

SEMI E51-0200

GUIDE FOR TYPICAL FACILITIES SERVICES AND TERMINATION MATRIX

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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 objectives of this Guide are to ensure a timely and cost-effective tool installation with minimum impact on the existing customer facilities, systems, and services, and to insure that the quality of facilities supplied (e.g., water, gases, chemicals, electricity) is not compromised once internal to the tool.

1.2 This Guide provides the equipment supplier with an understanding of the facilities available at the point of connection (POC) at the ‘typical’ customer site. If these typical facility services are considered by tool manufacturers during their tool design, additional cost and lead times associated with customizing each tool installation can be minimized resulting in reduced costs to build and install semiconductor equipment.

2 Scope

2.1 This Guide does not include site-specific conditions. The Typical Facilities Services and Termination Matrix Example—United States (refer to Table 1) identifies utilities, performance, and connections at typical semiconductor facilities. When site specifications differ, the user should create a Site-Specific Facilities Services and Termination Matrix (refer to Table 2) that is submitted with the request for a quote. Each tool should be supplied in a ‘facility ready’ state. This Guide represents the range of conditions in which equipment should be capable of operating.

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 Impact

3.1 A reference to this Guide and the Typical Facilities Services and Termination Matrix (see Table 1) or a completed Site-Specific Facilities Services and Termination Matrix (see Table 2) should be included with other applicable tool purchase specifications. When the supplier receives these documents, a dialogue can be established to resolve any installation issues prior to customer purchase or tool installation. Any additional facility requirements not identified should be determined when the tool quote is reviewed.

4 Referenced Standards and Documents

4.1 SEMI Standards and Safety Guidelines

SEMI E6 — Facilities Interface Specifications Guideline and Format

SEMI E7 — Specification for Electrical Interfaces for the U.S. Only

SEMI E30 — Specification for the Generic Model for Communications and Control of Manufacturing Equipment (GEM)

SEMI E33 — Specification for Semiconductor Manufacturing Facility Electromagnetic Compatibility

SEMI E49 — Guide for Standard Performance, Practices, and Sub-Assembly for High Purity Piping Systems and Final Assembly for Semiconductor Manufacturing Equipment

SEMI F47 — Specification for Semiconductor Processing Equipment Voltage Sag Immunity

4.2 IEEE® Standards¹

IEEE 1100 — Recommended Practice for Powering and Grounding Sensitive Electronic Equipment

4.3 NFPA® Standards²

NFPA 70® — National Electrical Code®

5 Terminology

5.1 Abbreviations and Acronyms

5.1.1 POC — point of connection

5.1.1.1 Discussion — POC is the point where the facility utility connects to the exterior of the tool.

5.1.2 psig — pounds per square inch, gauge

5.1.3 Typical Facilities Services and Termination Matrix

5.2 This section of the Guide identifies utilities, performance, and connections at typical semiconductor facilities. This includes a Typical Facilities Services and Termination Matrix Example—United States (refer to Table 1). The guide identifies typical utilities and is not intended to be limited to the listed utilities. A Site-Specific Facilities Services and Termination Matrix (refer to Table 2) is also provided to document differences from Table 1 utilities.

5.3 The following is an explanation of the table headings in the Typical Facilities Services and Termination Matrix.

5.3.1 Utilities — This is a list of process or process-related services typically found in semiconductor facilities. The list is divided into water service, gas service, drains, bulk chemical distribution, exhaust and electrical services.

5.3.2 Supply Temperature — Temperature and ranges are measured in °C (°F). Equipment or tool cooling systems should be sized to accommodate these ranges.

5.3.3 Supply/Return Pressure — Pressure and ranges are measured in kPa (psig). Where possible, equipment should be designed to operate at lower pressure which reduces energy and safety risks. Regulators should be specified by the customer and provided with the tool by the supplier.

5.3.4 Filtration — Filtration provides an indicator of particle size expectation at point of connection (POC) to the tool. The fabrication and quality of point of use (POU) filtration should be specified by the customer and provided with the tool by the supplier.

5.3.5 Specification — The specification column is a condensed version of typical customer specifications. The column should be used by customers to specify service quality at POC to the tool. Specified quality should not be compromised or lessened in any way internally by the supplier's tool. When the tool purchase specification is prepared, expanded, and detailed, quality requirements should be documented.

5.3.6 POC Material — Material that the facility typically uses for connections to tools. Additional material quality characteristics should be identified in the tool purchase specification. Interior piping or tubing should be specified by the customer and provided with the tool by the supplier to meet or exceed the facility POC material quality (refer to SEMI E49).

5.3.7 POC Fitting — Compatible connectors are critical to ensure that a tool is 'facility ready' once it arrives at a customer site. It is recommended that equipment be supplied with matching connections as requested by customer.

5.3.8 Notes — Special conditions or exceptions.

6 General Considerations

6.1 In addition to typical utilities, other facility-related issues should be addressed prior to tool installation.

¹ Institute of Electrical and Electronics Engineers, 3 Park Avenue, 17th Floor, New York, NY 10016-5997, USA; Telephone: +1.212.419.7900, Fax: +1.212.752.4929, <http://www.ieee.org>. IEEE trademark is owned by The Institute of Electrical and Electronics Engineers, Inc.

² National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471, USA; Telephone: +1.617.770.3000, Fax: +1.508.895-8301, <http://www.nfpa.org>. NFPA trademark is owned by National Fire Protection Association.

6.1.1 *Point of Connection Locations* — Due to age of construction or design, all semiconductor facilities are not the same. To interface with equipment or tool, three suggested POC locations have been determined (refer to Figure 1). The POC locations are the top, the bottom, or the back of the tool. The customer should identify a POC location in the tool purchase specification. Suppliers should design tools to allow for internal routing to all locations, to avoid customization for every installation.

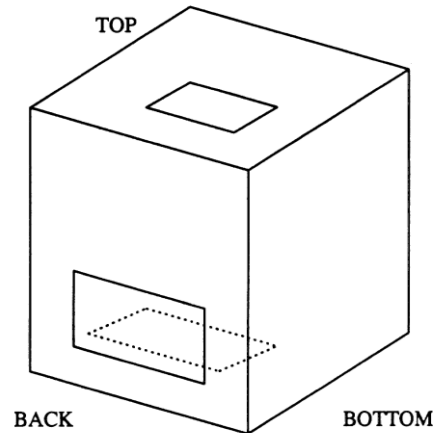


Figure 1
Three Point of Connection Locations

6.1.2 *Seismic* — The customer should specify the applicable earthquake zone for the installation site. The supplier should provide appropriate seismic restraints and installation instructions.

6.1.3 *Vibration* — The customer should specify that the supplier should provide the vibration sensitivity of the tool prior to purchase (refer to SEMI E6).

6.1.4 *Control and Signal Circuits* — The customer should specify and the supplier should provide control and signal circuits that when routed external to the tool are compliant with Article 725, Class 1, Class 2, and Class 3, Remote Control, Signaling and Power Limited—Control Circuits of the National Electrical Code (NFPA 70).

- *Class 1* — No power limitation, 600 volts max.
- *Class 2* — Derived from listed Class 2 power supply.
- *Class 3* — Derived from listed Class 3 power supply.

6.1.5 *Installation Requirements Provided by Suppliers* — Refer to SEMI E6.

6.1.6 *High Purity Distribution Systems Recommendations* — Refer to SEMI E49.

6.1.7 *POC Labeling* — To ensure accurate connection of facility utilities to each tool POC, the customer should specify and the supplier should provide labeling for each POC. Service labeling should match descriptions listed in the supplier provided installation documentation (refer to SEMI E6).

6.1.7.1 If required, mechanical POC labels should include:

- Service purpose,
- Maximum pressure or pressure range, and
- Flow rate (if appropriate).

6.1.7.1.1 *POC Label Example* — Process Purge, Nitrogen, 80 psig Max.

6.1.7.2 If required, electrical power POC labels should include: