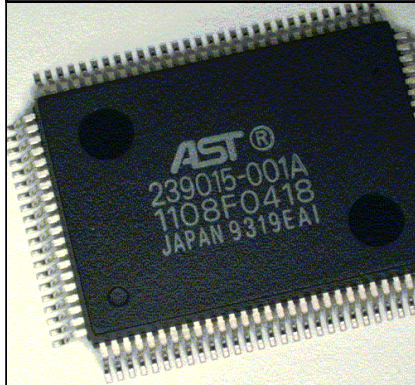


**SURFACE MOUNT TECHNOLOGY (SMT)
GULL-WING / "L" LEADED PACKAGES**

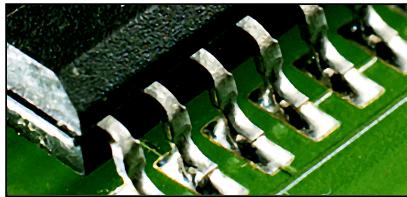


GULL-WING / "L" LEADED PACKAGES

Gull-Wing IC package leads are formed in a profile very similar to the outline of a seagull's wings. The Gull-Wing is considered one of the most reliable terminations for fine-pitch, high pin-count packages.

"L" lead IC packages have leads formed in a configuration very similar to the outline of the letter "L". The leads are shorter (length and height) than the "Gull-Wing" and tend to be much stiffer (hardened).

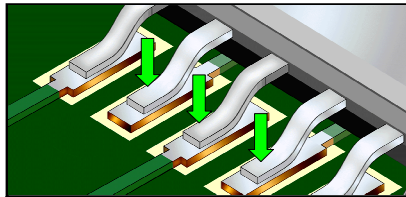
See Section 7.01 "Surface Mount Soldering, General Requirements", for common accept / reject criteria.



PREFERRED

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 and concave, and heel fillet is evident.

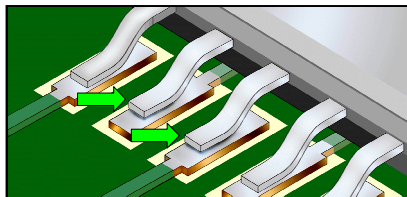
[NASA-STD-8739.2 \[8.7.4.h \]](#), [12.6.2], [12.8]



**PREFERRED
COPLANARITY**

The preferred planarity of the lead to the land pattern area is with the foot parallel and in full contact with the pad.

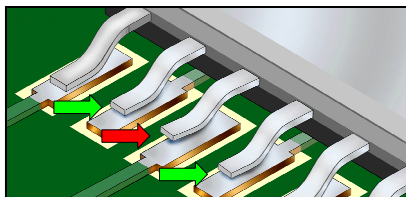
[NASA-STD-8739.2 \[7.1 \]](#)



**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]



**UNACCEPTABLE
IMPROPER 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 \[12.9.2.b.3 \]](#)

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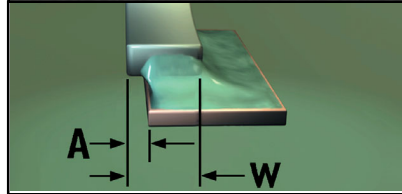
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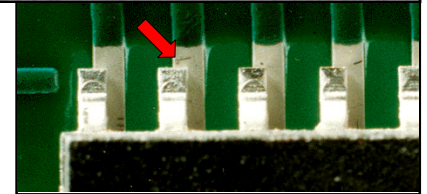
**SURFACE MOUNT TECHNOLOGY (SMT)
GULL-WING / "L" LEADED PACKAGES (cont.)**



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

Lateral / side overhang shall not exceed 25% of the lead width (W), and shall not violate minimum electrical spacing requirements.

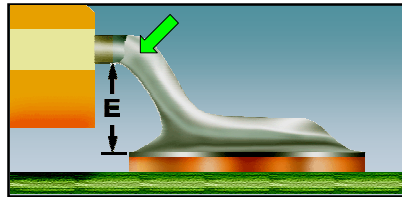
[NASA-STD-8739.2 \[8.7.4.h.i \]](#), [12.6.2.a.4]



**UNACCEPTABLE
IMPROPER LATERAL / SIDE OVERHANG**

Lateral / side overhang shall not exceed 25% of the lead width (W), and shall not violate minimum electrical spacing requirements.

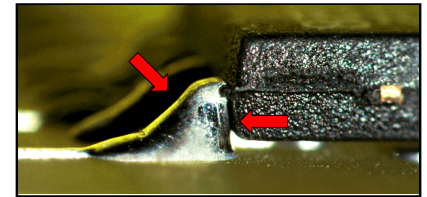
[NASA-STD-8739.2 \[12.9.2.b.1 \]](#)



**ACCEPTABLE
MAXIMUM HEEL FILLET HEIGHT (E)**

Solder may extend through the stress relief bend, but must not contact the lead seal. Solder shall exhibit a concave fillet and the lead contour shall be visible.

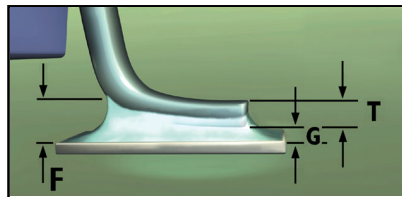
[NASA-STD-8739.2 \[12.8.1.b \]](#), [12.8.2.b.16]



**UNACCEPTABLE
EXCESS SOLDER**

The lead contour is not discernable; the solder extends through the stress-relief bends; and, the solder contacts the component body and seal.

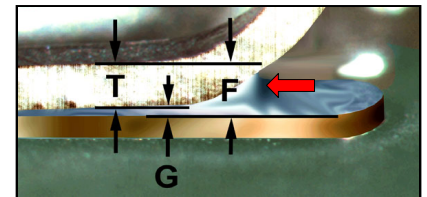
[NASA-STD-8739.2 \[12.8.2.b.12 \]](#), [12.8.2.b.16], [12.9.2.a.2]



**ACCEPTABLE
MINIMUM HEEL FILLET HEIGHT (F)**

The fillet height shall be equal to or greater than the minimum solder thickness (G), plus one (1) lead thickness (T).

[Best Workmanship Practice](#)



**UNACCEPTABLE
INSUFFICIENT HEEL FILLET HEIGHT (F)**

The heel fillet height is less than the minimum solder thickness (G), plus one (1) lead thickness (T). This may result in a weakened solder termination.

[Best Workmanship Practice](#)

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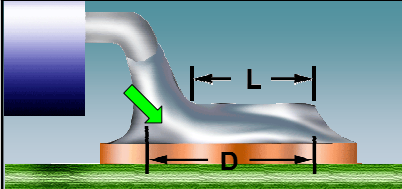
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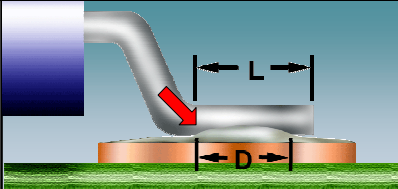
SURFACE MOUNT TECHNOLOGY (SMT)
GULL-WING / "L" LEADED PACKAGES (cont.)



**ACCEPTABLE
SIDE JOINT FILLET (D)**

The side joint fillet (D) shall be present, equal to the lead width (W) plus the heel fillet, or equal to a minimum of 75% of lead length (L) plus the heel fillet, whichever is less, and exhibit complete wetting and a positive contour.

[Best Workmanship Practice](#)

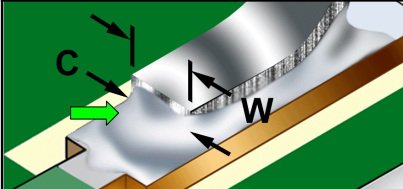


**UNACCEPTABLE
SIDE JOINT FILLET (D)**

The side joint fillet shall be present, equal to the lead length (L) plus the heel fillet, and exhibit a positive contour.

[NASA-STD-8739.2 \[12.8.1.b \]](#)

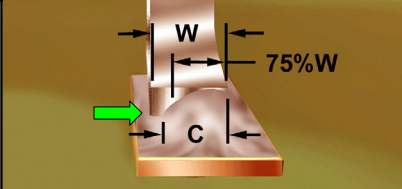
SURFACE MOUNT TECHNOLOGY (SMT)
GULL-WING / "L" LEADED PACKAGES (cont.)



**PREFERRED
END JOINT WIDTH (C)**

The width of the end joint (C) should be greater than or equal to the lead width (W).

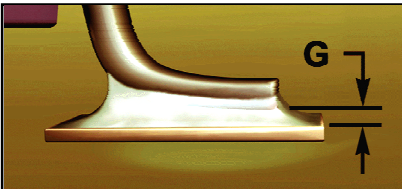
[Best Workmanship Practice](#)



**ACCEPTABLE
END JOINT WIDTH (C)**

The width of the end joint shall be greater than or equal to 75% of the lead width (W).

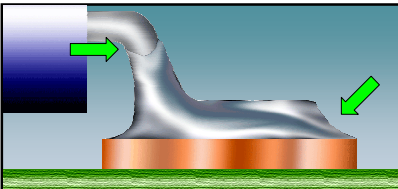
[Best Workmanship Practice](#)



**PREFERRED
SOLDER THICKNESS (G)**

The solder thickness shall be sufficient to form a properly wetted, concave fillet which extends over the complete periphery of the connection.

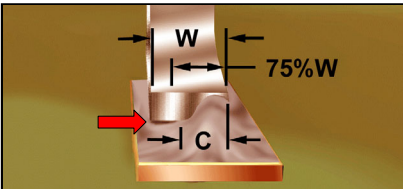
[NASA-STD-8739.2 \[12.8.1.b \], \[12.9.2.a \]](#)



**ACCEPTABLE
MAXIMUM SOLDER**

Solder quantity is at maximum, with the fillet extending up to the lead bend and completely covering the lead. The connection exhibits a well-wetted concave fillet on all sides, and the lead contour is discernable.

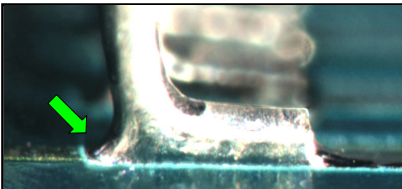
[NASA-STD-8739.2 \[12.8.1.b \], \[12.9.2.a \]](#)



**UNACCEPTABLE
INSUFFICIENT END JOINT WIDTH (C)**

The width of the end joint (C) is less than 75% of the lead width (W).

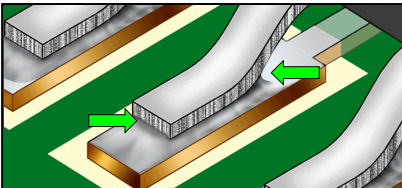
[Best Workmanship Practice](#)



**MANDATORY
HEEL FILLET**

A heel fillet is mandatory and the contour shall be positive.

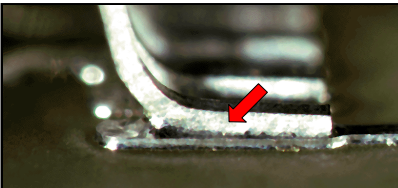
[NASA-STD-8739.2 \[12.9.2.b.5 \]](#)



**ACCEPTABLE
MINIMUM SOLDER**

Solder quantity is minimum, but the connection is well wetted on all sides, with a concave fillet between the lead and the land. A heel fillet is evident and properly formed.

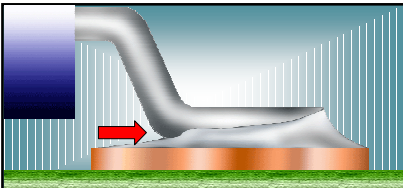
[NASA-STD-8739.2 \[12.8.1.b \], \[12.9.2.a \]](#)



**UNACCEPTABLE
INSUFFICIENT SOLDER**

The solder quantity shall be sufficient to form a properly wetted fillet.

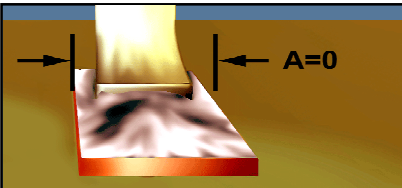
[NASA-STD-8739.2 \[12.8.2.b.6 \]](#)



**UNACCEPTABLE
MISSING HEEL FILLET**

A missing heel fillet is an indicator of improper process, and may impact the long-term reliability and integrity of the solder termination. A heel fillet is mandatory and the contour shall be positive.


[NASA-STD-8739.2 \[12.9.2.b.5 \]](#)




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

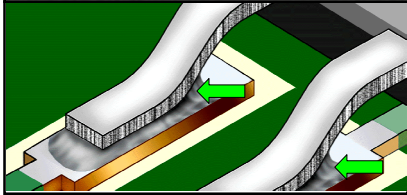
The target condition is no lateral / side overhang (A), with the component lead centered on the land.

[NASA-STD-8739.2 \[8.7.4.h \], \[12.6.2 \]](#)

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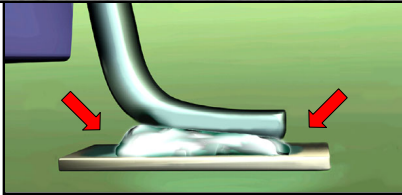
**SURFACE MOUNT TECHNOLOGY (SMT)
GULL-WING / "L" LEADED PACKAGES (cont.)**



**ACCEPTABLE
NONWETTING
(SPECIAL EXCLUSION)**

Leads not having wettable sides (edges) by design (such as leads stamped from pre-plated stock) are not required to exhibit side fillets.

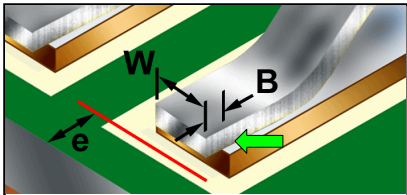
[Best Workmanship Practice](#)



**UNACCEPTABLE
IMPROPER WETTING**

The solder fillet shall exhibit a positive wetting angle, wet all elements of the connection, and shall extend to the edge of the pad.

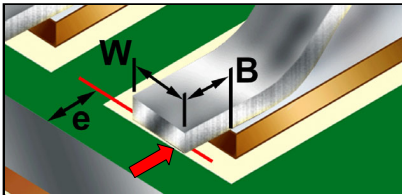
[NASA-STD-8739.2 \[12.9.2.a.1 \], \[12.9.2.b.4 \]](#)



**ACCEPTABLE
TOE OVERHANG (B)**

Toe overhang (B) shall not exceed 25% of the lead width (W), and shall not violate minimum electrical spacing (e) requirements.

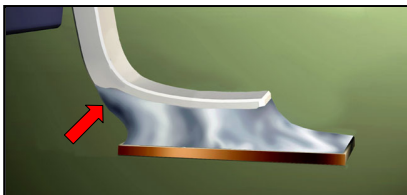
[NASA-STD-8739.2 \[8.7.4.h.2 \], \[12.6.2.a.5 \]](#)



**UNACCEPTABLE
EXCESSIVE TOE OVERHANG (B)**

Toe overhang (B) shall not exceed 25% of the lead width (W), and shall not violate minimum electrical spacing (e) requirements.

[NASA-STD-8739.2 \[12.6.2.a.4 \], \[12.9.2.b.2 \]](#)



**UNACCEPTABLE
HEEL OVERHANG**

Heel overhang is prohibited.

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