

INCH-POUND

MIL-PRF-39012/73C

16 November 2011

SUPERSEDING

MIL-PRF-39012/73B

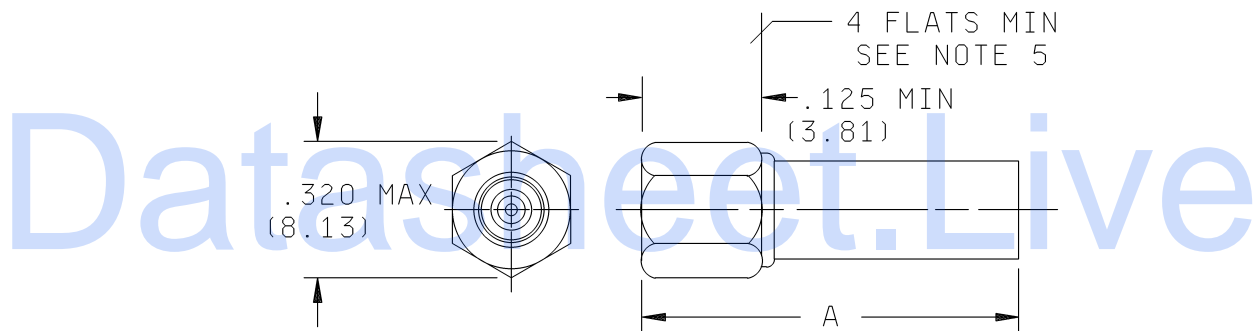
24 September 1986

PERFORMANCE SPECIFICATION SHEET

CONNECTORS, PLUGS, ELECTRICAL, COAXIAL, RADIO FREQUENCY, SERIES SMC (CABLED, SOCKET CONTACT, CLASS 2)

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-PRF-39012.



NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. For dimension A, see table I.
4. Dimension A defines the overall length of the connector when assembled to the cable.
5. Wrench flats are to accommodate standard wrench opening in accordance with FED-STD-H28, appendix 10.
6. Maximum overall diameter of the connector is .320 inch (8.13 mm).
7. All undimensioned pictorial configurations are for reference purposes only.
8. Series SMC, socket contact interface in accordance with MIL-STD-348.

FIGURE 1. General configuration.

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TABLE I. Dash numbers, cross-reference, and dimensions.

Dash No. M39012/73-	# Applicable cable group from MIL-PRF-39012, appendix B M17/	Typical mating connector <u>1/</u>	Dimensions	Inches (millimeters) maximum <u>2/</u>		
CATEGORY A – FIELD SERVICEABLE (NO SPECIAL TOOLS REQUIRED)						
0003 <u>3/ 4/</u>	Cable group I 93-RG178 * @ 169-00001 %	M39012/74-0003 M39012/76-0003	A	.88 (22.35)		
0004 <u>3/ 4/</u>	Cable group II 113-RG316 * @ 172-00001 % 94-RG179 ^	M39012/74-0004 M39012/76-0004				
0103 <u>3/</u>	Cable group I 93-RG178 * @ 169-00001 %	M39012/74-0103 M39012/76-0103				
0104 <u>3/</u>	Cable group II 113-RG316 * @ 172-00001 % 94-RG179 ^	M39012/74-0104 M39012/76-0104				
4101 <u>3/</u>	Cable group I 93-RG178 * @ 169-00001 %	M39012/74-4101 M39012/76-4101				
4102 <u>3/</u>	Cable group II 113-RG316 * @ 172-00001 % 94-RG179 ^	M39012/74-4102 M39012/76-4102				
CATEGORY C – FIELD REPLACEABLE (MIL-C-22520/5 BASIC CRIMP TOOL) <u>5/</u>						
0011 <u>3/ 4/</u>	Cable group I ~ 93-RG178 * @ 169-00001 %	M39012/74-0011 M39012/76-0011			A	1.10 (27.94)
0012 <u>3/ 4/</u>	Cable group IIa & 113-RG316 * @ 172-00001 % 94-RG179 ^	M39012/74-0012 M39012/76-0012				

See notes at end of table.

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TABLE I. Dash numbers, cross-reference, and dimensions – Continued.

Dash No. M39012/73-	# Applicable cable group from MIL-PRF-39012, appendix B M17/	Typical mating connector <u>1/</u>	Dimensions	Inches <u>2/</u> (millimeters) maximum
CATEGORY C – FIELD REPLACEABLE (MIL-C-22520/5 BASIC CRIMP TOOL) <u>5/</u>				
0016 <u>3/</u>	Cable group I ~ 93-RG178 * @ 169-00001 %	M39012/74-0017 M39012/76-0017	A	1.10 (27.94)
0017 <u>3/</u>	Cable group IIa & 113-RG316 * @ 172-00001 % 94-RG179 ^	M39012/74-0018 M39012/76-0018		
4001 <u>3/</u>	Cable group I ~ 93-RG178 * @ 169-00001 %	M39012/74-4001 M39012/76-4001		
4002 <u>3/</u>	Cable group IIa & 113-RG316 * @ 172-00001 % 94-RG179 ^	M39012/74-4002 M39012/76-4002		

1/ Mating connector Part or Identifying Number (PIN) is for reference only. All mating connectors may not be listed.

2/ Dimensions are in inches. Metric equivalents are given for information only.

3/ These connectors have captivated center contacts.

4/ Connector bodies shall be gold plated in accordance with ASTM B488, type II, code C, class 1.27.

5/ Category C connectors are assembled by means of the applicable crimping tool in accordance with MIL-DTL-22520 to the specified cable stripped as specified on figure 2.

The latest version of each cable shall be applicable.

* Cable to be used when performing tests requiring cable except as in notes @ and ^.

@ Cable to be used for the +200°C thermal shock tests.

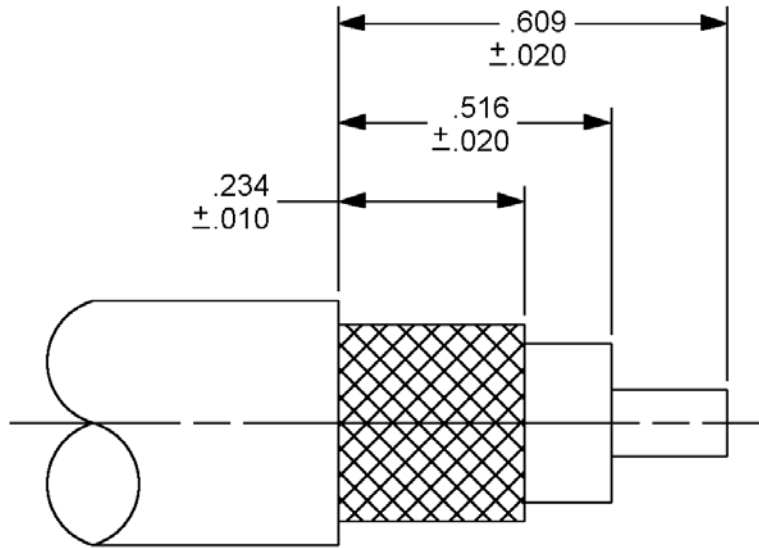
^ These are not 50 ohm cables, therefore, when attached to the specified connectors, VSWR, RF leakage and insertion loss are not applicable.

~ M22520/5-33 closure B or M22520/5-03 closure B.

& M22520/5-35 closure B or M22520/503 closure A.

% Caution is directed to the application of this cable above 400 MHz. Attenuation is tested only at 400 MHz. SRL and power handling capabilities are not stipulated herein.

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Inches	mm
.010	0.25
.020	0.51
.234	5.94
.516	13.11
.609	15.47

NOTES:

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FIGURE 2. Cable stripping dimensions for category C connectors.

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ENGINEERING DATA:

Nominal impedance: 50 ohms.

Frequency range: 0 to 10 GHz.

Voltage rating: The voltage rating shall be as specified in table II.

Temperature rating: -65°C to +165°C.

TABLE II. Voltage rating.

Cables	Voltage max. (sea level) V rms	Voltage max. at 70,000 ft. (4.437 kPa) V rms
Cable group I	250	60
Cable group II, IIa,	335	85

REQUIREMENTS:

Dimensions and configuration: See figure 1 and MIL-STD-348.

Force to engage and disengage:

Longitudinal force: Not applicable.

Torque: 16 inch-ounces, maximum.

Coupling proof torque: 100 inch-ounces, minimum.

Inspection conditions:

Torque: 35 to 50 inch-ounces.

Mating characteristics: See MIL-STD-348.

Center contact (socket):

Oversize test pin: .0215 inch diameter minimum (nonclosed entry contacts only).

Test pin finish: 16 microinches.

Insertion depth: .050 inch minimum.

Number of insertions: 1.

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Insertion force test:

Steel test pin diameter: .021 inch, minimum.

Insertion depth: .050 inch, minimum.

Test pin finish: 16 microinches.

Insertion force: 2.5 pounds, maximum.

Withdrawal force test:

Steel test pin diameter: .019 inch, maximum.

Insertion depth: .050 inch, minimum.

Test pin finish: 16 microinches.

Withdrawal force: 1 ounce, minimum.

Hermetic seal: Not applicable.

Leakage (pressurized connectors): Not applicable.

Insulation resistance: In accordance with MIL-STD-202, method 302, test condition B, 1,000 megohms minimum.

Center contact retention:

Axial force: 4 pounds minimum axial force. Applicable to captivated center contacts only.

Radial torque: Not applicable.

Resistance to test prod damage: Not applicable.

Salt atmosphere (corrosion): In accordance with MIL-STD-202 method 101, test condition B.

Voltage standing wave ratio (VSWR): From 500 MHz to 10 GHz, or approximately 80 percent of the upper cutoff frequency of the cable, whichever is lower.

<u>Cable group</u>	<u>VSWR</u>
I	1.25 + 0.04 (F) GHz
II, IIa,	1.20 + 0.04 (F) GHz

Swept frequency VSWR test setup:

Item 6: VSWR shall be less than 1.05 +.0025F (F in GHz).

Item 16: VSWR shall be less than 1.05 +.0025F (F in GHz).

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Second step of VSWR checkout procedure – VSWR shall be less than 1.10 +.01F (F in GHz).

Group B inspection: VSWR shall be less than 1.08 +.017F (F in GHz).

Qualification and group C inspection: VSWR shall not exceed 1.15.

Connector durability: 500 cycles minimum at 12 cycles per minute maximum. The connector shall meet mating characteristics and force to engage and disengage requirements.

Contact resistance: In milliohms, maximum.

	<u>Initial</u>	<u>After environment</u>
Center contact:	6.0	8.0
Outer contact:	1.0	Not applicable
Braid to body:	1	Not applicable

Dielectric withstanding voltage at sea level: In accordance with MIL-STD-202, method 301.

<u>Cable group</u>	<u>V rms (at sea level)</u>
I	750
II, IIa	1,000

Vibration, high frequency: In accordance with MIL-STD-202, method 204, test condition D.

Shock: In accordance with MIL-STD-202, method 213, test condition C.

Thermal shock: In accordance with MIL-STD-202, method 107, test condition B, except test high temperature shall be +85°C. High temperature shall be +200°C for connectors using +200°C cables (see tables I and III).

Moisture resistance: Not applicable.

Corona level:

Altitude: 70,000 feet (4.437 kPa).

<u>Cable group</u>	<u>Volts, min.</u>
I	185
II, IIa	250

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RF high potential withstanding voltage:

Voltage and frequency: Tested at a frequency from 5 to 7.5 MHz.

Leakage current: Not applicable.

<u>Cable group</u>	<u>Volts, rms min.</u>
I	500
II, IIa	700

Cable retention force: The cable retention force shall be as specified in table III.

TABLE III. Cable retention force. 1/ 2/

Cable dielectric outer diameter	Pounds, min. (N)	
	Non-crimp Single braid	Crimp Single braid
	Center contact	Center contact
	Captive	Captive
<u>Inches, max. (mm)</u>		
.036 (0.91)	13 (57.83)	13 (57.83)
.066 (1.68)	25 (111.20)	25 (111.20)

1/ Dimensions are in inches.

2/ Metric equivalents are given for information only.

Coupling mechanism retention force: 35 pounds, minimum.

RF leakage: -60 dB minimum, tested at frequency between 2 and 3 GHz..

RF insertion loss: .25 dB maximum tested at 4 GHz.

PIN: M39012/73 (dash number in table I or IV as applicable).

Group qualification: See table V.

Cross reference of PIN: See table VI.

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TABLE IV. Category B – non-field replaceable (special tools may be required).

NOT FOR ARMY, NAVY, OR AIR FORCE USE. FOR OEM USE ONLY

Dash No. <u>1/</u> M39012/73	# Applicable cable group from MIL-PRF-39012, appendix B M17/	Typical mating connector <u>2/</u>	Dimensions	Inches (millimeters) maximum <u>3/</u>
B0008 <u>4/ 5/</u>	93-RG178 * @ 169-00001 %	M39012/74B0008 M39012/76B0008	A	1.10 (27.94)
B0009 <u>4/ 5/</u>	113-RG316 * @ 172-00001 % 119-RG174 173-00001 %	M39012/74B0009 M39012/76B0009		
B0010 <u>4/ 5/</u>	94-RG179 * @ ^	M39012/74B0010 M39012/76B0010		
B0013 <u>4/</u>	93-RG178 * @ 169-00001 %	M39012/74B0014 M39012/76B0014		
B0014 <u>4/</u>	113-RG316 * @ 172-00001 % 119-RG174 173-00001 %	M39012/74B0015 M39012/76B0015		
B0015 <u>4/</u>	94-RG179 ^ @ *	M39012/74B0016 M39012/76B0016		

- 1/ For cross-reference of dash number to superseded PIN or type designation, see table VI.
- 2/ Mating connector PIN are for reference only. All mating connectors may not be listed.
- 3/ Dimensions are in inches. Metric equivalents are given for information only.
- 4/ These connectors have captive center contacts.
- 5/ Connector bodies shall be gold plated in accordance with ASTM B488, type II, code C, class 1.27.
- # The latest version of each cable shall be applicable.
- * Cable to be used when performing tests requiring cable except as in note @.
- @ Cable to be used for the +200°C thermal shock tests.
- % Caution is directed to the application of this cable above 400 MHz. Attenuation is tested only at 400 MHz. SRL and power handling capabilities are not stipulated herein.
- ^ These are not 50 ohm cables, therefore, when attached to the specified connectors, VSWR, RF leakage and insertion loss are not applicable.

NOTE: Connectors mate with connectors of the same material only; Example: M39012/73-3001 mates with M39012/74-3001, and M39012/73-4001 mates with M39012/74-4001.

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TABLE V. Group qualification and retention testing.

Group	Submission and retention of qualification of any of the following connectors <u>1/</u>	Qualifies the following connectors
I	M39012/ 73-0003	M39012/ 73-0003 73-0103 <u>2/</u>
II	73-0004	73-0004 73-0104 <u>2/</u>
III	73B0008	73B0008 73B0013 <u>2/</u>
IV	73B0009	73B0009 73B0010 73B0014 <u>2/</u> 73B0015 <u>2/</u>
V	73B0010	73B0010 73B0015 <u>2/</u>
VI	73-0011	73-0011 73-0016 <u>2/</u>
VII	73-0012	73-0012 73-0017 <u>2/</u>

1/ For qualification retention, where more than one part is listed in a group in this column, data may be supplied on any of those parts in order to retain qualification for those parts in the corresponding right hand column.

2/ Corrosion and contact resistance test data must be submitted to DSCC-VQ before qualification approval may be granted.

NOTE: If a connector manufacturer produces a connector which meets all the requirements for two or more connector PINs (within the same series), the manufacturer may receive qualification approval for two or more connector PINs by qualifying the one connector. It is not necessary that such connectors be in the same group. Each connector, however, must be marked with its own appropriate PIN. For group qualification, the connectors must be of similar design. Qualification of connectors qualifies connectors of the same material and finish only.

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TABLE VI. Cross reference of PIN.

Preferred PIN M39012/73 <u>1/</u>	Substitute for PIN Or type designation
-0003	M39012/73-0001
-0004	M39012/73-0002
B0008	M39012/73-0008, M39012/73-0005
B0009	M39012/73-0009, M39012/73-0006
B0010	M39012/73-0010, M39012/73-0007

1/ The “B” PIN is required marking for connectors manufactured after 24 March 1987. The connectors that are in stock or distribution that were previously qualified and marked with the old PIN shall also be considered acceptable for Government use until stock is purged. (Applies to category “B” P/N change only; M39012/XXBXXXX).

Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Referenced documents. In addition to MIL-PRF-39012, this document references the following:

- MIL-STD-348
- MIL-DTL-22520
- MIL-C-22520/5
- MIL-STD-202
- ASTM B488
- FED-STD-H28

CONCLUDING MATERIAL

Custodians:
 Army - CR
 Navy - EC
 Air Force - 85
 DLA - CC

Preparing activity:
 DLA - CC
 (Project 5935-2009-107)

Review activities:
 Army - AT, AV, EA, MI
 Navy - AS, MC, OS, SA, SH
 Air Force - 19, 99

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