**CAUTION!** *When the OAT is low (below -5 °C) during snow/freezing rain precipitation, melted snow or raindrops may drip from the cockpit windshields and freeze on the fuselage below. This could create ice build up on the forward fuselage that could possibly disturb the airflow around the static/pitot/angle-of-attack probes, and result in unreliable air data measurements during takeoff.*

*Therefore, during taxi out before takeoff, beware of this possible build up of ice. The area around static/pitot/angle-of-attack probes must be free of ice/snow before starting takeoff.*

**PITOTS AND STATICS (ground crew).....CHECK**

**GROUND EQUIPMENT..... REMOVED**

**DE-ICING/ANTI-ICING REPOR.....RECEIVED**

The information from ground personnel who performed the de-icing and post-application check must include (ANTI-ICING CODE):

- The type of fluid used
- The ratio of fluid to water (e.g. 75/25).
- The time of the holdover beginning
- The result of post-application check "Aircraft critical parts are clean"

**HOLDOVER TIME..... DETERMINE**

**DITCHING pb ..... OFF**

**OUTFLOW VALVE..... CHECK OPEN**

On the ECAM PRESS page, confirm that the outflow valve indication reaches the open green position to avoid any unexpected aircraft pressurization.

- At least 1 minute after completion of spraying operations:

ENG 1 BLEED..... ON

ENG 2 BLEED..... ON

- At least 5 minutes after completion of spraying operation:

APU BLEED..... AS RQRD

**Note:** There is a risk of de-icing fluid ingestion by the APU air intake, resulting in specific odors, or smoke warnings. Therefore:

- Keep the APU running with the APU BLEED OFF for 5 min after spraying completion before setting the APU BLEED to ON (if required),
- Consider APU BLEED OFF for takeoff.

NORMAL PROCEDURE.....RESUME

**END OF UPON COMPLETION OF THE SPRAYING OPERATION**

# **HOLD OVER TIME APPLY**

(Refer to FOM 4.2 De/Anti-icing Procedure for more detailed information)

## ■ **Determine Holdover Time**

- Holdover time starts when the final application of fluid begins.
- Use "FAA Holdover Time Guidelines" in the portable EFB.

## ■ **Use of Holdover Time Guidelines**

- Holdover time provides an operational guideline for departure planning. It must be used in conjunction with the Cockpit Check (Pre-Takeoff Check).
- Precipitation categories, except frost, Ice Pellet, Small Hail, specify a time range, and frost only specifies a single time.

Note: For precipitation events where the Holdover Time is determined by a time range, the Cockpit Check, Cabin Check, and External Check may be omitted if the 'Shortest Time' of the time range has not been exceeded and there are no other factors (e.g., jet blast) that could affect the Holdover Time.

## ■ **Holdover Time**

Holdover time is the estimated time to maintain the function after spraying anti-icing fluid to prevent the form of icing matters on the surfaces of the aircraft. Holdover time is determined by the PIC using the Holdover Time Guidelines on the Portable EFB.

Holdover time starts when the final application of fluid begins. The final fluid applied will be either:

- The time to begin spraying De/Anti-icing fluid in the one step procedure
- The time to begin spraying Anti-icing fluid in the two-step procedure

Holdover time ends when either:

- The applied fluid loses its effectiveness, or
- The time extracted from the holdover time range expires

## ■ **Secondary De/Anti-icing**

If an aircraft which has been de/anti-iced is delayed on the ground long enough that anti-icing protection is no longer effective or if for any reason the de/anti-icing process is interrupted while freezing/frozen precipitation is falling, the Ground De/Anti-Icing Procedure must be re-accomplished in its entirety. This is called Secondary De/Anti-icing. When secondary de/anti-icing is necessary, the contaminated anti-icing fluid and all icing matters must be completely removed by de-icing before making another application of anti-icing fluid. If a holdover time was previously established after completing secondary de/anti-icing, a new holdover time must be applied.

**END OF HOLD OVER TIME APPLY**

## TAXI CONSIDERATIONS

### Perform Engine Run-Up, As Required

During ground operation, when in icing conditions and when **the OAT is +3 °C or less, or if significant engine vibration occurs**, periodic engine run-ups are required.

| 구 분               | INTERVAL<br>(not greater than) | N1                               |
|-------------------|--------------------------------|----------------------------------|
| CEO (IAE V2500)   | 15 min                         | 50% (1.05 EPR)<br>(NO HOLD TIME) |
| NEO (CFM LEAP-1A) | 60 min                         | 50% for 5 s                      |

### Additional Considerations

- To be performed **after requesting to ATC** on the TWY, but if this is not possible, **it must be performed on the runway before takeoff**
  - \* Recommended request 10 minutes before Interval time
- Terminology example : “Request ENG Runup for (5 sec) Due to Ice Shedding”
- ICE SHEDDING POINT
  - \* **ICN** → TWY B or N dependant on DEP RWY
  - \* **GMP** → DEP RWY or P TWY (P1~P2, F2~G2)
- Ice Shedding must be performed when **the aircraft is stopped**
- **STANDING TAKEOFF** must be performed [refer to **FOM 6.3.5.2**]
- For the **A321 NEO**, **if takeoff is not possible within 120 minutes after engine start, Ramp return and AMM TASK must be performed**
- **if the SHEDDING INTERVAL TIME is exceeded & ENG VIBRATIONS increase, RAMP RETURN and AMM TASK procedure must be requested**
- Refer to **FCOM PRO-SUP-ADVWXR : ENGINE OPERATIONS ON GROUND IN ICING CONDITIONS (R/R)**

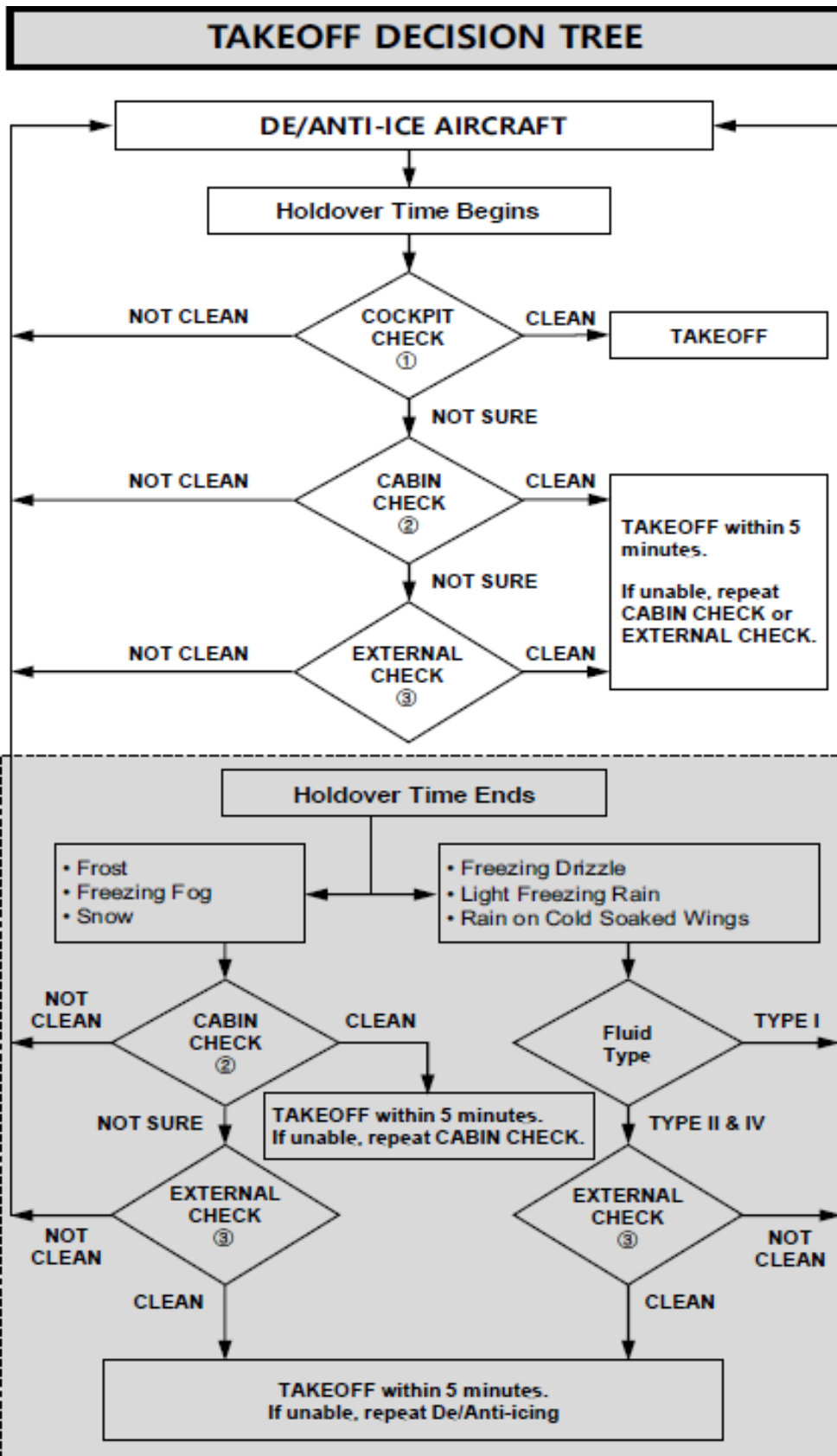
Before Takeoff, maintain the flaps retracted until the aircraft reaches the holding point of the takeoff runway to prevent contamination of the slats/flaps mechanism

### Adjust Holdover Time, As Required

Continuously assess weather and environmental conditions and periodically perform the COCKPIT CHECK

## END OF TAXI CONSIDERATIONS

# TAKEOFF DECISION



## □ **Application of the Clean Aircraft Concept**

The flight crew shall check whether the Clean Aircraft Concept is met through the following De/Anti-icing Check before deciding to operate.

### ■ **Cockpit Check (Pre-takeoff Check)**

This check is an integral part of the holdover time and is performed by the flight crew. Holdover Time is a value calculated through testing and is an approximate time to guarantee the effectiveness of De/Anti-icing Fluid. However, because the current weather environment and solution application method cannot perfectly match those at the time of testing, you should not solely rely on the anti-icing effective duration of the Holdover Time Guidelines to determine whether the aircraft is not iced.

The flight crew must continuously perform cockpit checks during the holdover time to confirm the de/anti-icing status of the aircraft, and the final cockpit check must be performed immediately before takeoff, if possible.

- The Cockpit Check is performed by the flight crew and is required anytime :

- Ground icing conditions exist

- The aircraft has been de/anti-iced

- The holdover time is still valid.

- The Cockpit Check consists of :

- A check of representative aircraft surfaces which are visible from the cockpit

- If desired or if any doubt exists, conduct a Cabin Check

- When circumstances do not permit a satisfactory visual check from inside the aircraft, return to the designated area and :

- Have a ground crew perform an external check

- If any doubt exists as to the condition of the aircraft, repeat the ground de/anti-icing procedure.

Note: The ground crew for de/anti-icing checks has the qualification required to perform them.

## ■ Cabin Check (Pre-takeoff Contamination Check)

This check is performed by the flight crew and is required :

- Anytime the aircraft has been de/anti-iced, and holdover time is exceeded during conditions of frost, freezing fog, or snow
- When doubt exists after conducting the Cockpit Check
- During conditions of snow grains

### **CAUTION**

**When Type I fluid has been applied during freezing drizzle and the holdover time has expired, a Cabin Check or External Check is not authorized.**

**Secondary de/anti-icing must be accomplished prior to takeoff.**

**When Type II or Type IV fluid has been applied during freezing drizzle, light freezing rain, or rain on cold soaked wings and holdover time has expired, a Cabin Check is not authorized because clear ice formation cannot be detected visually from inside the aircraft in this situation. In such case, return for an External Check or accomplish secondary de/anti-icing.**

The Cabin Check consists of a visual inspection of all representative aircraft surfaces which are visible from the best vantage point in the cabin. Normally, de/anti-icing fluid failure will first occur on the leading or trailing edges of the wing rather than the mid-chord. Therefore, the leading edges and upper surfaces of both wings must be visually checked for evidence of fluid failure.

Additionally, all visible engine inlets must be inspected for contamination. Takeoff must occur within 5 minutes of the most recent check.

The ability to adequately perform this check from inside the aircraft is highly dependent upon several factors. Lighting conditions, cleanliness of cabin/cockpit windows, and outside visibility may severely hinder or prevent the pilot's ability to satisfactorily assess aircraft surfaces for contamination.

When circumstances do not permit a satisfactory visual check from inside the aircraft,

return to the designated area and:

- Have a ground crew perform the external check
- If any doubt to take off on the condition of the aircraft exists , repeat the ground de/anti-icing procedure.

■ External Check (Alternative Pre-takeoff Check)

This check is performed by the de/anti-icing ground crew and is required anytime :

- Doubt exists after conducting a cabin check, or
- The aircraft has been anti-iced with Type II or Type IV fluid, and holdover time is exceeded during freezing drizzle, light freezing rain, or rain on cold soaked wings.

If the external check cannot be accomplished, return for secondary de/antiicing.

This check consists of a close visual inspection of the aircraft's upper wing surfaces and leading edges for frozen contamination. Takeoff must occur within 5 minutes of the external check; if unable, repeat the ground de/antiicing procedure.

**CAUTION**

**An external check is not authorized during freezing drizzle**

**when Type I fluid is used and holdover time has expired.**

**The aircraft must return to the designated area for**

**an External Check or accomplish the secondary de/anti-icing.**

There are some airports that perform the Secondary De/Anti-icing instead of External Check.

**END OF TAKE OFF DECISION**

# A330 DE/ANTI-ICING REFERENCE HANDBOOK

## De/Anti-Icing Background information and Policies

[Refer to ICN AIP](#) and [ICN AFile](#) for De-icing operational procedure

Refer to FOM Chapter 4.2 for more detail

## Before Fluid Spraying Ground

In all situations, **it is responsibility of the Captain to decide** if the ground crew must de-ice/anti-ice the aircraft, and/or if additional deicing/anti-icing treatment are required

**Engine(s) is/are running? (choose one)**

[YES](#)

[NO](#)

## Upon Completion of the Spraying Operation

**Engine(s) is/are running? (choose one)**

[YES](#)

[NO](#)

## [Holdover time starts when the final application begins](#)

in Either the one step or two step procedure

**Use Holdover Time Guidelines in the Aviator**

## During TAXI

### [TAXI CONSIDERATIONS](#)

## Before Take Off

### [TAKEOFF DECISION](#)



2025-2026

# ICN De/Anti-icing procedure Pilot Brief Sheet

Issued by: Apron Control Team  
Download at: [www.airport.kr](http://www.airport.kr)

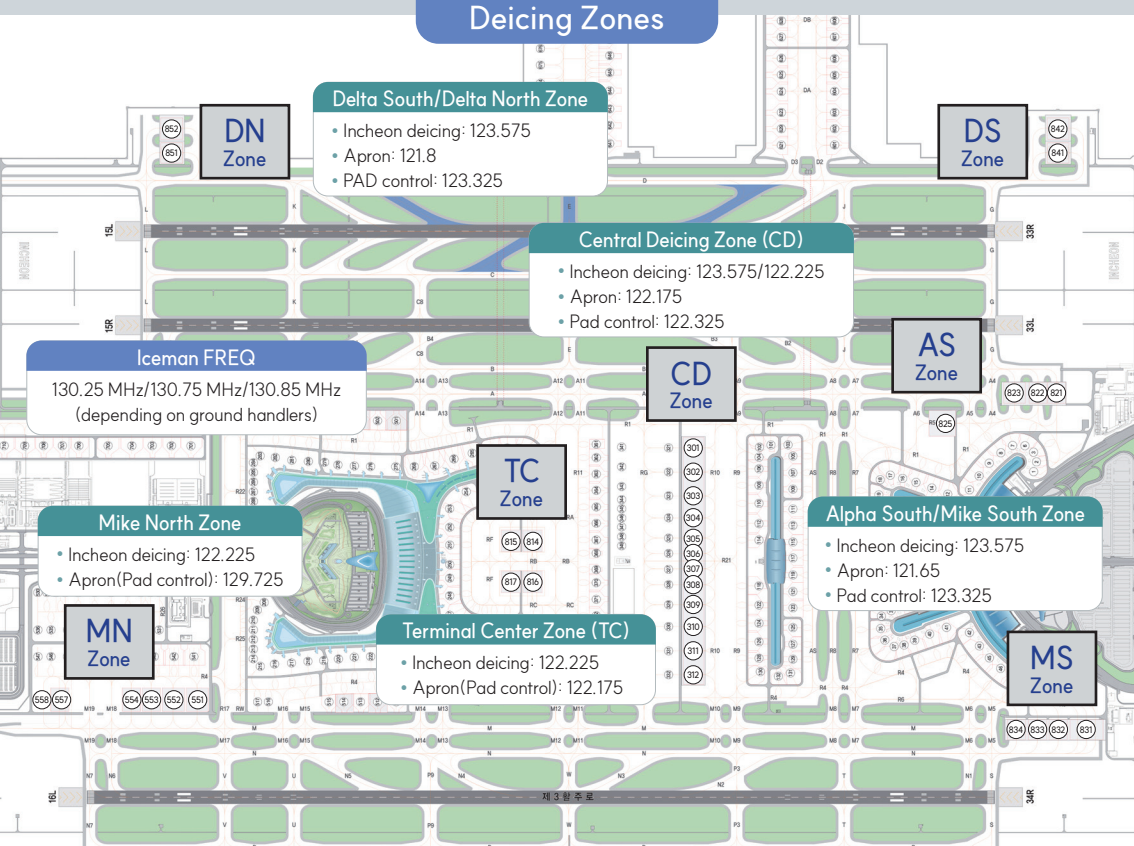


Incheon Airport

- ◆ De/Anti-icing operations are performed only in the remote de-icing pads.
- ◆ ENG ON deicing is available on all de-icing pads.
- ◆ For safety and ground handlers' operational reasons, ENG OFF de/anti-icing may be applied.
- ◆ All communication with Ice-man in the deicing pad is via VHF radio.
- ◆ The Iceman frequency is guided by Apron(Pad control), depending on ground handlers.

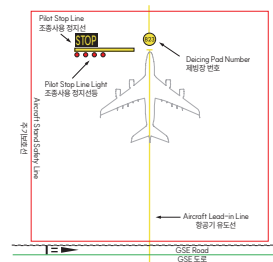


## Deicing Zones



Aircraft should stop when **pilot's stop line** aligns with the captain's shoulder line

- ◆ This marking is located on all de-icing pads to help aircraft stop without marshal service.
- ◆ The transverse bar indicates the cockpit stop position.



### **CAUTION**

Engine power should not be exceed GND idle in deicing pad at all times.

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

### Before De-icing Operation

- ① When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- ② Incheon Deicing will assign the de-icing zone and de-icing pad.
- ③ Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

### Entry Procedure

- ④ When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- ⑤ Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- ⑥ After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

### De-icing Procedure

- ⑦ Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- ⑧ When contact Iceman, report the de-icing pad number and parking brake set.
- ⑨ Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- ⑩ The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- ⑪ Iceman will inform "De-icing starts now"
- ⑫ To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery. (Engines on) When de-icing is started, contact Incheon Delivery (Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- ⑬ After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1 de-icing fluid has been applied, "hold over time does not apply".
- ⑭ (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

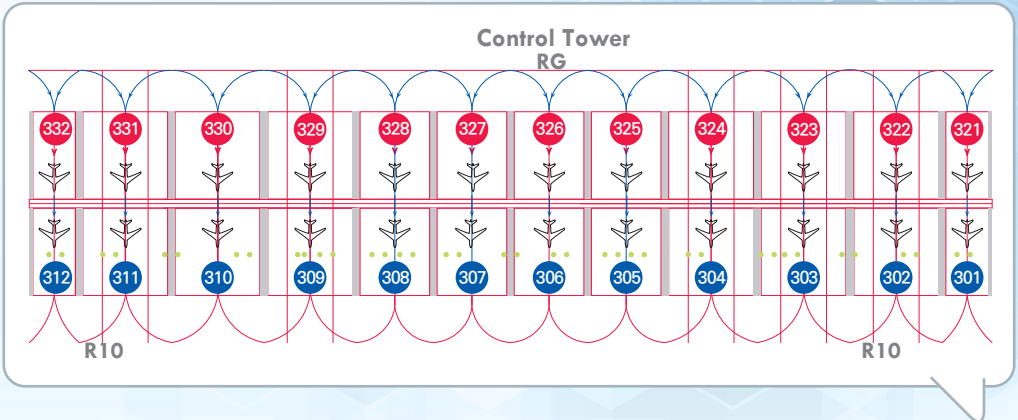
### Exit Procedure

- ⑮ Contact Pad Control and request for taxi.
- ⑯ Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

# CENTRAL DEICING ZONE(CD) Operation Procedure

Taxi to deicing pad #301 ~ #312 via holding bay #321 ~ #332

When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.



When aircraft approaches de-icing pad

FLIGHT CREW



Aircraft approaches  
De-icing pad

PAD CONTROL (Apron)



Stop bar lights on  
(by ICE MAN)

ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Pad control (Apron), (CALL SIGN),  
approaching de-icing pad #834

(CALL SIGN), Pad control (Apron).  
Continue taxi to de-icing pad #834  
(then hold abeam the stop line.)  
Report parking brake set.

Taxi to de-icing pad #834, report  
parking brake set, (CALL SIGN).

Pad control (Apron), (CALL SIGN),  
parking brake set.

(CALL SIGN),  
contact ICEMAN 130.85



Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request ENG ON deicing, Type 1 & Type 4, wings and tail deicing.

Engine set to ground idle and report ready for deicing, (CALL SIGN).

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② [EX] Wings & Tail / Full-body

ENG ON deicing may not be possible, due to weather and safety reasons (ENG OFF deicing ↗ page 9)

ICE MAN, (CALL SIGN), now ready for deicing.

Contact delivery 121.6, monitor ice man frequency, (CALL SIGN).

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, Type 1 & Type 4, wings & tail, ENG ON deicing, engine set to ground idle, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), deicing starts now, contact delivery 121.6, monitor ice man frequency.

Contact Clearance Delivery by voice regardless of PDC



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

we are ready for information,  
(CALL SIGN).

Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft, (CALL SIGN).

### NOTE: ANTI-ICING CODE

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN,  
Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft.

### If only TYPE I is applied:

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df-plus at 50%, started at 1340~ (upon pilot request)



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Ready to taxi, (CALL SIGN).

Contact pad control 123.325,  
(CALL SIGN).

**CAUTION: DO NOT TAXI  
IF STOP BAR LIGHTS ON**

(CALL SIGN), ICE MAN,  
Report ready to taxi.

(CALL SIGN), hold position and  
contact pad control 123.325 for  
taxi.

STOP BAR LIGHTS OFF





## When aircraft approaching de-icing pad

FLIGHT CREW



When Aircraft approaches  
De-icing pad

PAD CONTROL



Stop bar lights on  
(by ICE MAN)

ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Pad control, (CALL SIGN)  
Approaching de-icing zone MIKE SOUTH (MS).

(CALL SIGN), Pad control.  
Your de-icing pad #834.  
Continue taxi to de-icing pad #834.  
(then hold abeam the stop line)  
Report parking brake set.

Roger, taxi to de-icing pad #834,  
(CALL SIGN).

Pad control, (CALL SIGN),  
parking brake set.

(CALL SIGN),  
roger, contact ICEMAN 130.85





Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request *Type 1 & Type 4, wings and tail* deicing ENG SHUT DOWN deicing.

**DO NOT SHUT DOWN ENGINES UNTIL INSTRUCTED BY ICE MAN FOR GROUND SAFETY**

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② Wings & Tail or Full-body

Shut down engines now, report ready for deicing, (CALL SIGN)

ICE MAN, (CALL SIGN), now ready for deicing.

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, *Type 1 & Type 4, wings & tail*, shut down engines now, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), ICEMAN, deicing starts now.





Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICEMAN



We are ready for information.  
(CALL SIGN).

Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time*, post deicing check completed, all personnel and equipment are clear of aircraft. (CALL SIGN).

**NOTE: ANTI-ICING CODE**  
(Appropriate anti-icing code)

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN.

Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time*, post deicing check completed, all personnel and equipment are clear of aircraft.

**If only TYPE I is applied:**

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df- plus at 50%, started at 1340~ (upon pilot request)



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Contact C/D 121.6, (CALL SIGN).

Contact Clearance Delivery by voice regardless of PDC

After getting clearance, re-contact ice man frequency after ATC clearance.

ICE MAN, (CALL SIGN), we have ATC clearance. Request engines start up.

Engines start up approved, report ready to taxi. (CALL SIGN).

ICE MAN, (CALL SIGN). Ready to taxi.

Contact pad control 123.325 (CALL SIGN).

**CAUTION: DO NOT TAXI IF STOP BAR LIGHTS ON**

(CALL SIGN), ICE MAN. contact C/D 121.6 (for ATC clearance).

(CALL SIGN), Engines start up approved. Report ready to taxi.

(CALL SIGN), hold position and contact pad control 123.325 for taxi.

STOP BAR LIGHTS OFF



4. De-icing operations

4.1 Issuance of de/anti-icing operations phase

| Phase            | Application of phase                                                                  |
|------------------|---------------------------------------------------------------------------------------|
| BLUE (Phase 1)   | Initiated when snow begins and de-icing request are received.                         |
| YELLOW (Phase 2) | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft or more.  |
| ORANGE (Phase 3) | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft or more.  |
| RED (Phase 4)    | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft or more. |

Note : The de/anti-icing operation phase may be adjusted depending on de-icing capacity or prevailing traffic conditions.

4.2 De-icing zones and pads

De-icing pads assignment will be made as pad-group.

1. A South zone : 821, 822, 823, 825 pads
2. M South zone : 831, 832, 833, 834 pads
3. M North zone : 551, 552, 553, 554, 557, 558 pads
4. T Center zone : 814, 815, 816, 817 pads
5. Central De-icing zone : 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312 pads
6. D South zone : 841, 842 pads
7. D North zone : 851, 852 pads

4.3 De-icing operational procedures

1. De-icing requests and cancellations are possible through A-CDM portal system by AO or via radio communication with Incheon De-icing by flight crew.
2. Engine on de-icing is available on all de-icing pads and ACFT types applicable for engine on de-icing depend on AO or GHA.
3. Technical de-icing (landing gear, brakes, inside LE- or TE-flaps, under wing, engine inlets, fan blades and sensors/ static ports/ pitot probes) should be performed by engine off.
4. For safety and GHA's operational reasons(weather conditions, etc.), engine off de-icing can be applied.
5. On the de-icing pads ACFT shall hold abeam the stop line which indicates the cockpit stop position or follow the advice of the marshaller.
6. Aircrew shall control the throttle carefully, avoiding the exhausted gas causing damage to support personnel and equipment, when aircraft exit the de-icing stands.
7. During the engine on de-icing, aircrew shall keep the engine idle and set the brake. ACFT hold position until Pad Control give the taxi instruction.
8. The detailed de-icing procedures are given on the 'Incheon International Airport Pilot De-icing Guide'. The guide is available for download on the official website([www.airport.kr/co\\_en/4415/subview.do](http://www.airport.kr/co_en/4415/subview.do)).

Change : Information of de-icing operations and de-icing pad(ACFT stand NR. 558).

| FREQ                                                                                                                                                             | Call Sign               | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 128.65 MHz, 344.2 MHz<br>(ATIS)                                                                                                                                  | Incheon INTL<br>Airport | - Acknowledge "De/Anti-icing Phase" by ATIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.575 MHz (Apron 1, Apron 2,<br>Cargos)<br>122.225 MHz (Apron 3, 4)                                                                                            | Incheon De-icing        | - Contact when ready for pushback.<br>- Advise "Aircraft De-icing required and Engine On/Off De-icing".<br>- De-icing zones assignment.                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.65 MHz (Apron 1)<br>121.8 MHz (Apron 2, Cargos)<br>122.175 MHz (Apron 3)<br>129.725 MHz (Apron 3)<br>123.675 MHz (Apron 4)                                   | Incheon Apron           | - Set Mode A code to 2000.<br>- Select XPNDR or AUTO.<br>- Contact the frequency according to the controller's instruction.<br>- Pushback & taxi to De-icing zones.                                                                                                                                                                                                                                                                                                                                            |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (Central De-icing zone,<br>M North zone)           | Pad Control             | - De-icing pads assignment.<br>- Taxi to De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Ice Man frequency is guided by Pad Control.<br>- Enter the pad and report the brake set to Ice Man. Do not shut down engines until instructed by Ice Man for ground safety.<br>- Monitor Ice Man until De-icing is completed.                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.6 MHz                                                                                                                                                        | Incheon Delivery        | - (Engine Off) Once de-icing is completed, contact Incheon delivery to get ATC clearance. Report "Engine Off De-icing and De-icing completed" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- (Engine On) Once de-icing is started, contact Incheon delivery to get ATC clearance. Report "Engine On De-icing and De-icing started" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- Set Mode A assigned by ATC.<br>- Select XPNDR or AUTO. |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Re-contact Ice Man and Report start engine and ready to taxi.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (M North zone)<br>121.8 MHz(Central De-icing zone) | Pad Control             | - Taxi out from De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

NOTE 1 : The de-icing pad will be appropriately assigned by Incheon Apron or Pad Control when aircraft approaches to de-icing zone.

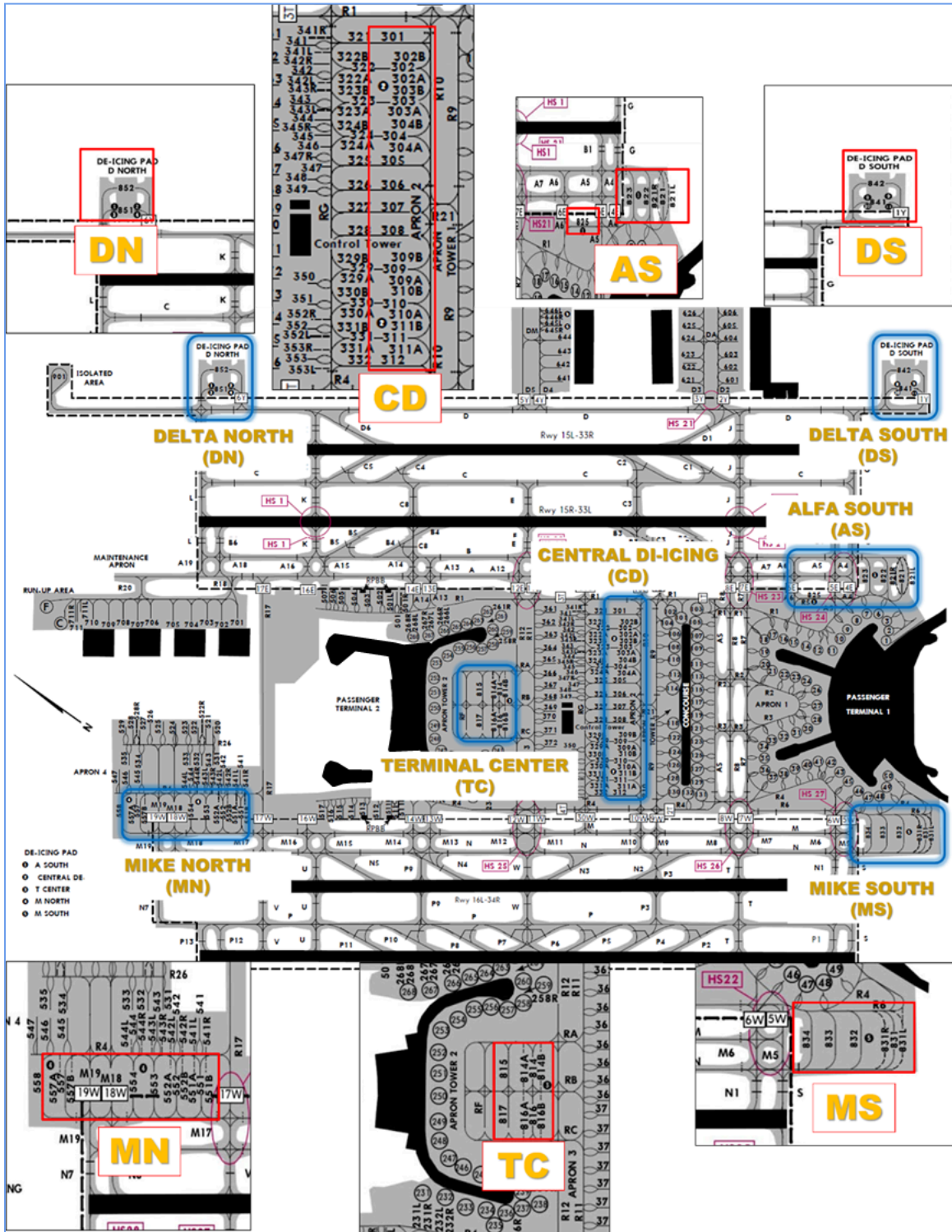
NOTE 2 : Flight crews shall monitor and maintain radio contact, otherwise re-sequenced as a result of no response to 3 successive calls.

NOTE 3 : This procedures can be changed by Incheon Apron according to the volume of de-icing traffic.

NOTE 4 : Flight crews need extra caution when entering and leaving the de-icing pad, since there are GSE roads in front of or behind the de-icing pad.

# Supplementary Information

- 2025-2026 winter season De/Anti-icing

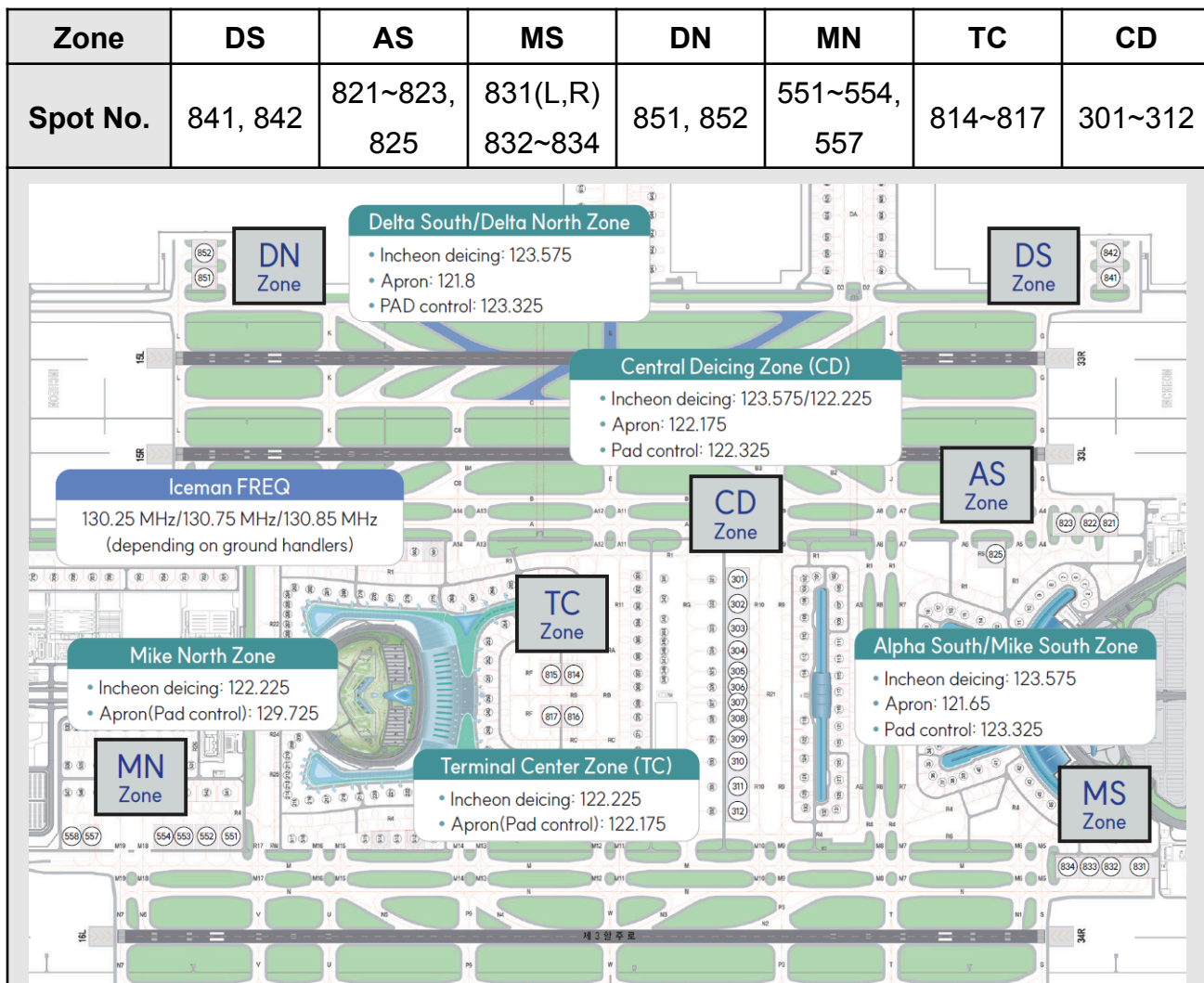


- De / Anti-icing pre-application procedures
  - ▶ When De / Anti-icing is required, apply in advance and check results through the Company Radio (“Asiana ICN”) (System application results will be delivered immediately upon application)
  - ▶ Based on departure time, application is recommended at least 40 minutes in advance.
  - ▶ Exception procedure
    - If the above general procedure is not possible, share with Company Radio first and request action.
    - Prior to cargo aircraft door closing, share the information through the Load Master (Face-to-face delivery)
    - Cancellation procedure after completion of pre-application: Notify a cancellation intention via radio communication with Incheon De-icing by flight crew.
    - New application process after TOBT (including after P/B): Direct action by flight crew, Notify an application intention to Company Radio & Airport’s apron
    - After completing the pre-application, re-application is not necessary due to non-compliance with the TOBT Window.
- "Ice Phase" will be acknowledged by ATIS

| De/Anti-icing Phase | Application of Phase                                                          |
|---------------------|-------------------------------------------------------------------------------|
| Phase 1 (Blue)      | Initiated when snow begins and de-icing request are received.                 |
| Phase 2 (Yellow)    | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft.  |
| Phase 3 (Orange)    | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft.  |
| Phase 4 (Red)       | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft. |

- De/Anti-icing operations are performed only in the remote De-icing pads.

- De-icing Pad location and frequency.



- ENG on and ENG off De/Anti-icing are both available.

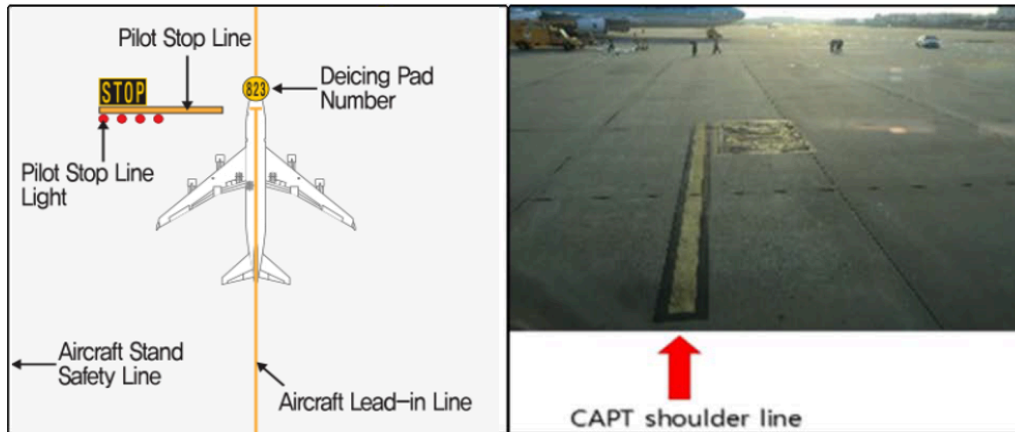
► **ENG ON De-icing available type:**

- 2-ENG aircrafts: A321, A330, A350, B777
- 4-ENG aircrafts: A380

**Note: For 4-ENG aircrafts (A380) ENG ON De-icing, Outboard ENG on and Inboard ENG off is basic procedure. ICE HOUSE(MAN) will notify this when entering de-icing pads.**

► **ENG ON De-icing is available on all de-icing pads.**

- Pilot Stop Line



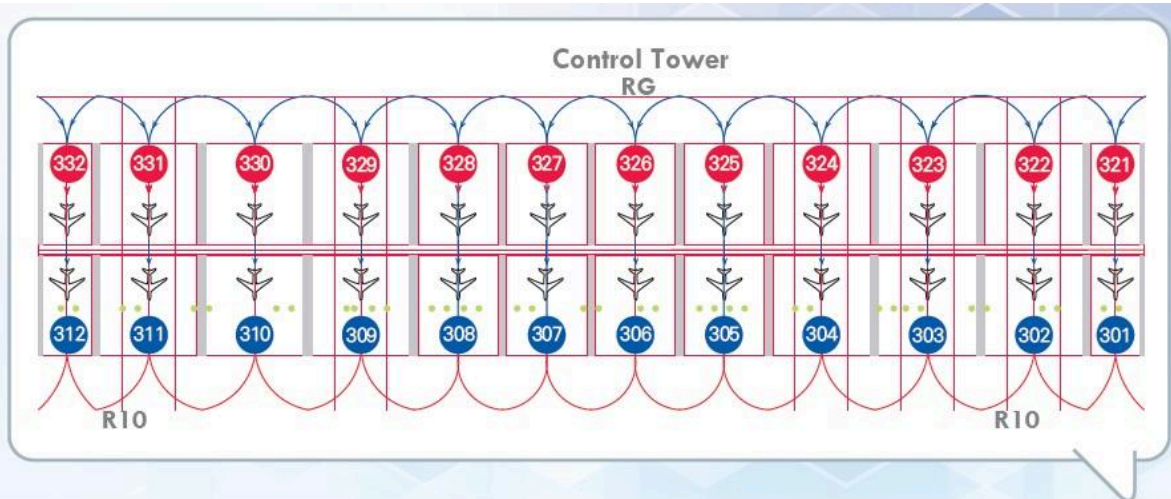
- ▶ This marking is located on all de-icing pads to help stop without marshal service.
- ▶ The transverse bar indicates the cockpit stop position.
- ▶ Aircraft proceed into the assigned de-icing pad and hold abeam the stop line.

***WARNING: Do not increase engines power exceed GND idle at all times in de-icing pad.***

***CAUTION: Be cautious of identifying the PSL(Pilot Stop Line) when entering de-icing pad, especially in wet /snow condition.***

- Central De-icing zone(CD) operation procedure.

- ▶ Taxi to de-icing pad #301 ~ #312 via holding bay #321 ~ #332.
- ▶ When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332.
- ▶ EMB(Electronic Message Board) will be conducted on pad #301 and #312.



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.

## - De/Anti-icing operational procedure

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

### Before De-icing Operation

- ① When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- ② Incheon Deicing will assign the de-icing zone and de-icing pad.
- ③ Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

### Entry Procedure

- ④ When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- ⑤ Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- ⑥ After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

### De-icing Procedure

- ⑦ Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- ⑧ When contact Iceman, report the de-icing pad number and parking brake set.
- ⑨ Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- ⑩ The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- ⑪ Iceman will inform "De-icing starts now"
- ⑫ To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery.  
(Engines on) When de-icing is started, contact Incheon Delivery  
(Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- ⑬ After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1 de-icing fluid has been applied, "hold over time does not apply".
- ⑭ (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

### Exit Procedure

- ⑮ Contact Pad Control and request for taxi.
- ⑯ Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

**Note:** *If OCC designates operationally limited flight due to curfew of destination airport or crew duty time control, the crews should request pushback immediately when fully ready for pushback. (Passenger boarding has been completed and doors are closed) and change the pushback sequence in coordination with ATC to avoid exceeding the operational limitation of flight or crew.*

## **BEFORE FLUID SPRAYING WITH ENGINE(S) RUNNING**

**CAUTION!** - Make sure that the low or high-pressure ground connectors **do not supply any external air to the aircraft.**

- If it is necessary for the ground crew to repeatedly anti-ice the aircraft, **they must deice the surfaces with a hot fluid mixture before applying a new layer of anti-icing fluid.**

**CAUTION!** - The ground crew should take care when spraying deicing fluid, and make sure that the engines and APU **do not ingest any fluid.**

- **Do not move flaps, slats, ailerons, spoilers or elevators, if they are not free of ice.**
- **Always ensure that both left and right side of the aircraft receive the same complete and symmetrical deicing/anti-icing treatment.**

COMMUNICATION WITH GROUND CREW.....ESTABLISH  
DEICING/ANTI-ICING FLUIDS TYPE..... CHECK APPROPRIATE  
CAB PRESS MODE SEL..... CHECK AUTO  
ENG 1 BLEED.....OFF  
ENG 2 BLEED..... OFF

**Note:** the AIR ENG 1+2 BLEED FAULT alert triggers when both ENG BLEED pb-sw are set to OFF. If this occurs, disregard this alert.

APU BLEED.....OFF  
DITCHING pushbutton.....ON

This prevents de-icing fluid from entering the aircraft.

The “CAB PRESS FWD OFV NOT OPEN”, “CAB PRESS AFT OFV NOT OPEN” and “COND LAV + GAL VENT FAULT” alerts are triggered and should be disregarded

**Note:** For passenger comfort reason, it is not recommended to operate on ground with both PACKS set to OFF for more than 20 min.

THRUST LEVERS..... CHECK IDLE  
"AIRCRAFT PREPARED FOR SPRAYING".....INFORM GND CREW

**END OF BEFORE FLUID SPRAYING WITH ENGINE(S) RUNNING**

**BEFORE FLUID SPRAYING WITH NO ENGINE(S) RUNNING**

**CAUTION!** - Make sure that the low or high-pressure ground connectors **do not supply any external air to the aircraft.**

- If it is necessary for the ground crew to repeatedly anti-ice the aircraft, **they must deice the surfaces with a hot fluid mixture before applying a new layer of anti-icing fluid.**

**CAUTION!** - **The ground crew should take care when spraying deicing fluid, and make sure that the engines and APU do not ingest any fluid.**

- **Do not move flaps, slats, ailerons, spoilers or elevators, if they are not free of ice.**
- **Always ensure that both left and right side of the aircraft receive the same complete and symmetrical deicing/anti-icing treatment.**

COMMUNICATION WITH GROUND CREW.....ESTABLISH

CAPT DEICING/ANTI-ICING FLUIDS TYPE.....CHECK APPROPRIATE

**CAPT DO NOT START THE ENGINES DURING FLUID SPRAYING**

CAB PRESS MODE SEL..... CHECK AUTO

ENG 1 BLEED.....OFF

ENG 2 BLEED..... OFF

APU BLEED.....OFF

DITCHING pushbutton.....ON

This prevents de-icing fluid from entering the aircraft.

The “CAB PRESS FWD OFV NOT OPEN”, “CAB PRESS AFT OFV NOT OPEN” and “COND LAV + GAL VENT FAULT” alerts are triggered and should be disregarded

**Note:** For passenger comfort reason, it is not recommended to operate on ground with both PACKS set to OFF for more than 20 min.

THRUST LEVERS..... CHECK IDLE

"AIRCRAFT PREPARED FOR SPRAYING"..... INFORM GND CREW

**END OF BEFORE FLUID SPRAYING WITH NO ENGINE(S) RUNNING**

**UPON COMPLETION OF THE SPRAYING OPERATION**  
**WITH ENGINE(S) RUNNING**

**CAUTION!** *When the OAT is low (below -5 °C) during snow/freezing rain precipitations and with crosswind conditions, melted snow or raindrops may drip from the cockpit windshields and freeze on the fuselage below. Ice may then build up and possibly disturb the airflow around the static/pitot/angle-of-attack probes, and result in unreliable air data measurements during takeoff.*

*Therefore during taxi out before takeoff beware of this possible buildup of ice. The area around static/pitot/angle-of-attack probes must be free of ice/snow before starting takeoff.*

**PITOTS AND STATICS (ground crew)..... CHECK**  
**GROUND EQUIPMENT..... REMOVE**  
**DE-ICING/ANTI-ICING REPORT..... RECEIVED**

The information from ground personnel who performed the de-icing and post-application check must include (ANTI-ICING CODE):

- The type of fluid used
- The ratio of fluid to water (e.g. 75/25).
- The time of the holdover beginning
- The result of post-application check "Aircraft critical parts are clean"

**DITCHING pushbutton..... OFF**  
**OUTFLOW VALVE.....CHECK OPEN**

On the ECAM PRESS page, confirm that the outflow valve indication reaches the open green position to avoid any unexpected aircraft pressurization.

At least 1 minute after completion of spraying operation:

ENG 1 BLEED..... ON

ENG 2 BLEED..... ON

At least 5 minutes after completion of spraying operation:

APU BLEED..... AS RQRD

**Note:** There is a risk of de-icing fluid ingestion by the APU air intake, resulting in specific odors, or smoke warnings.

- Keep the APU running with the APU BLEED OFF for 5 min after spraying completion before setting the APU BLEED to ON (if required),

- Consider APU BLEED OFF for takeoff.

NORMAL PROCEDURE..... RESUME

**END OF UPON COMPLETION OF THE SPRAYING OPERATION**

**WITH ENGINE(S) RUNNING**

**UPON COMPLETION OF THE SPRAYING OPERATION**  
**WITH NO ENGINE(S) RUNNING**

**CAUTION!** *When the OAT is low (below -5 °C) during snow/freezing rain precipitations and with crosswind conditions, melted snow or raindrops may drip from the cockpit windshields and freeze on the fuselage below. Ice may then build up and possibly disturb the airflow around the static/pitot/angle-of-attack probes, and result in unreliable air data measurements during takeoff.*

*Therefore during taxi out before takeoff beware of this possible buildup of ice. The area around static/pitot/angle-of-attack probes must be free of ice/snow before starting takeoff.*

**PITOTS AND STATICS (ground crew)..... CHECK**  
**GROUND EQUIPMENT..... REMOVE**  
**DE-ICING/ANTI-ICING REPORT..... RECEIVED**

The information from ground personnel who performed the de-icing and post-application check must include (ANTI-ICING CODE):

- The type of fluid used
- The ratio of fluid to water (e.g. 75/25).
- The time of the holdover beginning
- The result of post-application check "Aircraft critical parts are clean"

**DITCHING pushbutton..... OFF**  
**OUTFLOW VALVE..... CHECK OPEN**

On the ECAM PRESS page, confirm that the outflow valve indication reaches the open green position to avoid any unexpected aircraft pressurization.

**CAUTION!** *If spraying is performed with the engines not running, a small negative cabin delta P may appear for a short time, just after selecting the ditching pushbutton to OFF. During this time, do not open any doors or windows.*

At least 1 minute after completion of spraying operation:

ENG 1 BLEED..... ON

ENG 2 BLEED..... ON

At least 5 minutes after completion of spraying operation:

APU BLEED..... AS RQRD

APU BLEED..... AS RQRD

**Note:** There is a risk of de-icing fluid ingestion by the APU air intake, resulting in specific odors, or smoke warnings.

- Keep the APU running with the APU BLEED OFF for 5 min after spraying completion before setting the APU BLEED to ON (if required),
- Consider APU BLEED OFF for takeoff.

NORMAL PROCEDURE.....RESUME

**END OF UPON COMPLETION OF THE SPRAYING OPERATION**  
**WITH NO ENGINE(S) RUNNING**

# **HOLD OVER TIME APPLY**

(Refer to FOM 4.2 De/Anti-icing Procedure for more detailed information)

## ■ **Determine Holdover Time**

- Holdover time starts when the final application of fluid begins.
- Use "FAA Holdover Time Guidelines" in the portable EFB.

## ■ **Use of Holdover Time Guidelines**

- Holdover time provides an operational guideline for departure planning. It must be used in conjunction with the Cockpit Check (Pre-Takeoff Check).
- Precipitation categories, except frost, Ice Pellet, Small Hail, specify a time range, and frost only specifies a single time.

Note: For precipitation events where the Holdover Time is determined by a time range, the Cockpit Check, Cabin Check, and External Check may be omitted if the 'Shortest Time' of the time range has not been exceeded and there are no other factors (e.g., jet blast) that could affect the Holdover Time.

## ■ **Holdover Time**

Holdover time is the estimated time to maintain the function after spraying anti-icing fluid to prevent the form of icing matters on the surfaces of the aircraft. Holdover time is determined by the PIC using the Holdover Time Guidelines on the Portable EFB.

Holdover time starts when the final application of fluid begins. The final fluid applied will be either:

- The time to begin spraying De/Anti-icing fluid in the one step procedure
- The time to begin spraying Anti-icing fluid in the two-step procedure

Holdover time ends when either:

- The applied fluid loses its effectiveness, or
- The time extracted from the holdover time range expires

## ■ **Secondary De/Anti-icing**

If an aircraft which has been de/anti-iced is delayed on the ground long enough that anti-icing protection is no longer effective or if for any reason the de/anti-icing process is interrupted while freezing/frozen precipitation is falling, the Ground De/Anti-Icing Procedure must be re-accomplished in its entirety. This is called Secondary De/Anti-icing. When secondary de/anti-icing is necessary, the contaminated anti-icing fluid and all icing matters must be completely removed by de-icing before making another application of anti-icing fluid. If a holdover time was previously established after completing secondary de/anti-icing, a new holdover time must be applied.

**END OF HOLD OVER TIME APPLY**

## TAXI CONSIDERATIONS

(For more information Refer to FCOM PRO-NOR-SUPADVWXR Engine Operations on Ground in Icing Conditions)

|                |                                                                                                                                                                                                                                                                                                                    |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b> | During engine operations on ground in icing conditions, and with the OAT at +3 °C (37 °F) or below, ice accretion may affect the engine fan blades, spinner, or stators of the low pressure compressor.<br><br>Apply the following engine ice shedding procedure to prevent possible engine degradation or damage. |
|----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Perform the following procedure before the taxi time reaches the maximum time to next engine acceleration, or if the engine vibrations increase.

|                |                                                                                                                                                                                         |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>WARNING</b> | Before and during the application of the procedure, ensure that the jet blast due to the increased thrust does not result in any hazard to people or installations behind the aircraft. |
|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

SOP SURFACE CONDITION & AREA..... CHECK  
ATC..... NOTIFY  
PARKING BRAKE..... ON

|                |                                                                                                                                                                            |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>CAUTION</b> | Pay special attention to the aircraft movement during this procedure. If during thrust increase the aircraft starts to move, immediately retard the thrust levers to IDLE. |
|----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

THR LEVERS..... 50 % N1 (NO HOLD TIME)  
THR LEVERS..... RETARD TO IDLE

Repeat this procedure at intervals not longer than 15 min, or if the engine vibrations increase.

**AFTER LINE UP.**

**DO NOT PERFORM ROLLING TAKEOFF**

*Apply braking with the pedals or the parking brake, as required.*

THR LEVERS.....50 % N1 (NO HOLD TIME)  
THR LEVERS.....RETARD TO IDLE

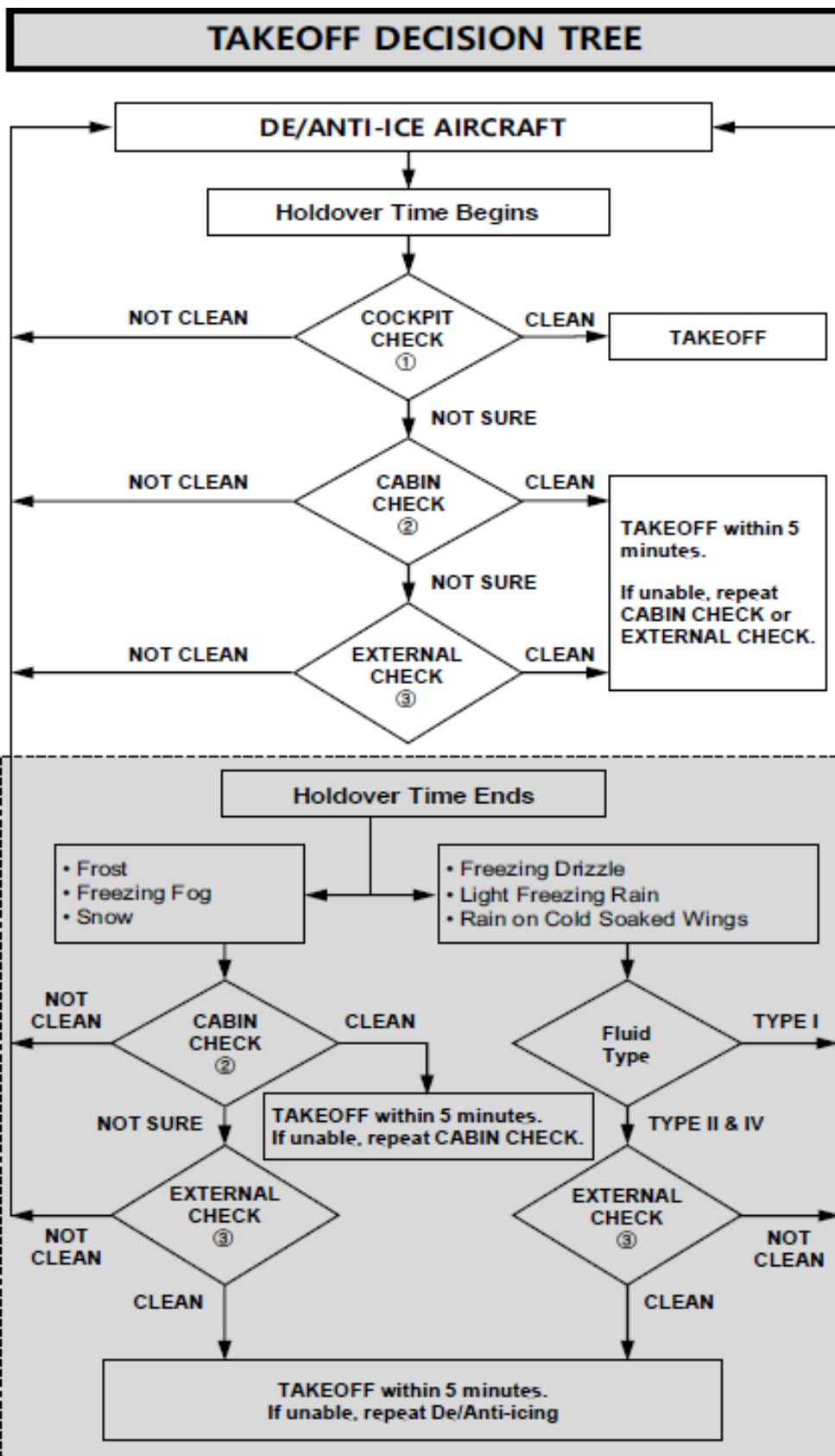
Before Takeoff keep flaps/slats retracted until reaching the holding point on the takeoff RWY to avoid contamination of the mechanism

**Adjust Holdover Time, As Required**

Continuously assess weather and environmental conditions and periodically perform the COCKPIT CHECK

**END OF TAXI CONSIDERATIONS**

# TAKEOFF DECISION



## □ **Application of the Clean Aircraft Concept**

The flight crew shall check whether the Clean Aircraft Concept is met through the following De/Anti-icing Check before deciding to operate.

### ■ **Cockpit Check (Pre-takeoff Check)**

This check is an integral part of the holdover time and is performed by the flight crew. Holdover Time is a value calculated through testing and is an approximate time to guarantee the effectiveness of De/Anti-icing Fluid. However, because the current weather environment and solution application method cannot perfectly match those at the time of testing, you should not solely rely on the anti-icing effective duration of the Holdover Time Guidelines to determine whether the aircraft is not iced.

The flight crew must continuously perform cockpit checks during the holdover time to confirm the de/anti-icing status of the aircraft, and the final cockpit check must be performed immediately before takeoff, if possible.

- The Cockpit Check is performed by the flight crew and is required anytime :

- Ground icing conditions exist

- The aircraft has been de/anti-iced

- The holdover time is still valid.

- The Cockpit Check consists of :

- A check of representative aircraft surfaces which are visible from the cockpit

- If desired or if any doubt exists, conduct a Cabin Check

- When circumstances do not permit a satisfactory visual check from inside the aircraft, return to the designated area and :

- Have a ground crew perform an external check

- If any doubt exists as to the condition of the aircraft, repeat the ground de/anti-icing procedure.

Note: The ground crew for de/anti-icing checks has the qualification required to perform them.

## ■ Cabin Check (Pre-takeoff Contamination Check)

This check is performed by the flight crew and is required :

- Anytime the aircraft has been de/anti-iced, and holdover time is exceeded during conditions of frost, freezing fog, or snow
- When doubt exists after conducting the Cockpit Check
- During conditions of snow grains

### **CAUTION**

**When Type I fluid has been applied during freezing drizzle and the holdover time has expired, a Cabin Check or External Check is not authorized.**

**Secondary de/anti-icing must be accomplished prior to takeoff.**

**When Type II or Type IV fluid has been applied during freezing drizzle, light freezing rain, or rain on cold soaked wings and holdover time has expired, a Cabin Check is not authorized because clear ice formation cannot be detected visually from inside the aircraft in this situation. In such case, return for an External Check or accomplish secondary de/anti-icing.**

The Cabin Check consists of a visual inspection of all representative aircraft surfaces which are visible from the best vantage point in the cabin. Normally, de/anti-icing fluid failure will first occur on the leading or trailing edges of the wing rather than the mid-chord. Therefore, the leading edges and upper surfaces of both wings must be visually checked for evidence of fluid failure.

Additionally, all visible engine inlets must be inspected for contamination. Takeoff must occur within 5 minutes of the most recent check.

The ability to adequately perform this check from inside the aircraft is highly dependent upon several factors. Lighting conditions, cleanliness of cabin/cockpit windows, and outside visibility may severely hinder or prevent the pilot's ability to satisfactorily assess aircraft surfaces for contamination.

When circumstances do not permit a satisfactory visual check from inside the aircraft,

return to the designated area and:

- Have a ground crew perform the external check
- If any doubt to take off on the condition of the aircraft exists , repeat the ground de/anti-icing procedure.

■ External Check (Alternative Pre-takeoff Check)

This check is performed by the de/anti-icing ground crew and is required anytime :

- Doubt exists after conducting a cabin check, or
- The aircraft has been anti-iced with Type II or Type IV fluid, and holdover time is exceeded during freezing drizzle, light freezing rain, or rain on cold soaked wings.

If the external check cannot be accomplished, return for secondary de/antiicing.

This check consists of a close visual inspection of the aircraft's upper wing surfaces and leading edges for frozen contamination. Takeoff must occur within 5 minutes of the external check; if unable, repeat the ground de/antiicing procedure.

**CAUTION**

**An external check is not authorized during freezing drizzle**

**when Type I fluid is used and holdover time has expired.**

**The aircraft must return to the designated area for**

**an External Check or accomplish the secondary de/anti-icing.**

There are some airports that perform the Secondary De/Anti-icing instead of External Check.

**END OF TAKE OFF DECISION**

# A350 DE/ANTI-ICING REFERENCE HANDBOOK

## De/Anti-Icing Background information and Policies

[Refer to ICN AIP](#) and [ICN AFile](#) for De-icing operational procedure

**Refer to FOM Chapter 4.2 for more detail**

## Before Fluid Spraying

In all situations, **it is responsibility of the Captain to decide** if the ground crew must de-ice/anti-ice the aircraft, and/or if additional deicing/anti-icing treatment are required

## [Before Fluid Spraying Procedures](#)

## After Fluid Spraying

## [After Fluid Spraying Procedures](#)

## [Holdover time starts when the final application begins](#)

in Either the one step or two step procedure

**Use Holdover Time Guidelines in the EFB**

## During TAXI

## [TAXI CONSIDERATIONS](#)

## Before Take Off

## [TAKEOFF DECISION](#)



2025-2026

# ICN De/Anti-icing procedure Pilot Brief Sheet

Issued by: Apron Control Team  
Download at: [www.airport.kr](http://www.airport.kr)

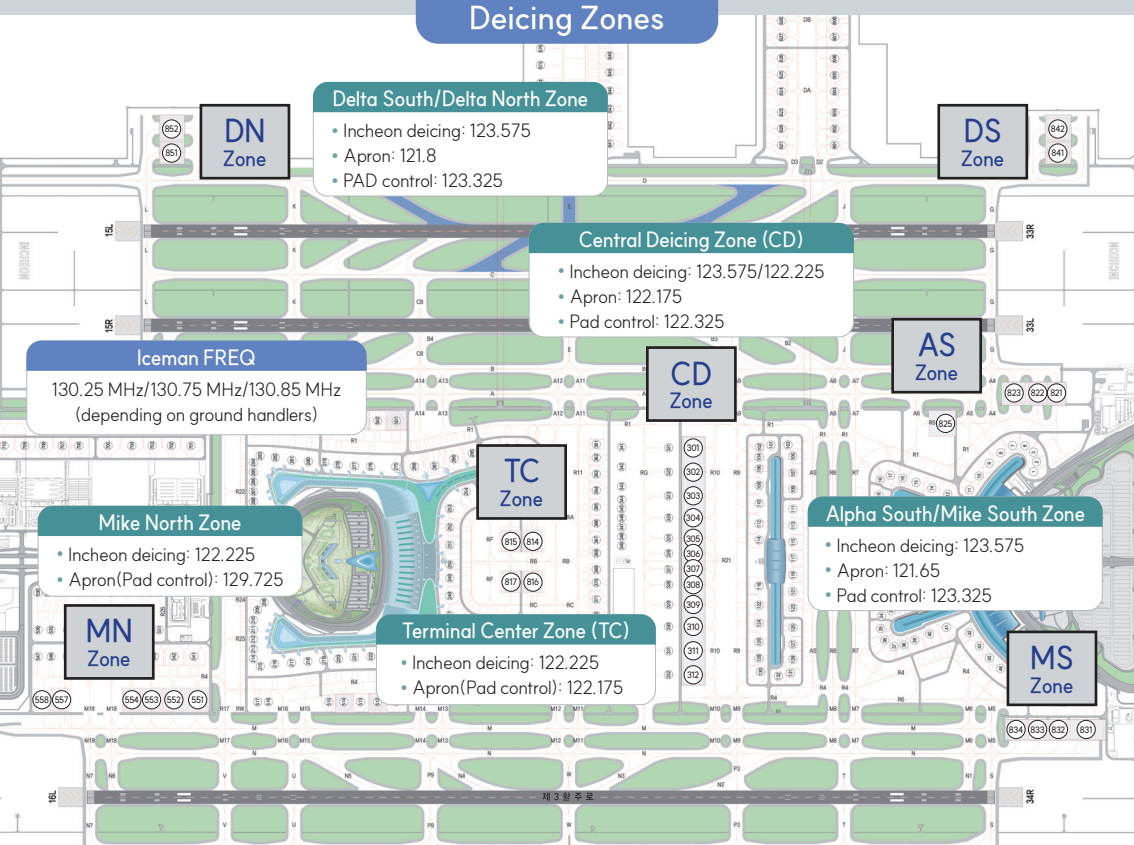


Incheon Airport

- ◆ De/Anti-icing operations are performed only in the remote de-icing pads.
- ◆ ENG ON deicing is available on all de-icing pads.
- ◆ For safety and ground handlers' operational reasons, ENG OFF de/anti-icing may be applied.
- ◆ All communication with Ice-man in the deicing pad is via VHF radio.
- ◆ The Iceman frequency is guided by Apron(Pad control), depending on ground handlers.

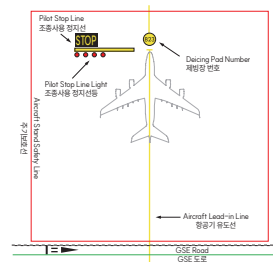


## Deicing Zones



Aircraft should stop when **pilot's stop line** aligns with the captain's shoulder line

- ◆ This marking is located on all de-icing pads to help aircraft stop without marshal service.
- ◆ The transverse bar indicates the cockpit stop position.



### CAUTION

Engine power should not be exceed GND idle in deicing pad at all times.

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

### Before De-icing Operation

- 1 When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- 2 Incheon Deicing will assign the de-icing zone and de-icing pad.
- 3 Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

### Entry Procedure

- 4 When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- 5 Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- 6 After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

### De-icing Procedure

- 7 Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- 8 When contact Iceman, report the de-icing pad number and parking brake set.
- 9 Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- 10 The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- 11 Iceman will inform "De-icing starts now"
- 12 To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery. (Engines on) When de-icing is started, contact Incheon Delivery (Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- 13 After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1 de-icing fluid has been applied, "hold over time does not apply".
- 14 (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

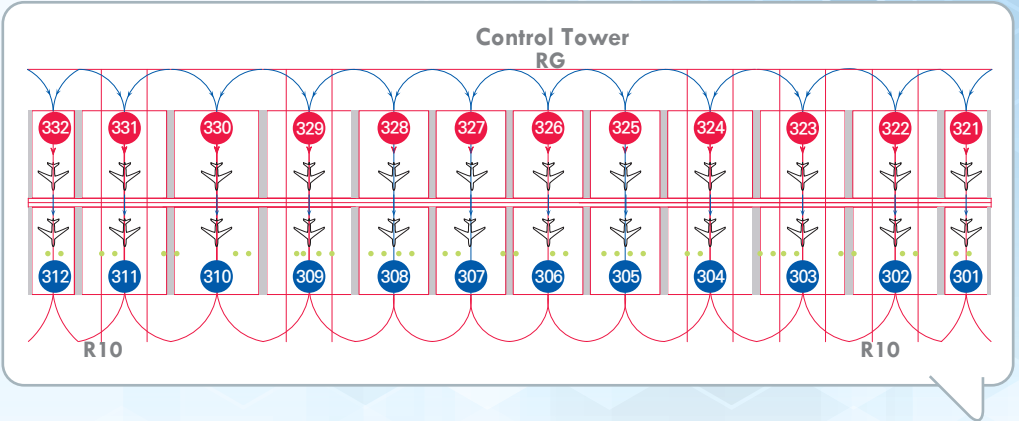
### Exit Procedure

- 15 Contact Pad Control and request for taxi.
- 16 Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

# CENTRAL DEICING ZONE(CD) Operation Procedure

Taxi to deicing pad #301 ~ #312 via holding bay #321 ~ #332

When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.



## When aircraft approaches de-icing pad

FLIGHT CREW



Aircraft approaches  
De-icing pad

PAD CONTROL (Apron)



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Stop bar lights on  
(by ICE MAN)

Pad control (Apron), (CALL SIGN),  
approaching de-icing pad #834

(CALL SIGN), Pad control (Apron).  
Continue taxi to de-icing pad #834  
(then hold abeam the stop line.)  
Report parking brake set.

Taxi to de-icing pad #834, report  
parking brake set, (CALL SIGN).

Pad control (Apron), (CALL SIGN),  
parking brake set.

(CALL SIGN),  
contact ICEMAN 130.85



Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request ENG ON deicing, Type 1 & Type 4, wings and tail deicing.

Engine set to ground idle and report ready for deicing, (CALL SIGN).

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② [EX] Wings & Tail / Full-body

ENG ON deicing may not be possible, due to weather and safety reasons (ENG OFF deicing ↗ page 9)

ICE MAN, (CALL SIGN), now ready for deicing.

Contact delivery 121.6, monitor ice man frequency, (CALL SIGN).

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, Type 1 & Type 4, wings & tail, ENG ON deicing, engine set to ground idle, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), deicing starts now, contact delivery 121.6, monitor ice man frequency.

Contact Clearance Delivery by voice regardless of PDC



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

we are ready for information,  
(CALL SIGN).

Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft, (CALL SIGN).

**NOTE: ANTI-ICING CODE**

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN,  
Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft.

**If only TYPE I is applied:**

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df-plus at 50%, started at 1340~ (upon pilot request)

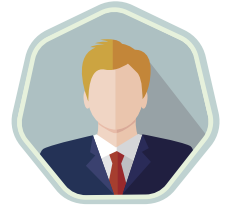


Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Ready to taxi, (CALL SIGN).

Contact pad control 123.325,  
(CALL SIGN).

**CAUTION: DO NOT TAXI  
IF STOP BAR LIGHTS ON**

(CALL SIGN), ICE MAN,  
Report ready to taxi.

(CALL SIGN), hold position and  
contact pad control 123.325 for  
taxi.

STOP BAR LIGHTS OFF





## When aircraft approaching de-icing pad

FLIGHT CREW



When Aircraft approaches  
De-icing pad

ICEMAN frequency is guided by  
pad control or Apron, depending on  
the ground handlers and de-icing zone.

PAD CONTROL



Stop bar lights on  
(by ICE MAN)

Pad control, (CALL SIGN)  
Approaching de-icing zone MIKE  
SOUTH (MS).

(CALL SIGN), Pad control.  
Your de-icing pad #834.  
Continue taxi to de-icing pad #834.  
(then hold abeam the stop line)  
Report parking brake set.

Roger, taxi to de-icing pad #834,  
(CALL SIGN).

Pad control, (CALL SIGN),  
parking brake set.

(CALL SIGN),  
roger, contact ICEMAN 130.85



Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request *Type 1 & Type 4, wings and tail* deicing ENG SHUT DOWN deicing.

**DO NOT SHUT DOWN ENGINES UNTIL INSTRUCTED BY ICE MAN FOR GROUND SAFETY**

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② Wings & Tail or Full-body

Shut down engines now, report ready for deicing, (CALL SIGN)

ICE MAN, (CALL SIGN), now ready for deicing.

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, *Type 1 & Type 4, wings & tail*, shut down engines now, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), ICEMAN, deicing starts now.





Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

We are ready for information.  
(CALL SIGN).

Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time*, post deicing check completed, all personnel and equipment are clear of aircraft. (CALL SIGN).

**NOTE: ANTI-ICING CODE**  
(Appropriate anti-icing code)

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN.

Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time*, post deicing check completed, all personnel and equipment are clear of aircraft.

**If only TYPE I is applied:**

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df- plus at 50%, started at 1340~ (upon pilot request)



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Contact C/D 121.6, (CALL SIGN).

Contact Clearance Delivery by voice regardless of PDC

After getting clearance, re-contact ice man frequency after ATC clearance.

ICE MAN, (CALL SIGN), we have ATC clearance. Request engines start up.

Engines start up approved, report ready to taxi. (CALL SIGN).

ICE MAN, (CALL SIGN). Ready to taxi.

Contact pad control 123.325 (CALL SIGN).

**CAUTION: DO NOT TAXI IF STOP BAR LIGHTS ON**

(CALL SIGN), ICE MAN. contact C/D 121.6 (for ATC clearance).

(CALL SIGN), Engines start up approved. Report ready to taxi.

(CALL SIGN), hold position and contact pad control 123.325 for taxi.

STOP BAR LIGHTS OFF



4. De-icing operations

4.1 Issuance of de/anti-icing operations phase

| Phase            | Application of phase                                                                  |
|------------------|---------------------------------------------------------------------------------------|
| BLUE (Phase 1)   | Initiated when snow begins and de-icing request are received.                         |
| YELLOW (Phase 2) | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft or more.  |
| ORANGE (Phase 3) | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft or more.  |
| RED (Phase 4)    | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft or more. |

Note : The de/anti-icing operation phase may be adjusted depending on de-icing capacity or prevailing traffic conditions.

4.2 De-icing zones and pads

De-icing pads assignment will be made as pad-group.

1. A South zone : 821, 822, 823, 825 pads
2. M South zone : 831, 832, 833, 834 pads
3. M North zone : 551, 552, 553, 554, 557, 558 pads
4. T Center zone : 814, 815, 816, 817 pads
5. Central De-icing zone : 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312 pads
6. D South zone : 841, 842 pads
7. D North zone : 851, 852 pads

4.3 De-icing operational procedures

1. De-icing requests and cancellations are possible through A-CDM portal system by AO or via radio communication with Incheon De-icing by flight crew.
2. Engine on de-icing is available on all de-icing pads and ACFT types applicable for engine on de-icing depend on AO or GHA.
3. Technical de-icing (landing gear, brakes, inside LE- or TE-flaps, under wing, engine inlets, fan blades and sensors/ static ports/ pitot probes) should be performed by engine off.
4. For safety and GHA's operational reasons(weather conditions, etc.), engine off de-icing can be applied.
5. On the de-icing pads ACFT shall hold abeam the stop line which indicates the cockpit stop position or follow the advice of the marshaller.
6. Aircrew shall control the throttle carefully, avoiding the exhausted gas causing damage to support personnel and equipment, when aircraft exit the de-icing stands.
7. During the engine on de-icing, aircrew shall keep the engine idle and set the brake. ACFT hold position until Pad Control give the taxi instruction.
8. The detailed de-icing procedures are given on the 'Incheon International Airport Pilot De-icing Guide'. The guide is available for download on the official website([www.airport.kr/co\\_en/4415/subview.do](http://www.airport.kr/co_en/4415/subview.do)).

Change : Information of de-icing operations and de-icing pad(ACFT stand NR. 558).

| FREQ                                                                                                                                                             | Call Sign               | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 128.65 MHz, 344.2 MHz<br>(ATIS)                                                                                                                                  | Incheon INTL<br>Airport | - Acknowledge "De/Anti-icing Phase" by ATIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.575 MHz (Apron 1, Apron 2,<br>Cargos)<br>122.225 MHz (Apron 3, 4)                                                                                            | Incheon De-icing        | - Contact when ready for pushback.<br>- Advise "Aircraft De-icing required and Engine On/Off De-icing".<br>- De-icing zones assignment.                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.65 MHz (Apron 1)<br>121.8 MHz (Apron 2, Cargos)<br>122.175 MHz (Apron 3)<br>129.725 MHz (Apron 3)<br>123.675 MHz (Apron 4)                                   | Incheon Apron           | - Set Mode A code to 2000.<br>- Select XPNDR or AUTO.<br>- Contact the frequency according to the controller's instruction.<br>- Pushback & taxi to De-icing zones.                                                                                                                                                                                                                                                                                                                                            |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (Central De-icing zone,<br>M North zone)           | Pad Control             | - De-icing pads assignment.<br>- Taxi to De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Ice Man frequency is guided by Pad Control.<br>- Enter the pad and report the brake set to Ice Man. Do not shut down engines until instructed by Ice Man for ground safety.<br>- Monitor Ice Man until De-icing is completed.                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.6 MHz                                                                                                                                                        | Incheon Delivery        | - (Engine Off) Once de-icing is completed, contact Incheon delivery to get ATC clearance. Report "Engine Off De-icing and De-icing completed" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- (Engine On) Once de-icing is started, contact Incheon delivery to get ATC clearance. Report "Engine On De-icing and De-icing started" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- Set Mode A assigned by ATC.<br>- Select XPNDR or AUTO. |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Re-contact Ice Man and Report start engine and ready to taxi.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (M North zone)<br>121.8 MHz(Central De-icing zone) | Pad Control             | - Taxi out from De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

NOTE 1 : The de-icing pad will be appropriately assigned by Incheon Apron or Pad Control when aircraft approaches to de-icing zone.

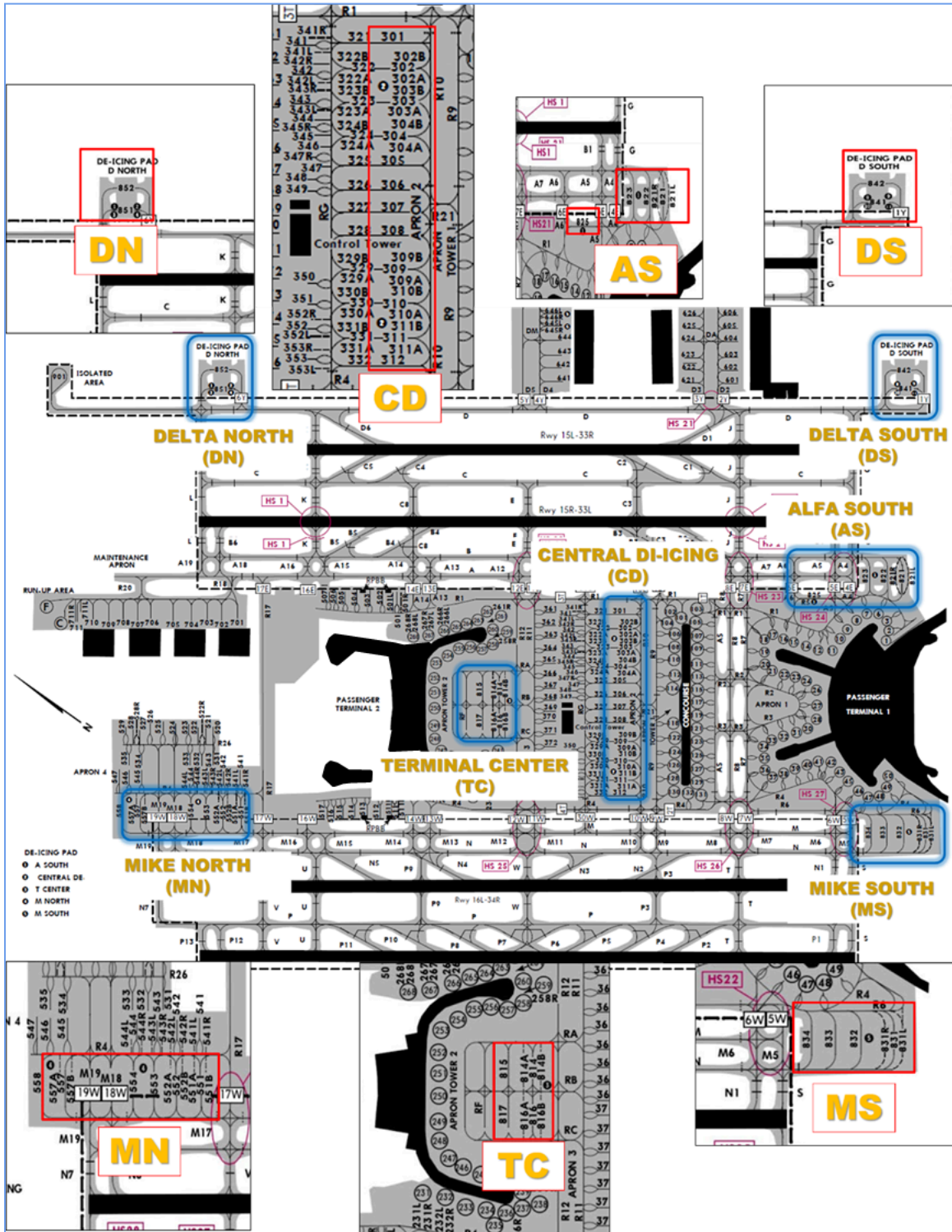
NOTE 2 : Flight crews shall monitor and maintain radio contact, otherwise re-sequenced as a result of no response to 3 successive calls.

NOTE 3 : This procedures can be changed by Incheon Apron according to the volume of de-icing traffic.

NOTE 4 : Flight crews need extra caution when entering and leaving the de-icing pad, since there are GSE roads in front of or behind the de-icing pad.

# Supplementary Information

- 2025-2026 winter season De/Anti-icing

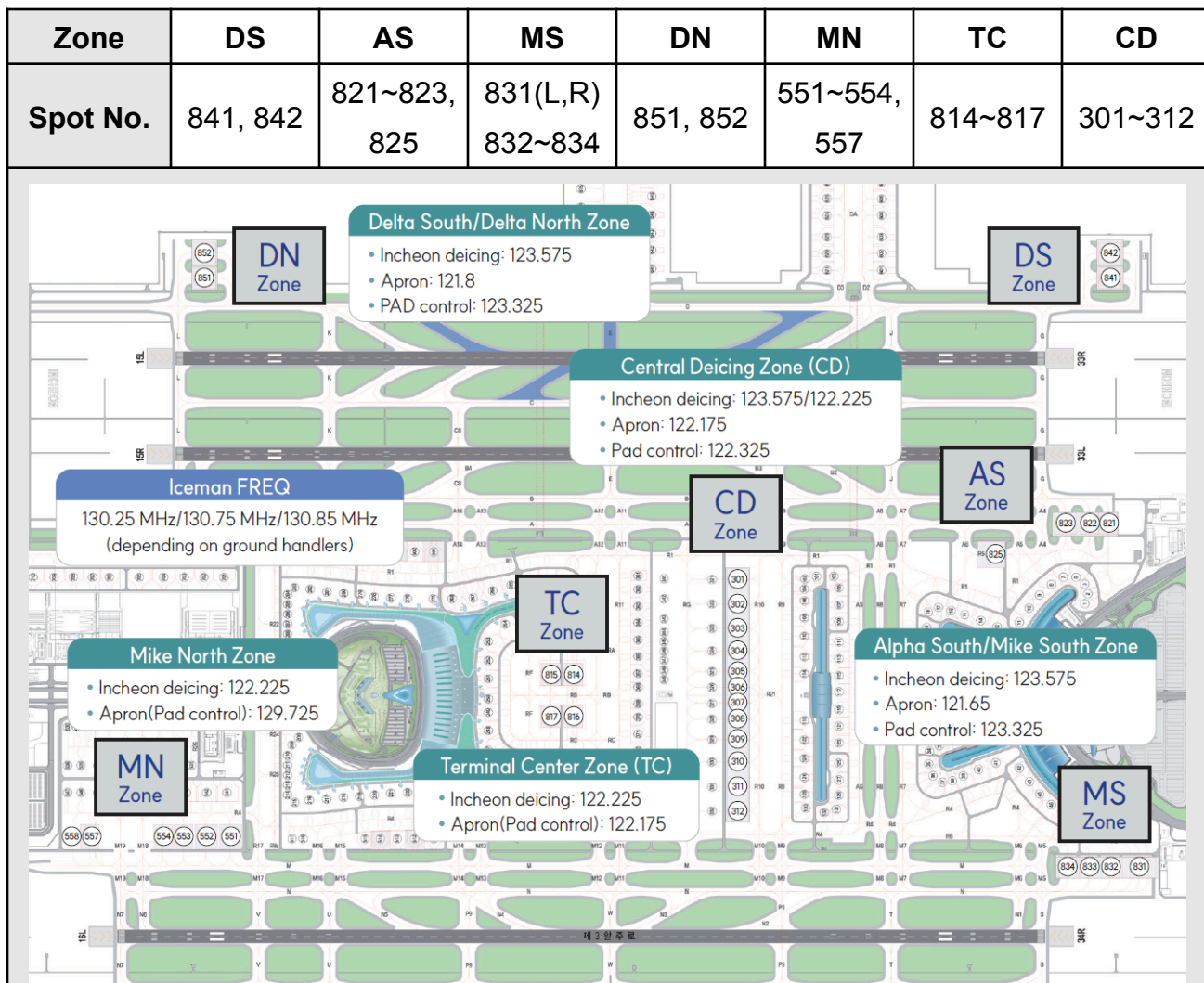


- De / Anti-icing pre-application procedures
  - ▶ When De / Anti-icing is required, apply in advance and check results through the Company Radio (“Asiana ICN”) (System application results will be delivered immediately upon application)
  - ▶ Based on departure time, application is recommended at least 40 minutes in advance.
  - ▶ Exception procedure
    - If the above general procedure is not possible, share with Company Radio first and request action.
    - Prior to cargo aircraft door closing, share the information through the Load Master (Face-to-face delivery)
    - Cancellation procedure after completion of pre-application: Notify a cancellation intention via radio communication with Incheon De-icing by flight crew.
    - New application process after TOBT (including after P/B): Direct action by flight crew, Notify an application intention to Company Radio & Airport’s apron
    - After completing the pre-application, re-application is not necessary due to non-compliance with the TOBT Window.
- "Ice Phase" will be acknowledged by ATIS

| De/Anti-icing Phase | Application of Phase                                                          |
|---------------------|-------------------------------------------------------------------------------|
| Phase 1 (Blue)      | Initiated when snow begins and de-icing request are received.                 |
| Phase 2 (Yellow)    | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft.  |
| Phase 3 (Orange)    | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft.  |
| Phase 4 (Red)       | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft. |

- De/Anti-icing operations are performed only in the remote De-icing pads.

- De-icing Pad location and frequency.



- ENG on and ENG off De/Anti-icing are both available.

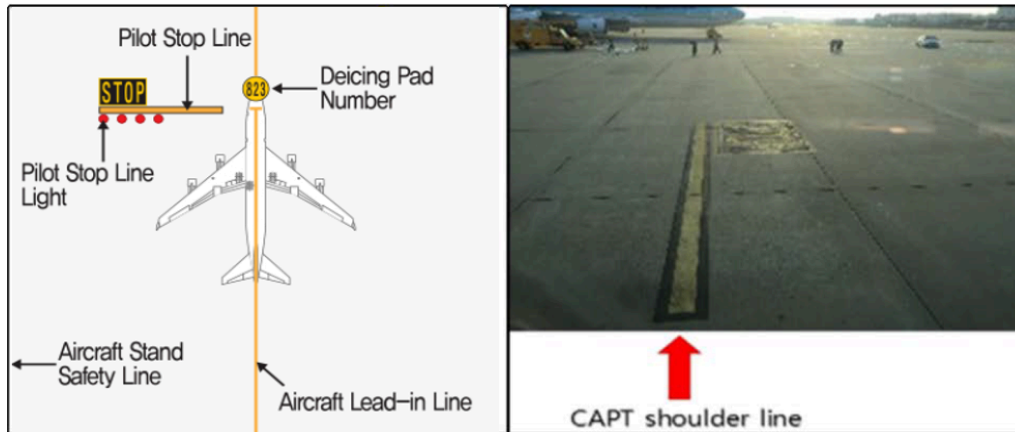
► **ENG ON De-icing available type:**

- 2-ENG aircrafts: A321, A330, A350, B777
- 4-ENG aircrafts: A380

**Note: For 4-ENG aircrafts (A380) ENG ON De-icing, Outboard ENG on and Inboard ENG off is basic procedure. ICE HOUSE(MAN) will notify this when entering de-icing pads.**

► **ENG ON De-icing is available on all de-icing pads.**

- Pilot Stop Line



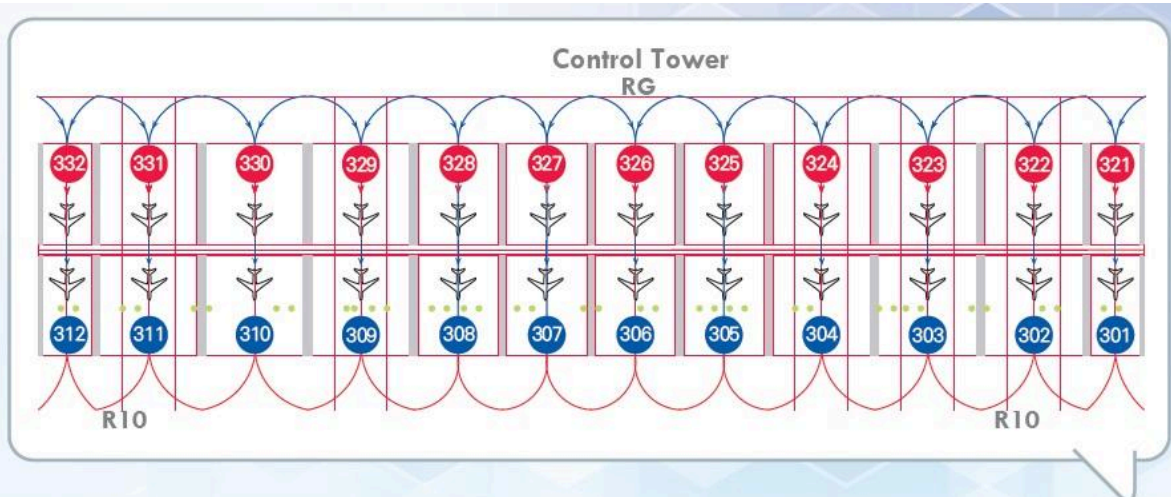
- ▶ This marking is located on all de-icing pads to help stop without marshal service.
- ▶ The transverse bar indicates the cockpit stop position.
- ▶ Aircraft proceed into the assigned de-icing pad and hold abeam the stop line.

***WARNING: Do not increase engines power exceed GND idle at all times in de-icing pad.***

***CAUTION: Be cautious of identifying the PSL(Pilot Stop Line) when entering de-icing pad, especially in wet /snow condition.***

- Central De-icing zone(CD) operation procedure.

- ▶ Taxi to de-icing pad #301 ~ #312 via holding bay #321 ~ #332.
- ▶ When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332.
- ▶ EMB(Electronic Message Board) will be conducted on pad #301 and #312.



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.

## - De/Anti-icing operational procedure

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

### Before De-icing Operation

- ① When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- ② Incheon Deicing will assign the de-icing zone and de-icing pad.
- ③ Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

### Entry Procedure

- ④ When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- ⑤ Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- ⑥ After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

### De-icing Procedure

- ⑦ Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- ⑧ When contact Iceman, report the de-icing pad number and parking brake set.
- ⑨ Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- ⑩ The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- ⑪ Iceman will inform "De-icing starts now"
- ⑫ To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery.  
(Engines on) When de-icing is started, contact Incheon Delivery  
(Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- ⑬ After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1 de-icing fluid has been applied, "hold over time does not apply".
- ⑭ (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

### Exit Procedure

- ⑮ Contact Pad Control and request for taxi.
- ⑯ Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

RKSI / ICN  
INCHEON INTL

Elev. 23 ft, 24 NOV 25  
INCHEON/SEOUL, KOREA

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***Note:** If OCC designates operationally limited flight due to curfew of destination airport or crew duty time control, the crews should request pushback immediately when fully ready for pushback. (Passenger boarding has been completed and doors are closed) and change the pushback sequence in coordination with ATC to avoid exceeding the operational limitation of flight or crew.*

**END OF RKSI AFILE**

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ASIANA AIRLINES

## **BEFORE FLUID SPRAYING**

(Refer to FCOM: AIRFRAME DEICING/ANTI-ICING PROCEDURE ON GROUND (R/D))

This procedure is applicable at the gate or at the deicing bay. Specific actions linked to the engine status (running or not) are mentioned when required.

|         |                                                                                                                                                                                                     |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAUTION | If possible, avoid APU operation during aircraft deicing/anti-icing. APU operation during aircraft deicing/anti-icing may result in deicing/anti-icing fluid ingestion and cause damage to the APU. |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

- **BEFORE FLUID SPRAYING:**

**DOORS..... CHECK CLOSED**  
**COM WITH GND PERSONNEL.....ESTABLISH**  
**PARK BRK..... ON**  
**ENG BLEED 1+2..... OFF**  
**APU BLEED..... OFF**  
**DITCHING pb ..... ON**

*Setting the DITCHING pb-sw to ON closes the following:*

- The outflow valves
- The avionics overboard valve
- Both pack valves
- All the cargo isolation valves
- The pack ram air inlets and outlets
- The emergency RAM air inlet.

*This prevents the deicing fluid from entering the aircraft.*

*The avionics ventilation remains available, when the avionics ventilation blowing fans are operative.*

**REC MAX TIME WITHOUT AIR COND: 30 MIN**

*On ground, with passengers on board, it is recommended not to exceed 30 min without air conditioning, because comfort may be affected.*

- **When the aircraft is ready for spraying:**

**FLUID SPRAYING.....REQUEST**

**END OF BEFORE FLUID SPRAYING**

# **AFTER FLUID SPRAYING**

(Refer to FCOM: AIRFRAME DEICING/ANTI-ICING PROCEDURE ON GROUND (R/D))

- **AFTER FLUID SPRAYING:**

**DITCHING pb** .....OFF

**OUTFLOW VALVES**.....CHECK OPEN

*To avoid any unexpected pressurization, check on the CAB PRESS SD page that both outflow valves are open.*

- **At least 1 min after fluid spraying:**

**ENG BLEED 1+2**.....ON

- **At least 5 min after fluid spraying:**

**APU BLEED**..... AS RQRD

*Note: There is a risk of fluid ingestion by the APU air intake resulting in odors or smoke alerts. Therefore, the flight crew should consider a takeoff with APU bleed off.*

**PROBE & WINDOW HEAT pb** ..... AUTO

**PITOTS AND STATICS (GROUND CREW)** ..... CHECK

**GROUND EQUIPMENT**..... CHECK REMOVED

*After deicing is completed, request the ground personnel to confirm that the aircraft is clear from any ground equipment.*

**DEICING/ANTI-ICING REPORT**..... RECEIVED

*The information from the ground personnel who performed the deicing/anti-icing, and the post-application check must include:*

- The type of fluid used
- The ratio of fluid to water (e.g. 75/25)
- The time of the holdover beginning
- The result of the post-application check: "Aircraft critical parts are clean".

**HOLDEOVER TIME**..... DETERMINE

*Holdover time starts when the final application of fluid begins.*

- **IF ENGINES NOT RUNNING:**

**SOP — BEFORE START**..... RESUME

*For a detailed description of the Before Start SOP, Refer to procedure.*

● **IF ENGINES RUNNING:**

**GND SPLRS..... ARM**

**RUDDER TRIM..... NEUTRAL**

**FLAPS..... SET**

*If taxiing in icing conditions with rain, slush, or snow, maintain the slats/flaps retracted until the aircraft reaches the holding point of the takeoff runway, in order to prevent contamination of the slats/flaps mechanism. Delay flight controls check accordingly. The flight crew should perform the flight controls check in the flaps configuration for takeoff.*

**FLIGHT CONTROLS.....CHECK**

*In freezing precipitation, perform the appropriate checks to evaluate aircraft icing. The decision on whether to take off, or to deice again the aircraft, depends on the amount of ice that has built up on the critical surfaces since the last deicing. Make an inspection from the inside and outside the aircraft before the holdover time expires, or just before takeoff.*

**AFTER START CHECKLIST..... COMPLETE**

*If taxiing in icing conditions with rain, slush, or snow, delay BEFORE T/O C/L until the aircraft reaches the holding point of the takeoff runway.*

**SOP — TAXI..... RESUME**

*For a detailed description of the Taxi SOP, Refer to procedure.*

**END OF AFTER FLUID SPRAYING**

# **HOLD OVER TIME APPLY**

(Refer to FOM 4.2 De/Anti-icing Procedure for more detailed information)

## ■ **Determine Holdover Time**

- Holdover time starts when the final application of fluid begins.
- Use "FAA Holdover Time Guidelines" in the portable EFB.

## ■ **Use of Holdover Time Guidelines**

- Holdover time provides an operational guideline for departure planning. It must be used in conjunction with the Cockpit Check (Pre-Takeoff Check).
- Precipitation categories, except frost, Ice Pellet, Small Hail, specify a time range, and frost only specifies a single time.

Note: For precipitation events where the Holdover Time is determined by a time range, the Cockpit Check, Cabin Check, and External Check may be omitted if the 'Shortest Time' of the time range has not been exceeded and there are no other factors (e.g., jet blast) that could affect the Holdover Time.

## ■ **Holdover Time**

Holdover time is the estimated time to maintain the function after spraying anti-icing fluid to prevent the form of icing matters on the surfaces of the aircraft. Holdover time is determined by the PIC using the Holdover Time Guidelines on the Portable EFB.

Holdover time starts when the final application of fluid begins. The final fluid applied will be either:

- The time to begin spraying De/Anti-icing fluid in the one step procedure
- The time to begin spraying Anti-icing fluid in the two-step procedure

Holdover time ends when either:

- The applied fluid loses its effectiveness, or
- The time extracted from the holdover time range expires

## ■ **Secondary De/Anti-icing**

If an aircraft which has been de/anti-iced is delayed on the ground long enough that anti-icing protection is no longer effective or if for any reason the de/anti-icing process is interrupted while freezing/frozen precipitation is falling, the Ground De/Anti-Icing Procedure must be re-accomplished in its entirety. This is called Secondary De/Anti-icing. When secondary de/anti-icing is necessary, the contaminated anti-icing fluid and all icing matters must be completely removed by de-icing before making another application of anti-icing fluid. If a holdover time was previously established after completing secondary de/anti-icing, a new holdover time must be applied.

**END OF HOLD OVER TIME APPLY**

# TAXI CONSIDERATIONS

## AFTER START

**PROBE & WINDOW HEAT pb-sw ..... AUTO FO**

*When at least one engine is started, window heating operates under automatic control.*

**☐ IF TAXI TO A DEICING BAY REQUIRED:**

**GND SPLRS: DO NOT ARM UNTIL ACFT DEICED**

**RUDDER TRIM: DO NOT MOVE UNTIL ACFT DEICED**

**FLAPS LEVER: DO NOT MOVE UNTIL ACFT DEICED**

**FLIGHT CONTROL SURFACES: DO NOT MOVE UNTIL ACFT DEICED**

**AFTER START C/L: DELAY UNTIL ACFT DEICED**

*Delay the AFTER START checklist until the aircraft is thoroughly deiced.*

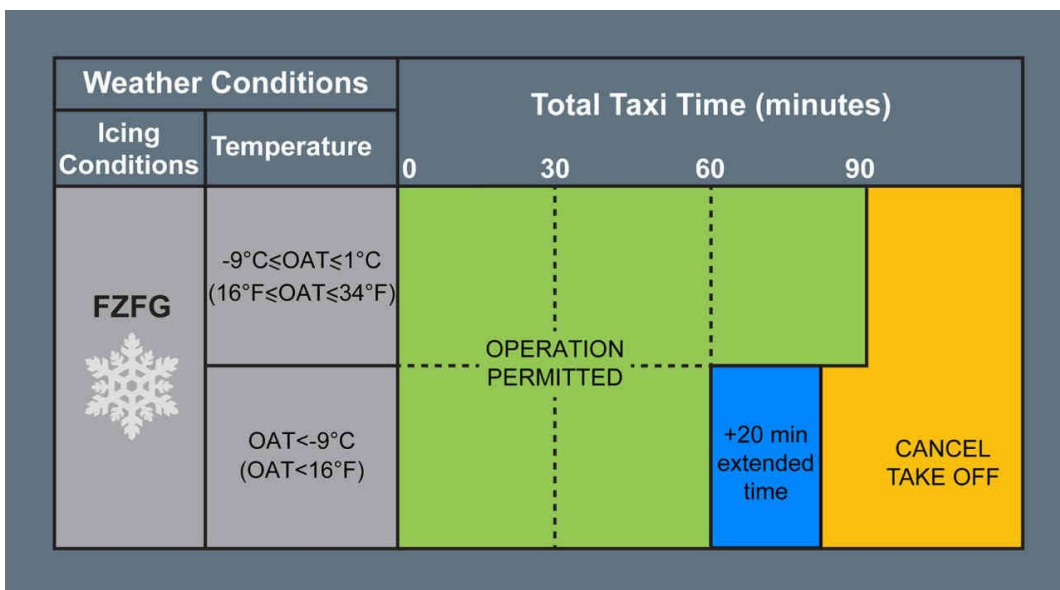
**☐ AT THE DEICING BAY:**

**AIRFRAME DEICING/ANTI-ICING PROCEDURE ON GROUND... REFER TO PROC APPLY**

**NORMAL SOP..... RESUME**

## ENGINE OPERATION ON GROUND IN FZFG

### MAXIMUM TAXI TIME IN FZFG CONDITIONS



| Outside Air Temperature                                                                               | Engine Stator A-ICE Valve Operative or Failed Open | Engine Stator A-ICE Valve Failed Closed |
|-------------------------------------------------------------------------------------------------------|----------------------------------------------------|-----------------------------------------|
| $-9^{\circ}\text{C} (16^{\circ}\text{F}) \leq \text{OAT} \leq 1^{\circ}\text{C} (34^{\circ}\text{F})$ | 90 min                                             | No Dispatch (1)                         |
| OAT below $-9^{\circ}\text{C} (16^{\circ}\text{F})$                                                   | 60 min + 20 min (2)                                |                                         |

(1) *Cancel takeoff and request the maintenance crew to perform:*

- *An engine section stator anti-ice valve inspection*
- *The VIGV inspection, and if necessary a manual engine core deicing.*

(2) *Supplementary procedure must be performed in order to extend the maximum taxi-time with additional 20 min running time.*

**ENGINE GROUND ICE-SHEDDING**

If temperature is OAT ≤ -9 °C (16 °F) and Total taxi-time in FZFG conditions is exceeded:

**GND SURFACE COND & AREA..... CHECK**

*Check that the ground surface conditions and the area behind the aircraft permit the application of the power setting during the procedure.*

**ATC.....NOTIFY**

**PARKING BRAKE.....ON**

**CAUTION** Pay extra attention to the aircraft movement during this procedure. If during thrust increase, the aircraft starts to move, immediately retard the thrust levers to IDLE.

**THR LEVERS ..... 50 % N1 FOR 2 MIN**

*Accelerate the engines not less than 50 % N1 for 2 min.*

*Takeoff must be performed within 20 min after application of the engine ground ice-shedding.*

**CAUTION** *If the ground surface conditions or the environment do not permit the application of the FZFG procedure when reaching the maximum taxi time: cancel the takeoff.*

*For more information, Refer to **PRO-NOR-SUP-SUP-ADVWXR ENGINE OPERATION ON GROUND IN FZFG (R/R).***

**Use ANTI ICE As Required**

**ENG 1 and 2 ANTI ICE pb-sw..... AS RQRD**

**At least 15 s after APU bleed is set to off:**

**WING ANTI ICE pb-sw ..... AS RQRD**

**ONE ENGINE TAXI-GENERAL (R/R)**

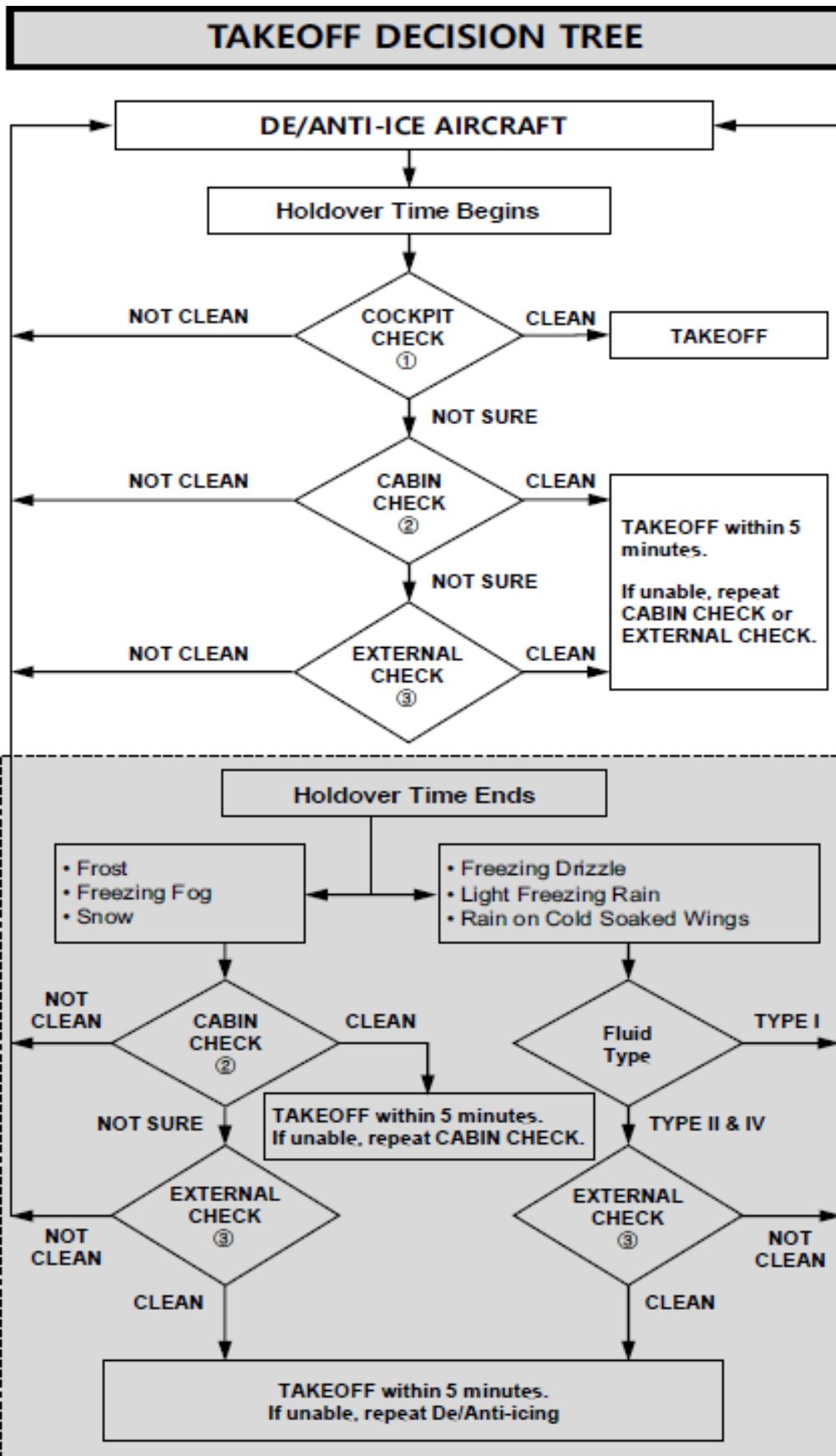
One engine taxi is not permitted in FZFG conditions with OAT at +1 °C (34 °F) or below (due to ice accretion and the required engine acceleration during the ice shedding procedure).

**Adjust Holdover Time, As Required**

Continuously assess weather and environmental conditions and periodically perform the **COCKPIT CHECK.**

**END OF TAXI CONSIDERATIONS**

# TAKEOFF DECISION



## **Application of the Clean Aircraft Concept**

The flight crew shall check whether the Clean Aircraft Concept is met through the following De/Anti-icing Check before deciding to operate.

### **■ Cockpit Check (Pre-takeoff Check)**

This check is an integral part of the holdover time and is performed by the flight crew. Holdover Time is a value calculated through testing and is an approximate time to guarantee the effectiveness of De/Anti-icing Fluid. However, because the current weather environment and solution application method cannot perfectly match those at the time of testing, you should not solely rely on the anti-icing effective duration of the Holdover Time Guidelines to determine whether the aircraft is not iced.

The flight crew must continuously perform cockpit checks during the holdover time to confirm the de/anti-icing status of the aircraft, and the final cockpit check must be performed immediately before takeoff, if possible.

- The Cockpit Check is performed by the flight crew and is required anytime :
  - Ground icing conditions exist
  - The aircraft has been de/anti-iced
  - The holdover time is still valid.
- The Cockpit Check consists of :
  - A check of representative aircraft surfaces which are visible from the cockpit
  - If desired or if any doubt exists, conduct a Cabin Check
- When circumstances do not permit a satisfactory visual check from inside the aircraft, return to the designated area and :
  - Have a ground crew perform an external check
  - If any doubt exists as to the condition of the aircraft, repeat the ground de/anti-icing procedure.

Note: The ground crew for de/anti-icing checks has the qualification required to perform them.

## ■ Cabin Check (Pre-takeoff Contamination Check)

This check is performed by the flight crew and is required :

- Anytime the aircraft has been de/anti-iced, and holdover time is exceeded during conditions of frost, freezing fog, or snow
- When doubt exists after conducting the Cockpit Check
- During conditions of snow grains

### CAUTION

**When Type I fluid has been applied during freezing drizzle and the holdover time has expired, a Cabin Check or External Check is not authorized. Secondary de/anti-icing must be accomplished prior to takeoff.**

**When Type II or Type IV fluid has been applied during freezing drizzle, light freezing rain, or rain on cold soaked wings and holdover time has expired, a Cabin Check is not authorized because clear ice formation cannot be detected visually from inside the aircraft in this situation. In such case, return for an External Check or accomplish secondary de/anti-icing.**

The Cabin Check consists of a visual inspection of all representative aircraft surfaces which are visible from the best vantage point in the cabin. Normally, de/anti-icing fluid failure will first occur on the leading or trailing edges of the wing rather than the mid-chord. Therefore, the leading edges and upper surfaces of both wings must be visually checked for evidence of fluid failure.

Additionally, all visible engine inlets must be inspected for contamination. Takeoff must occur within 5 minutes of the most recent check.

The ability to adequately perform this check from inside the aircraft is highly dependent upon several factors. Lighting conditions, cleanliness of cabin/cockpit windows, and outside visibility may severely hinder or prevent the pilot's ability to satisfactorily assess aircraft surfaces for contamination.

When circumstances do not permit a satisfactory visual check from inside the aircraft, return to the designated area and:

- Have a ground crew perform the external check
- If any doubt to take off on the condition of the aircraft exists , repeat the ground de/anti-icing procedure.

## ■ External Check (Alternative Pre-takeoff Check)

This check is performed by the de/anti-icing ground crew and is required anytime :

- Doubt exists after conducting a cabin check, or
- The aircraft has been anti-iced with Type II or Type IV fluid, and holdover time is exceeded during freezing drizzle, light freezing rain, or rain on cold soaked wings.

If the external check cannot be accomplished, return for secondary de/antiicing.

This check consists of a close visual inspection of the aircraft's upper wing surfaces and leading edges for frozen contamination. Takeoff must occur within 5 minutes of the external check; if unable, repeat the ground de/antiicing procedure.

### CAUTION

**An external check is not authorized during freezing drizzle  
when Type I fluid is used and holdover time has expired.  
The aircraft must return to the designated area for**

**an External Check or accomplish the secondary de/anti-icing.**

There are some airports that perform the Secondary De/Anti-icing instead of External Check.

## TAKEOFF

In extreme cold weather operations (OAT at or below -30 °C), main L/G retraction can take longer than expected and **L/G GEAR NOT LOCKED UP** ECAM alert may appear. In these temperature conditions, if **L/G GEAR NOT LOCKED UP** ECAM alert appears and Nose L/G appears as retracted in the WHEEL SD page, wait 1 min before applying the ECAM actions.

**END OF TAKE OFF DECISION**

# A380 DE/ANTI-ICING REFERENCE HANDBOOK

## De/Anti-Icing Background information and Policies

[Refer to ICN AIP](#) and [ICN AFile](#) for De-icing operational procedure **Refer to FOM Chapter 4.2 for more detail**

## Before Fluid Spraying

In all situations, **it is responsibility of the Captain to decide** if the ground crew must de-ice/anti-ice the aircraft, and/or if additional deicing/anti-icing treatment are required

## [Before Fluid Spraying Procedures](#)

## After Fluid Spraying

## [After Fluid Spraying Procedures](#)

## [Holdover time starts when the final application begins](#)

in Either the one step or two step procedure

**Use Holdover Time Guidelines in the EFB**

## During TAXI

## [TAXI CONSIDERATIONS](#)

## Before Take Off

## [TAKEOFF DECISION](#)



2025-2026

# ICN De/Anti-icing procedure Pilot Brief Sheet

Issued by: Apron Control Team  
Download at: [www.airport.kr](http://www.airport.kr)

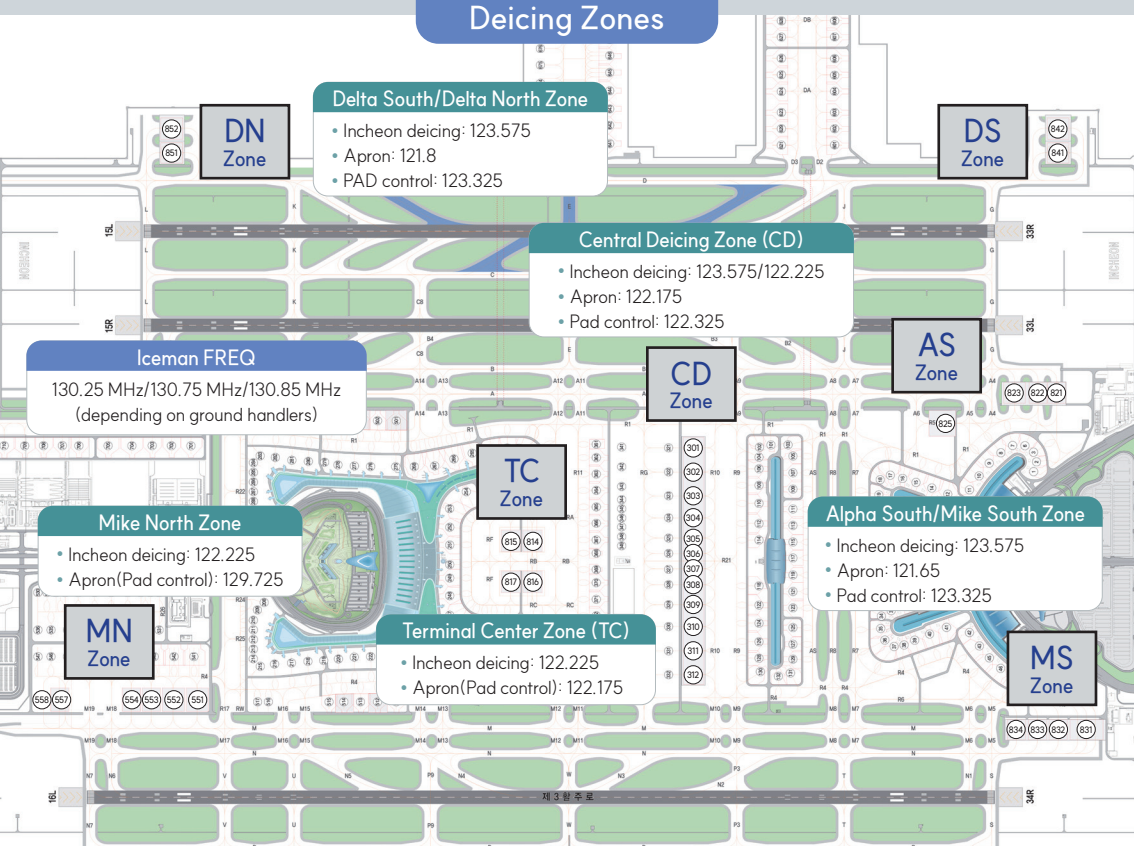


Incheon Airport

- ◆ De/Anti-icing operations are performed only in the remote de-icing pads.
- ◆ ENG ON deicing is available on all de-icing pads.
- ◆ For safety and ground handlers' operational reasons, ENG OFF de/anti-icing may be applied.
- ◆ All communication with Ice-man in the deicing pad is via VHF radio.
- ◆ The Iceman frequency is guided by Apron(Pad control), depending on ground handlers.

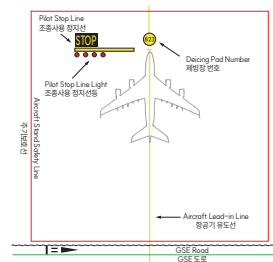


## Deicing Zones



Aircraft should stop when **pilot's stop line** aligns with the captain's shoulder line

- ◆ This marking is located on all de-icing pads to help aircraft stop without marshal service.
- ◆ The transverse bar indicates the cockpit stop position.



### **CAUTION**

Engine power should not be exceed GND idle in deicing pad at all times.

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

### Before De-icing Operation

- ① When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- ② Incheon Deicing will assign the de-icing zone and de-icing pad.
- ③ Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

### Entry Procedure

- ④ When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- ⑤ Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- ⑥ After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

### De-icing Procedure

- ⑦ Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- ⑧ When contact Iceman, report the de-icing pad number and parking brake set.
- ⑨ Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- ⑩ The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- ⑪ Iceman will inform "De-icing starts now"
- ⑫ To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery. (Engines on) When de-icing is started, contact Incheon Delivery (Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- ⑬ After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1de-icing fluid has been applied, "hold over time does not apply".
- ⑭ (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

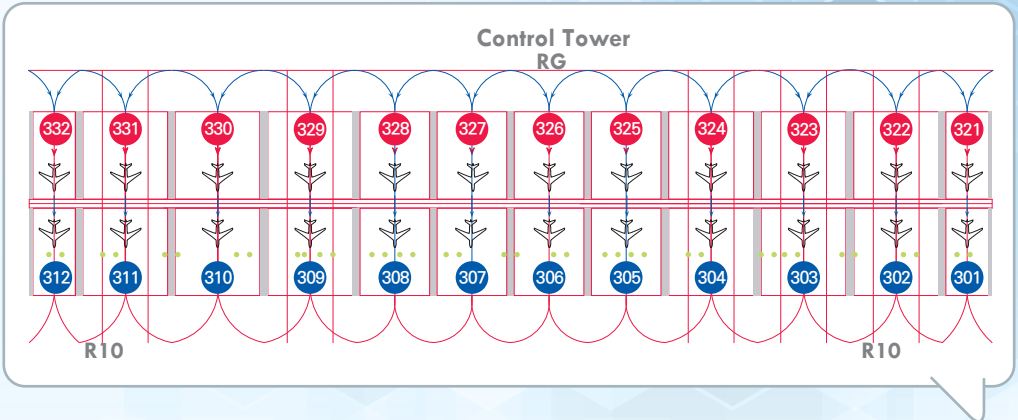
### Exit Procedure

- ⑮ Contact Pad Control and request for taxi.
- ⑯ Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

# CENTRAL DEICING ZONE(CD) Operation Procedure

Taxi to deicing pad #301 ~ #312 via holding bay #321 ~ #332

When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.



## When aircraft approaches de-icing pad

FLIGHT CREW

PAD CONTROL (Apron)



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.



Aircraft approaches  
De-icing pad

Stop bar lights on  
(by ICE MAN)

Pad control (Apron), (CALL SIGN),  
approaching de-icing pad #834

(CALL SIGN), Pad control (Apron).  
Continue taxi to de-icing pad #834  
(then hold abeam the stop line.)  
Report parking brake set.

Taxi to de-icing pad #834, report  
parking brake set, (CALL SIGN).

Pad control (Apron), (CALL SIGN),  
parking brake set.

(CALL SIGN),  
contact ICEMAN 130.85



Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request ENG ON deicing, Type 1 & Type 4, wings and tail deicing.

Engine set to ground idle and report ready for deicing, (CALL SIGN).

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② [EX] Wings & Tail / Full-body

ENG ON deicing may not be possible, due to weather and safety reasons (ENG OFF deicing ↗ page 9)

ICE MAN, (CALL SIGN), now ready for deicing.

Contact delivery 121.6, monitor ice man frequency, (CALL SIGN).

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, Type 1 & Type 4, wings & tail, ENG ON deicing, engine set to ground idle, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), deicing starts now, contact delivery 121.6, monitor ice man frequency.

Contact Clearance Delivery by voice regardless of PDC



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

we are ready for information,  
(CALL SIGN).

Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft, (CALL SIGN).

**NOTE: ANTI-ICING CODE**

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN,  
Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft.

**If only TYPE I is applied:**

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df-plus at 50%, started at 1340~ (upon pilot request)



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Ready to taxi, (CALL SIGN).

Contact pad control 123.325,  
(CALL SIGN).

**CAUTION: DO NOT TAXI  
IF STOP BAR LIGHTS ON**

(CALL SIGN), ICE MAN,  
Report ready to taxi.

(CALL SIGN), hold position and  
contact pad control 123.325 for  
taxi.

STOP BAR LIGHTS OFF





## When aircraft approaching de-icing pad

FLIGHT CREW



When Aircraft approaches  
De-icing pad

ICEMAN frequency is guided by  
pad control or Apron, depending on  
the ground handlers and de-icing zone.

PAD CONTROL



Stop bar lights on  
(by ICE MAN)

Pad control, (CALL SIGN)  
Approaching de-icing zone MIKE  
SOUTH (MS).

(CALL SIGN), Pad control.  
Your de-icing pad #834.  
Continue taxi to de-icing pad #834.  
(then hold abeam the stop line)  
Report parking brake set.

Roger, taxi to de-icing pad #834,  
(CALL SIGN).

Pad control, (CALL SIGN),  
parking brake set.

(CALL SIGN),  
roger, contact ICEMAN 130.85





Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request *Type 1 & Type 4, wings and tail* deicing ENG SHUT DOWN deicing.

**DO NOT SHUT DOWN ENGINES UNTIL INSTRUCTED BY ICE MAN FOR GROUND SAFETY**

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② Wings & Tail or Full-body

Shut down engines now, report ready for deicing, (CALL SIGN)

ICE MAN, (CALL SIGN), now ready for deicing.

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, *Type 1 & Type 4, wings & tail*, shut down engines now, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), ICEMAN, deicing starts now.





Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICEMAN



We are ready for information.  
(CALL SIGN).

Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time*, post deicing check completed, all personnel and equipment are clear of aircraft. (CALL SIGN).

**NOTE: ANTI-ICING CODE**  
(Appropriate anti-icing code)

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN.

Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time*, post deicing check completed, all personnel and equipment are clear of aircraft.

**If only TYPE I is applied:**

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df- plus at 50%, started at 1340~ (upon pilot request)



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Contact C/D 121.6, (CALL SIGN).

Contact Clearance Delivery by voice regardless of PDC

After getting clearance, re-contact ice man frequency after ATC clearance.

ICE MAN, (CALL SIGN), we have ATC clearance. Request engines start up.

Engines start up approved, report ready to taxi. (CALL SIGN).

ICE MAN, (CALL SIGN). Ready to taxi.

Contact pad control 123.325 (CALL SIGN).

**CAUTION: DO NOT TAXI IF STOP BAR LIGHTS ON**

(CALL SIGN), ICE MAN. contact C/D 121.6 (for ATC clearance).

(CALL SIGN), Engines start up approved. Report ready to taxi.

(CALL SIGN), hold position and contact pad control 123.325 for taxi.

STOP BAR LIGHTS OFF



4. De-icing operations

4.1 Issuance of de/anti-icing operations phase

| Phase            | Application of phase                                                                  |
|------------------|---------------------------------------------------------------------------------------|
| BLUE (Phase 1)   | Initiated when snow begins and de-icing request are received.                         |
| YELLOW (Phase 2) | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft or more.  |
| ORANGE (Phase 3) | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft or more.  |
| RED (Phase 4)    | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft or more. |

Note : The de/anti-icing operation phase may be adjusted depending on de-icing capacity or prevailing traffic conditions.

4.2 De-icing zones and pads

De-icing pads assignment will be made as pad-group.

1. A South zone : 821, 822, 823, 825 pads
2. M South zone : 831, 832, 833, 834 pads
3. M North zone : 551, 552, 553, 554, 557, 558 pads
4. T Center zone : 814, 815, 816, 817 pads
5. Central De-icing zone : 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312 pads
6. D South zone : 841, 842 pads
7. D North zone : 851, 852 pads

4.3 De-icing operational procedures

1. De-icing requests and cancellations are possible through A-CDM portal system by AO or via radio communication with Incheon De-icing by flight crew.
2. Engine on de-icing is available on all de-icing pads and ACFT types applicable for engine on de-icing depend on AO or GHA.
3. Technical de-icing (landing gear, brakes, inside LE- or TE-flaps, under wing, engine inlets, fan blades and sensors/ static ports/ pitot probes) should be performed by engine off.
4. For safety and GHA's operational reasons(weather conditions, etc.), engine off de-icing can be applied.
5. On the de-icing pads ACFT shall hold abeam the stop line which indicates the cockpit stop position or follow the advice of the marshaller.
6. Aircrew shall control the throttle carefully, avoiding the exhausted gas causing damage to support personnel and equipment, when aircraft exit the de-icing stands.
7. During the engine on de-icing, aircrew shall keep the engine idle and set the brake. ACFT hold position until Pad Control give the taxi instruction.
8. The detailed de-icing procedures are given on the 'Incheon International Airport Pilot De-icing Guide'. The guide is available for download on the official website([www.airport.kr/co\\_en/4415/subview.do](http://www.airport.kr/co_en/4415/subview.do)).

Change : Information of de-icing operations and de-icing pad(ACFT stand NR. 558).

| FREQ                                                                                                                                                             | Call Sign               | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 128.65 MHz, 344.2 MHz<br>(ATIS)                                                                                                                                  | Incheon INTL<br>Airport | - Acknowledge "De/Anti-icing Phase" by ATIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.575 MHz (Apron 1, Apron 2,<br>Cargos)<br>122.225 MHz (Apron 3, 4)                                                                                            | Incheon De-icing        | - Contact when ready for pushback.<br>- Advise "Aircraft De-icing required and Engine On/Off De-icing".<br>- De-icing zones assignment.                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.65 MHz (Apron 1)<br>121.8 MHz (Apron 2, Cargos)<br>122.175 MHz (Apron 3)<br>129.725 MHz (Apron 3)<br>123.675 MHz (Apron 4)                                   | Incheon Apron           | - Set Mode A code to 2000.<br>- Select XPNDR or AUTO.<br>- Contact the frequency according to the controller's instruction.<br>- Pushback & taxi to De-icing zones.                                                                                                                                                                                                                                                                                                                                            |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (Central De-icing zone,<br>M North zone)           | Pad Control             | - De-icing pads assignment.<br>- Taxi to De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Ice Man frequency is guided by Pad Control.<br>- Enter the pad and report the brake set to Ice Man. Do not shut down engines until instructed by Ice Man for ground safety.<br>- Monitor Ice Man until De-icing is completed.                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.6 MHz                                                                                                                                                        | Incheon Delivery        | - (Engine Off) Once de-icing is completed, contact Incheon delivery to get ATC clearance. Report "Engine Off De-icing and De-icing completed" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- (Engine On) Once de-icing is started, contact Incheon delivery to get ATC clearance. Report "Engine On De-icing and De-icing started" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- Set Mode A assigned by ATC.<br>- Select XPNDR or AUTO. |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Re-contact Ice Man and Report start engine and ready to taxi.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (M North zone)<br>121.8 MHz(Central De-icing zone) | Pad Control             | - Taxi out from De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

NOTE 1 : The de-icing pad will be appropriately assigned by Incheon Apron or Pad Control when aircraft approaches to de-icing zone.

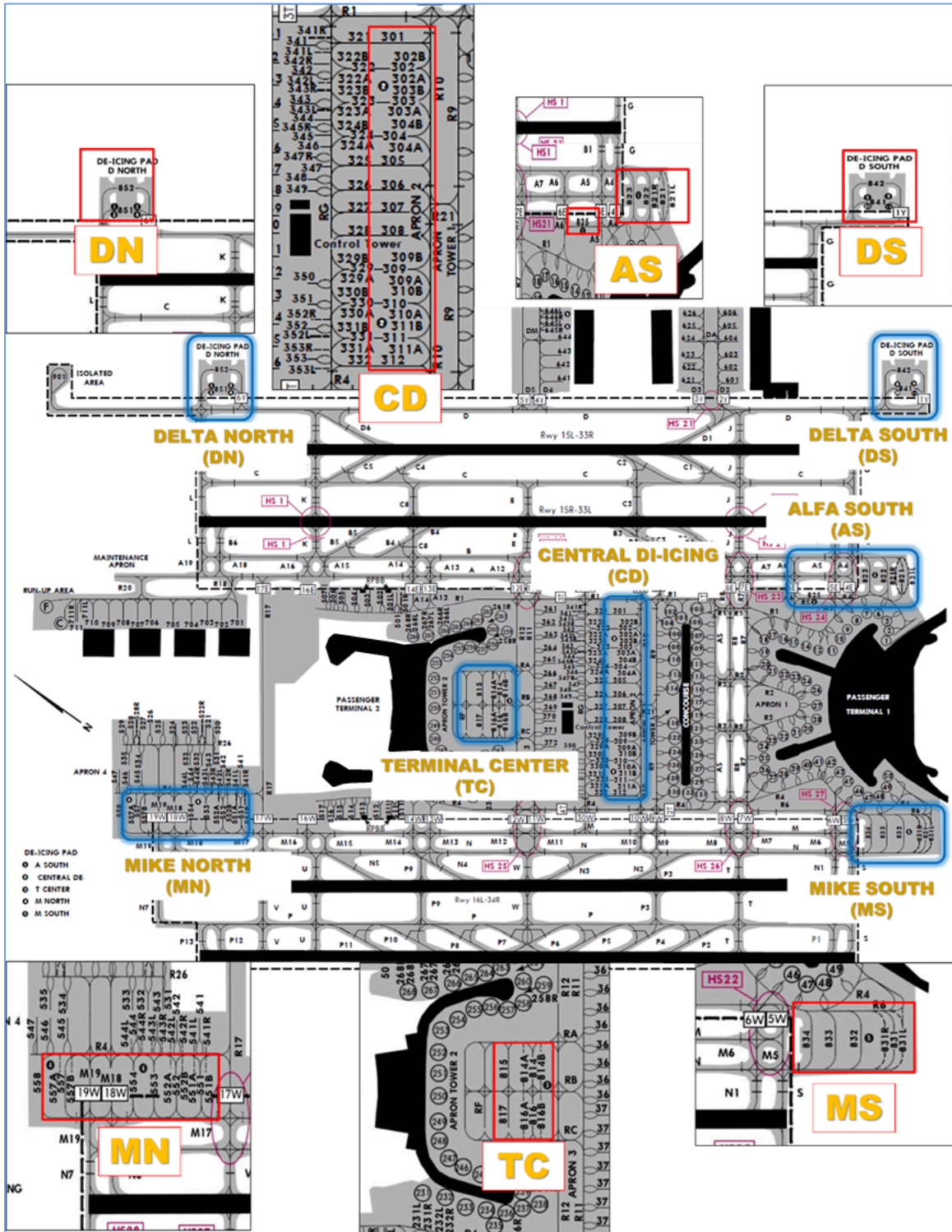
NOTE 2 : Flight crews shall monitor and maintain radio contact, otherwise re-sequenced as a result of no response to 3 successive calls.

NOTE 3 : This procedures can be changed by Incheon Apron according to the volume of de-icing traffic.

NOTE 4 : Flight crews need extra caution when entering and leaving the de-icing pad, since there are GSE roads in front of or behind the de-icing pad.

# Supplementary Information

- 2025-2026 winter season De/Anti-icing

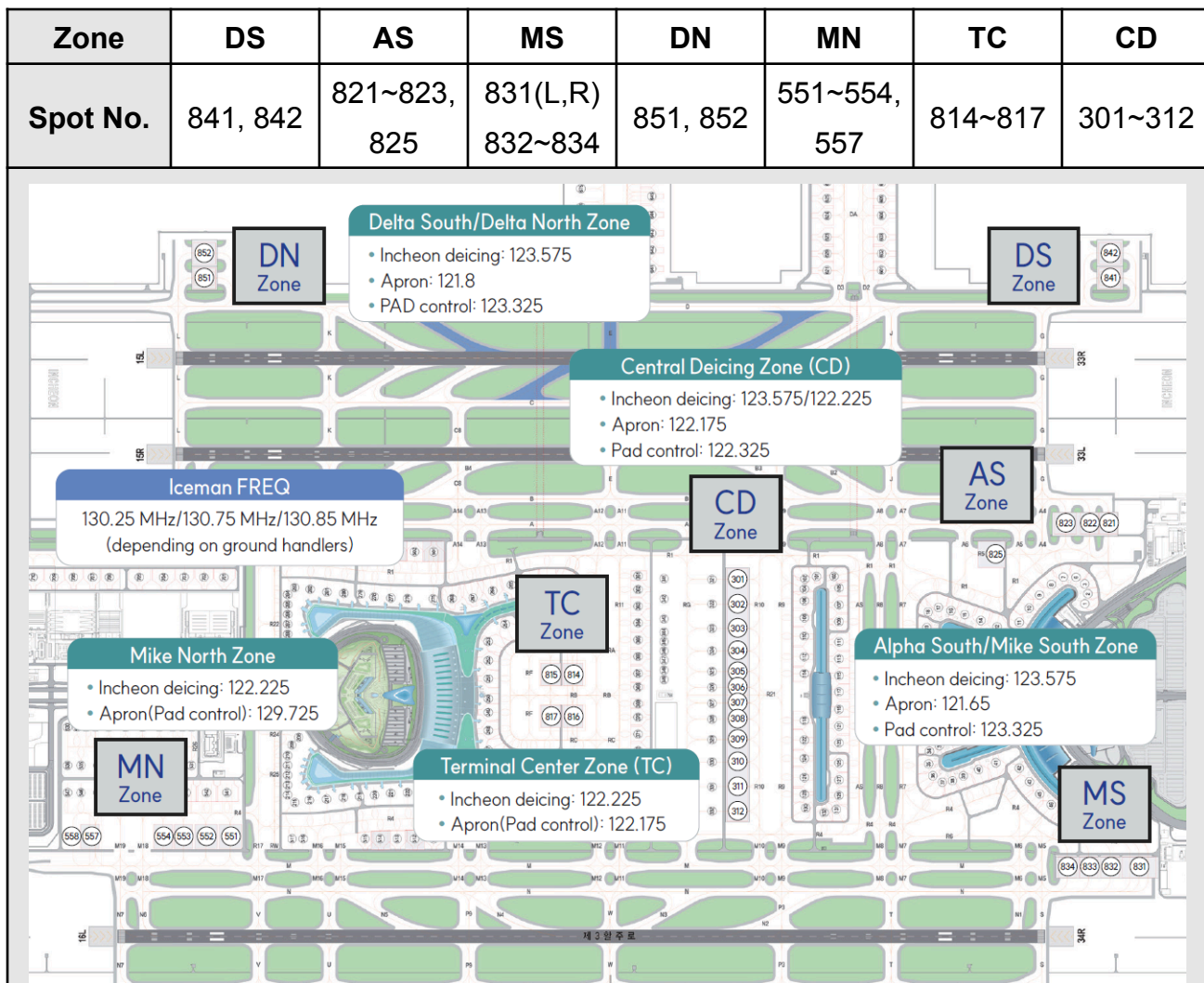


- De / Anti-icing pre-application procedures
  - ▶ When De / Anti-icing is required, apply in advance and check results through the Company Radio (“Asiana ICN”) (System application results will be delivered immediately upon application)
  - ▶ Based on departure time, application is recommended at least 40 minutes in advance.
  - ▶ Exception procedure
    - If the above general procedure is not possible, share with Company Radio first and request action.
    - Prior to cargo aircraft door closing, share the information through the Load Master (Face-to-face delivery)
    - Cancellation procedure after completion of pre-application: Notify a cancellation intention via radio communication with Incheon De-icing by flight crew.
    - New application process after TOBT (including after P/B): Direct action by flight crew, Notify an application intention to Company Radio & Airport’s apron
    - After completing the pre-application, re-application is not necessary due to non-compliance with the TOBT Window.
- "Ice Phase" will be acknowledged by ATIS

| De/Anti-icing Phase | Application of Phase                                                          |
|---------------------|-------------------------------------------------------------------------------|
| Phase 1 (Blue)      | Initiated when snow begins and de-icing request are received.                 |
| Phase 2 (Yellow)    | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft.  |
| Phase 3 (Orange)    | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft.  |
| Phase 4 (Red)       | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft. |

- De/Anti-icing operations are performed only in the remote De-icing pads.

- De-icing Pad location and frequency.



- ENG on and ENG off De/Anti-icing are both available.

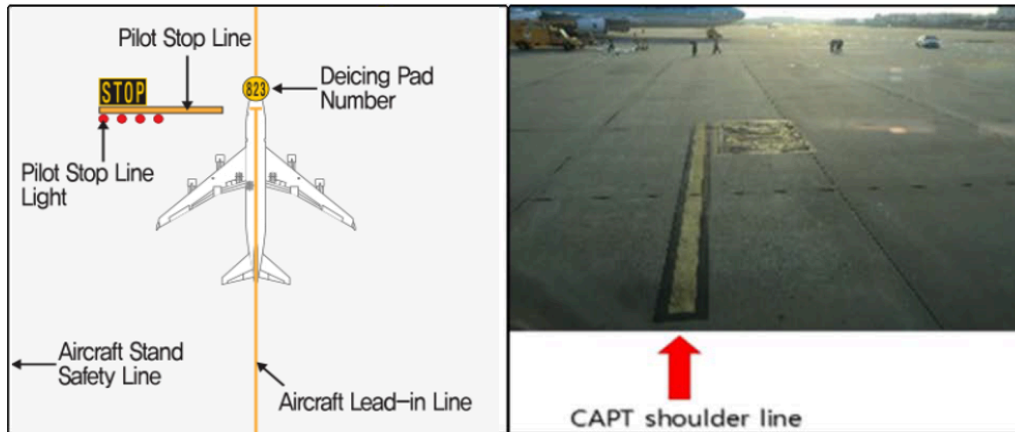
► **ENG ON De-icing available type:**

- 2-ENG aircrafts: A321, A330, A350, B777
- 4-ENG aircrafts: A380

**Note: For 4-ENG aircrafts (A380) ENG ON De-icing, Outboard ENG on and Inboard ENG off is basic procedure. ICE HOUSE(MAN) will notify this when entering de-icing pads.**

► **ENG ON De-icing is available on all de-icing pads.**

- Pilot Stop Line



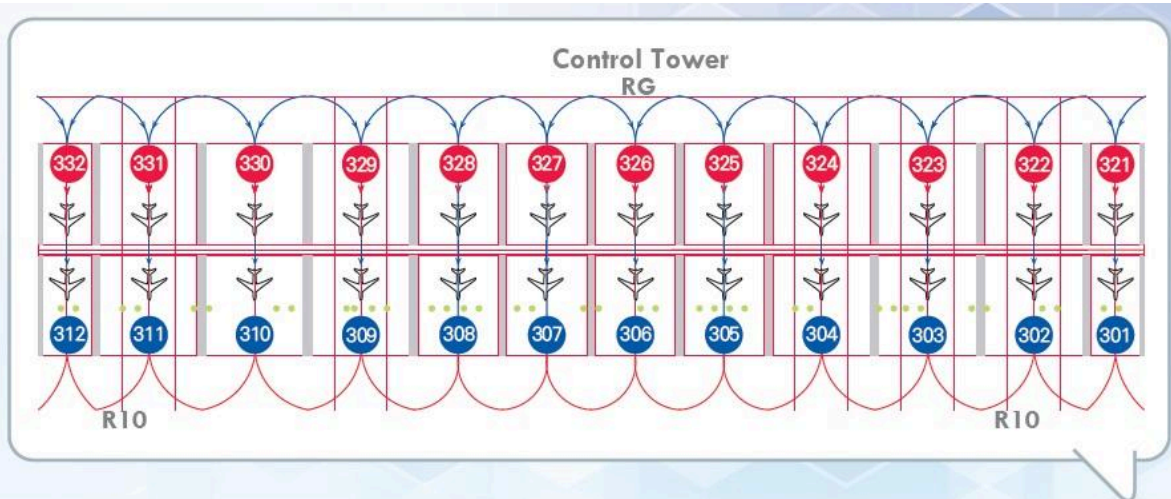
- ▶ This marking is located on all de-icing pads to help stop without marshal service.
- ▶ The transverse bar indicates the cockpit stop position.
- ▶ Aircraft proceed into the assigned de-icing pad and hold abeam the stop line.

***WARNING: Do not increase engines power exceed GND idle at all times in de-icing pad.***

***CAUTION: Be cautious of identifying the PSL(Pilot Stop Line) when entering de-icing pad, especially in wet /snow condition.***

- Central De-icing zone(CD) operation procedure.

- ▶ Taxi to de-icing pad #301 ~ #312 via holding bay #321 ~ #332.
- ▶ When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332.
- ▶ EMB(Electronic Message Board) will be conducted on pad #301 and #312.



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.

- De/Anti-icing operational procedure

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

**Before De-icing Operation**

- 1 When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- 2 Incheon Deicing will assign the de-icing zone and de-icing pad.
- 3 Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

**Entry Procedure**

- 4 When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- 5 Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- 6 After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

**De-icing Procedure**

- 7 Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- 8 When contact Iceman, report the de-icing pad number and parking brake set.
- 9 Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- 10 The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- 11 Iceman will inform "De-icing starts now"
- 12 To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery.  
(Engines on) When de-icing is started, contact Incheon Delivery  
(Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- 13 After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1 de-icing fluid has been applied, "hold over time does not apply".
- 14 (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

**Exit Procedure**

- 15 Contact Pad Control and request for taxi.
- 16 Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

RKSI / ICN  
INCHEON INTL

Elev. 23 ft, 24 NOV 25  
INCHEON/SEOUL, KOREA

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***Note:** If OCC designates operationally limited flight due to curfew of destination airport or crew duty time control, the crews should request pushback immediately when fully ready for pushback. (Passenger boarding has been completed and doors are closed) and change the pushback sequence in coordination with ATC to avoid exceeding the operational limitation of flight or crew.*

**END OF ICN AFILE**

# **BEFORE FLUID SPRAYING**

**(Refer to ECAM procedure or FCOM)**

This procedure is applicable at the gate or at the deicing bay. Specific actions linked to the engine status (running or not) are mentioned when required.

|         |                                                                                                                                                                                                     |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CAUTION | If possible, avoid APU operation during aircraft deicing/anti-icing. APU operation during aircraft deicing/anti-icing may result in deicing/anti-icing fluid ingestion and cause damage to the APU. |
|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

● **BEFORE FLUID SPRAYING:**

- WINDOWS & DOORS..... CHECK CLOSED
- COM WITH GND PERSONNEL.....ESTABLISH
- PARK BRK..... ON
- GND AIR SUPPLY.....CHK DISCONN
- ENG BLEED 1+2+3+4..... OFF
- APU BLEED..... OFF
- APU MASTER sw ..... OFF
- DITCHING pb ..... ON

**REC MAX TIME WITHOUT AIR COND: 30 MIN**

*On ground, with passengers on board, it is recommended not to exceed 30 min without air conditioning, because comfort may be affected.*

● **When the aircraft is ready for spraying:**

- FLUID SPRAYING.....REQUEST

**END OF BEFORE FLUID SPRAYING**

## AFTER FLUID SPRAYING

(Refer to ECAM procedure or FCOM)

- **AFTER FLUID SPRAYING:**

DITCHING pb .....OFF

OUTFLOW VALVES.....CHECK OPEN

*To avoid any unexpected pressurization, check on the CAB PRESS SD page that both outflow valves are open.*

- **At least 1 min after fluid spraying:**

ENG BLEED 1+2+3+4.....ON

- **At least 5 min after fluid spraying:**

APU BLEED..... AS RQRD

PROBE & WINDOW HEAT pb ..... AUTO

PITOTS AND STATICS (GROUND CREW) ..... CHECK

GROUND EQUIPMENT..... CHECK REMOVED

*After deicing is completed, request the ground personnel to confirm that the aircraft is clear from any ground equipment.*

DEICING/ANTI-ICING REPORT..... RECEIVED

- **IF ENGINES NOT RUNNING:**

SOP — BEFORE PUSHBACK or START..... RESUME

*For a detailed description of the Before Start SOP, Refer to procedure.*

- **IF ENGINES RUNNING:**

GND SPLRS..... ARM

RUDDER TRIM..... NEUTRAL

FLAPS..... SET

FLIGHT CONTROLS.....CHECK

AFTER START CHECKLIST..... COMPLETE

SOP — TAXI..... RESUME

*For a detailed description of the Taxi SOP, Refer to procedure.*

END OF AFTER FLUID SPRAYING

# **HOLD OVER TIME APPLY**

(Refer to FOM 4.2 De/Anti-icing Procedure for more detailed information)

## ■ **Determine Holdover Time**

- Holdover time starts when the final application of fluid begins.
- Use "FAA Holdover Time Guidelines" in the portable EFB.

## ■ **Use of Holdover Time Guidelines**

- Holdover time provides an operational guideline for departure planning. It must be used in conjunction with the Cockpit Check (Pre-Takeoff Check).
- Precipitation categories, except frost, Ice Pellet, Small Hail, specify a time range, and frost only specifies a single time.

Note: For precipitation events where the Holdover Time is determined by a time range, the Cockpit Check, Cabin Check, and External Check may be omitted if the 'Shortest Time' of the time range has not been exceeded and there are no other factors (e.g., jet blast) that could affect the Holdover Time.

## ■ **Holdover Time**

Holdover time is the estimated time to maintain the function after spraying anti-icing fluid to prevent the form of icing matters on the surfaces of the aircraft. Holdover time is determined by the PIC using the Holdover Time Guidelines on the Portable EFB.

Holdover time starts when the final application of fluid begins. The final fluid applied will be either:

- The time to begin spraying De/Anti-icing fluid in the one step procedure
- The time to begin spraying Anti-icing fluid in the two-step procedure

Holdover time ends when either:

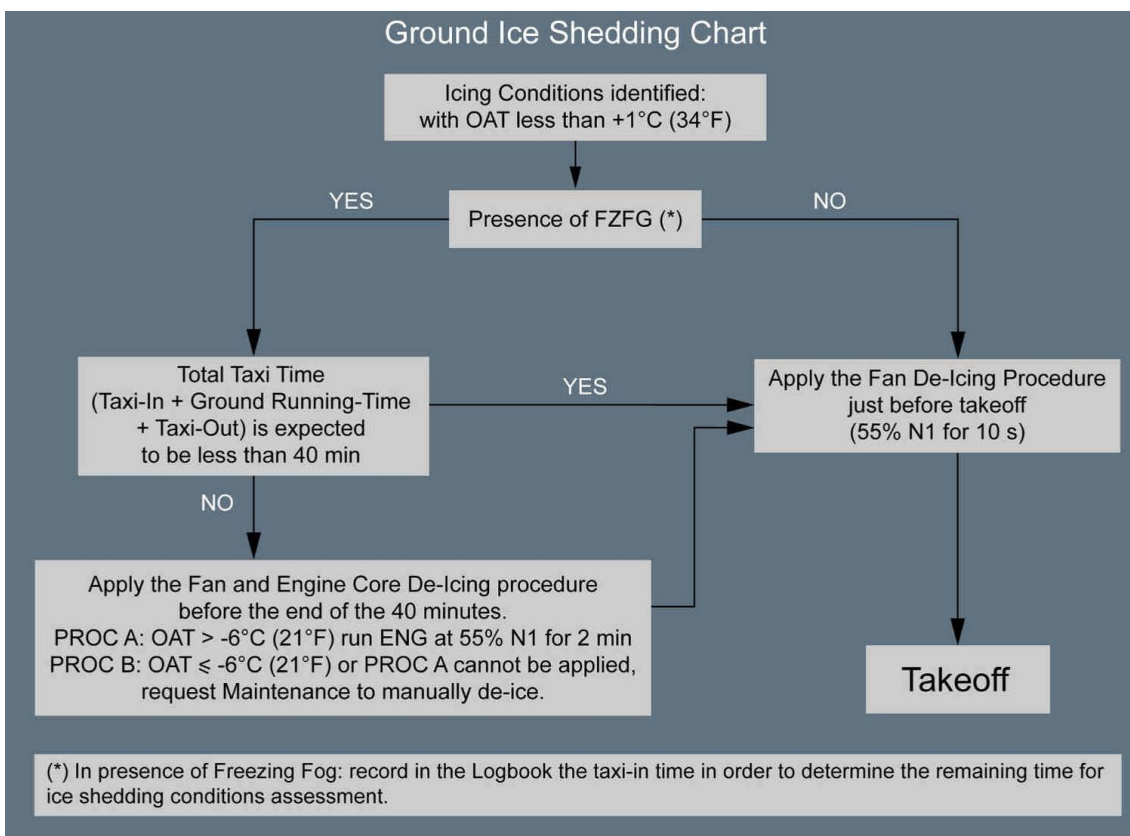
- The applied fluid loses its effectiveness, or
- The time extracted from the holdover time range expires

## ■ **Secondary De/Anti-icing**

If an aircraft which has been de/anti-iced is delayed on the ground long enough that anti-icing protection is no longer effective or if for any reason the de/anti-icing process is interrupted while freezing/frozen precipitation is falling, the Ground De/Anti-Icing Procedure must be re-accomplished in its entirety. This is called Secondary De/Anti-icing. When secondary de/anti-icing is necessary, the contaminated anti-icing fluid and all icing matters must be completely removed by de-icing before making another application of anti-icing fluid. If a holdover time was previously established after completing secondary de/anti-icing, a new holdover time must be applied.

**END OF HOLD OVER TIME APPLY**

## TAXI CONSIDERATIONS



### **Engine ICE SHEDDING ON GROUND**

- **If icing conditions have been identified, without freezing fog:**

Without freezing fog conditions: In order to shed any possible ice on the fan, increase the thrust to 55 % N1 for 10 s on two symmetric engines at a time (i.e. 1 and 4, 2 and 3) just before takeoff, with parking brake ON (or brake with pedals). The flight crew must notify the ATC before the increase of the thrust.

- **If icing conditions have been identified, with freezing fog:**

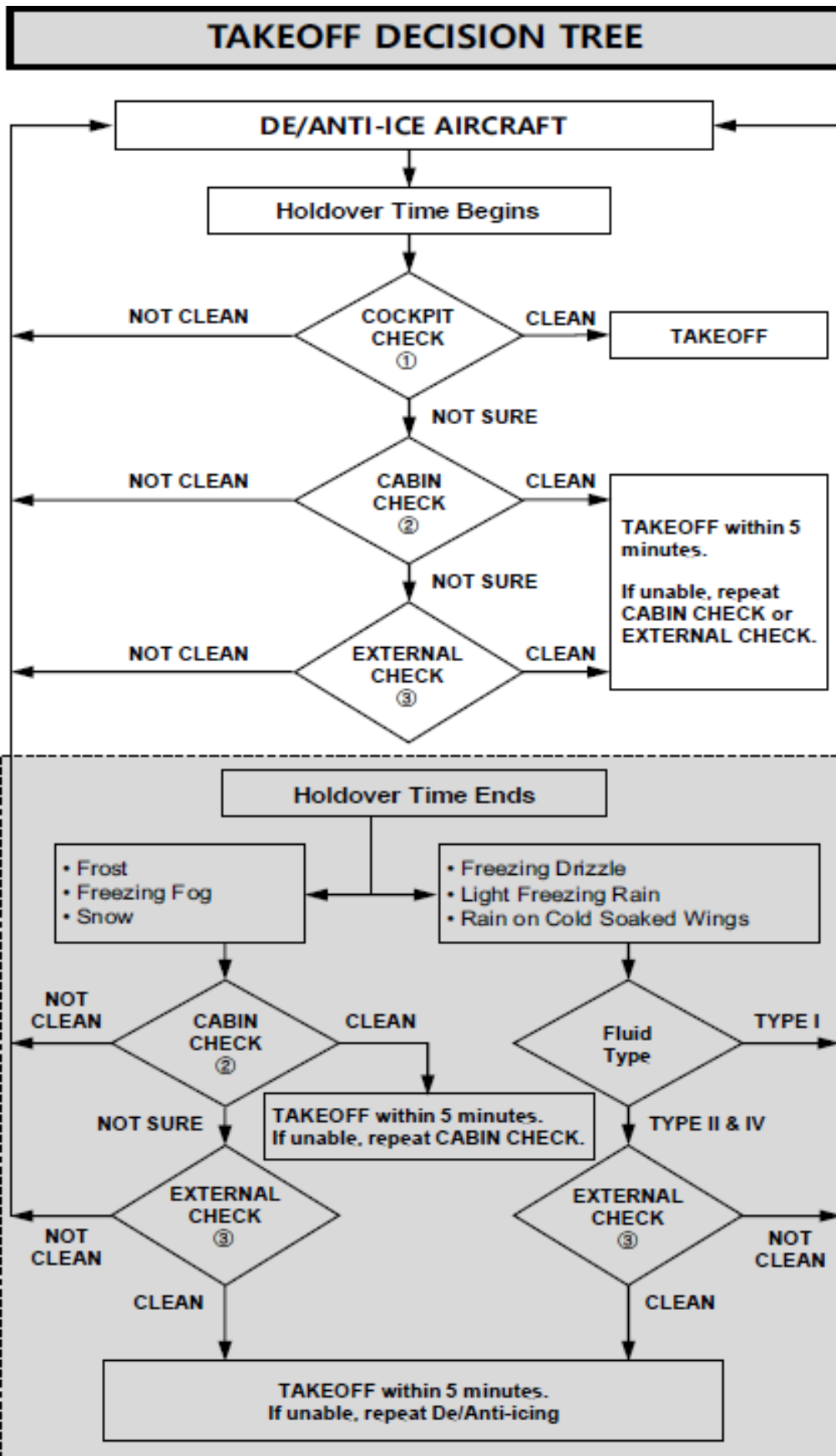
**PRO-NOR-NOR-SUP-SUP-ADVWXR** ENG Ice Shedding on Ground

### **Adjust Holdover Time, As Required**

Continuously assess weather and environmental conditions and periodically perform the COCKPIT CHECK

**END OF TAXI CONSIDERATIONS**

# TAKEOFF DECISION



## **Application of the Clean Aircraft Concept**

The flight crew shall check whether the Clean Aircraft Concept is met through the following De/Anti-icing Check before deciding to operate.

### **■ Cockpit Check (Pre-takeoff Check)**

This check is an integral part of the holdover time and is performed by the flight crew. Holdover Time is a value calculated through testing and is an approximate time to guarantee the effectiveness of De/Anti-icing Fluid. However, because the current weather environment and solution application method cannot perfectly match those at the time of testing, you should not solely rely on the anti-icing effective duration of the Holdover Time Guidelines to determine whether the aircraft is not iced.

The flight crew must continuously perform cockpit checks during the holdover time to confirm the de/anti-icing status of the aircraft, and the final cockpit check must be performed immediately before takeoff, if possible.

- The Cockpit Check is performed by the flight crew and is required anytime :
  - Ground icing conditions exist
  - The aircraft has been de/anti-iced
  - The holdover time is still valid.
- The Cockpit Check consists of :
  - A check of representative aircraft surfaces which are visible from the cockpit
  - If desired or if any doubt exists, conduct a Cabin Check
- When circumstances do not permit a satisfactory visual check from inside the aircraft, return to the designated area and :
  - Have a ground crew perform an external check
  - If any doubt exists as to the condition of the aircraft, repeat the ground de/anti-icing procedure.

Note: The ground crew for de/anti-icing checks has the qualification required to perform them.

## ■ Cabin Check (Pre-takeoff Contamination Check)

This check is performed by the flight crew and is required :

- Anytime the aircraft has been de/anti-iced, and holdover time is exceeded during conditions of frost, freezing fog, or snow
- When doubt exists after conducting the Cockpit Check
- During conditions of snow grains

### CAUTION

**When Type I fluid has been applied during freezing drizzle and the holdover time has expired, a Cabin Check or External Check is not authorized.**

**Secondary de/anti-icing must be accomplished prior to takeoff.**

**When Type II or Type IV fluid has been applied during freezing drizzle, light freezing rain, or rain on cold soaked wings and holdover time has expired, a Cabin Check is not authorized because clear ice formation cannot be detected visually from inside the aircraft in this situation. In such case, return for an External Check or accomplish secondary de/anti-icing.**

The Cabin Check consists of a visual inspection of all representative aircraft surfaces which are visible from the best vantage point in the cabin. Normally, de/anti-icing fluid failure will first occur on the leading or trailing edges of the wing rather than the mid-chord. Therefore, the leading edges and upper surfaces of both wings must be visually checked for evidence of fluid failure.

Additionally, all visible engine inlets must be inspected for contamination. Takeoff must occur within 5 minutes of the most recent check.

The ability to adequately perform this check from inside the aircraft is highly dependent upon several factors. Lighting conditions, cleanliness of cabin/cockpit windows, and outside visibility may severely hinder or prevent the pilot's ability to satisfactorily assess aircraft surfaces for contamination.

When circumstances do not permit a satisfactory visual check from inside the aircraft,

return to the designated area and:

- Have a ground crew perform the external check
- If any doubt to take off on the condition of the aircraft exists , repeat the ground de/anti-icing procedure.

#### ■ External Check (Alternative Pre-takeoff Check)

This check is performed by the de/anti-icing ground crew and is required anytime :

- Doubt exists after conducting a cabin check, or
- The aircraft has been anti-iced with Type II or Type IV fluid, and holdover time is exceeded during freezing drizzle, light freezing rain, or rain on cold soaked wings.

If the external check cannot be accomplished, return for secondary de/antiicing.

This check consists of a close visual inspection of the aircraft's upper wing surfaces and leading edges for frozen contamination. Takeoff must occur within 5 minutes of the external check; if unable, repeat the ground de/antiicing procedure.

### CAUTION

**An external check is not authorized during freezing drizzle  
when Type I fluid is used and holdover time has expired.**

**The aircraft must return to the designated area for  
an External Check or accomplish the secondary de/anti-icing.**

There are some airports that perform the Secondary De/Anti-icing instead of External Check.

**END OF TAKE OFF DECISION**

# B777 DE/ANTI-ICING REFERENCE HANDBOOK

## De/Anti-Icing Background information and Policies

[Refer to ICN AIP](#) and [ICN A-File](#) for De/Anti-icing operational procedure

Refer to FOM Chapter 4.2 for more detail

### If DE/ANTI-ICING is needed

In all situations, it is responsibility of the Captain to decide if the ground crew must de-ice/anti-ice the aircraft, and/or if additional deicing/anti-icing treatment are required

**Engine(s) is/are running? (choose one)**

[YES](#)

[NO](#)

### AFTER DE/ANTI-ICING is completed

**Engine(s) is/are running? (choose one)**

[YES](#)

[NO](#)

## [Holdover time starts when the final application begins](#)

in Either the one step or two step procedure

**Use Holdover Time Guidelines in the Aviator**

### During TAXI

## [TAXI CONSIDERATIONS](#)

### Before Take Off

## [TAKEOFF DECISION](#)



2025-2026

# ICN De/Anti-icing procedure Pilot Brief Sheet

Issued by: Apron Control Team  
Download at: [www.airport.kr](http://www.airport.kr)

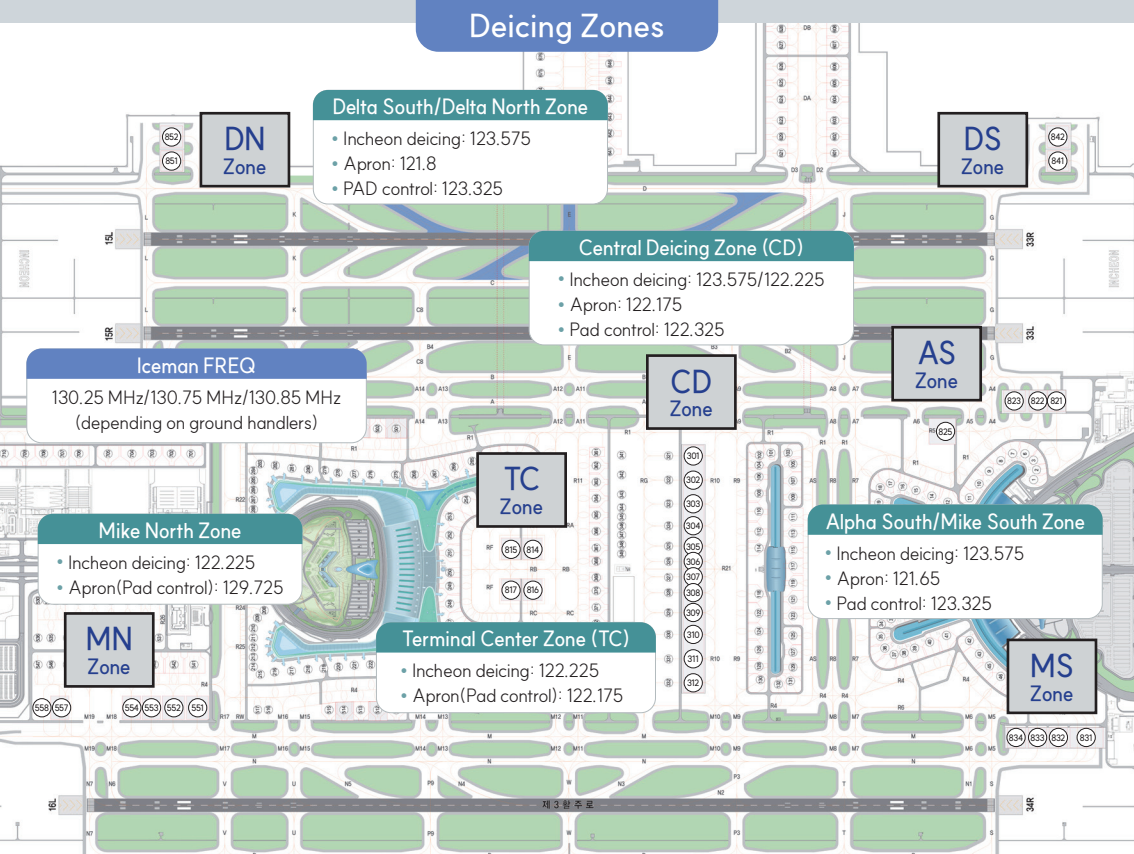


Incheon Airport

- ◆ De/Anti-icing operations are performed only in the remote de-icing pads.
- ◆ ENG ON deicing is available on all de-icing pads.
- ◆ For safety and ground handlers' operational reasons, ENG OFF de/anti-icing may be applied.
- ◆ All communication with Ice-man in the deicing pad is via VHF radio.
- ◆ The Iceman frequency is guided by Apron(Pad control), depending on ground handlers.

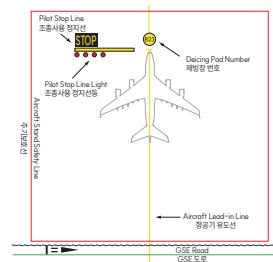


## Deicing Zones



Aircraft should stop when **pilot's stop line** aligns with the captain's shoulder line

- ◆ This marking is located on all de-icing pads to help aircraft stop without marshal service.
- ◆ The transverse bar indicates the cockpit stop position.



### CAUTION

Engine power should not be exceed GND idle in deicing pad at all times.

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

### Before De-icing Operation

- ① When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- ② Incheon Deicing will assign the de-icing zone and de-icing pad.
- ③ Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

### Entry Procedure

- ④ When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- ⑤ Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- ⑥ After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

### De-icing Procedure

- ⑦ Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- ⑧ When contact Iceman, report the de-icing pad number and parking brake set.
- ⑨ Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- ⑩ The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- ⑪ Iceman will inform "De-icing starts now"
- ⑫ To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery. (Engines on) When de-icing is started, contact Incheon Delivery (Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- ⑬ After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1 de-icing fluid has been applied, "hold over time does not apply".
- ⑭ (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

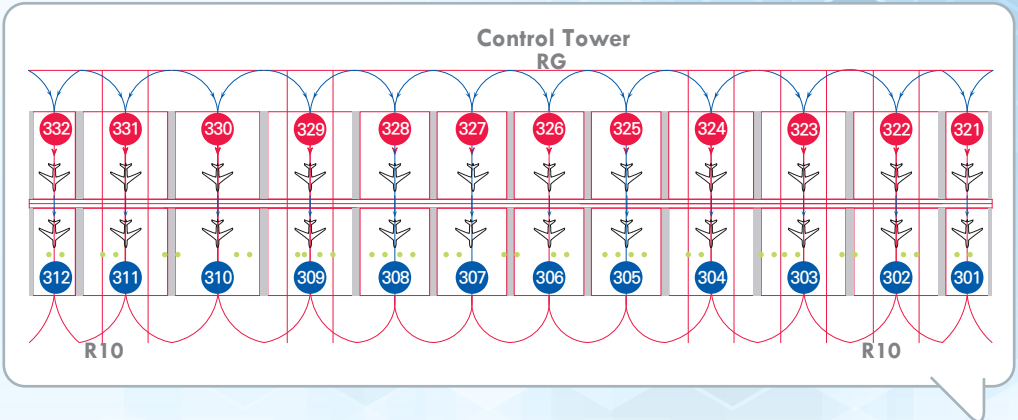
### Exit Procedure

- ⑮ Contact Pad Control and request for taxi.
- ⑯ Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

# CENTRAL DEICING ZONE(CD) Operation Procedure

Taxi to deicing pad #301 ~ #312 via holding bay #321 ~ #332

When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.



## When aircraft approaches de-icing pad

FLIGHT CREW



Aircraft approaches  
De-icing pad

PAD CONTROL (Apron)



Stop bar lights on  
(by ICE MAN)

ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Pad control (Apron), (CALL SIGN),  
approaching de-icing pad #834

(CALL SIGN), Pad control (Apron).  
Continue taxi to de-icing pad #834  
(then hold abeam the stop line.)  
Report parking brake set.

Taxi to de-icing pad #834, report  
parking brake set, (CALL SIGN).

Pad control (Apron), (CALL SIGN),  
parking brake set.

(CALL SIGN),  
contact ICEMAN 130.85



Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request ENG ON deicing, Type 1 & Type 4, wings and tail deicing.

Engine set to ground idle and report ready for deicing, (CALL SIGN).

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② [EX] Wings & Tail / Full-body

ENG ON deicing may not be possible, due to weather and safety reasons (ENG OFF deicing ↗ page 9)

ICE MAN, (CALL SIGN), now ready for deicing.

Contact delivery 121.6, monitor ice man frequency, (CALL SIGN).

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, Type 1 & Type 4, wings & tail, ENG ON deicing, engine set to ground idle, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), deicing starts now, contact delivery 121.6, monitor ice man frequency.

Contact Clearance Delivery by voice regardless of PDC



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

we are ready for information,  
(CALL SIGN).

Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft, (CALL SIGN).

### NOTE: ANTI-ICING CODE

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN,  
Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time, post deicing check completed, all personnel and equipment are clear of aircraft.

### If only TYPE I is applied:

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df-plus at 50%, started at 1340~ (upon pilot request)



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.



(CALL SIGN), ICE MAN,  
Report ready to taxi.

Ready to taxi, (CALL SIGN).

(CALL SIGN), hold position and  
contact pad control 123.325 for  
taxi.

STOP BAR LIGHTS OFF

Contact pad control 123.325,  
(CALL SIGN).

**CAUTION: DO NOT TAXI  
IF STOP BAR LIGHTS ON**



## When aircraft approaching de-icing pad

FLIGHT CREW



When Aircraft approaches  
De-icing pad

ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

PAD CONTROL



Stop bar lights on  
(by ICE MAN)

Pad control, (CALL SIGN)  
Approaching de-icing zone MIKE  
SOUTH (MS).

(CALL SIGN), Pad control.  
Your de-icing pad #834.  
Continue taxi to de-icing pad #834.  
(then hold abeam the stop line)  
Report parking brake set.

Roger, taxi to de-icing pad #834,  
(CALL SIGN).

Pad control, (CALL SIGN),  
parking brake set.

(CALL SIGN),  
roger, contact ICEMAN 130.85



Prior to deicing/anti-icing: aircraft configuration confirmation

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

ICE MAN, (CALL SIGN), de-icing pad #834, parking brake set, request *Type 1 & Type 4, wings and tail* deicing ENG SHUT DOWN deicing.

**DO NOT SHUT DOWN ENGINES UNTIL INSTRUCTED BY ICE MAN FOR GROUND SAFETY**

Pilot decides on

① deicing method, and ② area.

\* NOTE ① Type 1 or Type 1&4

② Wings & Tail or Full-body

Shut down engines now, report ready for deicing, (CALL SIGN)

ICE MAN, (CALL SIGN), now ready for deicing.

The aircraft position may be adjusted to align with the pilot stop line.

(CALL SIGN), ICE MAN, roger, *Type 1 & Type 4, wings & tail*, shut down engines now, report ready for deicing.

(CALL SIGN), Standby(to deice).

(CALL SIGN), ICEMAN, deicing starts now.





Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

We are ready for information.  
(CALL SIGN).

Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time*, post deicing check completed, all personnel and equipment are clear of aircraft. (CALL SIGN).

**NOTE: ANTI-ICING CODE**  
(Appropriate anti-icing code)

1. Type of fluid (Type I/II/III/IV) at (percent of mix) for (type II/III/IV)
2. Complete name of anti-icing fluid
3. Holdover time started at (local time)
4. Post deicing check completed.

(CALL SIGN), ICE MAN.

Deicing complete, advise when ready for information.

(CALL SIGN), Deicing complete, *deiced with type I, anti-iced with type IV Kilfrost ABC-S plus at 100%. Holdover started at 13:35 local time*, post deicing check completed, all personnel and equipment are clear of aircraft.

**If only TYPE I is applied:**

- 1) ~ deiced with type I, holdover time does not apply
- 2) ~ deiced with type I, kilfrost df- plus at 50%, started at 1340~ (upon pilot request)



Upon concluding deicing/anti-icing procedure.

FLIGHT CREW



ICEMAN



ICEMAN frequency is guided by pad control or Apron, depending on the ground handlers and de-icing zone.

Contact C/D 121.6, (CALL SIGN).

Contact Clearance Delivery by voice regardless of PDC

After getting clearance, re-contact ice man frequency after ATC clearance.

ICE MAN, (CALL SIGN), we have ATC clearance. Request engines start up.

Engines start up approved, report ready to taxi. (CALL SIGN).

ICE MAN, (CALL SIGN). Ready to taxi.

Contact pad control 123.325 (CALL SIGN).

**CAUTION: DO NOT TAXI IF STOP BAR LIGHTS ON**

(CALL SIGN), ICE MAN. contact C/D 121.6 (for ATC clearance).

(CALL SIGN), Engines start up approved. Report ready to taxi.

(CALL SIGN), hold position and contact pad control 123.325 for taxi.

STOP BAR LIGHTS OFF



4. De-icing operations

4.1 Issuance of de/anti-icing operations phase

| Phase            | Application of phase                                                                  |
|------------------|---------------------------------------------------------------------------------------|
| BLUE (Phase 1)   | Initiated when snow begins and de-icing request are received.                         |
| YELLOW (Phase 2) | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft or more.  |
| ORANGE (Phase 3) | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft or more.  |
| RED (Phase 4)    | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft or more. |

Note : The de/anti-icing operation phase may be adjusted depending on de-icing capacity or prevailing traffic conditions.

4.2 De-icing zones and pads

De-icing pads assignment will be made as pad-group.

1. A South zone : 821, 822, 823, 825 pads
2. M South zone : 831, 832, 833, 834 pads
3. M North zone : 551, 552, 553, 554, 557, 558 pads
4. T Center zone : 814, 815, 816, 817 pads
5. Central De-icing zone : 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312 pads
6. D South zone : 841, 842 pads
7. D North zone : 851, 852 pads

4.3 De-icing operational procedures

1. De-icing requests and cancellations are possible through A-CDM portal system by AO or via radio communication with Incheon De-icing by flight crew.
2. Engine on de-icing is available on all de-icing pads and ACFT types applicable for engine on de-icing depend on AO or GHA.
3. Technical de-icing (landing gear, brakes, inside LE- or TE-flaps, under wing, engine inlets, fan blades and sensors/ static ports/ pitot probes) should be performed by engine off.
4. For safety and GHA's operational reasons(weather conditions, etc.), engine off de-icing can be applied.
5. On the de-icing pads ACFT shall hold abeam the stop line which indicates the cockpit stop position or follow the advice of the marshaller.
6. Aircrew shall control the throttle carefully, avoiding the exhausted gas causing damage to support personnel and equipment, when aircraft exit the de-icing stands.
7. During the engine on de-icing, aircrew shall keep the engine idle and set the brake. ACFT hold position until Pad Control give the taxi instruction.
8. The detailed de-icing procedures are given on the 'Incheon International Airport Pilot De-icing Guide'. The guide is available for download on the official website([www.airport.kr/co\\_en/4415/subview.do](http://www.airport.kr/co_en/4415/subview.do)).

Change : Information of de-icing operations and de-icing pad(ACFT stand NR. 558).

| FREQ                                                                                                                                                             | Call Sign               | Procedure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 128.65 MHz, 344.2 MHz<br>(ATIS)                                                                                                                                  | Incheon INTL<br>Airport | - Acknowledge "De/Anti-icing Phase" by ATIS.                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.575 MHz (Apron 1, Apron 2,<br>Cargos)<br>122.225 MHz (Apron 3, 4)                                                                                            | Incheon De-icing        | - Contact when ready for pushback.<br>- Advise "Aircraft De-icing required and Engine On/Off De-icing".<br>- De-icing zones assignment.                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.65 MHz (Apron 1)<br>121.8 MHz (Apron 2, Cargos)<br>122.175 MHz (Apron 3)<br>129.725 MHz (Apron 3)<br>123.675 MHz (Apron 4)                                   | Incheon Apron           | - Set Mode A code to 2000.<br>- Select XPNDR or AUTO.<br>- Contact the frequency according to the controller's instruction.<br>- Pushback & taxi to De-icing zones.                                                                                                                                                                                                                                                                                                                                            |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (Central De-icing zone,<br>M North zone)           | Pad Control             | - De-icing pads assignment.<br>- Taxi to De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Ice Man frequency is guided by Pad Control.<br>- Enter the pad and report the brake set to Ice Man. Do not shut down engines until instructed by Ice Man for ground safety.<br>- Monitor Ice Man until De-icing is completed.                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 121.6 MHz                                                                                                                                                        | Incheon Delivery        | - (Engine Off) Once de-icing is completed, contact Incheon delivery to get ATC clearance. Report "Engine Off De-icing and De-icing completed" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- (Engine On) Once de-icing is started, contact Incheon delivery to get ATC clearance. Report "Engine On De-icing and De-icing started" when initial contact with Incheon delivery by voice or DCL. Monitor Ice Man.<br>- Set Mode A assigned by ATC.<br>- Select XPNDR or AUTO. |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 130.750 MHz<br>130.850 MHz<br>130.250 MHz                                                                                                                        | Ice Man                 | - Re-contact Ice Man and Report start engine and ready to taxi.                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| ↓                                                                                                                                                                |                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 123.325 MHz (A South zone,<br>M South zone, D South/North zone)<br>122.175 MHz (T Center zone)<br>122.325 MHz (M North zone)<br>121.8 MHz(Central De-icing zone) | Pad Control             | - Taxi out from De-icing pads.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

NOTE 1 : The de-icing pad will be appropriately assigned by Incheon Apron or Pad Control when aircraft approaches to de-icing zone.

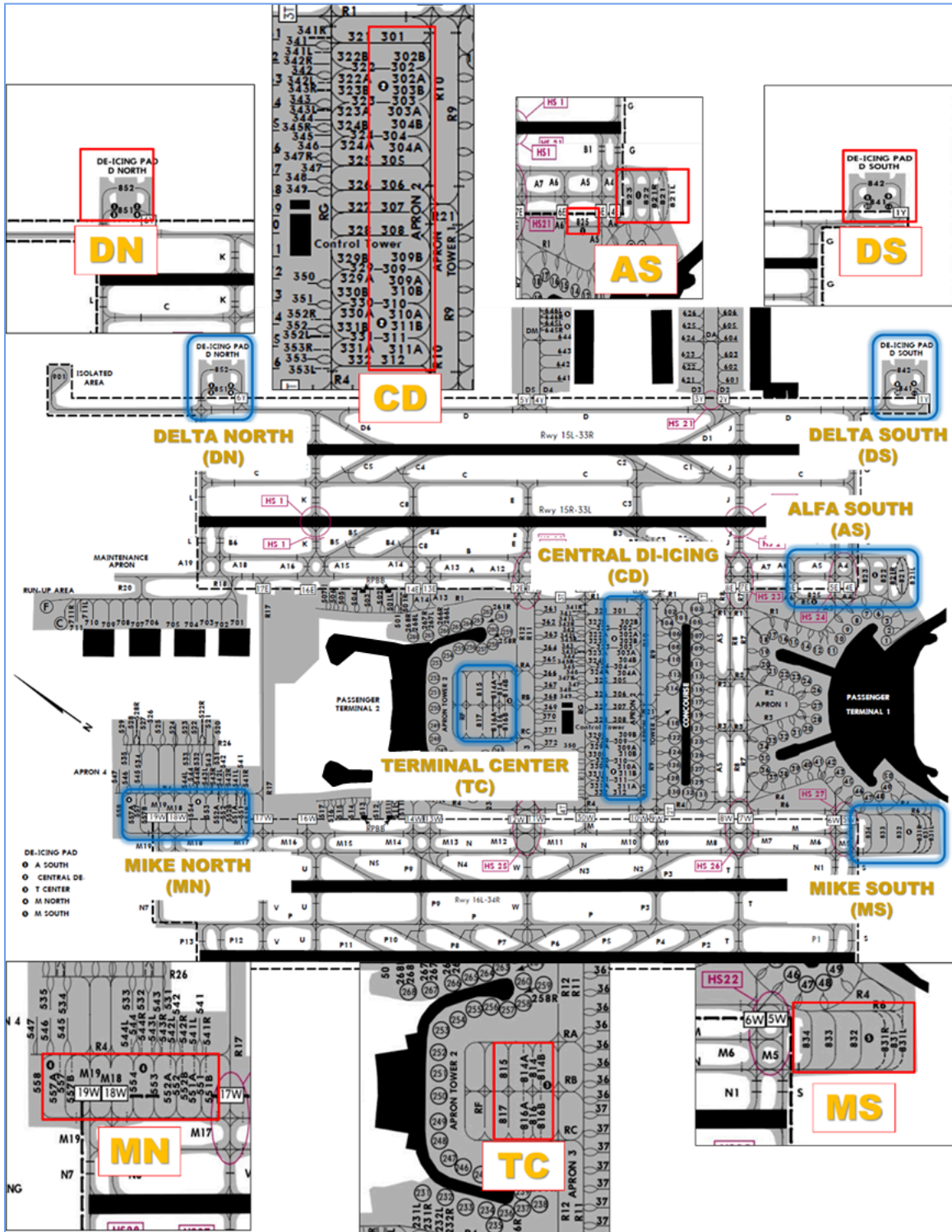
NOTE 2 : Flight crews shall monitor and maintain radio contact, otherwise re-sequenced as a result of no response to 3 successive calls.

NOTE 3 : This procedures can be changed by Incheon Apron according to the volume of de-icing traffic.

NOTE 4 : Flight crews need extra caution when entering and leaving the de-icing pad, since there are GSE roads in front of or behind the de-icing pad.

# Supplementary Information

- 2025-2026 winter season De/Anti-icing

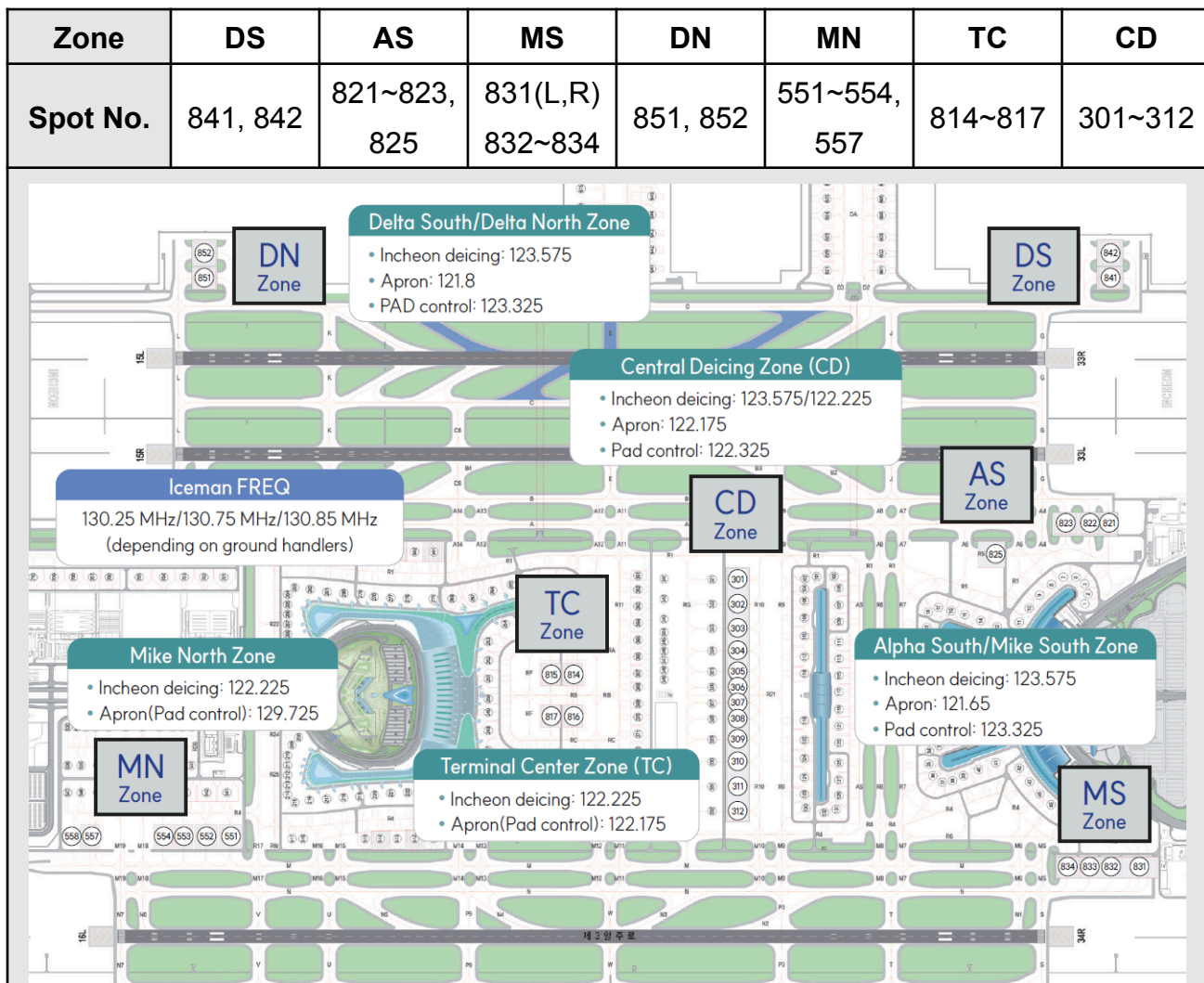


- De / Anti-icing pre-application procedures
  - ▶ When De / Anti-icing is required, apply in advance and check results through the Company Radio (“Asiana ICN”) (System application results will be delivered immediately upon application)
  - ▶ Based on departure time, application is recommended at least 40 minutes in advance.
  - ▶ Exception procedure
    - If the above general procedure is not possible, share with Company Radio first and request action.
    - Prior to cargo aircraft door closing, share the information through the Load Master (Face-to-face delivery)
    - Cancellation procedure after completion of pre-application: Notify a cancellation intention via radio communication with Incheon De-icing by flight crew.
    - New application process after TOBT (including after P/B): Direct action by flight crew, Notify an application intention to Company Radio & Airport’s apron
    - After completing the pre-application, re-application is not necessary due to non-compliance with the TOBT Window.
- "Ice Phase" will be acknowledged by ATIS

| De/Anti-icing Phase | Application of Phase                                                          |
|---------------------|-------------------------------------------------------------------------------|
| Phase 1 (Blue)      | Initiated when snow begins and de-icing request are received.                 |
| Phase 2 (Yellow)    | Initiated when number of aircraft in the de-icing queue reaches 45 aircraft.  |
| Phase 3 (Orange)    | Initiated when number of aircraft in the de-icing queue reaches 80 aircraft.  |
| Phase 4 (Red)       | Initiated when number of aircraft in the de-icing queue reaches 120 aircraft. |

- De/Anti-icing operations are performed only in the remote De-icing pads.

- De-icing Pad location and frequency.



- ENG on and ENG off De/Anti-icing are both available.

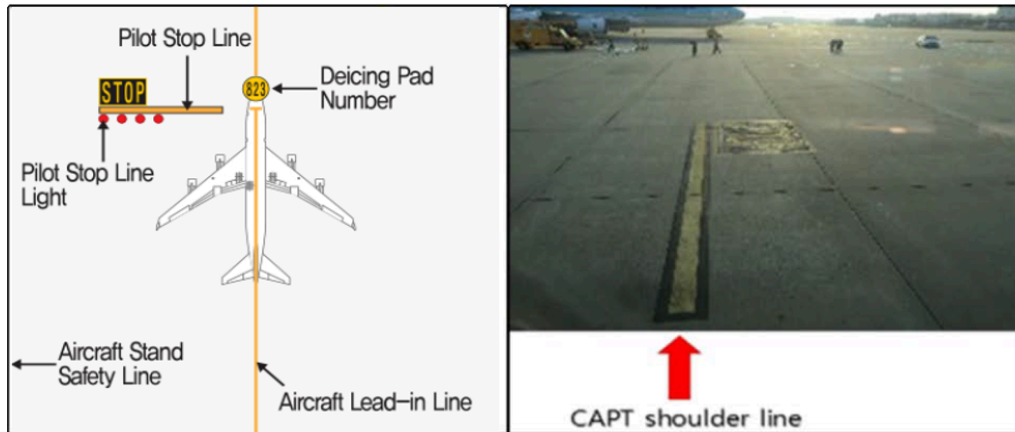
► **ENG ON De-icing available type:**

- 2-ENG aircrafts: A321, A330, A350, B777
- 4-ENG aircrafts: A380

**Note: For 4-ENG aircrafts (A380) ENG ON De-icing, Outboard ENG on and Inboard ENG off is basic procedure. ICE HOUSE(MAN) will notify this when entering de-icing pads.**

► **ENG ON De-icing is available on all de-icing pads.**

- Pilot Stop Line



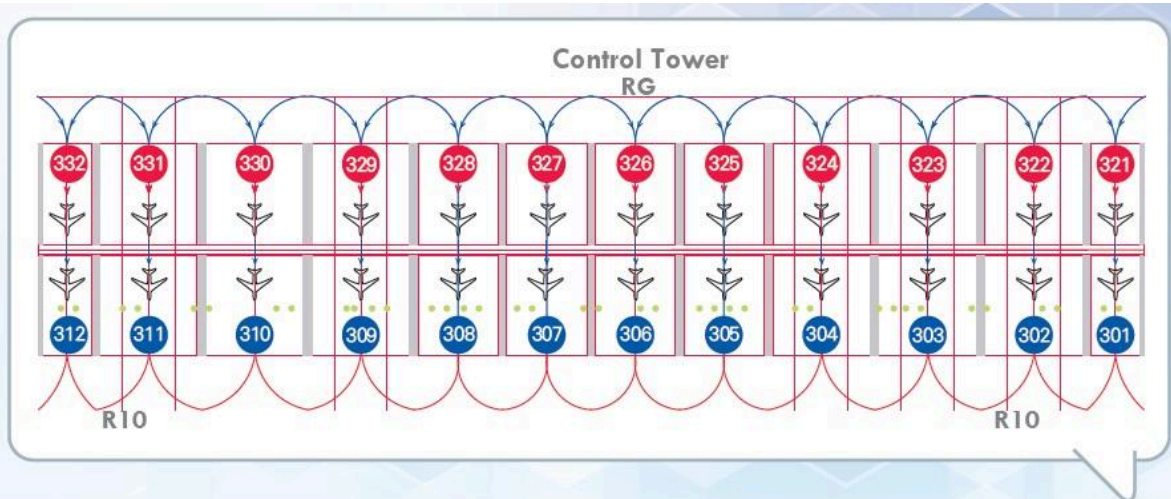
- ▶ This marking is located on all de-icing pads to help stop without marshal service.
- ▶ The transverse bar indicates the cockpit stop position.
- ▶ Aircraft proceed into the assigned de-icing pad and hold abeam the stop line.

***WARNING: Do not increase engines power exceed GND idle at all times in de-icing pad.***

***CAUTION: Be cautious of identifying the PSL(Pilot Stop Line) when entering de-icing pad, especially in wet /snow condition.***

- Central De-icing zone(CD) operation procedure.

- ▶ Taxi to de-icing pad #301 ~ #312 via holding bay #321 ~ #332.
- ▶ When #301 ~ #312 is occupied, wait at holding bay #321 ~ #332.
- ▶ EMB(Electronic Message Board) will be conducted on pad #301 and #312.



## Trial Operation of EMB(Electronic Message Board) for CD Zone (#301~#312)

In deicing pads #301~#312, EMB will display distance to correct stop position for parking guidance.



Pilot can check the status of deicing process via EMB display and frequency.



Apron and Delivery frequency can be guided.



After deicing is completed, EMB will display the deicing anti-code information.



\* Contents of EMB messages can be changed during the trial operation.

- De/Anti-icing operational procedure

Incheon Deicing Frequency – Apron 1,2 (Terminal 1, Concourse) : 123.575 MHz, Cargo Apron 1,2 : 123.575 MHz  
– Apron 3 (Terminal 2), Apron 4 : 122.225 MHz

**Before De-icing Operation**

- 1 When ready for Pushback, Contact Incheon Deicing & Advise that Deicing is required.
- 2 Incheon Deicing will assign the de-icing zone and de-icing pad.
- 3 Contact Apron for pushback and taxi to the de-icing zone.  
\* Set Mode A code to 2000

**Entry Procedure**

- 4 When approaching the de-icing zone, Apron will advise the flight crew to contact Pad Control.
- 5 Pad Control can reassign the de-icing pad and instruct the flight crew to continue taxi to the de-icing pad.  
\* Use extra caution when entering pad, there are no marshaller and wing guard. Hold abeam Pilot stop line.
- 6 After entering the de-icing pad abeam pilot stop line, report parking brake set.  
\* Do not shut down engines until instructed by Iceman for ground safety.

**De-icing Procedure**

- 7 Pad Control will advise the flight crew to contact Iceman for de/anti icing.
- 8 When contact Iceman, report the de-icing pad number and parking brake set.
- 9 Iceman will confirm engines on/off de-icing.  
\* Set engine to ground idle for ground safety if engines on de-icing is applied.  
\*\* For safety and ground handlers' operational reasons, engine-off deicing may be applied.
- 10 The flight crew determines the deicing area and method then informs the Iceman that "Ready for deicing". If needed, extra treatment is possible.
- 11 Iceman will inform "De-icing starts now"
- 12 To get ATC clearance via voice, Iceman will advise flight crew to contact Delivery.  
(Engines on) When de-icing is started, contact Incheon Delivery  
(Engines off) When de-icing is completed, contact Incheon Delivery  
\* Even if flight crews have PDC, they should contact Delivery to get clearance via voice RTF and report whether de-icing is started or completed.  
\* After flight crews get ATC clearance, return to Iceman frequency.
- 13 After de-icing is complete, Iceman confirms that the aircraft is clean and all vehicles are in the safety zone. Iceman will then provide the Anti-icing code.  
\* If only Type 1 de-icing fluid has been applied, "hold over time does not apply".
- 14 (Engines on) When ready for taxi, Iceman will advise the flight crew to contact Pad control.  
(Engines off) After getting the ATC clearance, request "Engines start up" to Iceman. When ready for taxi, Iceman will advise the flight crew to contact Pad control.

**Exit Procedure**

- 15 Contact Pad Control and request for taxi.
- 16 Pad Control will give taxi instruction.  
\* Hold position until instructed by Pad Control.  
\* Do not move until the pilot stop line lights are turned off in de-icing pad.  
\* The flight crew should make a final confirmation that the de-icing pad is clear from all personnel and equipment before exiting the pad.

RKSI / ICN  
INCHEON INTL

Elev. 23 ft, 24 NOV 25  
INCHEON/SEOUL, KOREA

---

***Note:** If OCC designates operationally limited flight due to curfew of destination airport or crew duty time control, the crews should request pushback immediately when fully ready for pushback. (Passenger boarding has been completed and doors are closed) and change the pushback sequence in coordination with ATC to avoid exceeding the operational limitation of flight or crew.*

**END OF RKSI AFILE**

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ASIANA AIRLINES

**BEFORE DE/ANTI-ICING WITH ENGINES RUNNING**

**PARKING BRAKE ..... SET**

**APU..... As needed**

**Flaps..... UP**

**THRUST LEVER ..... IDLE**

**PACK switches..... OFF**

Wait approximately 10 sec after packs switches are off  
before positioning bleed switches to off to reduce pack wear.

**ENG bleed switches ..... OFF**

**APU bleed switch (APU running) ..... OFF**

**END OF BEFORE DE/ANTI-ICING WITH ENGINES RUNNING**

**BEFORE DE/ANTI-ICING WITH ENGINES Not RUNNING**

**PARKING BRAKE..... SET**

**APU..... As needed**

**Flaps..... UP**

**THRUST LEVER ..... IDLE**

**Note:** if engines are shut down for de/anti-icing, position  
ENGINE ANTI-ICE selectors to AUTO.

**PACK switches..... OFF**

**ENG bleed switches..... ON**

**APU bleed switch (APU running) ..... OFF**

**END OF BEFORE DE/ANTI-ICING WITH ENGINES Not RUNNING**

**AFTER DE/ANTI-ICING is completed with ENGINES RUNNING**

OBTAIN AND READ BACK POST DE/ANTI-ICING REPORT

Record de/anti-icing code on the De/Anti-icing Code Report

**APU.....As needed**

Wait approximately one minute after de-icing is completed.

**Pack switches.....AUTO**

**ENG bleed switches..... ON**

**APU bleed switch.....AUTO**

**Flight Controls.....Check, as needed**

**DETERMINE HOLDOVER TIME**

- Use "FAA Holdover Time Guidelines" in the cockpit.
- Holdover time starts when the final application of fluid begins.

**END OF AFTER DE/ANTI-ICING is completed**

**WITH ENGINES RUNNING**

**AFTER DE/ANTI-ICING is completed with ENGINES **Not** RUNNING**

OBTAIN AND READ BACK POST DE/ANTI-ICING REPORT

Record de/anti-icing code on the De/Anti-icing Code Report

**APU..... As needed**

Wait approximately one minute after de-icing is completed.

**Pack switches.....AUTO**

**ENG bleed switches..... ON**

**APU bleed switch.....AUTO**

**Flight Controls..... Check, as needed**

**DETERMINE HOLDOVER TIME**

- Use "FAA Holdover Time Guidelines" in the cockpit.
- Holdover time starts when the final application of fluid begins.

**END OF AFTER DE/ANTI-ICE is completed**

**WITH ENGINES **not** RUNNING**

# **HOLD OVER TIME APPLY**

(Refer to FOM 4.2 De/Anti-icing Procedure for more detailed information)

## ■ **Determine Holdover Time**

- Holdover time starts when the final application of fluid begins.
- Use "FAA Holdover Time Guidelines" in the portable EFB.

## ■ **Use of Holdover Time Guidelines**

- Holdover time provides an operational guideline for departure planning. It must be used in conjunction with the Cockpit Check (Pre-Takeoff Check).
- Precipitation categories, except frost, Ice Pellet, Small Hail, specify a time range, and frost only specifies a single time.

Note: For precipitation events where the Holdover Time is determined by a time range, the Cockpit Check, Cabin Check, and External Check may be omitted if the 'Shortest Time' of the time range has not been exceeded and there are no other factors (e.g., jet blast) that could affect the Holdover Time.

## ■ **Holdover Time**

Holdover time is the estimated time to maintain the function after spraying anti-icing fluid to prevent the form of icing matters on the surfaces of the aircraft. Holdover time is determined by the PIC using the Holdover Time Guidelines on the Portable EFB.

Holdover time starts when the final application of fluid begins. The final fluid applied will be either:

- The time to begin spraying De/Anti-icing fluid in the one step procedure
- The time to begin spraying Anti-icing fluid in the two-step procedure

Holdover time ends when either:

- The applied fluid loses its effectiveness, or
- The time extracted from the holdover time range expires

## ■ **Secondary De/Anti-icing**

If an aircraft which has been de/anti-iced is delayed on the ground long enough that anti-icing protection is no longer effective or if for any reason the de/anti-icing process is interrupted while freezing/frozen precipitation is falling, the Ground De/Anti-Icing Procedure must be re-accomplished in its entirety. This is called Secondary De/Anti-icing. When secondary de/anti-icing is necessary, the contaminated anti-icing fluid and all icing matters must be completely removed by de-icing before making another application of anti-icing fluid. If a holdover time was previously established after completing secondary de/anti-icing, a new holdover time must be applied.

**END OF HOLD OVER TIME APPLY**

## **TAXI CONSIDERATIONS**

**Note:** Consider delaying flap extension when freezing precipitation may accumulate on surface, or when slush may accumulate in flap area.

**CAUTION!** *Taxi at a reduced speed. Use smaller nose wheel steering wheel and rudder inputs and apply minimum thrust evenly and smoothly. Differential thrust may be used to help maintain airplane momentum during turns. At all other times, apply thrust evenly. Taxiing on slippery taxiways or runways at excessive speed or with high crosswinds may start a skid.*

When engine anti-ice is required and the OAT is 3 °C or below, do an engine run up, as needed, to minimize ice build-up. Use the following procedure:

**Check that the area behind the airplane is clear.**

Run-up to a minimum of 50 % N1 for approximately 1 sec duration at intervals no greater than 15 mins.

Call "FLAPS \_\_\_\_" as needed for takeoff.

Flap lever ..... Set takeoff flaps, as needed

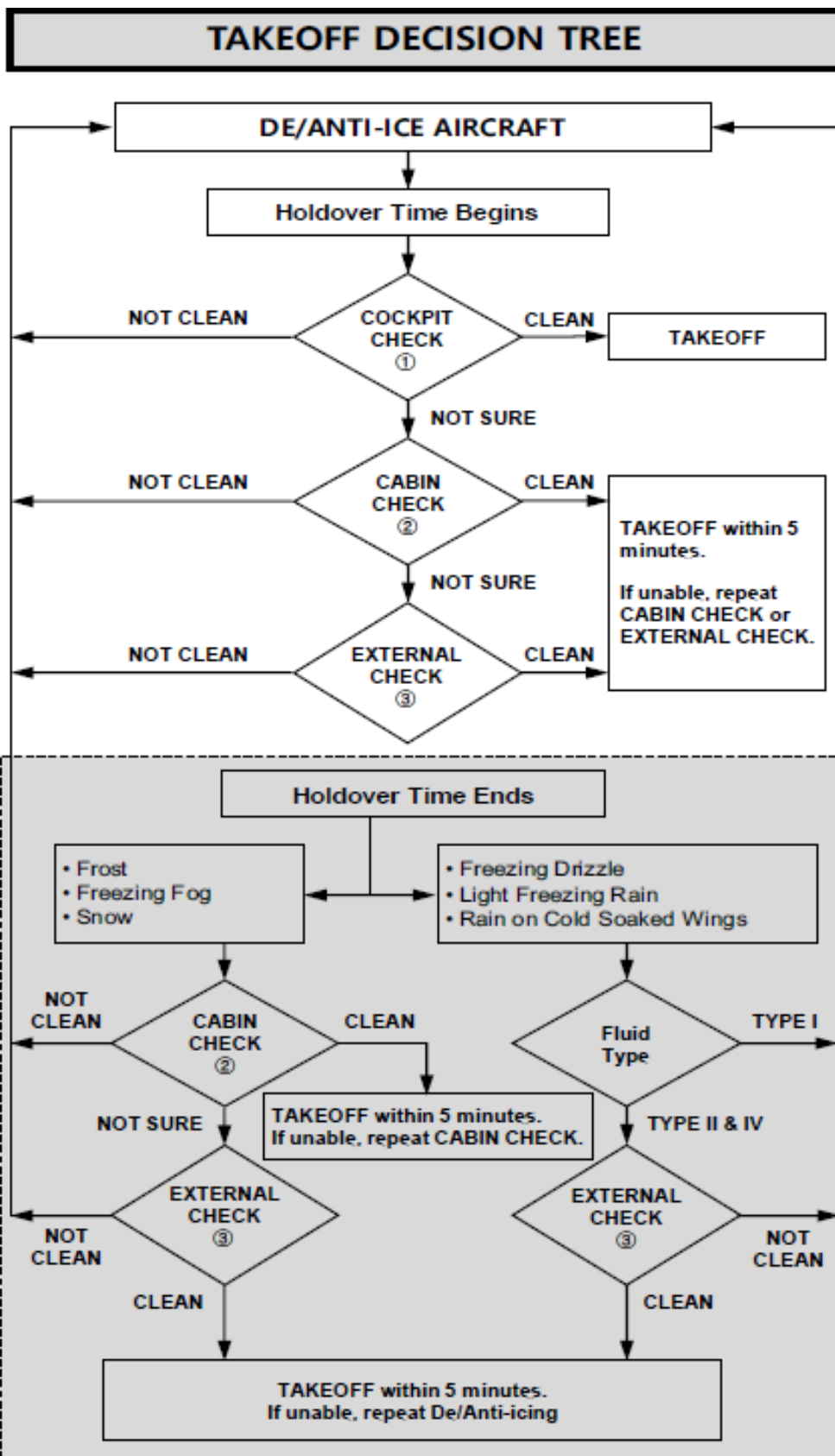
**Note:** Consider delaying flap extension if taxi route is through slush or standing water in low temperatures or if precipitation is falling with temperature below freezing.

**ADJUST HOLDOVER TIME, IF NECESSARY.**

- Continuously assess weather and environmental conditions and periodically perform the **COCKPIT CHECK**.

**END OF TAXI CONSIDERATIONS**

# TAKEOFF DECISION



## □ **Application of the Clean Aircraft Concept**

The flight crew shall check whether the Clean Aircraft Concept is met through the following De/Anti-icing Check before deciding to operate.

### ■ **Cockpit Check (Pre-takeoff Check)**

This check is an integral part of the holdover time and is performed by the flight crew. Holdover Time is a value calculated through testing and is an approximate time to guarantee the effectiveness of De/Anti-icing Fluid. However, because the current weather environment and solution application method cannot perfectly match those at the time of testing, you should not solely rely on the anti-icing effective duration of the Holdover Time Guidelines to determine whether the aircraft is not iced.

The flight crew must continuously perform cockpit checks during the holdover time to confirm the de/anti-icing status of the aircraft, and the final cockpit check must be performed immediately before takeoff, if possible.

- The Cockpit Check is performed by the flight crew and is required anytime :

- Ground icing conditions exist

- The aircraft has been de/anti-iced

- The holdover time is still valid.

- The Cockpit Check consists of :

- A check of representative aircraft surfaces which are visible from the cockpit

- If desired or if any doubt exists, conduct a Cabin Check

- When circumstances do not permit a satisfactory visual check from inside the aircraft, return to the designated area and :

- Have a ground crew perform an external check

- If any doubt exists as to the condition of the aircraft, repeat the ground de/anti-icing procedure.

Note: The ground crew for de/anti-icing checks has the qualification required to perform them.

## ■ Cabin Check (Pre-takeoff Contamination Check)

This check is performed by the flight crew and is required :

- Anytime the aircraft has been de/anti-iced, and holdover time is exceeded during conditions of frost, freezing fog, or snow
- When doubt exists after conducting the Cockpit Check
- During conditions of snow grains

### **CAUTION**

**When Type I fluid has been applied during freezing drizzle and the holdover time has expired, a Cabin Check or External Check is not authorized.**

**Secondary de/anti-icing must be accomplished prior to takeoff.**

**When Type II or Type IV fluid has been applied during freezing drizzle, light freezing rain, or rain on cold soaked wings and holdover time has expired, a Cabin Check is not authorized because clear ice formation cannot be detected visually from inside the aircraft in this situation. In such case, return for an External Check or accomplish secondary de/anti-icing.**

The Cabin Check consists of a visual inspection of all representative aircraft surfaces which are visible from the best vantage point in the cabin. Normally, de/anti-icing fluid failure will first occur on the leading or trailing edges of the wing rather than the mid-chord. Therefore, the leading edges and upper surfaces of both wings must be visually checked for evidence of fluid failure.

Additionally, all visible engine inlets must be inspected for contamination. Takeoff must occur within 5 minutes of the most recent check.

The ability to adequately perform this check from inside the aircraft is highly dependent upon several factors. Lighting conditions, cleanliness of cabin/cockpit windows, and outside visibility may severely hinder or prevent the pilot's ability to satisfactorily assess aircraft surfaces for contamination.

When circumstances do not permit a satisfactory visual check from inside the aircraft,

return to the designated area and:

- Have a ground crew perform the external check
- If any doubt to take off on the condition of the aircraft exists , repeat the ground de/anti-icing procedure.

■ External Check (Alternative Pre-takeoff Check)

This check is performed by the de/anti-icing ground crew and is required anytime :

- Doubt exists after conducting a cabin check, or
- The aircraft has been anti-iced with Type II or Type IV fluid, and holdover time is exceeded during freezing drizzle, light freezing rain, or rain on cold soaked wings.

If the external check cannot be accomplished, return for secondary de/antiicing.

This check consists of a close visual inspection of the aircraft's upper wing surfaces and leading edges for frozen contamination. Takeoff must occur within 5 minutes of the external check; if unable, repeat the ground de/antiicing procedure.

**CAUTION**

**An external check is not authorized during freezing drizzle**

**when Type I fluid is used and holdover time has expired.**

**The aircraft must return to the designated area for**

**an External Check or accomplish the secondary de/anti-icing.**

There are some airports that perform the Secondary De/Anti-icing instead of External Check.

**END OF TAKE OFF DECISION**

## **BEFORE TAKEOFF PROCEDURE**

Verify takeoff flaps set.

Do the normal Before Takeoff Procedure

Oil temperature must be at least 50 °C before takeoff. Any subsequent drop in oil temperature will not affect engine performance.

## **TAKEOFF PROCEDURE**


### **TAKEOFF DECISION**

Do the normal Takeoff Procedure with the following modification:

When engine anti-ice is required and the OAT is 3 °C or below, the takeoff must be preceded by a static engine run-up. Use the following procedure:

Run-up to a minimum of 50% N1 and confirm stable engine operation  
Before the start of the takeoff roll

### **END OF TAKE OFF PROCEDURE**

|            |               |                                                                                                |
|------------|---------------|------------------------------------------------------------------------------------------------|
| FSI-26-001 | <b>운항표준정보</b> | All Fleets  |
| SELOI      |               | 26 FEB 2026                                                                                    |

## FMS NDB Update 오류에 따른 이륙시 초기 선회 시기 강조

### 1. 배경

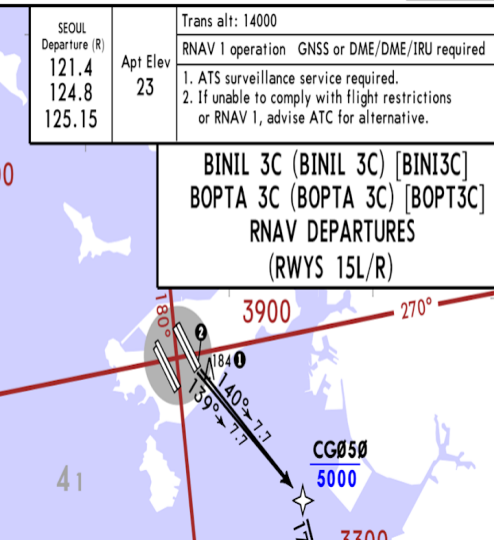
- 제작사(Jeppesen 社)의 FMS Navigation Database(이하 NDB) 코딩 방식 변경으로, 활주로와 SID Track 차이 3도 이상이면 Conditional Waypoint 를 설정하여 운영해 왔으나, 16도 이상으로 변경됨.(’23년 2월)
- 인천공항의 일부 출발 절차(SID)중 이륙 후 초기 선회각이 15도 이하인 절차에서 Conditional Waypoint (e.g. ICN 15R, At or above 530ft)가 삭제됨.
- 이에 따라 FMS SID 경로가 이륙 직후 첫 번째 RNAV Waypoint 를 향해 바로 직진(Direct) 하도록 시현됨.

### <RKSI RWY 15R SID>

**SEOUL/INCHEON, KOREA**  
Eff 1 Oct 1600Z **RNAV SID**

|                                                   |                |                                                                                                                                                                                                      |
|---------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SEOL<br>Departure (R)<br>121.4<br>124.8<br>125.15 | Apt Elev<br>23 | Trans alt: 14000<br>RNAV 1 operation GNSS or DME/DME/IRU required<br>1. ATS surveillance service required.<br>2. If unable to comply with flight restrictions or RNAV 1, advise ATC for alternative. |
|---------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**BINIL 3C (BINIL 3C) [BINI3C]  
BOPTA 3C (BOPTA 3C) [BOPT3C]  
RNAV DEPARTURES  
(RWYS 15L/R)**



PROCEDURE & AIRSPACE RESTRICTIONS  
See 20-3

**Close-in obstacles**

RWY 15L: Light Tower 110 height, 0.3 NM from DER.

6.5% climb is required until reaching FL170 for ATC purpose.  
Minimum 4.1% climb gradient is required until 1000 for obstacle ① avoidance.

|                |     |     |     |      |      |      |
|----------------|-----|-----|-----|------|------|------|
| Gnd speed-KT   | 75  | 100 | 150 | 200  | 250  | 300  |
| 4.1% V/V (fpm) | 311 | 415 | 623 | 830  | 1038 | 1246 |
| 6.5% V/V (fpm) | 494 | 658 | 987 | 1316 | 1646 | 1975 |

| SID             | INITIAL CLIMB                                          |
|-----------------|--------------------------------------------------------|
| <b>BINIL 3C</b> | CG050 - CG100 - CP101 - ATNER - HP121 - BELTU - BINIL. |
| <b>BOPTA 3C</b> | CG050 - CG100 - CD120 - VIMER - EXUTO - BOPTA.         |

CHANGES: Procedures upnumbered, altitude restrictions at CG100 & BELTU, bearings, waypoint

## <FMS\_A350>

| FROM    | TIME  | SPD | ALT     | TRK  | DIST | FPA |
|---------|-------|-----|---------|------|------|-----|
| RKST15B | 00:00 | --- | 20      | 153° | 1    |     |
| 530     |       |     |         |      |      |     |
| C139    |       |     |         | 139° | 8    |     |
| CG050   |       |     | -5000   | 170° | 6    |     |
| BOPT3C  |       |     |         | 190° | 9    |     |
| CG100   |       |     | -8000   | 190° | 8    |     |
| BOPT3C  |       |     |         | 188° | 6    |     |
| CD120   |       |     | WINDOW  | 192° | 9    |     |
| BOPT3C  |       |     |         |      |      |     |
| VIMER   |       |     | -10000  |      |      |     |
| BOPT3C  |       |     |         |      |      |     |
| EXUTO   |       |     | +FL1000 |      |      |     |
| BOPT3C  |       |     |         |      |      |     |
| BOPTA   |       |     | +FL170  |      |      |     |



| FROM    | TIME  | SPD | ALT    | TRK  | DIST | FPA |
|---------|-------|-----|--------|------|------|-----|
| RKST15B | 00:00 | --- | 20     | 141° | 10   |     |
| CG050   | 00:02 | 250 | *5000  | 170° | 6    |     |
| BOPT3C  |       |     |        | 190° | 6    |     |
| CG100   | 00:04 | "   | *8000  | 190° | 8    |     |
| (T/C)   | 00:04 | "   | FL100  | 188° | 6    |     |
| BOPT3C  |       |     |        | 192° | 9    |     |
| CD120   | 00:06 | "   | *FL100 |      |      |     |
| BOPT3C  |       |     |        |      |      |     |
| VIMER   | 00:07 | "   | "      |      |      |     |
| BOPT3C  |       |     |        |      |      |     |
| EXUTO   | 00:09 | "   | "      |      |      |     |
| BOPT3C  |       |     |        |      |      |     |
| BOPTA   | 00:10 | "   | "      |      |      |     |

## 2. 조치사항

- 활주로와 SID Track 차이 3도 이상인 경우, FMS 및 ND 상에 초기 선회를 위한 Conditional Waypoint 유무 확인.
- Conditional Waypoint 없을 시, FD 가 이륙 후 AGL 400ft 미만에서 선회를 지시할 수 있으므로 다음 절차 수행
  - Takeoff Briefing 시 해당내용 포함하여 PF와 PM 간의 역할, AP engage 시기 및 Callout(e.g. "400 ft")에 대하여 명확히 브리핑 실시.
  - AGL 400ft 미만에서, FD 지시에 따른 선회가 되지 않도록 Manual Control.

## 3. 강조사항

- 이륙 후 선회는 FOM 6.4.4(이륙 후 의 선회)에 명시된 예외 상황을 제외하고, AGL 400ft 이상에서 이루어질 수 있도록 유의.
- SID 경로 미준수되지 않도록 유의.

## 4. 적용시기 : 즉시 ~ UFN

운항기술표준 담당