

SEMI P22-0307

GUIDELINE FOR PHOTOMASK DEFECT CLASSIFICATION AND SIZE DEFINITION

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NOTICE: This Standard or Safety Guideline has an Inactive Status because the conditions to maintain Current Status have not been met. Inactive Standards or Safety Guidelines are available from SEMI and continue to be valid for use.

NOTICE: This Document was completely rewritten in 2007.

1 Purpose

1.1 The purpose of this guideline is to establish standard nomenclature for photomask defect classifications, and to define defect sizing methods. Within this Document only the word 'photomask' will be used, but it is meant to be interchangeable with the word 'reticle'.

2 Scope

2.1 It is desirable to follow this guideline when discussing classification, nomenclature, and size of the photomask defects.

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 None.

4 Terminology

4.1 Definitions

4.1.1 *design pattern* — pattern as defined in design data.

4.1.2 *photomask pattern* — pattern on photomask surface.

4.1.3 *reference pattern* — pattern on the photomask as intended by the photomask manufacture. It is distinguished from design pattern as it has naturally occurring corner rounding and process bias.

5 Classification of the Mask Defect

5.1 Mask Pattern Defect

5.1.1 *Shape Defect* — A photomask pattern whose shape is different from the reference pattern is called a shape defect.

5.1.1.1 *Isolated Defect* — Shape defects which are isolated from pattern are called isolated defects.

1. Dot [Figure 1]

2. Hole [Figure 2]

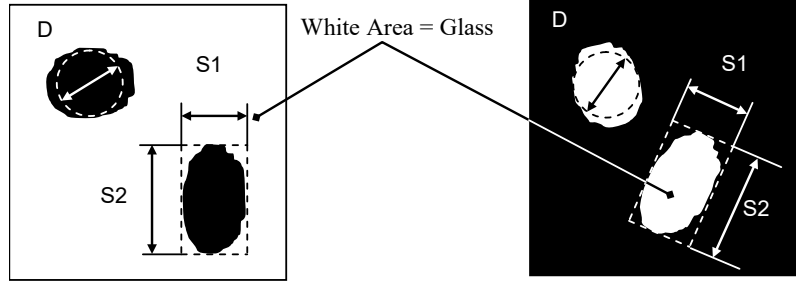


Figure 1
Dot

Figure 2
Hole

5.1.1.2 *Edge Defect* — Shape defects which are adjacent to straight pattern edge are called edge defects.

1. Edge Extension [Figure 3]
2. Edge Intrusion [Figure 4]

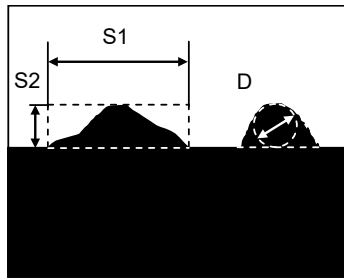


Figure 3
Edge Extension

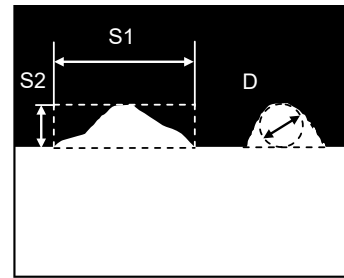


Figure 4
Edge Intrusion

5.1.1.3 *Corner Defect* — Shape defects which are adjacent to corners are called corner defects.

1. Corner Extension [Figures 5, 7, 9, 11, and 13]
2. Corner Intrusion [Figures 6, 8, 10, 12, and 14]

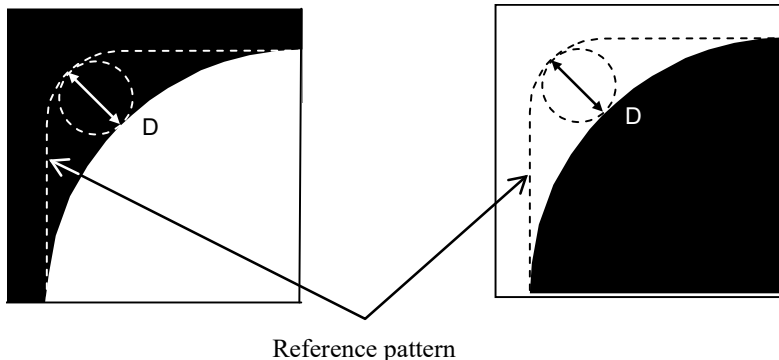


Figure 5
Corner Extension

Figure 6
Corner Intrusion

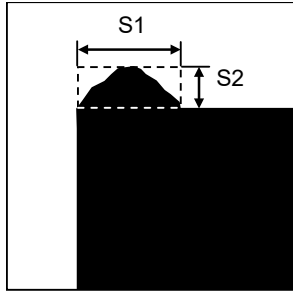


Figure 7
Corner Extension

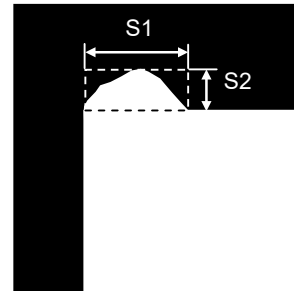


Figure 8
Corner Intrusion

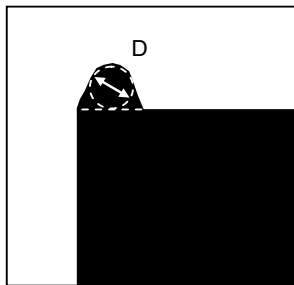


Figure 9
Corner Extension

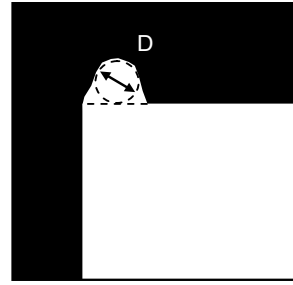


Figure 10
Corner Intrusion

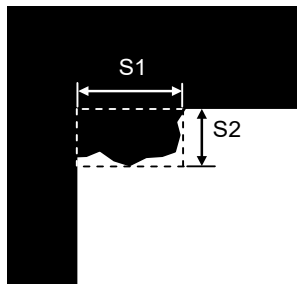


Figure 11
Corner Extension

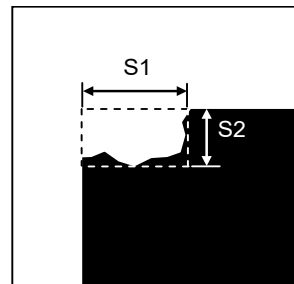


Figure 12
Corner Intrusion

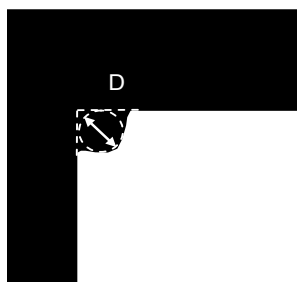


Figure 13
Corner Extension

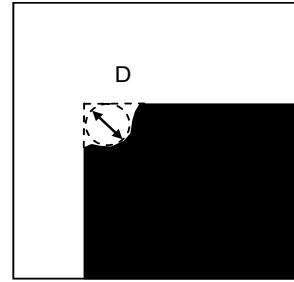


Figure 14
Corner Intrusion