



SEMI E6-96

FACILITIES INTERFACE SPECIFICATIONS GUIDELINE AND FORMAT

NOTE: This entire document was revised in 1995.

1 Purpose

This guideline is intended to assist suppliers with the communication of information about the facilities needs of their equipment to those who are responsible for the facilities design and the equipment installation.

The successful installation and operation of semiconductor equipment is the mutual objective of the owner of the equipment, the operator, the installer, and the supplier. Within the semiconductor industry, the diversity and complexity of equipment have created significant problems for those who design the facilities and install the equipment. It is very difficult to stay current with the ever-changing requirements necessary for individual pieces of equipment. As a result, it is difficult to guarantee that the facilities will meet the needs of each piece of equipment.

2 Scope

Design and installation requirements vary with each owner and project. Therefore, this guideline is designed to cover all activities that may be included with equipment installation.

3 Impact

Any supplier who uses this format is expected to include within the document all requirements for the site facilities, equipment shipping, installation, startup, acceptance test, and training. This is a guiding document for those who design the facility and install the equipment. The format is to be used for all types of equipment. Therefore, it will be necessary for each supplier to make modifications as required to suit the complexity of the equipment. The intent is to have a simple, but complete, format for all equipment.

4 Referenced Documents

None.

5 Related Documents

NOTE: All documents cited shall be the latest published versions of an adopted standard. All documents shall cite those specifications in effect at the date of purchase.

5.1 SEMI Documents

SEMI C3 — Specifications for Gases

SEMI E1.1 — Standard for 3 inch Plastic and Metal Wafer Carriers, General Usage

SEMI E1.2 — Standard for 100 mm Plastic and Metal Wafer Carriers, General Usage

SEMI E1.3 — Standard for 125 mm Plastic and Metal Wafer Carriers, General Usage

SEMI E1.4 — Standard for 125 mm Plastic and Metal Wafer Carriers, Auto Transport Usage

SEMI E1.5 — Standard for 150 mm Plastic and Metal Wafer Carriers, General Usage

SEMI E1.7 — Standard for 200 mm Plastic and Metal Wafer Carriers, General Usage (Proposed)

SEMI E4 — SEMI Equipment Communications Standard 1 Message Transfer (SECS-I)

SEMI E5 — SEMI Equipment Communications Standard 2 Message Content (SECS-II)

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

SEMI E8 — Specification for Wafer Transport Systems: Interface Coordinates

SEMI E13 — Standard for SEMI Equipment Communication Standard Message Service (SMS) — Part 1, SMS Services and Part 2, SMS Protocol

SEMI E15 — Specification for Inter-Equipment Material Transport Interface

SEMI E19 — Standard Mechanical Interface (SMIF)

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

SEMI E33 — Specification for Semiconductor Manufacturing Facility Electromagnetic Compatibility

SEMI S2 — Safety Guidelines for Semiconductor Manufacturing Equipment

5.2 Other Document¹

Federal Standard 209E — Airborne Particulate Cleanliness Classes in Cleanrooms and Clean Zones



6 Terminology

6.1 *P&ID* — Pipe and instrument drawings.

6.2 *interconnect* — Connection(s) between tool main-frame and peripheral tool sub-systems equipment.

6.3 *facilitization* — The provision of facilities or services.

7 Instructions and Sample

Following is a sample for equipment interface specifications. The sample below includes a table of contents and sample forms. Address each of the items in the table of contents with a comment, even if the item does not apply. Those responsible for the installation need to be sure every aspect has been considered and addressed. In the following sections, the instructions for each element of the table of contents is followed by a sample.

- Table of contents (sample)
- Introduction
- Administrative interface
- Safety
 - Non-physical conditions
 - Monitoring communications
 - Clearances
- Facilities installation requirements
 - Environment
 - Schematic (single line) diagram and equipment data sheets
 - Equipment facilitization drawings
- Shipping and receiving requirements
- Installation requirements
 - Transport and positioning equipment tools
 - Assembly and hookup tools and equipment
- Startup requirements
 - Equipment
 - Material

— Personnel

- Acceptance test
- Training
- Addenda (list by topic)

7.1 Introduction

7.1.1 *Instructions for Introduction* — The introduction should include general information about the scope of the document and any other introductory statements.

7.1.2 *Sample for Introduction* — This document contains the facilities design and equipment installation requirements for (indicate equipment name). It conforms to SEMI E6 (Facilities Interface Specifications Guideline and Format).

7.2 Administrative Interface

7.2.1 *Instructions for Administrative Interface* — The administrative interface should include the contacts for commercial questions and technical questions.

The equipment description should include:

- Functionality and intended use
- Wafer or material handling method
- Interface with other equipment (especially cluster tools)
- Special process requirements
- Number of pieces included as part of this equipment

Suppliers are encouraged to make the specifications document as specific as possible to the delivered equipment.

Include here information about the availability of facilities data in electronic formats. Specify the software format name and revision level, and indicate the names of data files contained in it.

1 General Service Administration, Federal Supply Service Bureau, Specification Section, Suite 8167, 470 East L'Enfant Place, SW, Washington, D.C. 20407



7.2.2 Sample for Administrative Interface

Table 1. Administrative Interface

	Supplier — Sales Rep.	Purchasing Agent
Company Name		
Address		
Administrative:		
Contact & Title		
Phone/Fax		
	Supplier — Mfg. Location	User — Installation Location
Company Name		
Address		
Administrative:		
Contact & Title		
Phone/Fax		
Shipping (FOB):		
Contact & Title	Supplier:	User:
Phone/Fax		
Equipment Identification Data:		
Model		
Serial Number		
RFQ Number	N/A	
Quotation Number		N/A
Project Number	N/A	
Sales Order Number		N/A
Purchase Order No.	N/A	
Equipment Name		
Type:		
Description:		
Options Included:		

7.3 Safety

7.3.1 Instructions for Safety — Any special safety concerns relating to the facilities design or equipment installation, startup, or testing should be addressed here.

7.3.1.1 Non-Physical Conditions — Information should be provided by the supplier on all non-physical equipment emissions including radio frequencies, temperature, humidity, vibrations, noise, odors, and ionizing and non-ionizing radiation. This information should be formatted to show emissions during normal operation and potential emission or releases in the event of malfunction or abnormal conditions.



Information should be provided on any non-physical conditions that could exist in the user's facility, that would adversely affect the operation of the equipment being supplied.

7.3.1.2 Monitoring Communications — The supplier should provide information on the protocol, number, type, and location of the data/communication connectors for external monitoring that are provided or desirable.

Examples of conditions that are typically monitored are: chemicals that could present a health hazard, flammable chemicals and other fire hazard conditions, equipment temperature, exhaust systems, radiation sources, and power supplies.

7.3.1.3 Clearances — Drawings required under Section 7.4.3, equipment facilitization drawings, should include clearances required for operator access and equipment maintenance and the operation of doors, drawers, and panels integrated into the equipment. Notations should be given if the clearances shown are in compliance with standards or codes.

7.3.2 Sample for Safety — Safety-related checks should be performed to supplier specification prior to system acceptance. These safety checks at point of installation should be accepted by:

- Supplier(s) safety representative
- Customer safety representative

Installation site acceptance test should be signed off by a supplier and a customer. The following test should be performed prior to acceptance to verify that the system meets requirements:

- Statement of conformance to SEMI S2 (Safety Guidelines for Semiconductor Manufacturing Equipment)
- Safety interlocks function and shut-down correct hazards
- Ventilation flow test at specifications and location where this can be verified by measurement
- Preventive maintenance and operating procedures are clearly documented, and personnel are trained
- Chemical spill containment is adequate for 110% of the quantity of fluids in the system
- UPS output(s) are isolated when emergency shut-down occurs

- Manual operation of the tool is documented, and personnel are trained
- EMO circuit functions
- Ability to lock out hazardous energy sources prior to maintenance
- Onboard gas detection system is functional
- Onboard fire detection system is functional
- Auxiliary equipment tie-ins function as intended and do not increase level of risk (scrubbers, purging systems, alarms)
- Site-specific installation does not degrade tool's ergonomic design factors
- Interface to building systems functions as intended

7.4 Facilities Installation Requirements

7.4.1 Environment

7.4.1.1 Instructions for Environment — These requirements must address the temperature and humidity requirements of equipment when it is facilitized for operation. Any other requirements, such as vibration, may be addressed in the body of the specifications or in the addenda with backup information provided in the addenda.



7.4.1.2 Sample for Temperature

Table 2. Temperature

	Non-Operating Range, min./max.*		Operating Range, min./max.		Target Temp.	Tolerance ±	Maximum Rate of Change/Hour
Tool Area							
Support Equipment Area							

* The temperature range which will prevent possible damage to the tool.

7.4.1.3 Sample for Relative Humidity

Table 3. Relative Humidity

	Range (%)			Percent per Hour
Tool Area		to		
Support Equipment Area		to		

7.4.1.4 Sample for Special Lighting — Provide Table for Special Equipment Requirements.

7.4.1.5 Sample for Vibration Requirements

_____ This equipment gives forth vibration that may impact sensitive equipment installed nearby. (If yes, indicate worst-case criterion here:_____.)

_____ This equipment is sensitive to vibration. (If the facility needs to meet Criteria A or better, indicate here:_____.) If the tool requirement is more stringent than Criteria A, provide the information required in the Addendum Section.

7.4.1.6 Sample for Noise Requirements

_____ This equipment gives forth electromagnetic radiation that may impact sensitive equipment installed nearby.

_____ This equipment is sensitive to or produces electromagnetic radiation, electromagnetic interference, radio frequency, acoustical vibrations, or electrostatic discharge. (If yes, provide data.)

7.4.1.7 Sample for Seismic Requirements

_____ This equipment has brackets or other mechanisms to secure for earthquake protection. (If yes, provide data.)

7.4.1.8 Sample for Environment Cleanliness

_____ This equipment requires a clean room to meet operational specifications. (If yes, provide minimum cleanliness data.) Different areas of a tool or subassemblies may need different minimums. If so, the supplier should state this information.

7.4.2 Schematic (Single Line) Diagram and Equipment Data Sheet

7.4.2.1 Instructions for Schematic (Single Line) Diagrams — The diagram(s) is required. It may be included in the body of the specification or in an addendum at the option of the supplier. Included in the application notes are samples of possible formats. These also serve as a checklist of information needed by the facilities design and installation people.



A schematic (single line) diagram and equipment data sheet are to be developed for the various facilities requirements. The diagram should be designed to give the facilities designer or equipment installer a detailed overview of the facility requirement being covered. The equipment data sheet should be designed to give the facilities designer or equipment installer the following specific information about the facility items covered in the diagram:

- A description
- Whether the customer or supplier provides the item
- The "to" and "from" connection points, with connections named
- The length or other applicable physical characteristics
- A reference designation to the interface diagram

For equipment with simple facilities requirements, the supplier may combine requirements to reduce the number of diagrams and diagram data sheets. The facilities interface diagrams will be contained in the body of the document.

It is also recommended that equipment data sheets be included for all equipment, especially those with multiple stand-alone components. The equipment data sheet should give the facilities designer or equipment installer detailed information of all facilities required for a given assembly. This should include but is not limited to:

- A description
- All physical characteristics of the assembly
- Environmental requirements
- Detailed facility requirements for items listed
- A reference designation to the interface diagram
- Applicable notes to guide the designer or installer when installing the equipment

As with the facilities interface specifications format, it is recommended that the diagrams and data sheets list items "not needed" so the facilities provider will know that these subjects were considered by the equipment supplier.

7.4.2.2 Sample for Schematic (Single Line) Diagram

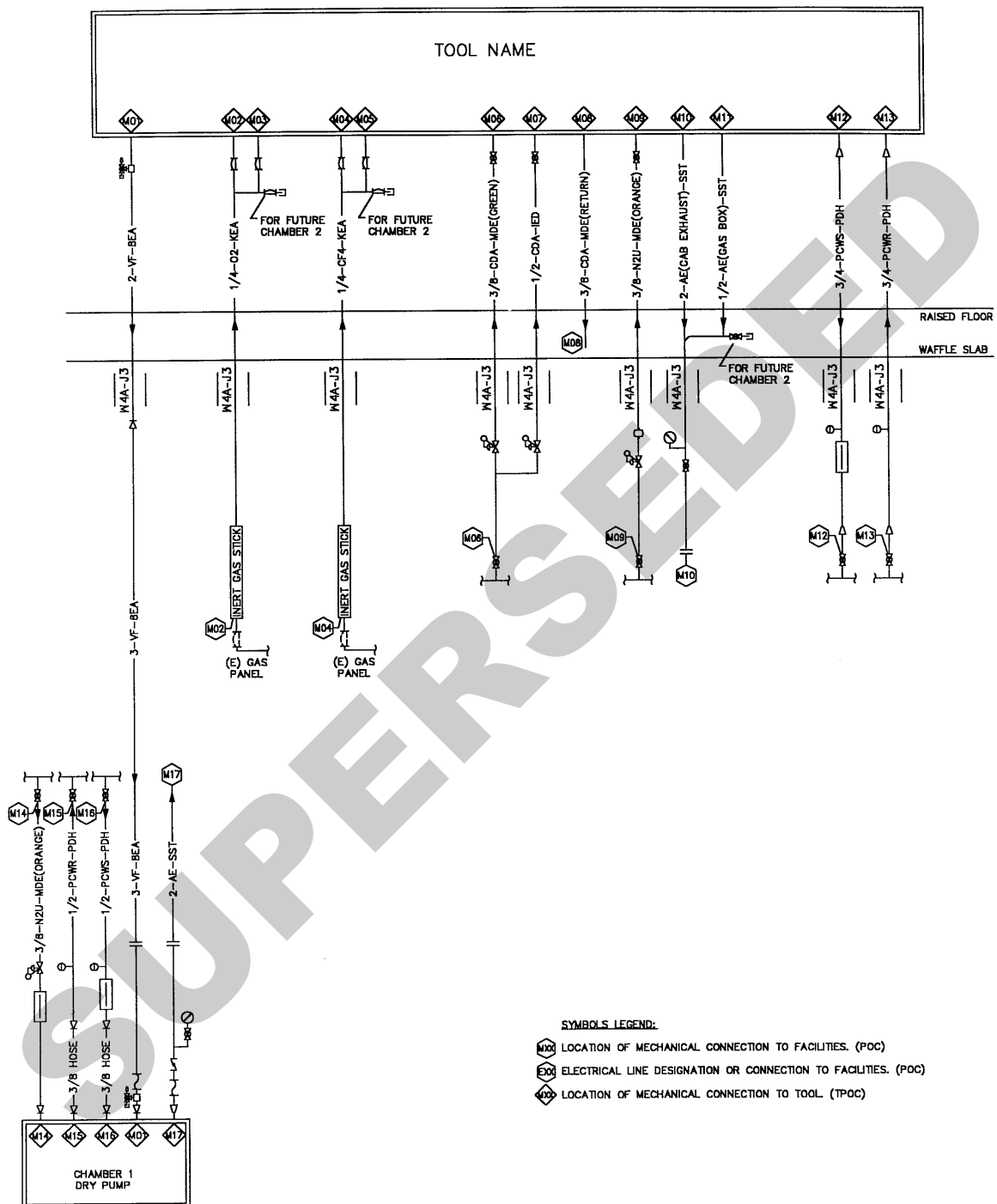


Figure 1
Schematic (Single Line) Diagram