

SEMI P40-1109 (Reapproved 1221) SPECIFICATION FOR MOUNTING REQUIREMENTS FOR EXTREME ULTRAVIOLET LITHOGRAPHY MASKS

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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 This Specification covers the mounting requirements for extreme ultraviolet lithography (EUVL) masks in select tools.

2 Scope

2.1 This Standard details the requirements for EUVL mask mounting. The mask mount is a flat reference surface against which the mask is clamped. The specific design and material of the mask mount are not specified.

2.1.1 The mounting requirements in this Standard apply to the EUV exposure tools. These mounting requirements may be used in other tools used to fabricate or measure EUV masks.

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 P37 — Specification for Extreme Ultraviolet Lithography Masks Substrates

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

4 Terminology

4.1 Abbreviations and Acronyms

4.1.1 *EUV* — extreme ultraviolet

4.1.2 *EUVL* — extreme ultraviolet lithography

4.2 Definitions

4.2.1 *chuck* — the chuck is the physical apparatus in the tools listed in § 2.1.1 upon which the mask is mounted.

4.2.2 *mounting surface* — the mounting surface is the surface of the chuck in direct contact with the mask. The backside of the mask, which is the non-patterned side, shall be in direct contact with the mounting surface while the mask is being used in the tools listed in § 2.1.1.

4.2.3 *pin or pedestal* — if the surface of the chuck consists of an array of pins or pedestals, pins are protrusions from the chuck surface that come to a point at the location on their surface farthest from the chuck. Pedestals have a nominally flat surface at their surface farthest from the chuck.

4.2.4 *user* — this term may refer to the user of fabrication equipment for EUV masks that contains a chuck, or this term may refer to the purchaser of an EUV mask from a mask supplier.

5 Mounting Requirements

5.1 The mask mounting quality area (backside) is indicated in Figure 1. The dimensions of the mask mounting quality area, D and W , are agreed upon between the user and supplier. The edge length of the mask substrate, L , is defined in SEMI P37.

5.2 The mounting surface shall meet the flatness requirements and local slope requirements defined in Tables 1 and 2 over the mounting quality area shown in Figure 1.

5.2.1 The flatness error is defined as the maximum deviation of the surface from the best fit plane determined by least squares fitting. This definition is illustrated in Figure 2. Note that the mounting surface is defined in ¶ 4.2.2.

5.2.2 If the mounting surface is discontinuous, the plane that defines the maximum deviation will include points near or at the tops of the pins or pedestals. This plane is illustrated in Figure 3.

5.3 The mask will be mounted with a clamping pressure as specified in Table 3. The clamping pressure is the force per unit area in the plane of the mounting surface. The minimum effective bending stiffness of the chuck cross section is specified in Table 4.

6 Test Methods

6.1 *General* — Test methods do not preclude empirically meeting the requirements. Nor do they preclude the use of a reference blank.

6.2 *Flatness* — To be agreed upon between user and supplier.

6.3 *Local Slope* — To be agreed upon between user and supplier.

6.4 *Clamping Pressure* — To be agreed upon between user and supplier.

7 Certification

7.1 Upon request of the user, a supplier's certification that the chuck was manufactured and tested in accordance with this Specification, together with a report of the test results, shall be furnished at the time of shipment.

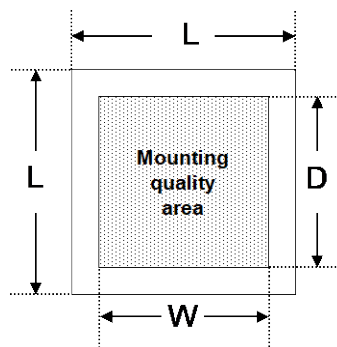


Figure 1
Dimensions of Mask Backside Mounting Quality Area

Table 1 Flatness of the Mounting Surface

<i>Mounting Quality Area (millimeters²)</i>	<i>Maximum Peak-to-Valley Flatness (nanometers)</i>
$W \times D$	30

Table 2 Local Slope of the Mounting Surface

<i>Area over Which Local Slope is Measured (millimeters²)</i>	<i>Local Slope Error (microradians)</i>
20×20	≤ 1.0