

METRIC

MIL-DTL-38999/36
30 November 2006

DETAIL SPECIFICATION SHEET

CONNECTORS, ELECTRICAL, CIRCULAR, THREADED, PLUG,
LANYARD RELEASE, FAIL-SAFE, REMOVABLE CRIMP CONTACTS,
PINS, SHELL SIZE 25, SERIES III, METRIC

This specification is approved for use by all Departments
and Agencies of the Department of Defense.

The requirements for acquiring the product described herein
shall consist of this specification sheet and MIL-DTL-38999.

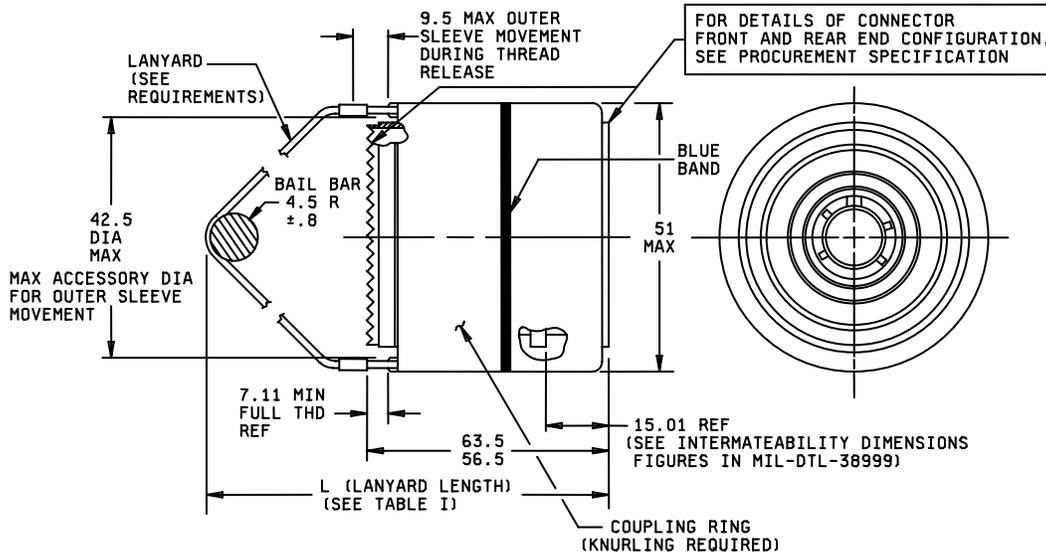


FIGURE 1. Plug, classes F, R, W and X, type 1.

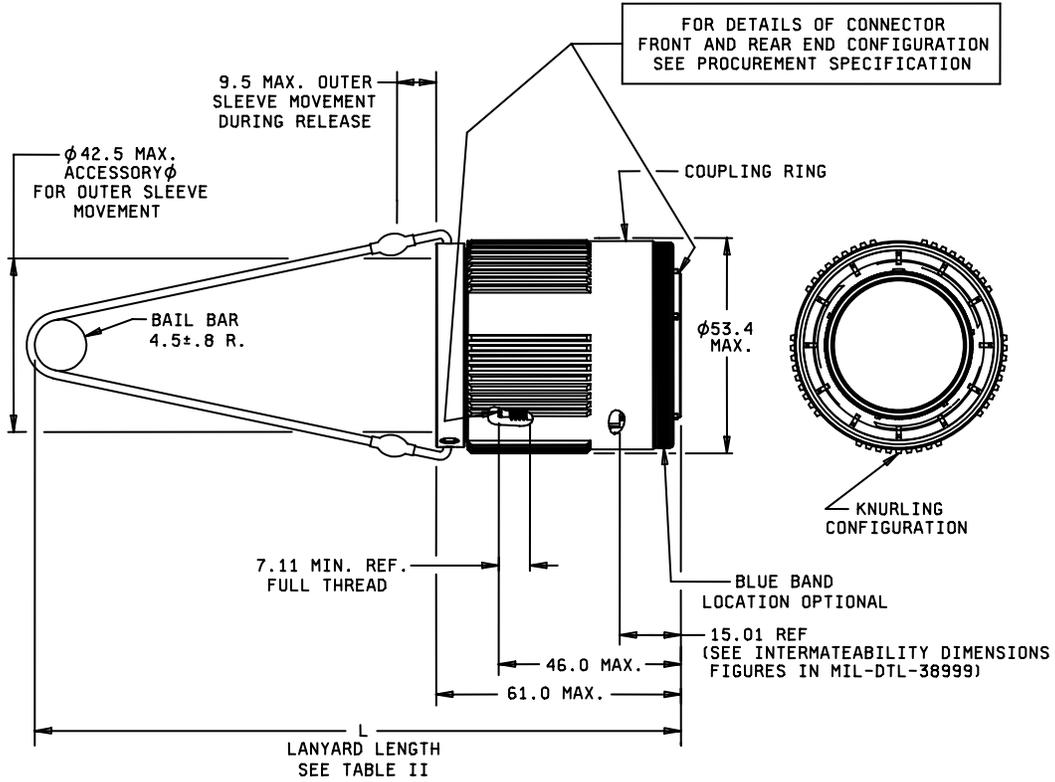
MIL-DTL-38999/36

mm	Inches	mm	Inches
.80	.031	42.5	1.67
6.30	.248	51	2.01
7.11	.280	56.5	2.22
9.50	.374	63.5	2.50
15.01	.591		

NOTES:

1. Dimensions are in millimeters. Inch equivalents are given for information only.
2. Polarizing position N is shown.
3. EMI grounding feature required on this connector.
4. The Government may stock, store, and issue this configuration.

FIGURE 1. Plug, classes F, R, W and X, type 1 – Continued.

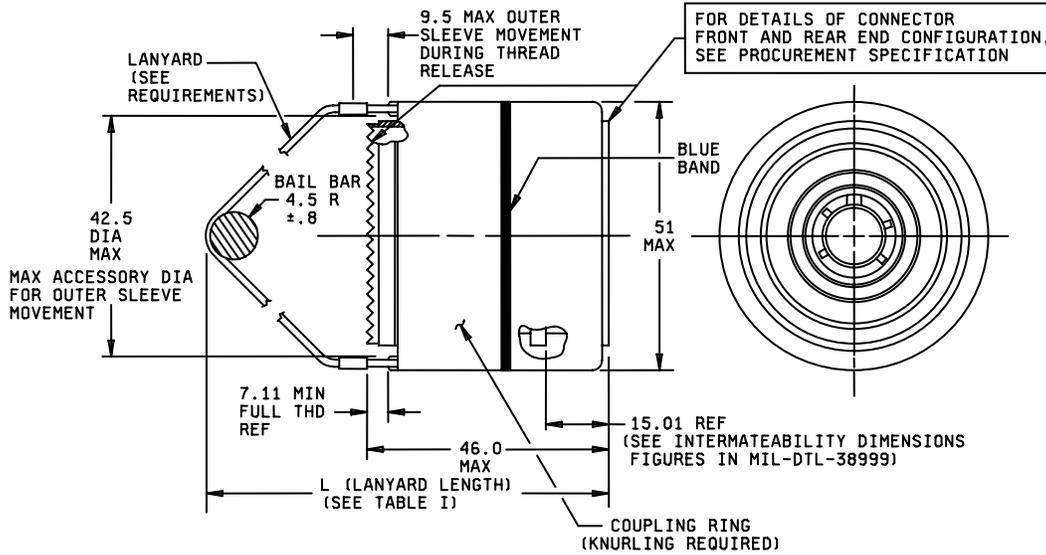


mm	Inches	mm	Inches
.80	.031	42.5	1.67
4.50	.177	46.0	1.81
7.11	.280	53.4	2.10
9.50	.374	61.0	2.40
15.01	.591		

NOTES:

1. Dimensions are in millimeters. Inch equivalents are given for information only.
2. Polarization position N is shown.
3. EMI grounding feature required on this connector.
4. The Government may stock, store, and issue this configuration.

FIGURE 2. Plug, classes J and M, type 3.

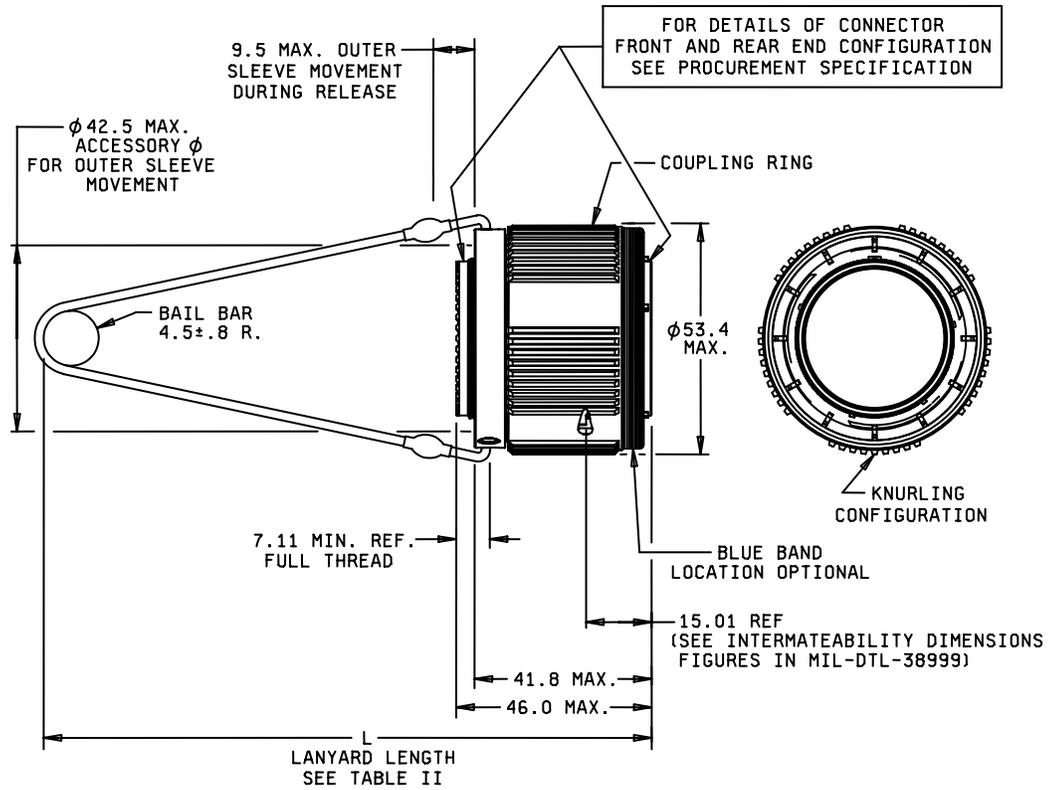


mm	Inches	mm	Inches
.80	.031	15.01	.591
6.30	.248	42.5	1.67
7.11	.280	51	2.01
9.50	.374	46.0	1.81

NOTES:

1. Dimensions are in millimeters. Inch equivalents are given for information only.
2. Polarizing position N is shown.
3. EMI grounding feature required on this connector.
4. The Government may stock, store, and issue this configuration.

FIGURE 3. Plug, classes F, R, W and X, type 4.



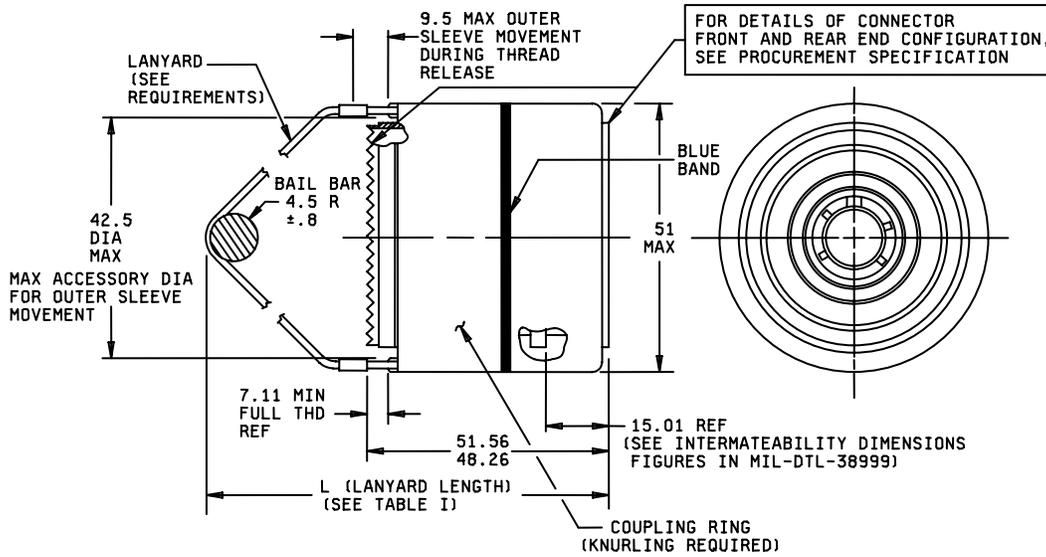
mm	Inches	mm	Inches
.80	.031	41.8	1.65
4.50	.177	42.5	1.67
7.11	.280	46.0	1.81
9.50	.374	53.4	2.10
15.01	.591		

NOTES:

1. Dimensions are in millimeters. Inch equivalents are given for information only.
2. Polarization position N is shown.
3. EMI grounding feature required on this connector.
4. The Government may stock, store, and issue this configuration.

FIGURE 4. Plug, classes J and M, type 5.

MIL-DTL-38999/36



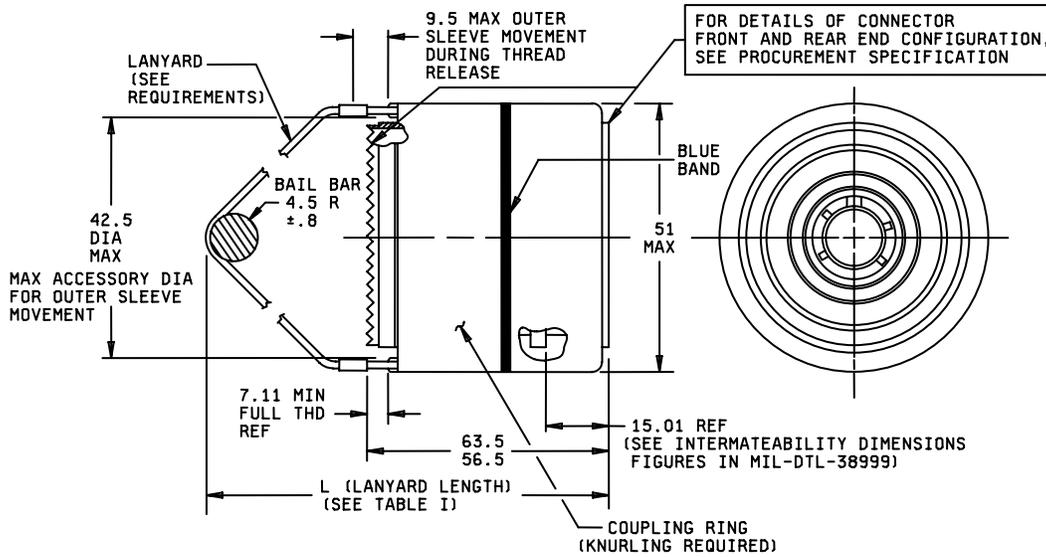
mm	Inches	mm	Inches
.80	.031	42.5	1.67
6.30	.248	51	2.01
7.11	.280	48.26	1.900
9.50	.374	51.56	2.030
15.01	.591		

NOTES:

1. Dimensions are in millimeters. Inch equivalents are given for information only.
2. Polarizing position N is shown.
3. EMI grounding feature required on this connector.
4. The Government may stock, store, and issue this configuration.

FIGURE 5. Plug, classes F, R, W and X, type 6.

MIL-DTL-38999/36

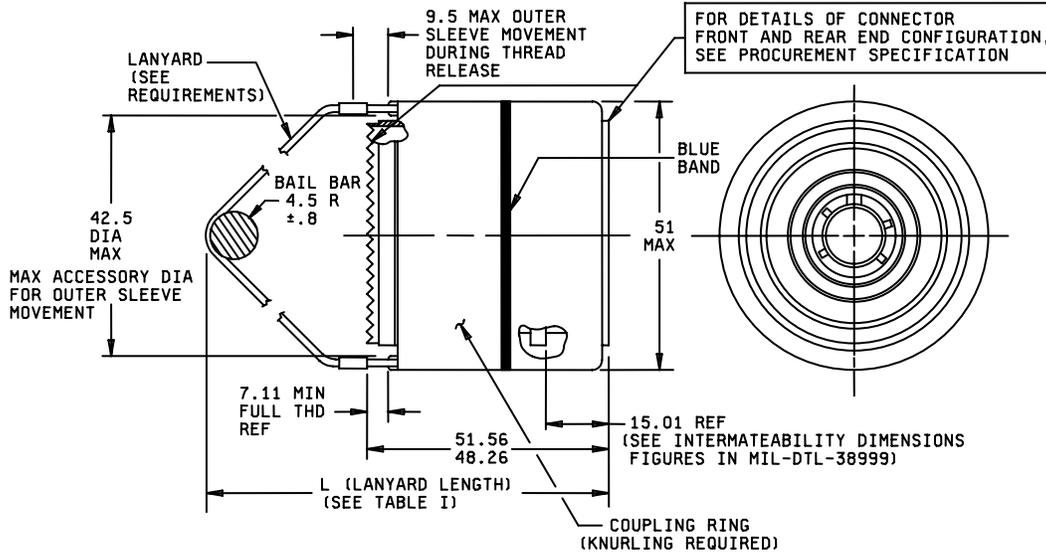


mm	Inches	mm	Inches
.80	.031	42.5	1.67
6.30	.248	51	2.01
7.11	.280	56.5	2.22
9.50	.374	63.5	2.50
15.01	.591		

NOTES:

1. Dimensions are in millimeters. Inch equivalents are given for information only.
2. Polarizing position N is shown.
3. EMI grounding feature required on this connector.
4. The Government may stock, store, and issue this configuration.

FIGURE 6. Plug, classes F, R, W and X, type 7.

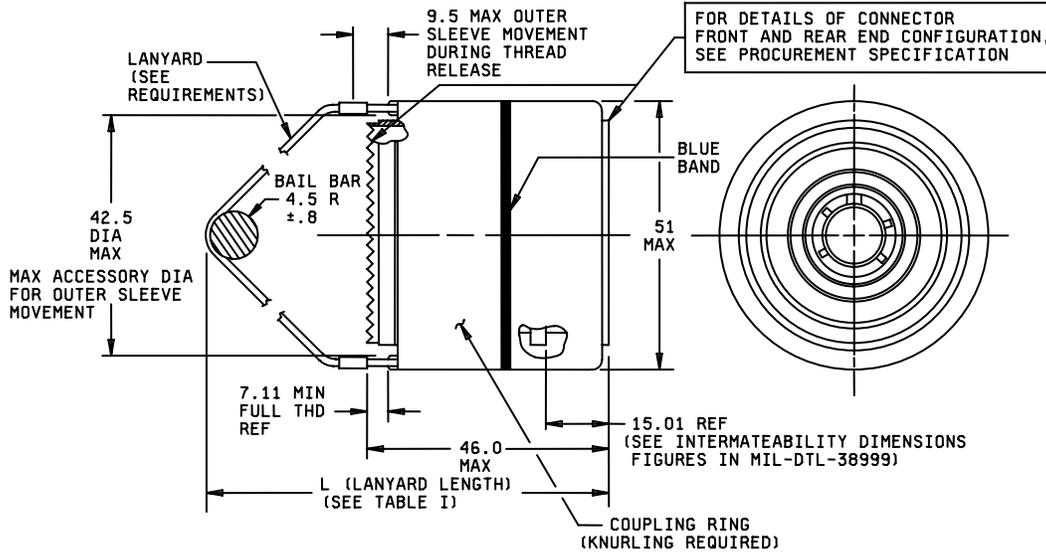


mm	Inches	mm	Inches
.80	.031	42.5	1.67
6.30	.248	51	2.01
7.11	.280	48.26	1.900
9.50	.374	51.56	2.030
15.01	.591		

NOTES:

1. Dimensions are in millimeters. Inch equivalents are given for information only.
2. Polarizing position N is shown.
3. EMI grounding feature required on this connector.
4. The Government may stock, store, and issue this configuration.

FIGURE 7. Plug, classes F, R, W and X, type 8.



mm	Inches	mm	Inches
.80	.031	15.01	.591
6.30	.248	42.5	1.67
7.11	.280	51	2.01
9.50	.374	46.0	1.81

NOTES:

1. Dimensions are in millimeters. Inch equivalents are given for information only.
2. Polarizing position N is shown.
3. EMI grounding feature required on this connector.
4. The Government may stock, store, and issue this configuration.

FIGURE 8. Plug, classes F, R, W and X, type 9.

REQUIREMENTS:

Dimensions and configurations: See figures 1 through 8 and table I.
Interface dimensions shall be in accordance with to MIL-DTL-38999.

TABLE I. Summary of connector types.

Types	Material	Shell length type	Coupling ring length type
1	Metal	Long	Long
3	Composite	Short	Long
4	Metal	Short	Short
5	Composite	Short	Short
6	Metal	Medium	Medium
7	Hybrid Metal shell, Composite coupling ring	Long	Long
8		Medium	Medium
9		Short	Short

This connector mates with MIL-DTL-38999/20 and /24.

Connector shall accept SAE-AS85049 self-locking accessories.

For insert arrangements: See MIL-STD-1560.

Lanyard:

- a. 1.57 millimeter minimum diameter, seven strands of stainless steel capable of withstanding 890 Newtons pull test after assembly with connector.
- b. Coupling design optional. Cable shall be covered with a suitable protective sleeving to preclude possible chaffing of wires.
- c. Class J and M connectors, 2.54 millimeters nominal diameter, Kevlar cord capable of withstanding 890 Newtons pull test after assembly with connector.

The connector shall properly disengage from any mated connector, including partially mated connectors, in accordance with the requirements as specified herein, and before the lanyard reaches its breaking point.

Connector design shall incorporate a swivel action for the lanyard to prevent twisting of the cable. The degree of rotation shall be restricted to prevent the lanyard going under the cable when fitted with a right-angled backshell.

Spare contacts: The twin-axial and coaxial contacts are exempted from the spare contact requirements of MIL-DTL-38999.

The Government may stock, store, and issue types 1, 3, 4, 5, 6, 7, 8 and 9 (see figures 1 through 8).

QUALIFICATION

Connectors shall meet the qualification requirements of MIL-DTL-38999 with the following exceptions and additions:

Durability: Wired connectors shall meet the durability requirements of groups 1 and 2, as specified in the qualification and group C periodic tests table in MIL-DTL-38999, with the following exceptions:

The total number of cycles of mating and un-mating shall be 400 normal mating and un-mating cycles and 100 high speed pull separations.

The following sequences shall be followed: For each of the mating sequences performed, connectors with adjustable lanyards shall exercise the full extent of the lanyard in the following way:

The lanyard shall be released to its fully elongated state, and then tightened to remove all slack when in its installed position simulating a weapons installation. The lanyard shall then be slackened to allow for the amount of slack required by this specification. This operation shall be repeated for all 100 high speed separation operations.

Connectors with adjustable lanyards and fixed length lanyards shall then be subjected to the following cycles of testing:

- a. Perform 25 cycles of angle and straight high speed separation at a velocity of 9.15 m/s (30 ft/sec) + 10% - 0%, at a temperature of -65°C (tolerance of + 0°C, -5 °C) with a brand new fully wired receptacle using the following sequence:
 - (1) 5 cycles of 15 degree angle pull at 180 degrees from the main receptacle keyway.
 - (2) 5 cycles of 15 degree angle pull (see figure 9) at 0 degrees from the main receptacle keyway.
 - (3) 5 cycles of 15 degree angle pull (see figure 9) at 90 degree from the main receptacle keyway.
 - (4) 5 cycles of 15 degree angle pull (see figure 9) at 270 degree from the main receptacle keyway.
 - (5) 5 cycles of 0 degree angle pull (see figure 9).
- b. Perform 100 cycles of normal mating and unmating. When performing the low temperature high speed separation test, the connector shall be tested within 3 minutes of removal from the cold chamber.
- c. Perform 25 cycles of angle and straight high speed separation test at a velocity of 9.15 m/s (30 ft/sec) + 10% - 0%, at ambient temperature using a brand new fully wired receptacle for every 25 cycles, using the following sequence:
 - (1) 5 cycles of 15 degree angle pull at 180 degrees from the main receptacle keyway.
 - (2) 5 cycles of 15 degree angle pull (see figure 9) at 0 degrees from the main receptacle keyway.
 - (3) 5 cycles of 15 degree angle pull (see figure 9) at 90 degree from the main receptacle keyway.
 - (4) 5 cycles of 15 degree angle pull (see figure 9) at 270 degree from the main receptacle keyway.
 - (5) 5 cycles of 0 degree angle pull (see figure 9).
 - (6) The sequence is to be followed by 100 normal cycles of mating and unmating.

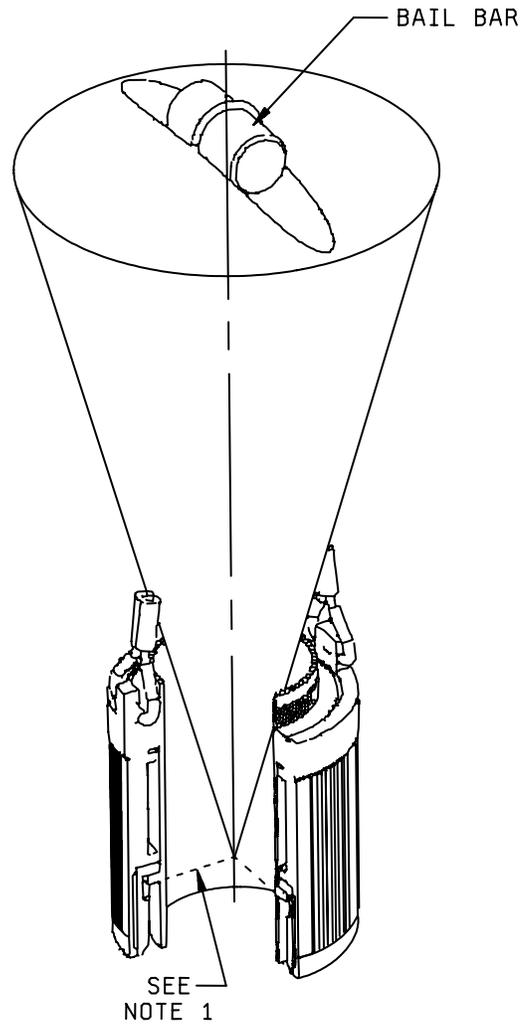
Repeat this sequence (subpara c) a further 2 times (3 total).

d. Durability test requirements:

- (1) The force required to separate the connectors during the high speed separation shall be measured and recorded. The force shall not exceed the 400 Newtons for straight pulls and 445 Newtons for 15° pulls.
- (2) The Bail bar dimension for the test shall be 4.5 mm radius +/- .8 mm.
- (3) The 15-degree angle is measured from the front insert face of the plug after mating with the receptacle and shell-to-shell bottoming is achieved. There shall be no pre-tensioning forces applied via the lanyard prior to separation.
- (4) Slack in the lanyard shall be 13 ± 6 mm and shall be measured from the top of the bail bar.
- (5) At the point of separation the velocity shall be measured and recorded. The test rig shall have sufficient momentum to ensure that the velocity is maintained at a minimum of 30 ft/sec throughout the entire separation phase. The measurement period for the force and velocity measurements shall extend to either side of the initial point of separation to capture the entire separation force characteristics.
- (6) The Lanyards shall be examined for mechanical damage. There shall be no permanent damage such as elongation, fraying of wires. Adjustable lanyards shall be examined and measurements made to ensure that no slippage of the locking mechanism has occurred. No elongation of the lanyard length, measured from the top of the bail bar, greater than 2 mm shall be permitted. The connector shall be examined. There shall be no visible distortion of the lanyard attachment points, or the rear end retention mechanism.

Vibration: Wired mated connectors shall meet the vibration requirements of MIL-DTL-38999 with the following exceptions:

- a. Sine vibration: Connectors shall be subjected to the test specified in method 204, test condition G, of MIL-STD-202.
- b. Random vibration: Connectors shall be subjected to the test procedure specified in test procedure EIA-364-28, test condition VI, letter I, at ambient temperature. Duration shall be 8 hours in the longitudinal direction and 8 hours in a perpendicular direction, for a total of 16 hours.
- c. The QPL evaluating activity will define the accessory load and cable to be used in the random and sine vibration tests.
- d. The vibration test accessory load fixture referenced in the vibration test paragraph of MIL-DTL-38999 shall be attached during this vibration test.



NOTES:

1. The Interface plane between a mated receptacle and the plug as specified herein.
2. Representation of the lanyard position with respect to the bail bar/attachment point as a cone. Maximum offset from the perpendicular is to be no greater than 15 degrees in any direction.

FIGURE 9. Lanyard position to the bail bar attachment point.

Ice Resistance: To be performed in place of the Ice Resistance test in group 11 of the qualification table in MIL-DTL-38999. The test item shall consist of a mated, wired set of new connectors (not previously exercised) with accessories attached and is required to complete two cycles of the sequence. The first sequence shall end with a pull at 15° and the second sequence with a straight pull. In between cycles, the connector shall be permitted to attain ambient temperature and dry off before being subjected to the second cycle. The test item shall be placed in a chamber and the temperature reduced and stabilized such that the item is maintained at -18°C (tolerance of +0°C, - 5°C) for 1 hour. After stabilization of the chamber temperature, the test item shall be sprayed with water pre-cooled to 2°C (tolerance of +5°C, -0°C), for a period of five (5) minutes. The test item shall be located a maximum of 305 mm (12 inches) from the spray nozzle. The entire test item shall be exposed to the spray. After completion of water spray, the test item shall remain in the chamber at -18°C (tolerance of +0°C, -5°C) for an additional 30 minutes. Upon completion of the 30-minute cold soak period, the test item shall be removed from the chamber and immediately (within two (2) minutes) subjected to uncoupling by use of the lanyard mechanism, using the high speed pull separation at a velocity of 9.15 m/s (30 ft/sec) + 10%, - 0%. The force required to separate the connectors shall not exceed 400 Newton for straight pulls and 440 Newtons for angled pulls (at 15°), by more than 50%.

Eyelet - Lanyard strength test: This test shall be applied immediately prior to and immediately following the durability tests in groups 1 and 2 of the qualification table in MIL-DTL-38999. The connector lanyard shall be subjected to a straight pull with the body of the connector restrained. The load applied shall be 890 Newtons. The load shall be applied for a period of one minute. The test shall be repeated 3 times (4 total). The lanyard shall withstand the loads without breaking.

The lanyards shall be examined for mechanical damage. There shall be no permanent damage such as elongation or fraying of wires.

The connector shall be examined. There shall be no visible distortion of the lanyard attachment points or the rear end retention mechanism.

Partially mated disengagement: To be applied immediately after the durability tests in groups 1 and 2 of the qualification table in MIL-DTL-38999. The test is to be performed when connectors are partially mated with the plug. The coupling ring shall be rotated until the connector is fully mated (red band obscured) and then the coupling ring shall be backed off by rotating through 180°. Pull-separation shall be accomplished within the limits as specified in the durability test. One single straight pull and one pull at 15°.

Dust (fine sand): To be performed in addition to the requirements of dust (fine sand) in group 11 of the qualification table in MIL-DTL-38999. Upon completion of the dust test, the test items shall be removed from the chamber and within 4 minutes shall be subjected to uncoupling by use of the lanyard mechanism using the high speed pull separation at a velocity of 9.15 m/s (30 ft/sec) + 10%, - 0% (single straight pull). The force required to separate the connectors shall not exceed the required values specified for pull-separation by more than 25 percent.

External bending moment: Wired connectors shall meet the external bending moment requirements of MIL-DTL-38999 with the following exceptions: shell size 25 shall be 28.3 Newton-meters.

GROUP A INSPECTION

In addition to the group A inspection requirements of MIL-DTL-38999, the connectors shall be subjected to the following test:

All connectors, prior to delivery, shall be subjected to a low-speed pull separation test. The functioning of the release mechanism shall be exercised by a single pull in the axial direction to demonstrate that the mechanism operates satisfactorily. The velocity of pull shall not exceed 13cm/second. The maximum force to release the connector shall not exceed 400 Newtons. The tests shall be conducted at ambient temperature and the results retained for audit by the Qualifying Activity.

GROUP C PERIODIC INSPECTION

12 Month tests: In addition to the 12 month tests required under MIL-DTL-38999 group C inspection, two sample connectors shall be subjected to the durability test in the manner described by this specification sheet, except that the total number of cycles shall be 125. The sequence shall be 25 high speed separation tests followed by 100 normal mating and un-mating operations. The test is to be conducted at ambient temperature.

24 Month tests: In addition to the 24 month tests required under MIL-DTL-38999 group C inspection, two extra samples shall be subjected to the revised test program as follows:

One connector shall be included in group 1 testing. The durability element of group 1 shall meet the requirements of this specification sheet (500 cycles, including angular pulls and temperature extremes). One connector shall be included in group 2 testing. The durability element of group 2 shall meet the requirements of this specification sheet (500 cycles, including angular pulls and temperature extremes). The samples provided shall not be required to complete the rest of groups 1 and 2 following completion of the durability test.

USER INTEGRATION GUIDANCE (See MIL-HDBK-1760)

Lanyard slack

Excessive slackness in the Lanyard when integrated into the aircraft is known to be detrimental to the performance of the connector. Best practice suggests that users endeavor to minimize the amount of slack in the lanyard in operational use.

Deployment angle

This connector is tested to the angular limit of 15° during High Speed separations. The 15° should not be used by the integrator as a tolerance for the attachment point, and integrators should endeavor to achieve perpendicular alignment whenever possible.

Side Thrust avoidance

Side thrust forces and torsional forces, imparted by the umbilical cable are known to be detrimental to the performance of the connector in High Speed Separation. Users are advised to route the umbilical cable in such a manner to minimize these forces.

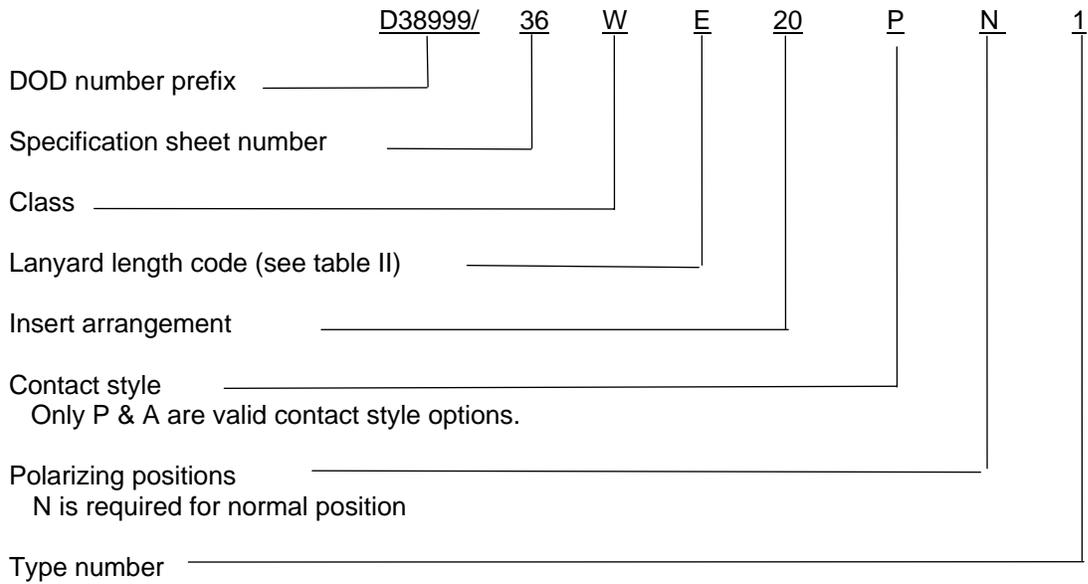
MIL-HDBK-1760:

MILITARY HANDBOOK, AIRCRAFT/STORE ELECTRICAL INTERCONNECTION SYSTEM

This handbook is available to provide advice and guidance for the integration of weapons onto aircraft. Users are advised to consult this document.

MIL-DTL-38999/36

Part or Identifying Number (PIN) example for all figures and types:



- For type 1, see figure 1.
- For type 3, see figure 2.
- For type 4, see figure 3.
- For type 5, see figure 4.
- For type 6, see figure 5.
- For type 7, see figure 6.
- For type 8, see figure 7.
- For type 9, see figure 8.

TABLE II. Lanyard length codes.

Code	L +/- 6
E	153 (6.024)
F	166 (6.535)
G	178 (7.008)
H	191 (7.520)
I	203 (7.992)
J	216 (8.504)
K	229 (9.016)
L	242 (9.528)
X (Adjustable)	153 (6.024) – 191 (7.520)
Y (Adjustable)	178 (7.008) – 216 (8.504)
Z (Adjustable)	203 (7.992) – 242 (9.53)

SUPERSESION DATA

This slash sheet supersedes MIL-DTL-38999/31. See table III for further clarification.

TABLE III. Supersession cross reference information.

SUPERSEDING CONNECTOR TYPE	SUPERSEDED CONNECTOR TYPE
MIL-DTL-38999/36 Type 1	MIL-DTL-38999/31 Type 1
None (no type 2)	MIL-DTL-38999/31 Type 2
MIL-DTL-38999/36 Type 3	MIL-DTL-38999/31 Type 3
MIL-DTL-38999/36 Type 4	MIL-DTL-38999/31 Type 4
MIL-DTL-38999/36 Type 5	MIL-DTL-38999/31 Type 5
MIL-DTL-38999/36 Type 6	MIL-DTL-38999/31 Type 6
MIL-DTL-38999/36 Type 7	None
MIL-DTL-38999/36 Type 8	None
MIL-DTL-38999/36 Type 9	None

Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Referenced documents. In addition to MIL-DTL-38999, this document references the following:

MIL-DTL-38999/20
MIL-DTL-38999/24
MIL-STD-202
MIL-STD-1560
MIL-HDBK-1760
EIA-364-28
SAE-AS85049

CONCLUDING MATERIAL

Custodians:
Army – CR
Navy – AS
Air Force – 11
DLA – CC

Preparing activity:
DLA – CC

(Project 5935–2007-044)

Review activities:
Army – AR, MI
Navy – EC, MC, OS
Air Force – 19, 99

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <http://assist.daps.dla.mil>.