Background Statement

Diaphragm valves are used in liquid chemical distribution facilities and process equipment for semiconductor and flat panel display manufacturing. Those facilities and equipment have been technically innovated and the diaphragm valves used with PFA tube which is sized in metric or English unit dimensions have been varied in many shapes and sizes.

The manufacturers offer different specifications, shapes, mounting dimensions, connecting face distances, and connecting point heights. Especially the fittings are available in dozens of types. In this situation, the dimensional compatibility's not found between valves from different manufacturers, and resulted in design and maintenance problems of those facilities and tools.

The standardization for the dimensions of the pedestal of the diaphragm valves has been completed, but the outside dimensions of the valves still vary, therefore these dimensions of the height of the flow path and outside dimensions of the valve body will be standardized for standard design of tubing and maintenance of the diaphragm valves.
SEMI Draft Document 3785A
New Standard: DIMENSIONAL SPECIFICATION of a DIAPHRAGM VALVE for a METRIC PFA TUBE

1 Purpose
1.1 This document specifies the outside dimensions of diaphragm valves used with metric PFA tubes in liquid chemical distribution facilities and process equipment for semiconductor and flat panel display manufacturing.

2 Scope
2.1 This specification addresses dimensions of diaphragm valves used with metric PFA tubes except for face-to-face dimensions. Since there are many sizes of fittings being applied to valves, this document doesn’t specify face-to-face dimensions.
2.2 These diaphragm valves are limited to pneumatic valves. Specification for manual valves should be separately provided as needed.
2.3 These diaphragm valves are used in chemical distribution systems for semiconductor and flat panel display manufacturing.
2.4 The valves are made from materials such as PTFE or PFA, which have high corrosion resistance and low contamination contribution to the fluid.
2.5 The valves withstand up to 0.2 megapascals (MPa) (29 pounds per square inch (psi)) back pressure.

NOTICE: This standard does not purport to address safety issues, if any, associated with its use. It is the responsibility of the users of this standard to establish appropriate safety and health practices and determine the applicability of regulatory or other limitations prior to use.

3 Referenced Standards
3.1 SEMI Standards
SEMI F65 — Dimensional Specification for Mounting Bases of Diaphragm Valves Used with Metric PFA Tubes
NOTICE: Unless otherwise indicated, all documents cited should be the latest published versions.

4 Terminology
4.1 Abbreviations and Acronyms
4.1.1 PFA — Tetrafluoroethylene
Perfluoroalkylvinylether
4.1.2 PTFE — Tetrafluoroethylene

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 truck system; and other chemicals used for process or maintenance (such as slurry of CMP) of equipment or facilities.

5 Dimensional Specifications
5.1 Overall Height Dimensions — the height (B) and (C) indicated in Figure 1 and the values for different tube sizes are specified in Table 1.
5.2 Port Height Dimensions — the height (A) indicated in Figure 1 and the values for different tube sizes are specified in Table 1.
5.3 Body Dimensions — the length (D) and width (E) of the body indicated in Figure 1 and the values for different tube sizes are specified in Table 1.

Figure 1
Top View of A Typical Diaphragm Valve
Table 1  Dimensional Specifications

<table>
<thead>
<tr>
<th>Tube Size (mm)</th>
<th>A (mm)</th>
<th>B (mm)</th>
<th>C (mm)</th>
<th>D (mm)</th>
<th>E (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 / 22</td>
<td>35 - 40</td>
<td>MAX 145</td>
<td>MAX 175</td>
<td>MAX 62</td>
<td>MAX 62</td>
</tr>
<tr>
<td>19 / 16</td>
<td>25 - 30</td>
<td>MAX 120</td>
<td>MAX 150</td>
<td>MAX 60</td>
<td>MAX 60</td>
</tr>
<tr>
<td>12 / 10</td>
<td>20 - 30</td>
<td>MAX 95</td>
<td>MAX 115</td>
<td>MAX 36</td>
<td>MAX 40</td>
</tr>
<tr>
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<td>20 - 25</td>
<td>MAX 95</td>
<td>MAX 115</td>
<td>MAX 36</td>
<td>MAX 40</td>
</tr>
<tr>
<td>6 / 4</td>
<td>15 - 25</td>
<td>MAX 80</td>
<td>MAX 100</td>
<td>MAX 35</td>
<td>MAX 35</td>
</tr>
</tbody>
</table>

NOTE 1: OD and ID are the outside diameter and inside diameter of the tube respectively.

NOTE 2: As seen above, dimensions of A are specified by the range, and dimensions from B to E are specified as maximum dimensions that are to be considered as targets.

6 Measurements

6.1 The mounting base must be conditioned for a minimum of one hour in an air environment of 23±3°C (73.4±5.4°F) prior to measuring the dimensions.

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