

SEMI F110-0712 (Reapproved 0618) TEST METHOD FOR MONO-DISPERSED POLYSTYRENE LATEX (PSL) CHALLENGE OF LIQUID FILTERS

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NOTICE: This Document was reapproved with minor editorial changes.

1 Purpose

1.1 This Document provides a test method for the mono-dispersed polystyrene latex (PSL) challenging of liquid filters.

2 Scope

2.1 This Document covers a mono-dispersed PSL particle challenge test method for 50 to 200 nm rated liquid filter.

2.2 This Document defines a test condition for mono-dispersed PSL challenge test.

2.3 The following areas are addressed in this Document:

- test condition such as fluid, flow rate, pressure, PSL concentration, membrane treatment, etc.
- type of filter evaluated.
- type of PSL (reference material).
- method of membrane treatment prior to the test for decreasing the adsorbing effect.
- description of the test result.

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 F63 — Guide for Ultrapure Water Used in Semiconductor Processing

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

4 Terminology

4.1 Abbreviations and Acronyms

4.1.1 *AIST* — National Institute of Advanced Industrial Science and Technology¹

4.1.2 *CMC* — critical micelle concentration

4.1.3 *FM* — flow meter

4.1.4 *LPM* — liters per minute (L/min)

4.1.5 *LRV* — log reduction value

4.1.6 *NIST* — National Institute of Standards and Technology²

¹ National Institute of Advanced Industrial Science and Technology, 1-1-1 Umezono, Tsukuba, Ibaraki 305-8568 Japan; Telephone: +81.29.861.2000, <http://www.aist.go.jp>

² National Institute of Standards and Technology, 100 Bureau Drive, Stop 3460, Gaithersburg, MD 20899-3460, USA; Telephone: +1.301.975.6478, <http://www.nist.gov>

4.1.7 *OPC* — optical particle counter

4.1.8 *P* — pressure gauge

4.1.9 *PSL* — polystyrene latex

4.1.10 *UPW* — ultrapure water

4.1.11 *V* — valve

4.2 Definitions

4.2.1 *background* — the number of OPC count when feeding the water without PSL.

4.2.2 *challenge* — the water and PSL particle that are supplied to the test filter.

4.2.3 *efficiency* — particle removal efficiency of filter measured by this test method. It is the effectiveness of the filter in removing the particles, and is measured as $(\text{Upstream} - \text{Downstream}) / \text{Upstream} \times 100$.

4.2.4 *log reduction value (LRV)* — log reduction value of filter measured by test method. This is measured as logarithmic value of ratio of upstream to downstream particle counts.

5 Apparatus

5.1 Test Device

5.1.1 For this Test Method, use the schematic shown in Figure 1 or Figure 2.

5.1.2 The standard test device shall consist of a pre-filter, flow meters, a particle injection device, pressure gauges, a test filter, a particle counter, flow control valves, a resistivity sensor, a thermometer, and tubing connecting them.

NOTE 1: Location of resistivity sensor shall be downstream of pre-filter and upstream of test filter. A static mixer or elbows shall be added to the test apparatus to ensure the challenged particle is well mixed before it reached the test filter.

5.1.3 The pore size of a pre-filter shall be equal to or smaller than the pore size of a test filter.

5.1.4 Use a flow meter with an allowable error to less than 5% full scale and of appropriate range.

5.1.5 Use a pressure gauge with an allowable error to less than 1% full scale and of appropriate range.

5.1.6 Use a thermometer with an allowable error to less than 1% full scale and of appropriate range.

5.1.7 Use a tubing with an inner diameter that does not lead to significant pressure loss for the fluid medium used in the test.

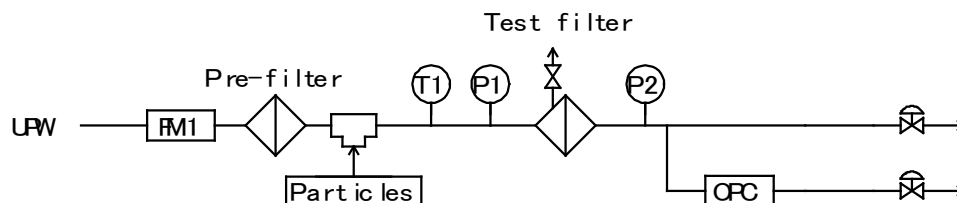


Figure 1
Schematic of Typical Test Setup (Example 1)