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Superseding AS1613A

**Image Quality Indicator
Radiographic**

RATIONALE

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1. SCOPE:

- 1.1 Purpose: This Aerospace Standard establishes an identification system and provides design and tolerance information in describing two series of image quality indicators currently used in radiography of aerospace components, especially in electronic component evaluation and radiographic film and paper classification.
- 1.2 Classification: Individual image quality indicators (IQIs) are classified by use of this standard number, followed by appropriate codes, as shown in Table I. Synopsis of the classification system is:

AS 1613-A-XX IQI shown in Fig. 1, with six tungsten wires

AS 1613-B-XX IQI shown in Fig. 2, with six tungsten wires and six lead beads.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

- 2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350	- Standards and Test Methods
AMS 3608	- Plastic Sheet, Methyl Methacrylate, General Purposes
AMS 5045	- Steel Sheet and Strip, 0.25 Max Carbon, Hard Temper
AMS 7295	- Radiographic Film and Paper, Industrial
AMS 7295/1	- Radiographic Film, 5-80

- 2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

ASTM B29 - Pig Lead
ASTM F288 - Tungsten Wire for Electron Devices and Lamps

3. TECHNICAL REQUIREMENTS:

- 3.1 The requirements specified herein are applicable when this standard number, with all appropriate codes, is specified.
- 3.2 Image quality indicators (IQI) shall conform to the requirements of Fig. 1 and Table I for the "A" series, and Fig. 2 and Tables I and II for the "B" series, as specified in the standard callout, as shown in 1.2.
- 3.3 All image quality indicators shall be made from the following materials:
- 3.3.1 Face sheets shall be low-carbon steel conforming to AMS 5045, or equivalent.
- 3.3.2 Wires shall be tungsten lamp filament wire conforming to ASTM F288.
- 3.3.3 Center sections shall be clear acrylic of low X-ray density conforming to AMS 3608, or equivalent.
- 3.3.4 Beads and "lead numbers" shall be lead conforming to ASTM B29, or equivalent.
- 3.3.5 Wires and beads shall be hot-pressed in place or cemented in grooves or holes; all elements shall be bonded with clear acrylic cement of low X-ray density.
- 3.3.6 Use of corner pins and corner pin material is optional.
- 3.3.7 When specified, face sheets may be made from a corrosion-resistant alloy, and wires and beads may be made from copper or other alloy, all with the equivalent radiographic density of the materials specified in 3.1 through 3.3.4.
- 3.4 Each IQI shall be identified with the classification code numbers and letters imprinted by a suitable permanent marking system that will not wear off, smear, or be obliterated during the normal use of the IQI.
- 3.5 The last identifying number in the classification code shall be applied to each IQI with lead or other radiographic opaque numbers in the position shown on the applicable figure. The lead number shall identify the IQI used in a radiograph, shall be of such size and font to reproduce clearly on a radiograph, and shall be applied in such a manner that the identification will not be smeared or otherwise obliterated during handling, use, and storage with reasonable care, for the lifetime of the IQI.
- 3.6 The thickness of face sheets shall be determined by the use of an appropriate optical comparator capable of accurate measurement to 0.00001 in. (0.25 μ m).

- 3.7 The diameter of the tungsten wires and lead beads, and the wire and bead spacing, may be determined by direct measurement from a radiograph using film meeting the requirements of AMS 7295/1, film type 5-80. The radiograph geometry (source-to-film distance and focal spot size) shall be such that the geometric unsharpness in the test radiograph is less than 0.001 in. (0.025 mm). The exposure and processing shall be in accordance with AMS 7295.

4. NOTES:

- 4.1 The image quality indicators described herein have been used in industry since prior to 1967 and have been identified by various systems, most often by individual company designation. Table III indicates the relationship between these identification systems known to the date of publication of this standard.
- 4.2 Image quality indicators identified by an industrial system shown in Table III may be used interchangeably with the applicable AS 1613 IQI.
- 4.3 For ordering, purchase documents should specify not less than the following:
- Title, number, and date of this standard
 - Part number of IQI desired (See 1.2 and Table I)
 - Alternate materials, if desired (See 3.3.7)
 - Quantity of IQIs desired
- 4.4 Purchaser should request a wire and bead accuracy diagram for each IQI. The diagram should be a radiograph of the IQI in plane view.

PREPARED BY

SAE AEROSPACE MATERIALS DIVISION

This document was prepared by and is under the jurisdiction of AMS Committee "K".

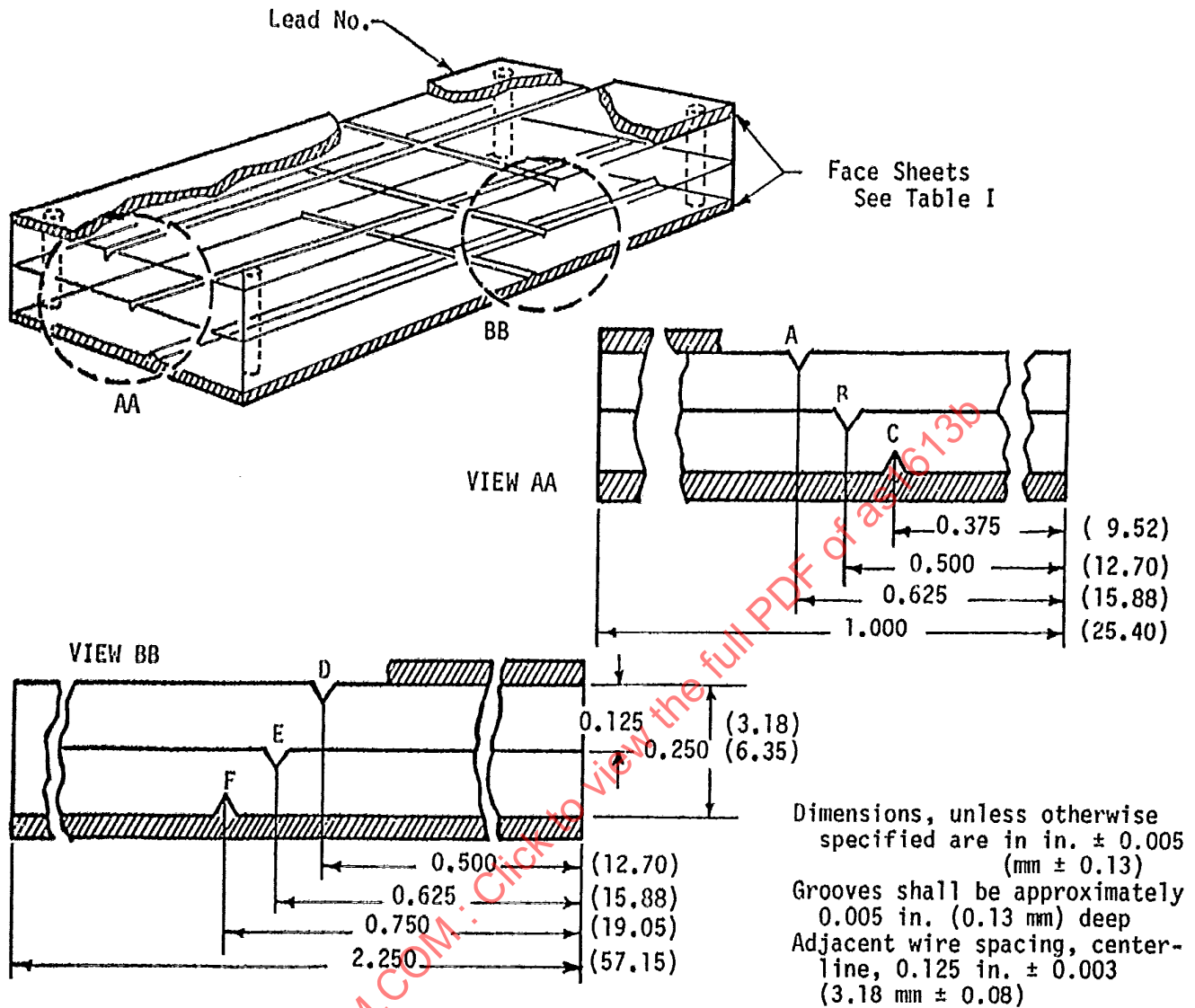


FIGURE 1
IMAGE QUALITY INDICATOR, AS 1613-A SERIES

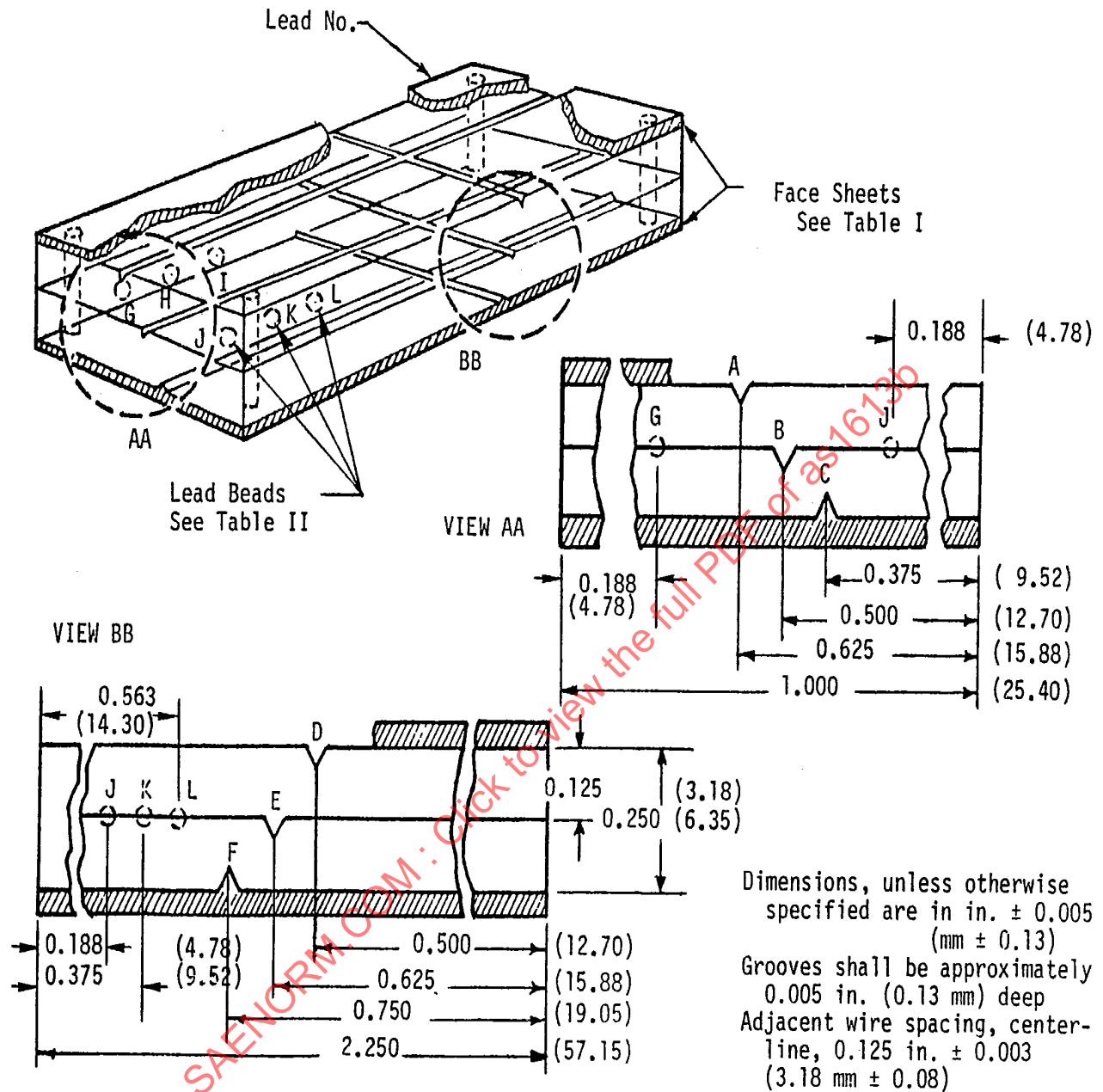


FIGURE 2
IMAGE QUALITY INDICATOR, AS 1613-B SERIES

TABLE I

Image Quality Indicators, Face Sheet and Wire Sizes wire

IQI Lead Number	Face Sheet or Shim Thickness	A	B	C	D	E	F
*-00	None	0.0020 (0.051)	0.0010 (0.025)	0.0005 (0.013)	0.0005 (0.013)	0.0010 (0.025)	0.0020 (0.051)
-0	0.0020 (0.051)	0.0020 (0.051)	0.0010 (0.025)	0.0005 (0.013)	0.0005 (0.013)	0.0010 (0.025)	0.0020 (0.051)
-1	0.0050 (0.13)	0.0020 (0.051)	0.0010 (0.025)	0.0005 (0.013)	0.0005 (0.013)	0.0010 (0.025)	0.0020 (0.051)
-2	0.0070 (0.178)	0.0020 (0.051)	0.0010 (0.025)	0.0005 (0.013)	0.0005 (0.013)	0.0010 (0.025)	0.0020 (0.051)
-3	0.0100 (0.25)	0.0030 (0.076)	0.0020 (0.051)	0.0010 (0.025)	0.0010 (0.025)	0.0020 (0.051)	0.0030 (0.076)
-4	0.0150 (0.381)	0.0030 (0.076)	0.0020 (0.051)	0.0010 (0.025)	0.0010 (0.025)	0.0020 (0.051)	0.0030 (0.076)
-5	0.0250 (0.635)	0.0050 (0.127)	0.0030 (0.076)	0.0020 (0.051)	0.0020 (0.051)	0.0030 (0.076)	0.0050 (0.127)
-6	0.0350 (0.889)	0.0050 (0.127)	0.0030 (0.076)	0.0020 (0.051)	0.0020 (0.051)	0.0030 (0.076)	0.0050 (0.127)

*A or B, as applicable

**+0.0002, -0.0000 (+0.005, -0.0000)

TABLE II

Image Quality Indicators, Lead Bead Sizes For All IQI Lead Numbers

Lead Bead Code Letter	Diameter, in. (mm)
G	0.0150 ± 0.0002 (0.381 ± 0.005)
H	0.0100 ± 0.0002 (0.254 ± 0.005)
I	0.0080 ± 0.0002 (0.203 ± 0.005)
J	0.0060 ± 0.0002 (0.152 ± 0.005)
K	0.0040 ± 0.0002 (0.101 ± 0.005)
L	0.0020 ± 0.0002 (0.050 ± 0.005)