

SEMI F108-0310

GUIDE FOR INTEGRATION OF LIQUID CHEMICAL PIPING COMPONENTS FOR SEMICONDUCTOR, FLAT PANEL DISPLAY, AND SOLAR CELL MANUFACTURING APPLICATIONS

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1 Purpose

1.1 This Standard provides a guide for manufacturers of liquid chemical equipment as well as piping system installers where integration of polymer components is to consider minimization of installation space.

1.2 This Standard is also expected to advance installation practices of polymer components used in liquid chemical equipment distribution system within device and process device for semiconductor, flat panel display and solar cell manufacturing.

2 Scope

2.1 This Guide applies to polymer components such as valves, regulators and filters which convey and control the liquid chemicals in the piping system.

2.2 These components and piping systems are constructed of materials such as polytetrafluoroethylene (PTFE), perfluoroalkoxy (PFA), polyvinylidene fluoride (PVDF), polyvinylchloride (PVC), and polypropylene (PP), etc., which have high corrosion resistance properties and low fluid contamination properties.

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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 Definitions

4.1.1 *integration* — the connections of various components, such as valves, regulators and filters used in liquid chemical distribution or mixing. Since the piping may be complicated in some cases, and require extra space, integration refers to reviewing the conventional connection method which connects these components with other components and/or tubing/piping systems and simply offers suggestions that minimize space, thereby connecting or fitting each component in close proximity.

4.1.2 *liquid chemicals* — acids, alkali, organic solvents and pure water used in wet stations, resist and developer used in track systems, and chemicals (CMP slurry, etc.) used for other systems and device processes and maintenance.

4.1.3 *components* — devices used to convey and control the liquid chemicals in the liquid chemical distribution system and process equipment device. Such components include valves, regulators, filters, pumps, flow meters, pressure gauges, heat exchange units, etc.

5 Recommendations Regarding Performance

5.1 The sealing performance as well as the component material strength of each integrated component's connection section in respect to the liquid chemical should adequately meet said component supplier's pressure and temperature specifications.

5.2 The durability of each integrated component's connection section should be equal to the said component supplier's durability.

5.3 The flow path shape of each integrated component's connection section should ensure that the liquid chemical's retention and purging ability are not inferior to existing conventional polymer tube or resin pipe connections.

NOTE 1: It is recommended that the working conditions, including the liquid chemical characteristics and the compatibility of the component materials, should be adequately reviewed by the user and supplier before deciding the performance specifications.

6 Recommendations Regarding Dimensional Guidelines

6.1 The integrated liquid chemical piping should be smaller and use less space than the existing conventional polymer tube connections to contribute to downsizing and space-saving of equipment and devices.

7 Recommendations Regarding Assembly/Disassembly and Flexibility

7.1 Each of the integrated components should be removable, and should not require any special skills, etc. Assembly should be possible in a short time with little space and few workers.

7.2 Each of the removal components should be easy to handle and store.

7.3 The removal and replacement procedures and methods should be clearly indicated. The important items or check points regarding assembly/disassembly should be clearly indicated for the personnel who are involved in the removal and replacement.

8 Related Documents

8.1 SEMI Standards and Safety Guidelines

SEMI F57-0301 — Provisional Specification for Polymer Components Used in Ultrapure Water and Liquid Chemical Distribution Systems

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