**BUTT “I” LEADED PACKAGES**

Butt / “I” leaded parts have leads formed and positioned perpendicular to the circuit land.

The use of the Butt / “I” Leaded device termination configuration is not recommended for high reliability / spaceflight applications, due to the limited mechanical reliability of the termination.

See Section 7.01 “Surface Mount Soldering, General Requirements”, for common accept / reject criteria.

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**PREFERRED COPLANARITY**

The part is properly oriented to the land pattern, with each lead centered across the width of the land. Leads are planar. Fillets are shiny, concave, and evident on the front and back faces of the lead.

NASA-STD-8739.2 [7.8.1], [12.9.5]

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**UNACCEPTABLE INSUFFICIENT HEEL / TOE FILLET HEIGHT**

The fillet height shall be sufficient to exhibit evidence of complete wetting.

NASA-STD-8739.2 [12.9.5.a.1]

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**UNACCEPTABLE EXCESSIVE HEEL / TOE FILLET HEIGHT**

The fillet height shall not exceed 75% of the lead height. The fillet shall be the full width of the contact area, exhibit a positive wetting angle, and the lead contour shall be visible.

NASA-STD-8739.2 [12.9.5.b.3]

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**ACCEPTABLE LATERAL / SIDE OVERHANG (A)**

Lateral / side overhang shall not exceed 25% of lead width.

NASA-STD-8739.2 [8.7.4.k]

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**UNACCEPTABLE PROPER SIDE JOINT FILLET**

The side joint fillet does not exhibit proper wetting, or a positive contour. (*See Nonwetting for special exclusion*)

NASA-STD-8739.2 [12.8.1.b], [12.9.5.a.1]

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**PREFERRED SIDE JOINT FILLET**

The side joint fillet shall exhibit proper wetting to the component lead, a positive contour, and shall extend to the edges of the termination pad. (*See Nonwetting for special exclusion*)

NASA-STD-8739.2 [12.8.1.b], [12.9.5.a.1]

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**ACCEPTABLE COPLANARITY**

The maximum acceptable non-planarity between any portion of the lead foot and the pad shall not exceed 0.26 mm (0.010”).

NASA-STD-8739.2 [7.1], [12.9.2.b.3]

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**UNACCEPTABLE IMPROPER COPLANARITY**

Excessive non-planarity results in open or mechanically weak solder joints. Improper component lead coplanarity can produce solder bridging and open terminations.

NASA-STD-8739.2 [7.1], [12.9.2.b.3]

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**NASA WORKMANSHIP STANDARDS**

**National Aeronautics and Space Administration**

**Johnson Space Center**

**Houston, Texas USA 77058**

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Page: 1
MANDATORY
HEEL OVERHANG
Heel overhang is prohibited, as it will prevent the formation of the heel fillet (mandatory).

NASA-STD-8739.2 [ 8.8.4 ], [ 12.9.5 ]

ACCEPTABLE
HEEL / TOE FILLET HEIGHT
The fillet height shall not exceed 75% of the lead height. The fillet shall be the full width of the contact area, exhibit a positive wetting angle, and the lead contour shall be visible.

NASA-STD-8739.2 [ 12.9.5.a ], [ 12.9.5.b.3 ]

NASA WORKMANSHIP STANDARDS

NASA WORKMANSHIP STANDARDS
There shall be evidence of complete wetting and a positive wetting angle that extends over the complete periphery of the connection.

NASA-STD-8739.2 [12.8.1.b], [12.9.5]

MANDATORY TOE OVERHANG

Toe overhang is prohibited.

NASA-STD-8739.2 [8.8.4], [12.9.5]

PREFERRED TOE FILLET

There shall be evidence of complete wetting and a positive wetting angle.

NASA-STD-8739.2 [12.9.5.a.1]

UNACCEPTABLE MISSING TOE FILLET

There shall be evidence of complete wetting and a positive wetting angle that extends over the complete periphery of the connection.

NASA-STD-8739.2 [12.8.1.b], [12.9.5]