GENERAL REQUIREMENTS

WRAP ORIENTATION

Conductors may be wrapped clockwise (CW) or counterclockwise (CCW) to the terminal, but the curvature of dress shall be such that the wrap will tighten against the terminal if the conductor is pulled.

NASA-STD-8739.3 [ 9.1.8 ]

UNACCEPTABLE

IMPROPER WRAP ORIENTATION

The conductor’s curvature and direction of dress are improper, and the wrap will loosen against the terminal if the conductor is pulled. This will eventually weaken the solder joint.

NASA-STD-8739.3 [ 13.6.2.a.10 ]

PREFERRED

BIFURCATED TERMINALS

Conductors shall enter the slot, perpendicular to the posts, and make positive contact with at least one post corner. Wires shall be placed in ascending order, with largest on the bottom, and wrap directions shall alternate.

NASA-STD-8739.3 [ 9.3.2 ]

SOLDERED ASSEMBLY

The lead profile is discernible, with wire and terminal interface completely wetted. The solder is smooth and shiny, and fillets the entire wire/lead and terminal interface.

NASA-STD-8739.3 [ 10.2.2 ], [ 13.6.1 ]

ACCEPTABLE

BIFURCATED TERMINALS

BOTTOM ROUTE

The uninsulated conductor end shall enter the terminal from the bottom, be brought through one of the side slots at the top, and wrapped as required for a side route termination.

NASA-STD-8739.3 [ 9.3.3 ]

STRAIGHT-THROUGH TERMINATION

Single conductors may be terminated straight-through, providing the conductor is in contact with the base, exhibits proper insulation clearance, and has no end overhang.

NASA-STD-8739.3 [ 9.3.2 ]

INSULATION GAP

The insulation gap (referenced from the first point of contact of the conductor to the terminal) shall be less than two (2) wire diameters, but shall not be imbedded in the solder joint. The wire contour shall be visible at the end of the insulation.

NASA-STD-8739.3 [ 9.1.1 ], [ 9.1.2 ]

INSULATION GAP (SPECIAL EXCEPTION)

When characteristic impedance or other circuit parameters may be affected (i.e.: high-voltage, high-frequency terminations, etc.), the insulation clearance requirements may be modified. All variations shall be documented.

NASA-STD-8739.3 [ 9.1.4 ]

IMPROPER INSULATION GAP (C)

The insulation gap (referenced from the first point of contact of the conductor to the terminal) is greater than two (2) wire diameters. Excessive insulation gap may present a birdcaging or shorting risk.

NASA-STD-8739.3 [ 13.6.2.a.2 ]

MULTIPLE TERMINATIONS

Conductor insulation clearances are not required to be equal for applications involving the termination of multiple (common) conductors to a terminal in parallel orientation.

NASA-STD-8739.3 [ 9.1.3 ]

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THROUGH-HOLE SOLDERING TERMINALS

GENERAL REQUIREMENTS

WRAP ORIENTATION

Conductors may be wrapped clockwise (CW) or counterclockwise (CCW) to the terminal, but the curvature of dress shall be such that the wrap will tighten against the terminal if the conductor is pulled.

NASA-STD-8739.3 [ 9.1.8 ]

UNACCEPTABLE

IMPROPER WRAP ORIENTATION

The conductor’s curvature and direction of dress are improper, and the wrap will loosen against the terminal if the conductor is pulled. This will eventually weaken the solder joint.

NASA-STD-8739.3 [ 13.6.2.a.10 ]

PREFERRED

BIFURCATED TERMINALS

Conductors shall enter the slot, perpendicular to the posts, and make positive contact with at least one post corner. Wires shall be placed in ascending order, with largest on the bottom, and wrap directions shall alternate.

NASA-STD-8739.3 [ 9.3.2 ]

SOLDERED ASSEMBLY

The lead profile is discernible, with wire and terminal interface completely wetted. The solder is smooth and shiny, and fillets the entire wire/lead and terminal interface.

NASA-STD-8739.3 [ 10.2.2 ], [ 13.6.1 ]

ACCEPTABLE

BIFURCATED TERMINALS

BOTTOM ROUTE

The uninsulated conductor end shall enter the terminal from the bottom, be brought through one of the side slots at the top, and wrapped as required for a side route termination.

NASA-STD-8739.3 [ 9.3.3 ]

STRAIGHT-THROUGH TERMINATION

Single conductors may be terminated straight-through, providing the conductor is in contact with the base, exhibits proper insulation clearance, and has no end overhang.

NASA-STD-8739.3 [ 9.3.2 ]

INSULATION GAP

The insulation gap (referenced from the first point of contact of the conductor to the terminal) shall be less than two (2) wire diameters, but shall not be imbedded in the solder joint. The wire contour shall be visible at the end of the insulation.

NASA-STD-8739.3 [ 9.1.1 ], [ 9.1.2 ]

INSULATION GAP (SPECIAL EXCEPTION)

When characteristic impedance or other circuit parameters may be affected (i.e.: high-voltage, high-frequency terminations, etc.), the insulation clearance requirements may be modified. All variations shall be documented.

NASA-STD-8739.3 [ 9.1.4 ]

IMPROPER INSULATION GAP (C)

The insulation gap (referenced from the first point of contact of the conductor to the terminal) is greater than two (2) wire diameters. Excessive insulation gap may present a birdcaging or shorting risk.

NASA-STD-8739.3 [ 13.6.2.a.2 ]

MULTIPLE TERMINATIONS

Conductor insulation clearances are not required to be equal for applications involving the termination of multiple (common) conductors to a terminal in parallel orientation.

NASA-STD-8739.3 [ 9.1.3 ]

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THROUGH-HOLE SOLDERING TERMINALS (cont.)
PREFERRED HOOK TERMINALS
The conductor is wrapped in full contact with the terminal for a minimum of 180° and a maximum of 270°, and is attached to the hook within the 180° arc. Insulation clearance is less than one (1) wire diameter, and wire end does not protrude.

GENERAL REQUIREMENTS
The top route termination has unfilled space between the posts and the conductor, and no filler wire or doubling has been used to fill the gap.

ACCEPTABLE BIFURCATED TERMINALS
Top termination is not recommended for flight hardware.

Best Workmanship Practice

UNACCEPTABLE BIFURCATED TERMINALS

TOP TERMINATION
The conductor is in contact with both posts. Any space between the posts has been filled with filler wire or by doubling. Top termination is not recommended for flight hardware.

Best Workmanship Practice

ACCEPTABLE BIFURCATED TERMINALS

WRAP DIRECTION
When multiple conductors are connected to a terminal, the direction of bend of each additional conductor shall alternate and the termination shall alternate posts.

NASA STD-8739.3 [ 9.3.2 ]

UNACCEPTABLE BIFURCATED TERMINALS

END TAIL OVERHANG
The end tail shall not extend beyond the diameter of the terminal base, except when physical clearance is adequate. End tail overhang may violate minimum electrical clearance.

NASA STD-8739.3 [ 9.3.2 ]

NASA STD-8739.9 [ 13.6.2.a.10 ]

GENERAL REQUIREMENTS
Sleeving shall completely cover and fit snugly around the terminal and the wire insulation, and overlap the wire insulation by a minimum of 5 mm (0.20 in.), or two (2) insulated wire diameters, whichever is larger.

UNACCEPTABLE BIFURCATED TERMINALS

TERMINAL FILL
Conductors shall be in full contact with the terminal and each other. They shall be mounted as close to the base as allowed by the insulation or body shape, and not wrapped onto each other or extend beyond the top of the terminal.

NASA STD-8739.3 [ 9.1.9 ]

GENERAL REQUIREMENTS
The number of conductors shall not exceed the capacity of the terminal post. Conductors shall not extend above the top of the terminal post.

Best Workmanship Practice

GENERAL REQUIREMENTS
Wire / harness terminations shall exhibit an even distribution of conductor dress and tension throughout the cable and harness, to prevent stress to the terminations.

NASA STD-8739.3 [ 9.1.5 ], [ 9.1.7 ], [ 13.6.1 ]

NASA STD-8739.4 [ 4.3.5.c ]

NASA STD-8739.4 [ 4.3.5.c ]

GENERAL REQUIREMENTS
The termination exhibits an uneven dress length of individual conductors, which may result in a concentration of stress on a single conductor.

NASA STD-8739.3 [ 13.6.2.a.10 ], [ 13.6.2.a.17 ]

NASA STD-8739.4 [ 4.3.5.c ]

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The lead profile is discernible, with wire and terminal interface completely wetted. The solder is smooth and shiny, and fillets the entire wire/lead and terminal interface.

NASA-STD-8739.3 [13.6.1]

The wire passes through the eye of the terminal, is wrapped in contact with both sides of the terminal, and does not overhang the terminal edge. Insulation clearance is less than 1 wire diameter.

NASA-STD-8739.3 [9.5]

The conductor(s) are wrapped in full contact for a minimum of 180°. Wraps alternate direction and do not overlap. Terminations are located more than one wire diameter from hook end, with majority located within the 180° arc (hook).

NASA-STD-8739.3 [9.4.], [13.6.2.a.10]

The wire passes through the terminal eye, exhibits two (2) quarter turn (90°) zig-zag wraps in contact with both terminal sides. Termination exhibits proper insulation clearance (C).

NASA-STD-8739.3 [9.5]

Conductors and part leads shall be mounted as close to the terminal base, as allowed by the insulation or body shape, and shall be in full contact with the terminal and each other.

NASA-STD-8739.3 [9.1.], [13.6.2.a.10]

Components shall be mounted parallel and in contact with the mounting surface, unless specified otherwise in the engineering documentation.

NASA-STD-8739.3 [8.3.1], [13.6.2.a.5]

The wire shall pass between each set of terminal posts, contact each terminal base, and exhibit stress relief. The wire ends shall be attached to the first and last terminal with a 90° to 180° wrap.

NASA-STD-8739.3 [9.3.4]

Multiple discrete components may be terminated in a piggybacked / stacked configuration, with the largest component mounted parallel to and in contact with the mounting surface. All components shall be stress-relieved and staked.

Best Workmanship Practice
SPECIAL APPLICATIONS
CONTINUOUS RUN CONNECTIONS
PIERCED / PERFORATED TERMINALS
The wire shall pass through each terminal eye, contacting both sides of each terminal, exhibit stress relief, and shall be terminated to the first and last terminal with a 90° to 180° wrap.

UNACCEPTABLE
The wire passes through each terminal eye, but does not contact both sides of each terminal. Best Workmanship Practice

SPECIAL APPLICATIONS
CONTINUOUS RUN CONNECTIONS
TURRET TERMINALS
The wire shall wrap around each terminal, contact each terminal base, exhibit stress relief, and be terminated to the first and last terminal with a 180° to 270° wrap (depending on wire gauge).

UNACCEPTABLE
The wire does not wrap 360° around each inner terminal or exhibit sufficient stress relief. NASA-STD-8739.3 [9.2.3]

UNACCEPTABLE
PIERCED / PERFORATED TERMINAL SIDE ENTRY
The wire passes through the terminal eye, but exhibits a wrap that is less than 90° and which is not in contact with the terminal face. NASA-STD-8739.3 [9.5], [13.6.2.a.10]

PREFERRED TURRET TERMINAL
The conductors are parallel to each other and to the mounting base. Conductors are mechanically secure, wrapped a minimum of 180° to 360°, non-overlapping, with the first conductor in contact with the terminal base. NASA-STD-8739.3 [9.2]

PREFERRED TURRET TERMINAL SOLDERED ASSEMBLY
The lead profile is discernible, with wire and terminal interface completely wetted. The solder is smooth and shiny, and fillets the entire wire/lead and terminal interface. NASA-STD-8739.3 [10.2.2], [13.6.1]

ACCEPTABLE TURRET TERMINAL
Conductors have been mechanically secured to the terminal with a minimum of 180° wraps. Multiple conductors may be installed in a single slot, if wrapped to the post without overlap. NASA-STD-8739.3 [9.2.1]

ACCEPTABLE TURRET TERMINALS BOTTOM ROUTE
The uninsulated conductor end shall enter the terminal from the bottom, be brought through the side slot at the top, and wrapped as required for a side route termination. NASA-STD-8739.3 [9.2.2]

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