



AEROSPACE STANDARD

SAE AS5635

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Message Boards (Deicing Facilities)

FOREWORD

A visual message display system is intended to improve deicing facility safety and operations management including administrative and record keeping functions.

The Message Boards at a Deicing Facility are the display elements of such a system that includes display of aircraft movement monitoring, deicing facility control and records, and possibly deicing truck location and deicing operation performance.

The intent of a Message Board display at a Deicing Facility is to enhance communication and information to the pilot related to deicing operations.

Direct interface with the pilot comprises display of:

Aircraft lead-in to the deicing pad bay,
Lead-out from the deicing pad bay, and
Pertinent de/anti-icing process information.

This standard covers the Message Boards for Deicing Facilities.

Reference to the overall Central Deicing Facility management system is made to provide an appropriate context.

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1. SCOPE:

This SAE Aerospace Standard (AS) establishes the minimum standard requirements for Message Boards (MBs) at Deicing Facilities. This standard also defines the minimum content and appearance of the display, functional capabilities, design requirements, and inspection and testing requirements.

The Design and Operation of Aircraft Deicing Facilities are covered by ARP4902.

Standards for the deicing facility management system are outside the scope of this document.

1.1 Equipment Classification:

The MB system may incorporate additional features not addressed in this standard (such as the ability to display quantity of de/anti-icing fluids used). The incorporation of such additional features, not considered essential for system functioning, shall not compromise the system's intended purpose.

1.2 Field of Application:

1.2.1 Applicable Airplanes: The MB system is applicable to all classes of aircraft using civil deicing facilities.

1.2.2 Applicable Airports: The message board system shall be compatible with airport ground operations operating under ICAO Standards.

1.3 System Elements:

1.3.1 Message Boards: MBs display variable information based on an interface with the Deicing Facility control station including information on aircraft guidance and positioning.

1.3.2 MB Controls: Control of the Message Boards can be either manual, and/or automatically operated through third party detection devices (e.g., aircraft location sensing devices). The system may be further enhanced by interfacing with Apron Control software, and Airline operation system databases, including information resource management, data archiving, retrieval and reporting.

1.3.3 Alternative Applications for MBs: MB technologies may have alternative applications for airport operations (e.g., aircraft/vehicle movement instruction/information).

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2.3 (Continued):

FAA: Federal Aviation Administration (USA)

FPD: Freezing Point Depressant; used to qualify the nature of fluids

IEC: International Electricity Committee

JAA: Joint Aviation Authorities (in Europe)

JAR: Joint Aviation Requirements (Europe)

MB: Message Board

Min: Minute

MOPS: Minimum Operational Performance Specification

MTBF: Mean Time Between Failures

OAT: Outside Air Temperature

SAE: Society of Automotive Engineers (USA originated)

T.C: Transport Canada (The Canadian Civil Aviation Authority)

3. GENERAL DESIGN REQUIREMENTS:

3.1 Introduction:

This chapter identifies general design requirements for MBs at Deicing Facilities.

The Deicing Facility Control System may include, but is not limited to, the following elements:

Deicing Facility control (Icehouse) Workstation

Aircraft Movement Detection and Guidance Display

Addressable/Electronic Message Boards (AMB/EMB)

Power supplies and transmission

Data Links (aircraft, deicing equipment, ACARS)

Computerized management of deicing operations

Control and direction of aircraft movements

Apron control (aircraft, deicing vehicles and equipment, snow removal equipment)

Airline Databases

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3.1 (Continued):

Data Recording:

- Aircraft identification
- Aircraft movements, including timestamp
- Deicing operations including fluid utilization and recovery
- Time and weather
- Archiving and data recovery
- De/anti-icing fluid inventory

When locating MBs, consideration should be given to the deicing facility layout and space available.

The MB may include, but is not limited to, display of variable messages including:

- Control and direction of aircraft movements
- Pad identification
- Airline and/or aircraft identification
- Instructions (Slow, Stop, Hold, Exit, and directional arrows/chevrons)
- Relevant radio frequencies
- Deicing information (OAT, Fluid Type, Final fluid application Start time)

3.2 Purpose:

The primary purpose of MBs is to enhance aviation safety by:

- reducing verbal communication,
- providing pilots with clear concise information,
- improving operational efficiency, and
- reducing congestion by removing personnel and equipment from the deicing area.

The MBs shall comply with applicable FAA/JAA/TC operation regulations and/or standards, and shall provide information to the flight crew regarding any movement/information instruction.

3.3 Technical Requirements:

Design, supply and installation of MB shall be in accordance with current regulations, applicable standards and generally accepted good engineering practices.

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- 3.3.1 Design and Selection of Materials: MB parts exposed to the external environment shall be designed to withstand the temperature, pressure, chemical and/or radiation environment associated with deicing/anti-icing conditions. MB parts exposed to the external environment shall be designed to withstand impact from deicing fluids; and slush and ice particles shed from an airplane and remain functional.

Materials shall be of a quality that experience and/or tests have demonstrated to be suitable and dependable.

- 3.3.2 Workmanship: Workmanship shall be such as to minimize degradation of service performance and reliability. All components shall be fitted properly and firmly in their appropriate positions. All electrical connections shall be mechanically secured and electrically sound. Care shall be given to neatness and thoroughness of soldering, wiring, welding, brazing, surface treatments, painting, screwed and bolted assemblies, marking of parts and assemblies, and elimination of burrs and sharp edges.

- 3.3.3 Electrical Bonding and Grounding: The MB grounding system shall provide for separation of AC (Alternating Current) power, DC (Direct Current) power, chassis ground and signal ground(s).

On non-conductive enclosures, controls or metal parts that may be touched shall be bonded to ground. Case ground shall not be used for electrical power returns. Materials, surface preparation and finishes for electric bonding surfaces shall be compatible with preservation of adequate electrical conductivity over the life of the Message Board. The maximum resistance across any bonding or grounding junction shall be 1.0 Ω or less, as manufactured.

- 3.3.4 Manufacturer Identification: Manufacturer identification information shall not be conspicuous on the exterior of MBs.
- 3.3.5 Operation: Operation of the MBs at deicing facilities shall be consistent with the principles of the procedures required by ARP4902 paragraph 6.4 and ARP4737 Section 10.

MBs may be mobile or fixed.

3.4 Facility Considerations:

MBs shall consider the applicable requirements of ARP4902 Section 4 and paragraphs 4.2.6.5 and 4.3.

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Sample 'A'

Left area:

Green 'GO'

Right Area – Information Display:

Flight Number, and Pad



Sample 'B'

Left area:

Green 'GO', Pad Identification

Right Area – Information Display:

Flight Number

FIGURE 1 - Sample Information Displays: Aircraft Entry to Pad

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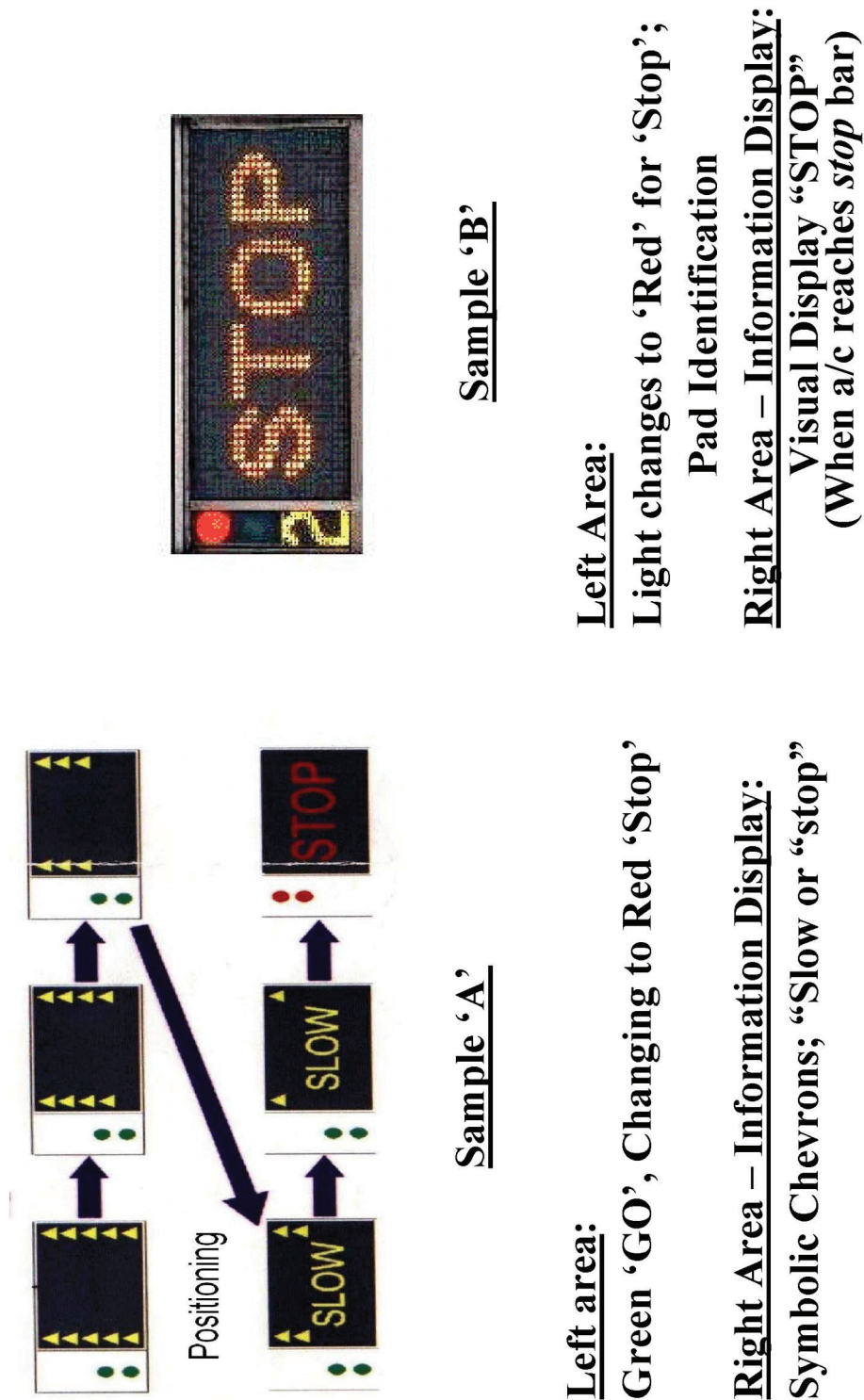


FIGURE 2 - Sample Information Displays: Aircraft Positioning

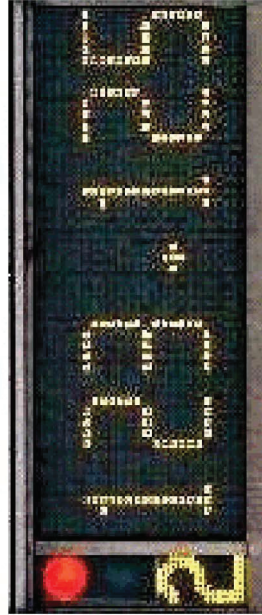
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Sample 'A'

Left area:
Red 'Stop'

Right Area – Information Display:
Pad Control Radio Frequency



Sample 'B'

Left area:
Red 'Stop', Pad Identification

Right Area – Information Display:
Pad Control Radio Frequency

FIGURE 3 - Sample Information Displays: Radio Frequency (Display when a/c stops)

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Sample 'A'

Left area:
Green 'GO'

Right Area – Information Display:
Text Message "EXIT NOW"



Sample 'B'

Left area:
Green 'Go', Pad Identification

Right Area – Information Display:
Arrows Indicating Exit Taxiway
Direction

FIGURE 5 - Sample Information Displays: Aircraft Exit

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3.5.5 Display Format:

General: The display design shall:

- Utilize natural and meaningful symbology that is readily understood.
- Provide information that is immediately discernable.
- Provide an indication to the Deicing Facility control center when an MB is inoperative.
- Have a variable intensity setting over a 24-hour period. (Brightest in daylight), 7000 nits minimum.

Display Layout (see Figures 1 through 5): Messages shall be displayed on two areas of the board:

- Left Area - Dedicated to "traffic light" display.

TABLE 1

Location	Form	Display Color	Message When Lit
Upper	Signal indicator light(s)	red	"Stop"
Lower	Signal indicator light(s)	green	"Go"

- Right Area - Information display
Per ICAO Standards

Character height (minimum)	40 cm (16 in)
Character height (maximum)	80 cm (32 in)
Character Color	Amber (advisory/instructional) on black background Red (instructional) on black background

- Deicing Pad Identification on Message Boards: The MB may bear the deicing pad identification number on either the face or the side of the casing. This pad number may be illuminated when located on the side of the MB case.

3.6 Safety Requirements:

- Design for Safety: All aspects of the MB design should be considered in terms of safety.

The system shall have built in redundancy

The MBs shall have frangible connections on the MB supports.