

THROUGH-HOLE SOLDERING RADIAL COMPONENTS	
RADIAL COMPONENTS	<p>Radial-leaded components are often used in the packaging of capacitors and transistor TO cans. Radials differ from axials in that the leads exit from a common side of the component, rather than from opposite ends or sides. This gives the radial a vertical profile and a smaller printed wiring footprint.</p> <p>See Section 6.01 "Through-Hole Soldering, General Requirements", for common accept / reject criteria.</p>

PREFERRED HORIZONTAL MOUNTING IN PTH INTERIM ASSEMBLY

The component body is in flat contact with, and bonded to the board surface. Component leads exhibit proper bend radius and bend spacing.

[Best Workmanship Practice](#)

PREFERRED HORIZONTAL MOUNTING IN PTH COMPLETED ASSEMBLY

The completed assembly exhibits proper solder fillet formation on both the component and solder sides of the printed wiring board (PWB).

[NASA-STD-8739.3 \[13.6.1 \]](#)

PREFERRED VERTICAL MOUNT IN NPTH INTERIM ASSEMBLY

The component has been installed perpendicular to, and the base parallel to, the board. The component may be mounted on the PWB surface and terminated with an off-the-pad lap joint.

[NASA-STD-8739.3 \[8.4.3 \]](#)

PREFERRED VERTICAL MOUNT IN NPTH COMPLETED ASSEMBLY

The component leads have been properly soldered. Solder has not wicked up through the non-plated-through-hole (NPTH) and contacted the lead seal / meniscus.

[NASA-STD-8739.3 \[8.4.3 \]](#)

NASA WORKMANSHIP STANDARDS			
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THROUGH-HOLE SOLDERING RADIAL COMPONENTS (cont.)	
ACCEPTABLE STRESS RELIEF	ACCEPTABLE TILT
<p>Stress relief shall be incorporated, wherever possible, into all leads and conductors in solder connections to provide freedom of movement of part leads or conductors between points of constraint.</p> <p>NASA-STD-8739.3 [8.1.1]</p>	<p>Component tilt does not violate minimum electrical clearance or prohibit the installation or inspection of adjacent components.</p> <p>Best Workmanship Practice</p>

UNACCEPTABLE IMPROPER HORIZONTAL MOUNTING

The component body is not in contact with the mounting surface. This condition may be corrected through the use of underfill or staking material, if approved.

[Best Workmanship Practice](#)

UNACCEPTABLE IMPROPER HORIZONTAL SPACING

Parts intended for horizontal mounting shall be parallel to, and in contact with, the mounting surface. Part spacing above the mounting surface shall not exceed 0.70 mm (0.027 in.), unless the part will be bonded.

[NASA-STD-8739.3 \[8.4.2.a \]](#)

UNACCEPTABLE IMPROPER VERTICAL SPACING NON-PLATED-THROUGH HOLE (NPTH)

While the component has not been mounted with the end in contact with the board surface, the leads have been terminated with an off-the-pad-lap solder joint.

[NASA-STD-8739.3 \[13.6.2.a.6 \]](#)

UNACCEPTABLE IMPROPER VERTICAL SPACING PLATED THROUGH HOLE (PTH)

The component has been mounted with the end of the component in contact with the plated-through-hole (PTH). This will result in solder contact with the part body meniscus.

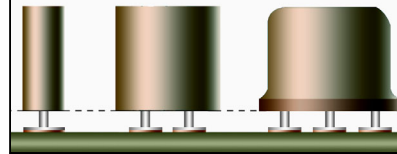
[NASA-STD-8739.3 \[8.4.2.b.1 \] \[13.6.2.a.6 \]](#)

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THROUGH-HOLE SOLDERING
RADIAL COMPONENTS (cont.)

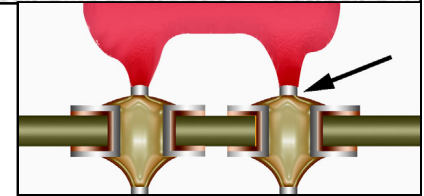
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THROUGH-HOLE SOLDERING
RADIAL COMPONENTS (cont.)



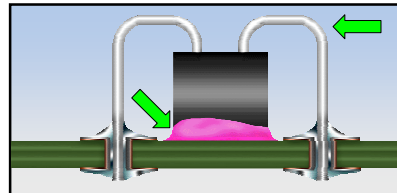
**PREFERRED
VERTICAL MOUNT IN PTH
INTERIM ASSEMBLY**

The component(s) have been installed with the major axis perpendicular to, and the base parallel to, the board. Space between the base and board: 0.5 mm (0.020 in.) to 1.27 mm (0.050 in.).
[NASA-STD-8739.3 \[8.4.3 \]](#)



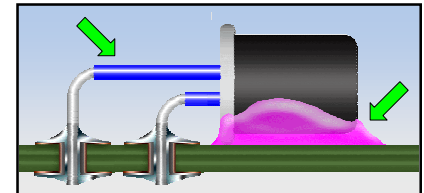
**PREFERRED
VERTICAL MOUNT IN PTH
COMPLETED ASSEMBLY**

There is discernible clearance between the coating meniscus and the solder fillet.
[NASA-STD-8739.3 \[8.4.3 \]](#), [13.6.1]



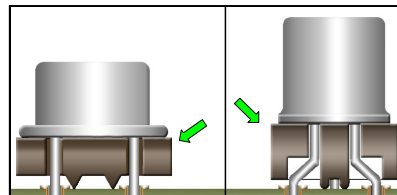
**ACCEPTABLE
INVERTED MOUNTING**

Components mounted in an inverted position shall be bonded to the mounting surface. The leads shall be provided appropriate stress relief. Leads and devices with metal cases shall meet minimum electrical spacing requirements.
[Best Workmanship Practice](#)



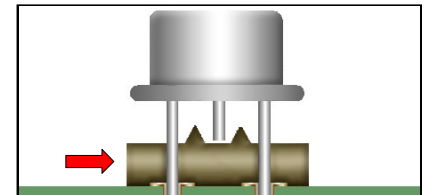
**ACCEPTABLE
SIDE MOUNT**

The component may be side mounted, provided appropriate stress relief and lead protection is provided.
[Best Workmanship Practice](#)



**ACCEPTABLE
SPACERS**

The spacer is in full contact with both the component base and the board. The spacer's feet are in contact with the board, allowing the solder to flow to the topside of the board, and allow the terminations to be cleaned and visually inspected.
[Best Workmanship Practice](#)



**UNACCEPTABLE
IMPROPERLY INSTALLED SPACER**

The spacer is not in contact with both the component base and the board, and is inverted, prohibiting proper solder flow to the topside of the board, or allow the terminations to be cleaned and visually inspected.
[Best Workmanship Practice](#)

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