



AEROSPACE INFORMATION REPORT

AIR8471™

Issued 2025-12

Aircraft Pressures and Temperatures – Resource Document

RATIONALE

This document provides tested resource data on aircraft deicing pressures and temperatures – specifically deicing equipment outputs and impact pressures/temperatures over distance. The data is taken from ARD50102 and TFT (Task Force Tips) data tested around 2000. ARD50102 was a resource document and had only a 2 year life. This document restores the data for committee use.

To be clear, the text was not updated and stands as it was published in 2002, for instance the references were not updated and the text not adjusted to reflect the current document harmonization criteria of SAE G-12.

1. SCOPE:

This SAE AIR covers Forced Air technology including: reference material, equipment, safety, operation, and methodology. It is intended to provide pressure and temperature (*temps pages 26 & 31*) information and minimum safety guidelines regarding use of equipment to remove frozen contaminants related to:

- i) Forced air
- ii) Forced air/fluid
- iii) Deicing fluid

2. APPLICABLE DOCUMENTS:

The following publications form a part of this document to the extent specified herein. The latest issue of all publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. Nothing in this document supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1 SAE Publications:

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS6285	Aircraft Ground Deicing/Anti-icing Processes
AS6286	Aircraft Ground Deicing/Anti-Icing Training and Qualification Program
ARP1247	General Requirements for Aerospace Ground Support Equipment Motorized and Nonmotorized
ARP1971	Aircraft Deicing Vehicle - Self-Propelled
ARP4047	Aircraft Deicing Vehicle - Self-Propelled, Small Capacity

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SAE WEB ADDRESS:

Full document details: SAE AIR8471

For more information on this standard, visit
<https://www.sae.org/standards/content/AIR8471/>

Documents

Standard, visit Sharing Hub

- ARP5058 Enclosed Operator's Cabin for Aircraft Ground De/Anti-icing Equipment
- AMS1424 Fluid, Aircraft Deicing/Anti-icing Fluids, SAE Type I
- AMS1428 Fluid, Aircraft De/Anti-icing Fluids, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV

2.2 ANSI Publications:

Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

- ANSI A92.2 For Vehicle-Mounted Elevating and Rotating Aerial Device

2.3 OSHA Publications:

Available from OSHA, 200 Constitution Avenue, NW, Washington, DC 20210.

Safety and Health Standards 29 CFR 1910

2.4 ISO Publications:

Available from International Organization for Standardization, Case Postale 56. CH-1211 Geneve 20, Switzerland.

- ISO 11075 Aerospace - Aircraft Deicing/anti-icing Newtonian fluids, ISO type I
- ISO 11076 Aerospace - Aircraft Deicing/anti-icing methods with fluids
- ISO 11077 Aerospace - Self-propelled Deicing/anti-icing vehicle - Functional requirements
- ISO 11078 Aerospace - Aircraft Deicing/anti-icing non-Newtonian fluids, ISO type II
(III, IV will be added)

2.5 Other Publications:

TP 13664E Safety Issues and Concerns of Forced Air Deicing Systems.

J919 - Sound Measurement - Off Road Work Machines - Operator - Singular Type

CSA (Canadian Standard Association) CSA C-225 Vehicle-Mounted Aerial Devices

NFPA 70 - National Fire Protection Association Electrical Code

EN 1915-1 Aircraft Ground Support Equipment General Requirements, Part 1: Basic Safety Requirements

EN 1915-2 Aircraft Ground Support Equipment General Requirements, Part 2: Stability and Strength Requirements, Calculations and Test Methods

EN 12312-6 Aircraft Ground Support Equipment Specific Requirements, Part 6: Deicers and Deicing/Anti-icing Equipment

EN 280 Mobile Elevating Work Platforms - Design Calculations - Stability Criteria - Construction - Safety - Examinations and Tests

IATA AHM 975 Functional Specifications for an Aircraft Deicing/Anti-icing Vehicle

ATA. 101 Specification for Ground Equipment Technical Data

3. GENERAL DESCRIPTION:

Forced Air utilizes an air stream to remove accumulations of frozen contamination from the aircraft with or without fluid. Forced Air could provide the option of injecting heated or unheated fluid into the air stream for removal of heavier frozen contamination.

CAUTION: Forced Air only may not remove adhering contaminants and therefore will not eliminate the need for deicing processes in accordance with AS6285.

CAUTION: Forced Air or Forced Air/Fluid applications may not eliminate the need for deicing/anti-icing processes in accordance with AS6285.

Forced Air systems could also assist in the application of anti-icing fluids when approved by the fluid manufacturer.

There are several different types of systems in the industry (Reference Appendix A).

3.1 Background:

Forced Air is a modern-day refinement of various air systems used over the last 40 years in the frozen contaminant removal process. Auxiliary Power Units are and have been used worldwide since the 1960s.

4. TECHNICAL:

Identified forced air systems have been shown to exert less force on the aircraft surface than conventional fluid systems. See Appendix B and C.

4.1 Personnel Safety Concerns:

- Refer to AS6286.
- Noise levels will vary depending on the location of air source components and air nozzle relative to location of personnel. Hearing protection is required if noise levels exceed 85 decibels. Reference ARP1247. The unit noise level should be checked for conformance with local regulations.
- While the materials, methods, application, and processes described or referenced in this document may involve the use of hazardous materials, this document does not address the hazards which may be involved in such use. It is solely the user's responsibility to ensure familiarity with the safe and proper use of any hazardous materials and processes and to take necessary precautionary measures to ensure the health and safety of all personnel.

4.2 Aircraft Safety Concerns:

- Refer to AS6285 for details and cautions.
- Care should be taken during the use of forced air, to prevent loose debris from impacting personnel, other aircraft surfaces or being ingested into engines or other intakes.

4.3 Fluid Performance:

The effect on de/anti-icing fluids when simultaneously applied with Forced Air needs further evaluation (Reference Appendix C).

5. METHODS/PROCEDURES:

The following information may be used for the establishment of methods for removal of frozen contaminants from aircraft surfaces using forced air or forced air/fluid process.

5.1 Forced Air Precautions:

- 5.1.1 Forced Air may not remove adhering contaminants and therefore will not eliminate the need for deicing processes in accordance with AS6285.
- 5.1.2 Consult aircraft manufacturers' limitations for maximum air pressures.
- 5.1.3 Forced Air shall not be directed into engines, auxiliary intakes/exhausts or the orifices of pitot heads, static vents or directly onto air stream direction detectors (e.g., probes or angle of attack airflow sensors).
- 5.1.4 When removing ice, snow or slush from the landing gear and wheel well areas care should be taken as debris may cause damage to components.
- 5.1.5 When removing ice, snow or slush from aircraft surfaces care should be taken to prevent it from entering and accumulating in aerodynamically quiet areas such as control surface hinge areas or from entering engine inlets as special inspections may then be required.
- 5.1.6 Care should be taken to prevent loose debris from impacting personnel or other aircraft surfaces (Reference Appendix C).
- 5.1.7 Forced Air applications may not eliminate the need for deicing/anti-icing processes in accordance with AS6285.
- 5.1.8 When anti-icing is not necessary this process must be followed by a post application check complying with AS6285.

5.2 Forced Air/Fluid Process:

- 5.2.1 Forced Air/Fluid can be used to remove or assist in the removal of adhering frozen contaminants.
- 5.2.2 Forced Air/Fluid application shall follow the deicing related information in AS6285. Methods/Procedures.
- 5.2.3 When removing ice, snow or slush from aircraft surfaces care should be taken to prevent it from entering and accumulating in aerodynamically quiet areas such as control surface hinge areas or from entering engine inlets as special inspections may then be required.
- 5.2.4 Care should be taken to prevent loose debris from impacting personnel or other aircraft surfaces (Reference Appendix C).
- 5.2.5 Forced Air or Forced Air/Fluid applications may not eliminate the need for deicing/anti-icing processes in accordance with AS6285).
- 5.2.6 When anti-icing is not necessary this process must be followed by a Post Application Check complying with AS6285.

WARNING: Published Holdover Time guidelines shall not be used when using forced air unless followed by the application of deicing and anti-icing fluid, without forced air, in accordance with AS6285.

PREPARED UNDER THE JURISDICTION OF
SAE SUBCOMMITTEE G-12M METHODS OF
COMMITTEE G-12, AIRCRAFT GROUND DEICING COMMITTEE

APPENDIX A
EQUIPMENT DESCRIPTIONS FROM EQUIPMENT MANUFACTURERS

FMC

The forced air is generated by a hydraulically driven centrifugal compressor, mounted in a sound insulated enclosure on the boom of the deicer.

The compressed air is ducted to a turret and nozzle, mounted in front of the operator cabin. The operator aims the nozzle using joystick controls. The rubber nozzle tip is designed to obtain maximum forced air reach and minimize the risk of aircraft damage.

A regular fluid nozzle is mounted on top of the air nozzle. De/anti-icing fluid can be applied from the fluid nozzle while the air system is in operation or can be injected into the airflow through the nozzle.

Nominal air output of the system is 100 pounds per minute at 13 psi at the nozzle. This output can be reduced manually by the operator or automatically when anti-icing fluid is injected.

Specifications:

Air Velocity	635-785 mph
Air Volume	1100-1400 cfm (cubic feet per minute)
	85-102.3 lb/min
Air Pressure @ Nozzle	8-13 psi
Fluid Injection	0-15 gpm (gallons per minute)

NOTES: Low numbers for Anti-icing Fluid Injection/Assist
High numbers for Deicing Fluid Injection/Assist or Air only

GLOBAL

Forced air is created by a hydraulically driven centrifugal compressor mounted at the operator platform to maximize air system efficiency.

The air inlet to the compressor is protected against object ingestion by a “Bellmouth” screen. The oil lubrication system incorporates an automatic monitoring system and shutdowns.

The oil lubrication system includes: inline filters, vented oil reservoir and a lightweight heat exchanger for system protection.

An air manifold is provided between the compressor and the 2-axis flow monitor with a projectile containment device.

A joystick operates the 2-axis flow monitor in a horizontal and vertical direction with an air system on/off switch.

A twin tube manifold is mounted to the 2-axis flow monitor. The tube manifold has the deicing/anti-icing tube and nozzle mounted over the air flow tube. Mounted on the air tube is a specific contoured rubber nozzle that was computer designed for optimum air flow.

Specifications:

Air Velocity	700-760 mph
Air Volume	1100-1400 cfm
	100-110 lb/min
Air Pressure @ Nozzle	11-13 psig
Fluid Injection	0-15 gpm

PREMIER

The Premier Hybrid Deicer is a truck-mounted deicer with independent systems for forced air, deicing and for anti-icing. The deicing system incorporates a co-axial nozzle, air compressor, high pressure liquid pump and other components comprising the Honeywell-patented Hybrid Deicing System TM.

Nozzle control is done from an open or enclosed boom-mounted cab. The co-axial nozzle ejects an independent deicing fluid stream (heated to 180 °F) within an air stream; both streams exiting the nozzle in the same direction and at about the same high velocity of 750 mph. The deicing fluid can be varied between 9 or 20 gpm, instantly.

The 100-ppm air stream can also be turned off so that deicing can be done with a high velocity, heated stream of deicing fluid similar to conventional deicing. Therefore, this system has on-the-spot adjustment to match the specific deicing conditions yielding an effective and glycol-efficient deicing process.

Specifications:

Air Velocity	700-750 mph
Air Volume	105-115 lb/min
Air Pressure @ Nozzle	12-15 psig
Fluid Injection	9 or 20 gpm (heated to 180 °F)

G. VESTERGAARD A/S

G. Vestergaard A/S has been working with Forced Air Systems for several years and offers several Forced Air systems. Some parameters e.g., air flow, speed and pressure are very important when doing Forced air snow removal, however, two factors seem to be most important.

The two factors are:

1. Distance from air nozzle to area being treated
2. Maneuverability of air nozzle

The blow distance is probably the most important factor within Forced air operation. The optimal blow distance should not exceed 3-5 feet, especially when the contamination differs from light powder snow.

Elephant GAMMA:

Equipped with MAK MSU 200 Air Start Unit that can operate as conventional Air Start Unit, or as snow removal unit. Air is lead to the basket via a pipe/swivel system, where the air nozzle is swivel mounted.

Elephant MY:

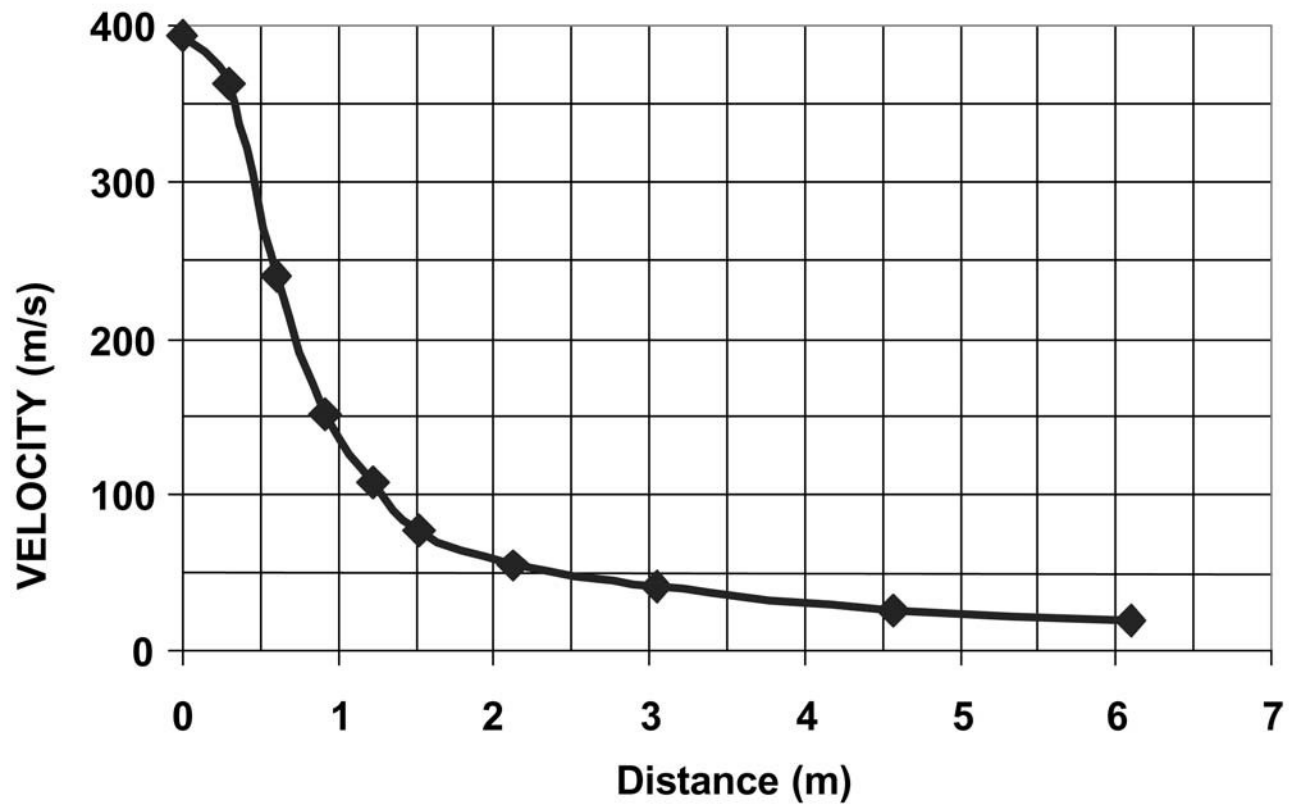
A very simple system, which incorporates a directly hydraulic driven centrifugal blower. Air nozzle can be moved swiftly from side to side ($\pm 50^\circ$) as well as from up (30°) to straight down. It is located at the bottom of the basket, in order to offer the shortest possible working distance. Noise level below 96 dB(A) in operator's basket.

Elephant BETA:

The BETA is equipped with a hydraulic directly driven centrifugal blower. The air stream is ducted in telescopic piping on the side of the telescope. The air nozzle is located right beside the main nozzle and moves synchronously and with the same speed as this. Air nozzle control is thus done via the main nozzle joystick, and the working range of the air nozzle is similar to that of the fluid nozzle. The nozzle moves 180° vertically (from upwards to “backwards”) and ±30° horizontally. Noise level below 80 dB(A) in operator’s cabin.

Air Velocity:	GAMMA:770-800 mph
	MY:340-380 mph
	BETA:335-375 mph
Air Volume:	GAMMA:200-206 lb/min
	MY:160-170 lb/min
	BETA:155-165 lb/min
Air Pressure @ nozzle:	GAMMA:18-20 psi
	MY:4-5 psi
	BETA:4-5 psi

All units can be equipped with fluid injection.

APPENDIX B
TEST AND EMPIRICAL DATA**FMC-Air Velocity vs Distance**ambient: 2°C and
1006mBAR*Figure B1*

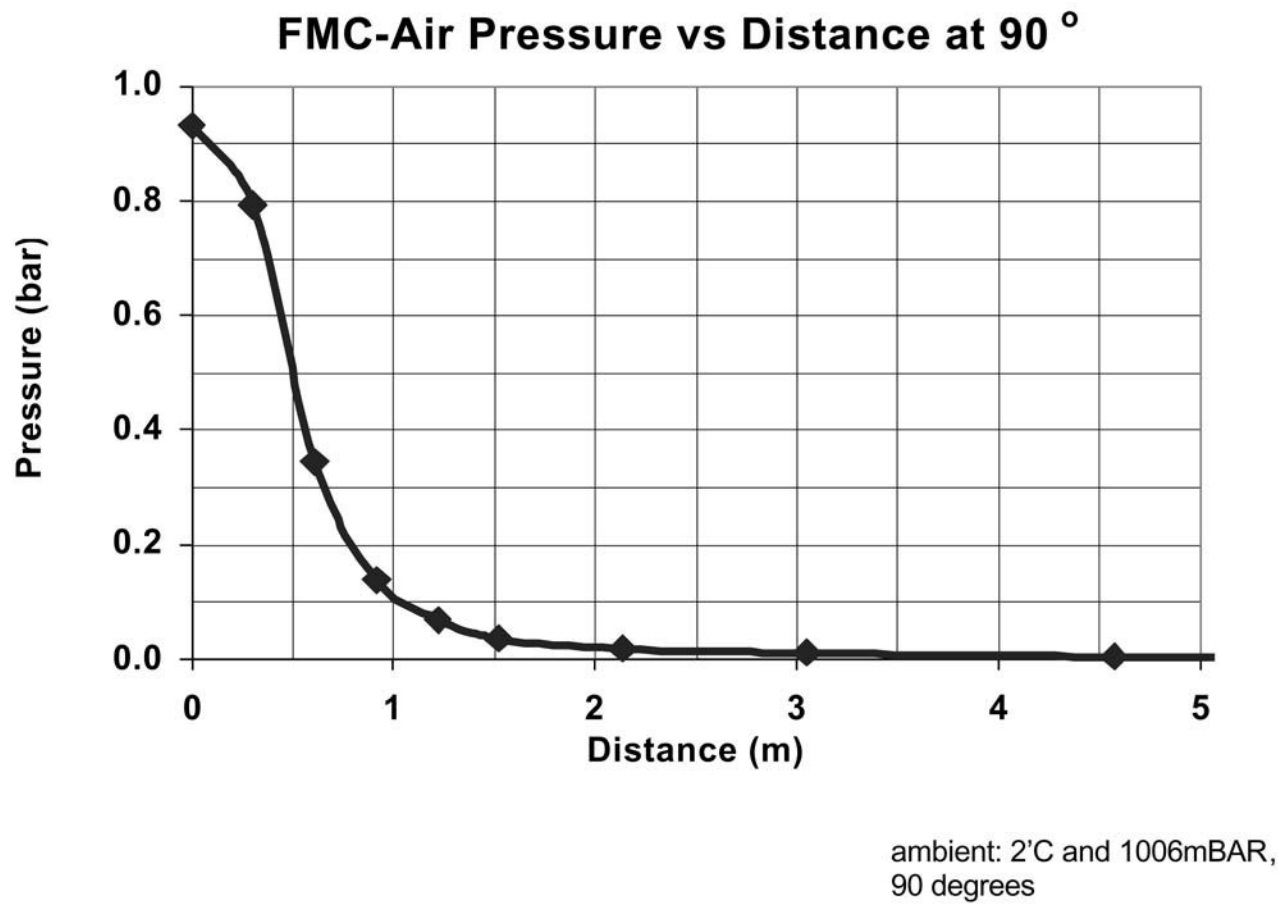
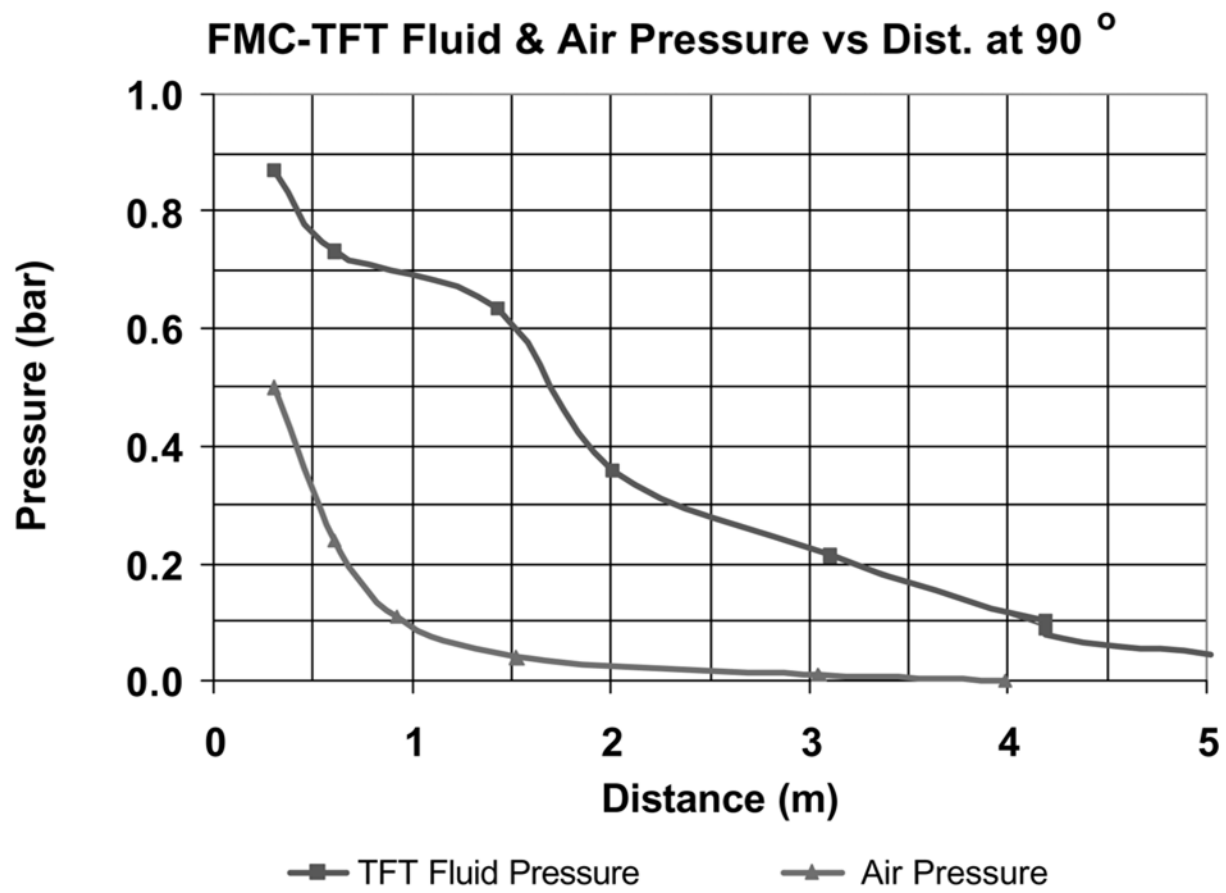


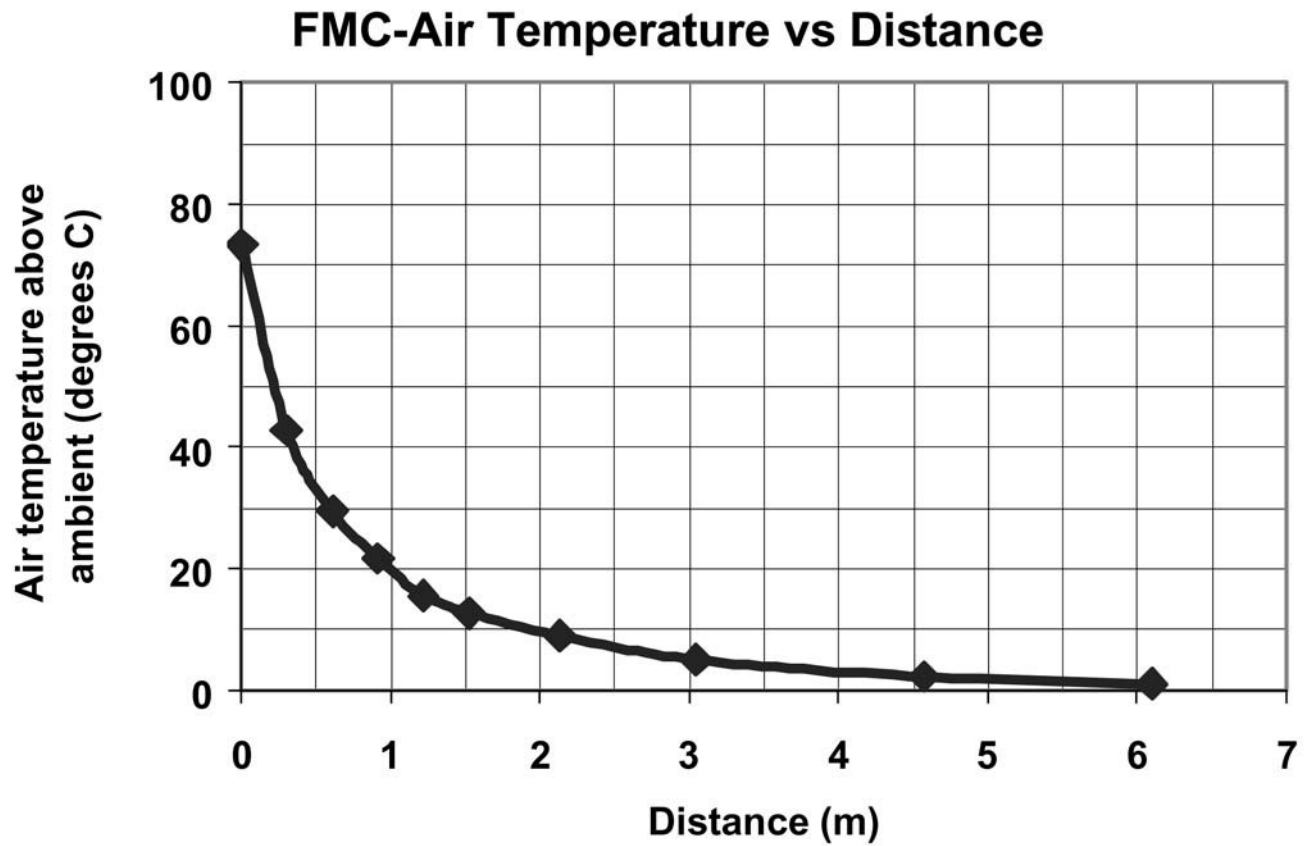
Figure B2



225 l/min, 6.9 bar at
nozzle

Ambient:
19.4°C

Figure B3



Ambient: 3°C and
1006mBAR

Figure B4