

SEMI F100-0705

TEST METHOD FOR MINIMUM FLOW COEFFICIENT OF DIAPHRAGM VALVE FOR METRIC PERFLUROALKOXY (PFA) TUBE

This Standard was technically approved by the Global Liquid Chemicals Committee. This edition was approved for publication by the global Audits and Reviews Subcommittee on March 11, 2005. It was available at www.semi.org in June 2005.

NOTICE: The section symbol (§) is used to reference a numbered section, paragraph, or header and all subordinate paragraphs, headers, and embedded material (i.e., EXCEPTIONs, lists) therein. The paragraph symbol (§) is used to reference a particular numbered paragraph and embedded material therein. When duplicated (i.e., §§ and §§§) the symbols are used to reference more than one section or paragraph, respectively.

NOTICE: This Standard or Safety Guideline has an Inactive Status because the conditions to maintain Current Status have not been met. Inactive Standards or Safety Guidelines are available from SEMI and continue to be valid for use.

1 Purpose

- 1.1 This compliance test method presents that the verification of the compatibility of each diaphragm valves for metric perfluoroalkoxy (PFA) tube simply.
- 1.2 This Standard specifies the relative orifice that gives the minimum flow coefficient for diaphragm valve for metric PFA tube.
- 1.3 This compliance test method describes how to verify the flow coefficient of the diaphragm valve by comparing with the relative orifice.

2 Scope

- 2.1 This Specification addresses a capacity of diaphragm valves used with metric PFA tubes.
- 2.2 These diaphragm valves are used in chemical distribution systems for semiconductor and flat panel display manufacturing.
- 2.3 The valves are made from materials such as polytetrafluoroethylene (PTFE) or PFA, which have high corrosion resistance and low contamination contribution to the fluid.
- 2.4 The valves withstand up to 0.2 megapascals (MPa) (29 pounds per square inch [psi]) backpressure.
- 2.5 Fully open to fully shut switch over is the objective of the shut-off valve.

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 None.

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

4 Terminology

4.1 Abbreviations and Acronyms

- 4.1.1 *PFA* — perfluoroalkoxy

4.2 Definitions

- 4.2.1 *back pressure* — a maximum allowable pressure applied to outlet of a diaphragm valve.
- 4.2.2 *liquid chemicals* — acid, alkali, organic solvent, and pure water used for wet stations; resists and developers used for track system; and other chemicals used for process or maintenance (such as slurry of CMP) of equipment or facilities.

5 Test Fluids

5.1 *Incompressible (Liquid) Fluid* — Water is standard liquid test fluid.

6 Test Setup

6.1 Standard Orifice

6.1.1 Orifice Diameter (A)

6.1.1.1 On the basis of 50% of the inner diameter of PFA tube connection. Refer to Figure 1.

- $\phi 2.0$ [mm] orifice ($\phi 6$ -4 [mm] tube)
- $\phi 4.0$ [mm] orifice ($\phi 10$ -8 [mm] tube)
- $\phi 5.0$ [mm] orifice ($\phi 12$ -10 [mm] tube)
- $\phi 8.0$ [mm] orifice ($\phi 19$ -16 [mm] tube)
- $\phi 11.0$ [mm] orifice ($\phi 25$ -22 [mm] tube)

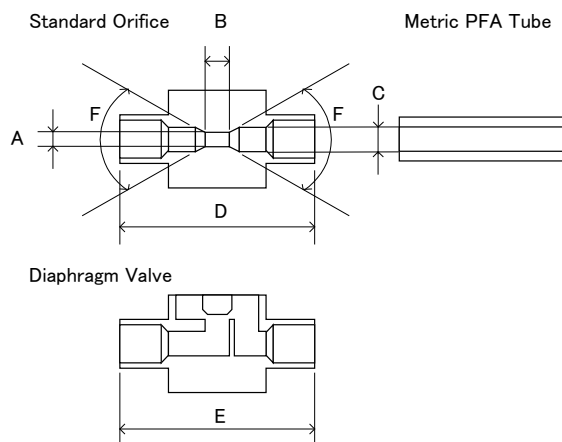


Figure 1
Inside View of Standard Orifice

6.1.2 Orifice Diameter Tolerance

6.1.2.1 Tolerance: $+0.2, -0$ [mm]

6.1.3 Orifice Length (B) should be less than inner tube diameter; that is, $B \leq A$.

6.1.4 Dimensions (D) should be determined in accordance with the test valve port connection; that is, $D \leq E$.

6.1.5 Dimension (F) should be equal to or less than a 90 degree angle.