The Institute for

Interconnecting

and Packaging

Electronic Circuits

IPC-OI-645

Standard for Visual Optical Inspection Aids

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A standard developed by the Institute for Interconnecting and Packaging Electronic Circuits

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Standard for Visual Optical Inspection Aids

1.0 GENERAL

1.1 Scope This standard establishes the requirements, definitions, and certification provisions for optical inspection aids and defines inspection grades that can be used as accept/reject criteria for the instrumentation used in an inspection process that uses optical inspection aids.

1.2 Purpose The intent of this document is to provide information to be used in the selection and application of optical magnifying inspection aids. It also provides specific preferred wording and specific definitions of inspection grades to be used for inspection operations requiring varying degrees of optical magnification assistance.

1.3 Usage Grades This specification provides Grades [I through XII] to reflect progressive increases in magnification and resolution. These different grades indicate a progression of increased usage complexity and application cost. The use of one grade for a specific acceptance test does not mean that other acceptance features must use the same grade for acceptance. Selection should be based on the minimum needed to control required reliability. A grade should not be over specified, causing too-critical inspection of the product without a real need for the added complexity and cost involved with increases in grade.

1.4 Certification Test The certification for both the initial qualification of the magnifying aid and the periodic quality conformance tests and methods are intended to demonstrate the ability of the optical inspection aid to meet the requirements of this standard. The examples used in the Appendices are not the only way this can be demonstrated, but are supplied as one of many acceptable ways. The methods defined in this standard are supplied so users of this standard not familiar with optical technology applications have a reference for consideration.

2.0 APPLICABLE DOCUMENTS

The following documents, of the issue currently in effect, form a part of this document to the extent specified herein.

2.1 IPC[1]

IPC-T-50 Terms and Definitions for Interconnecting and Packaging Electronic Circuits.

2.2 Military[2]

MIL-STD-150A Military Standard Photographic Lenses

MIL-STD-1241A Military Standard Optical Terms and Definitions

MIL-STD-1686A Electrostatic Discharge Control Program for Protection of Electrical and Electronic Parts, Assemblies, and Equipment (Excluding Electrically Initiated Devices)

2.3 Underwriters Laboratories[3]

U.L. Standard 1581 Reference Standard for Electrical Wire, Cable, and Flexible Cords.

U.L. Standard 153 Portable Lamps.

3.0 REQUIREMENTS

3.1 Related Terms and Definitions Related definitions and all terms used herein shall be as specified in IPC-T-50, MIL-STD-1241A, MIL-STD-150A, and MIL-STD-1686A or if not included in them, the definitions in this section applies.

3.1.1 Apparent Field-Of-View Angle The angular subtence of the field-of-view in the image space of the optical system (the angle seen by the observer's eye) as differentiated from that in the object space (the real field).

3.1.2 Color Temperature A measure of the energy distribution over the visible spectral range (i.e., the color quality) of a light source with a continuous spectrum expressed in Kelvins (K). The color temperature is the temperature on the absolute scale (degrees C+273) to which a perfect blackbody radiator would have to be heated to appear visually as the same color as the light source in question.

3.1.3 Density, Optical Logarithm to the base 10 of the reciprocal of transmittance.

3.1.4 Diopter Abbreviated DIOPT. A unit of refractive power of a lens. In a lens or lens system it is numerically equal to the reciprocal of the focal length measured in meters. For example, if a lens has a focal length of 25 centimeters, i.e., 1/4 meter, its refractive power is 4 diopters.

1. Publications may be obtained from the Institute for Interconnecting and Packaging Electronic Circuits, 2215 Sanders Road, Northbrook, IL 60062-6135.
2. Publications may be obtained from the Standardization Documents Order Desk, Building 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094.
3. Publications may be obtained from Underwriters Laboratories, 333 Pfingsten Rd., Northbrook, IL 60062