

SEMI F2-94 (Withdrawn 0703) SPECIFICATION FOR 316L STAINLESS STEEL TUBING FOR GENERAL PURPOSE SEMICONDUCTOR MANUFACTURING APPLICATIONS

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NOTICE: This Document was balloted and approved for withdrawal in 2003.

NOTICE: Paragraphs entitled ‘NOTE:’ are not an official part of this Standard or Safety Guideline and are not intended to modify or supersede the official Standard or Safety Guideline. These have been supplied by the global technical committee to enhance the usage of the Standard or Safety Guideline.

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.

1 Purpose

1.1 The purpose of this Specification is to identify the applicable ASTM tubing specification requirements and to define the special material chemical composition requirements for 316L stainless steel tubing which is to be used for general purpose applications in semiconductor manufacturing facilities.

2 Scope

2.1 This Specification covers grades of nominal-wall-thickness stainless steel tubing as designated in Table 1 of ASTM A269, for use in chemical (gas or liquid) distribution systems in semiconductor manufacturing facilities and in comparable research and development areas.

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 *ANSI/ASME Standards*¹

ANSI/ASME B31.1 — Power Piping

ANSI/ASME B31.3 — Chemical Plant and Petroleum Refinery Piping

ANSI/ASME B46.1 — Surface Texture: Surface Roughness, Waviness, and Lay

Boiler and Pressure Vessel Code — Section III NCA, The Rules for Construction of Nuclear Power Plant Components

3.2 *ASTM Standards*²

ASTM A262 — Practices for Determining Susceptibility to Intergranular Attack in Austenitic Stainless Steels

ASTM A269 — Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service

ASTM A450/A450M — Specification for General Requirements for Carbon, Ferritic Alloy, and Austenitic Alloy Steel Tubes

¹ American National Standards Institute, 25 West 43rd Street, New York, NY 10036, USA; Telephone: +1.212.642.4900, Fax: +1.212.398.0023, <http://www.ansi.org>

² American National Standards Institute, 25 West 43rd Street, New York, NY 10036, USA; Telephone: +1.212.642.4900, Fax: +1.212.398.0023, <http://www.ansi.org>

ASTM A632 — Specification for Seamless and Welded Austenitic Stainless Steel Tubing (Small Diameter) for General Service

ASTM E112 — Methods for Determining Average Grain Size

3.3 *ISO Standards*³

ISO 9000 — Quality Management and Quality Assurance Standards

3.4 *United Standards Military Standards*⁴

MIL-STD-105 — Sampling Procedures and Tables for Inspection by Attributes

MIL-STD-753 — Corrosion Resistant Steel Parts: Sampling, Inspection and Testing for Surface Passivation

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

4 General Requirements

4.1 Material furnished under this Specification shall conform to the requirements of ASTM A269 for nominal sizes ½ inch diameter and larger and to the requirements of ASTM A632 for nominal sizes smaller than ½ inch diameter, and to the additional requirements herein.

5 Ordering Information

5.1 Orders for material under this Specification shall include the following, as required to describe the material adequately:

- Quantity (meters, feet, or number of lengths).
- Grade (per Table 1 of ASTM A269).
- Size (nominal outside diameter and nominal wall thickness).
- This Specification number.
- Surface condition (if applicable).
- Special requirements and any supplementary requirements selected.

6 Process

6.1 The steel shall be processed in accordance with the section on process of ASTM A269.

7 Manufacture

7.1 Tubing shall be made by the seamless process and must be cold finished.

8 Heat Treatment

8.1 All tubing shall be furnished in the heat treated condition in accordance with the section on Heat Treatment of ASTM A269. If grain size is restricted by the supplementary requirement specified in ¶ 17.1.3 of this Specification, the minimum annealing temperature shall not apply, provided that the tubing passes the intergranular corrosion test of § 13 of this Specification.

8.2 All tubing shall be vacuum annealed, or bright annealed in an unmixed hydrogen atmosphere, followed by rapid cooling. The adequacy of the cooling rate shall be confirmed by the intergranular corrosion test of § 13 of this Specification.

³ International Organization for Standardization, ISO Central Secretariat, BIBC II, Chemin de Blandonnet 8, CP 401, 1214 Vernier, Geneva, Switzerland; Telephone: +41.22.749.01.11, <http://www.iso.org>

⁴ Available from <http://everyspec.com>