

SEMI E28-0218

GUIDE FOR PRESSURE PARAMETERS OF THE MASS FLOW CONTROLLER

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1 Purpose

1.1 The purpose of this Guide is to establish a uniform, worldwide means to describe pressure parameters as they relate to mass flow controllers (MFC). It is intended to prevent confusion and misunderstanding between manufacturers and users.

2 Scope

2.1 This Guide contains definitions of terms which describe gas pressure in MFCs as used in the semiconductor industry. SI units are the reference units for this Guide.

NOTICE: SEMI Standards and Safety Guidelines do not purport to address all safety issues associated with their use. It is the responsibility of the users of the Documents to establish appropriate safety and health practices, and determine the applicability of regulatory or other limitations prior to use.

3 Referenced Standards and Documents

3.1 SEMI Standards and Safety Guidelines

SEMI E12 — Guide for Standardized Pressure, Temperature, Density, and Flow Units Used in Mass Flow Meters and Mass Flow Controllers

NOTICE: Unless otherwise indicated, all documents cited shall be the latest published versions.

4 Terminology

4.1 Definitions

4.1.1 *absolute pressure* — the pressure measured relative to zero pressure (perfect vacuum). (Refer to Figure 1 and Figure 2.)

4.1.2 *ambient pressure* — the absolute pressure of the medium surrounding the MFC. (Refer to Figure 2.)

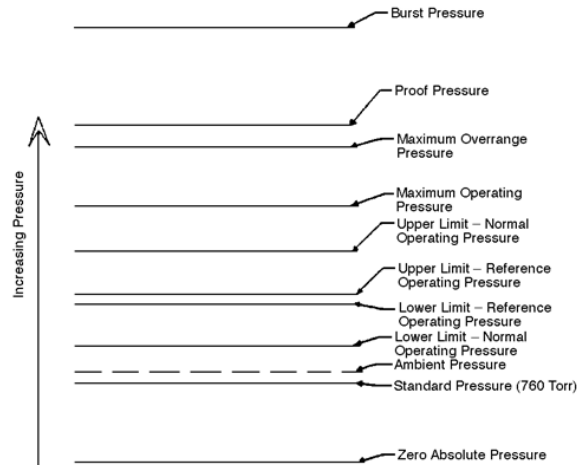


Figure 1
Pressure Definitions for MFCs

4.1.3 *burst pressure* — the gas pressure at which the MFC may rupture.

4.1.4 *differential pressure* — the difference in absolute pressure between two points of measurement in a system. (Refer to Figure 3.)

NOTE 1: To indicate unambiguously that a pressure measurement is differential, the following abbreviations should be used:

- Pa (d) — Pascal, differential (Other units may include the following: psi (d) – pounds per square inch, differential; Torr (d) – Torr, differential; kg/cm²(d) – kilograms per square centimeter, differential; bar (d) – bar, differential.)

4.1.5 *gauge pressure* — the differential pressure measured relative to ambient pressure.

4.1.5.1 For example, when the pressure within a system equals the prevailing ambient pressure, the gauge pressure equals zero. (Refer to Figure 2.)

NOTE 2: To indicate unambiguously that a pressure measurement is gauge, the following abbreviations should be used:

- Pa (g) — Pascal, gauge (Other units of pressure may include the following: psi (g) – Pounds per square inch, gauge; Torr (g) – Torr, gauge; kg/cm² – kilograms per square centimeter, gauge; bar (g) – bar, gauge.)

NOTE 3: The performance of MFCs can vary significantly with gas density. Atmospheric pressure varies with the weather and altitude at various geographical locations. Gauge pressure units commonly reference atmospheric pressure. Therefore, the same gauge pressures measured at different geographical locations may correspond to different gas densities. For this reason, the use of gauge pressure units with MFCs can be imprecise and should be avoided.

4.1.6 *inlet pressure* — the pressure at the inlet fitting of the MFC. (Refer to Figure 3.)

4.1.7 *maximum operating pressure* — the highest pressure at which device is permitted to operate as per the functional specifications provided by the MFC manufacturer. (Refer to Figure 1.)

4.1.8 *maximum overrange pressure* — the maximum gas pressure to which the MFC can be subjected without degrading specified performance and not needing adjustments to meet specified performance when returned to normal operating pressure. (Refer to Figure 1.)

4.1.9 *MFC calibration pressure, inlet and outlet* — the inlet and outlet pressure at which the MFC was calibrated.

4.1.10 *normal operating pressure, inlet and outlet* — the pressure range within which the MFC meets its stated performance specifications (refer to Figure 1).

4.1.11 *normal operating differential pressure* — the range of differential pressure (refer to § 4.1.4) required by the MFC to meet its stated performance specifications.

NOTE 4: The upper and lower limits are dependent upon the absolute inlet or outlet pressure. These limits are manufacturer-specific.