

INCH-POUND
MIL-PRF-39012/5H
w/AMENDMENT 1
4 May 2010
SUPERSEDING
MIL-PRF-39012/5H
16 November 2006

PERFORMANCE SPECIFICATION SHEET

CONNECTORS, PLUG, ELECTRICAL, COAXIAL, RADIO FREQUENCY
(SERIES N (CABLED), RIGHT ANGLE, PIN 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.

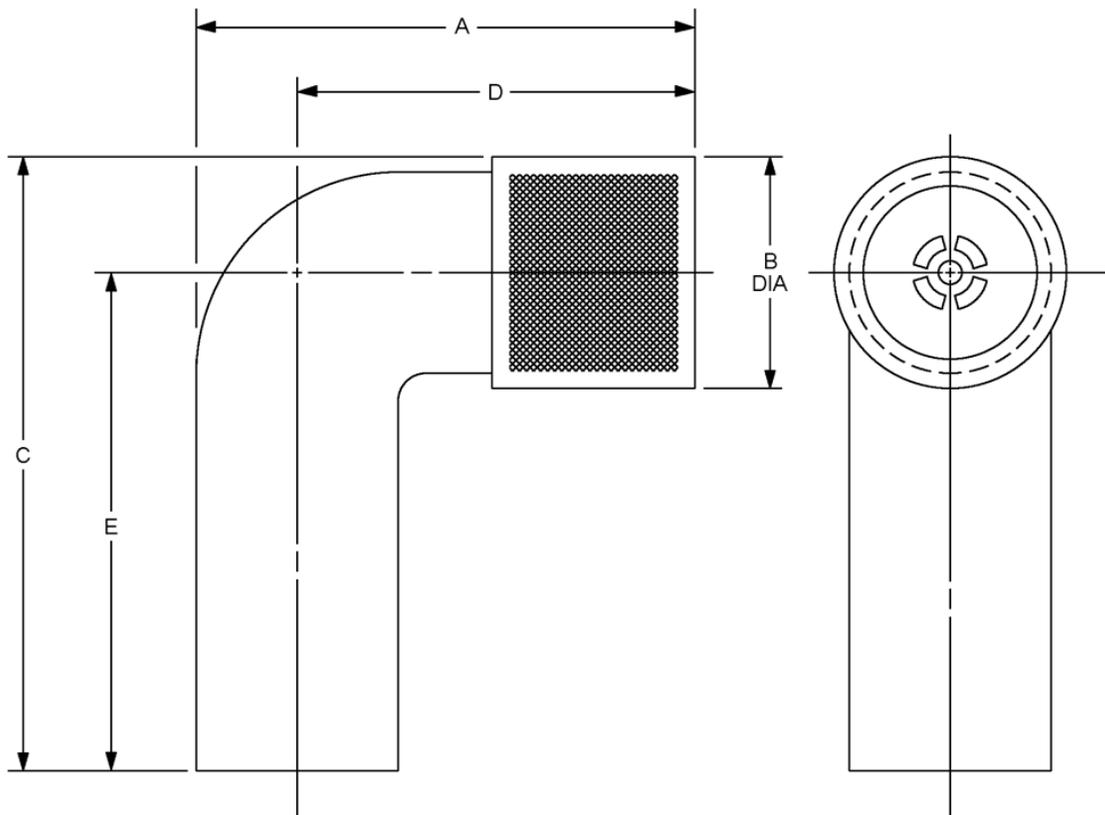


FIGURE 1. General configuration.

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NOTES:

1. For dimensions A, B, C, D, and E, see tables I and III.
2. Dimensions A, B, and C are the largest overall dimensions of the connector.
3. Wrench flats are to accommodate standard wrench opening in accordance with FED-STD-H28, appendix 10.
4. All undimensioned pictorial representations are for reference purposes only.
5. Dimension C defines the maximum length of the connector when assembled to the appropriate cable.
6. Series N, pin contact interface, in accordance with MIL-STD-348.
7. Three holes .027 inch (0.69 mm) minimum diameter, equally spaced, are required for safety wiring after mating. Location on the coupling nut is optional.

FIGURE 1. General configuration – Continued.

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

Part or Identifying Number (PIN) M39012/05- <u>1/</u>	Applicable cable <u>2/</u> M17/	Dimensions	Inches (millimeters) #	
			Minimum	Maximum
Category A – Field serviceable (no special tools required) <u>3/</u>				
X006	Cable group VIII 2-RG006 <u>4/</u> 112-RG304 <u>5/</u>	A B C	1.312 (33.32)	1.500 (38.10) .827 (21.01) 2.370 (58.42)
X104	Cable group XIV 79-RG218 <u>5/</u>			
X101	Cable group X 86-00001 <u>6/</u> 127-RG393 <u>5/</u>			
X015	Cable group XII 78-RG217 <u>5/</u>			
X125	Cable group XI 74-RG215 <u>5/ 7/</u> 189-00002 <u>7/</u>			
X030	220-00001	A B C	1.312 (33.32)	1.500 (38.10) .827 (21.01) 2.370 (60.20)
X130	220-00002 <u>7/</u>			
X031	221-00001			
X131	221-00002 <u>7/</u>			
X032	222-00001			
X132	222-00002 <u>7/</u>			
X033	223-00001			
X133	223-00002 <u>7/</u>			
X034	224-00001			
X134	224-00002 <u>7/</u>			
X035	225-00001			
X135	225-00002 <u>7/</u>			
X036	226-00001			
X136	226-00002 <u>7/</u>			
X037	227-00001			
X137	227-00002 <u>7/</u>			
X038	228-00001			
X138	228-00002 <u>7/</u>			

See notes at end of table.

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

PIN M39012/05- <u>1</u> /	Applicable cable <u>2</u> / M17/	Dimensions	Inches (millimeters) #	
			Minimum	Maximum
Category C – Field replaceable (MIL-DTL-22520 crimp tool) See note next to applicable cable for crimp die <u>3</u> / <u>8</u> /				
X016	Cable group VIII <u>9</u> / 112-RG303 <u>5</u> /	A B C	1.312 (33.32)	1.531 (38.89) .827 (21.01) 2.375 (60.33)
X004	Cable group XA <u>10</u> / 65-RG165 <u>5</u> / <u>6</u> /			
X005	Cable group XB <u>10</u> / 86-00001 <u>6</u> / 127-RG393 <u>5</u> /			
X014	Cable group XC <u>10</u> / 62-RG144 <u>4</u> / <u>5</u> / <u>6</u> /			
X017	Cable group XD <u>10</u> / 77-RG216 <u>4</u> / <u>5</u> / <u>6</u> /			

See notes at end of table.

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

PIN M39012/05- <u>1/</u>	Applicable cable <u>2/</u> M17/	Dimensions	Inches (millimeters) #	
			Minimum	Maximum
Category D – Field replaceable – Defined piece part <u>3/ 8/ 11/ 12/</u>				
X501	Cable group XB 127-RG393 <u>5/</u>	A B C D E	1.312 (33.32)	1.406 (35.72) .827 (21.01) 2.218 (56.36) 1.078 (27.38) 1.812 (46.04)
X502	Cable group XA 65-RG165 <u>5/</u>			
X503	Cable group VIB 60-RG142 <u>6/</u> 128-RG400 <u>5/</u>			
X504	Cable group VIA 111-RG303 <u>5/</u>			

1/ For cross-reference of dash number to superseded PIN or type designation, see table IV.

2/ The latest version of each cable shall be applicable.

3/ These connectors have captivated center contacts.

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

5/ Cable to be used when performing tests requiring cable except as in 4/ and 6/.

6/ Cable to be used for the +200°C temperature cycling tests.

7/ Armored cable.

8/ These connectors are assembled using the applicable crimp tool, to the specified cables stripped as shown on figure 3.

9/ M22520/5-35 closure A or M22520/5-55 closure A.

10/ M22520/5-61.

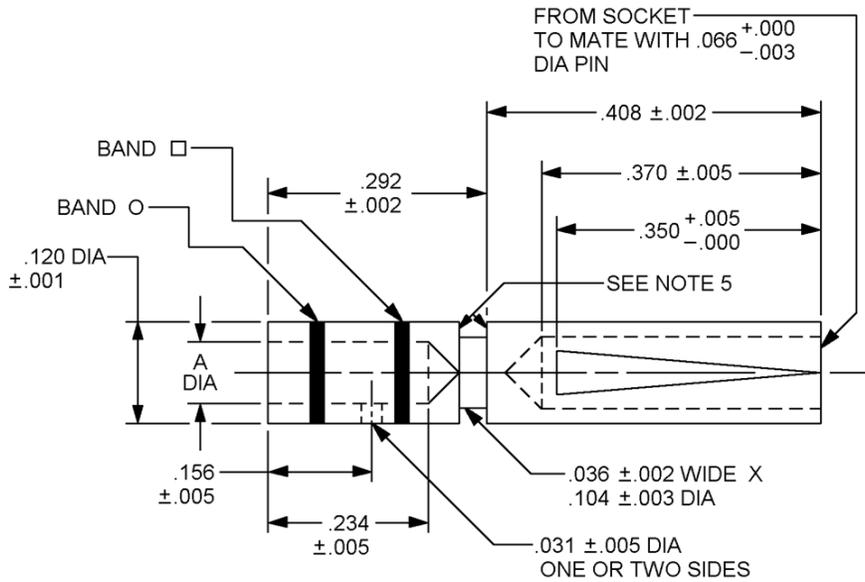
11/ Complete connector assembly shall consist of a body, center contact, ferrule and assembly instructions.

12/ Not to be used in army equipment.

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

X Denotes connector body plating material option. The only plating options allowable are Silver or Nickel over brass in accordance with MIL-PRF-39012. Only connectors of the same materials shall be mated to avoid dissimilar metal problems. **CAUTION: A NICKEL PLATED BODY IS NOT FOR USE IN APPLICATIONS WHERE PASSIVE INTERMODULATION GENERATION (PIM) MAY BE A CONCERN**). Silver is the preferred plating option.

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CENTER CONTACT

Inches	mm	Inches	mm	Inches	mm	Inches	mm
.001	0.03	.043	1.09	.250	6.35	.492	12.50
.002	0.05	.066	1.68	.292	7.42	.500	12.70
.003	0.08	.098	2.49	.350	8.89	.600	15.24
.005	0.13	.104	2.64	.370	9.40		
.015	0.38	.156	3.96	.408	10.36		
.031	0.79	.220	5.59	.418	10.62		
.036	0.91	.234	5.94	.438	11.13		

Dash no.	Contact no. <u>1/</u>	Dimension A	Basic crimp tool <u>2/</u> M22520/1	Crimp die or positioner M22520/1 <u>3/</u>	Crimp tensile Minimum, pounds (N)	Color band □	Color band O
X501 X502	5-10	.098 ± .002	-01	-13	60 (266.90)	Red	Orange
X503 X504	5-11	.043 + .001 - .002	-01	-13	20 (88.96)	Blue	Orange

1/ Contact numbers are for identification only.

2/ Class 2 tool may be used by OEM (see MIL-DTL-22520).

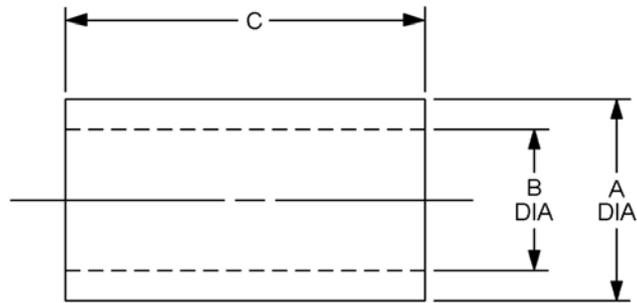
3/ Optional tool: M22520/5-01 with M22520/5-25 closure B die.

NOTES:

1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Crimp tensile test shall be in accordance with SAE-AS39029.
4. Copyright notice: All information disclosed in these specification sheets which is or may be copyrighted is reproduced herein with the express permission of the copyright owner.
5. Maximum break of .003 inch (0.08 mm).
6. Color bands shall be positioned such that no coloring material enters the inspection hole.

FIGURE 2. Contact and ferrule dimensions for category D only.

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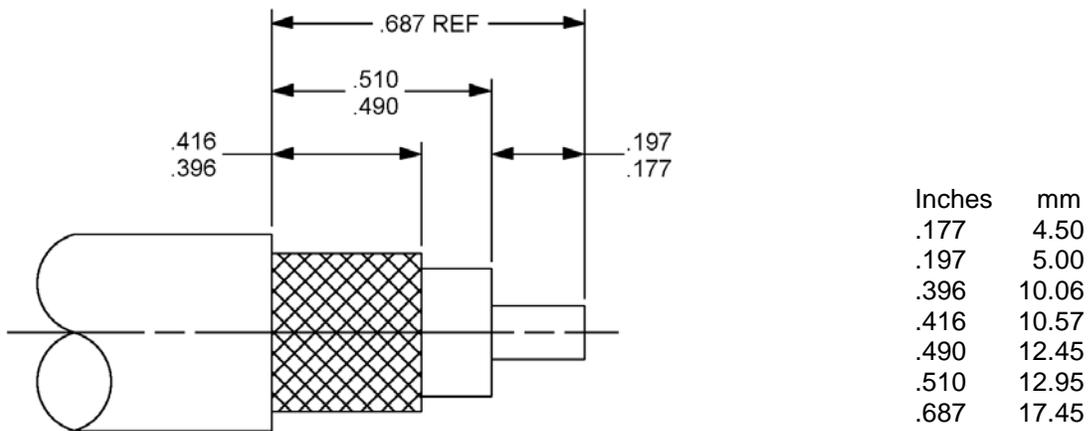
CRIMP FERRULE

Dash number	Ferrule number <u>1/</u>	A ± .003	B ± .003	C ± .015	Basic crimp tool <u>2/</u>	Crimp die or positioner M22520/5-
X501	5-50	.492	.438	.600	M22520/5-01	25
X502	5-51	.492	.418	.600		Closure A or 61
X503	5-52	.250	.220	.500		5, 11, 57
X504	5-53	.245	.206	.500		Closure A or 19 Closure B

1/ Ferrule numbers are for identification only.

2/ Class 2 tools may be used by OEM (see MIL-DTL-22520).

FIGURE 2. Contact and ferrule dimensions for category D only – Continued.



NOTES:

- Dimensions are in inches.
- Metric equivalents are given for information only.

FIGURE 3. Cable stripping dimensions for field replaceable connectors.

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ENGINEERING DATA:

Nominal impedance: 50 ohms.

Frequency range: 0 to 11 GHz.

Voltage rating

1,000 volts rms maximum working voltage at sea level.

250 volts rms maximum at 70,000 feet (4.437 kPa).

Temperature rating: -65°C to +165°C.

REQUIREMENTS:

Designs and configurations: See figures 1, 2, and 3.

Force to engage and disengage:

Longitudinal force: Not applicable.

Torque: 6 inch-pounds (.68 Nm) maximum.

Coupling proof torque: 15 inch-pounds (1.69 Nm) minimum.

Inspection conditions: Coupling torque: 6 to 10 inch-pounds (.68 to 1.13 Nm).

Mating characteristics: In accordance with MIL-STD-348.

Outer contact:

Test ring ID: .316 inch (8.03 mm) maximum, 16 microinch (0.406 μ m) finish.

Insertion force: 25 pounds (111.20 N) maximum when inserted a minimum of .093 (2.36 mm) inch.

Contacts with slotted members: Shall contact a .324 inch (8.23 mm) minimum diameter ring within .031 inch (0.79 mm) of their tip ends.

Hermetic seal: Not applicable.

Leakage (pressurized connectors): Not applicable.

Insulation resistance: Method 302 of MIL-STD-202, test condition B. 5,000 megohms minimum.

Center contact retention: (Applicable to captivated-center-contact connectors only.) 15 pounds (66.72 N) minimum axial force for all cables except RG400 and RG142; 6 pounds (26.69 N) minimum for RG400 and RG142.

Corrosion (salt spray): Method 101 of MIL-STD-202, test condition B.

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Voltage standing wave ratio (VSWR): From 500 to 11 GHz, or approximately 80 percent of upper cutoff frequency of the cable, whichever is lower.

From 500 MHz to 9 GHz: 1.35 maximum.

From 9 to 11 GHz: 1.50 maximum.

Swept frequency VSWR test setup:

Item 6: VSWR shall be less than $1.008 + .002 F$ (F in GHz).

Item 16: VSWR shall be less than $1.008 + .002 F$ (F in GHz).

Second step of VSWR checkout procedure – VSWR shall be less than $1.012 + .004 F$ (F in GHz).

Group B inspection – VSWR shall be less than $1.024 + .007 F$ (F in GHz).

Qualification and group C inspection – VSWR shall not exceed 1.08.

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

Contact resistance: In milliohms maximum.

	<u>Initial</u>	<u>After environment</u>
Center contact	2.5	3.0
Outer contact (silver)	.2	Not applicable
Outer contact (nickel)	.4	Not applicable
Braid to body	.05	Not applicable

Dielectric withstanding voltage: Method 301 of MIL-STD-202. 2,500 volts rms minimum at sea level for connectors using other than RG400 and RG142; 1,500 volts rms minimum for connectors using RG400 and RG142.

Vibration, high frequency: Method 204 of MIL-STD-202, test condition B.

Shock: Method 213 of MIL-STD-202, test condition I.

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

Moisture resistance: Method 106 of MIL-STD-202. No measurements at high humidity. Insulation resistance shall be at least 200 megohms within 5 minutes after removal from humidity.

Corona level:

Voltage: 500 volts rms minimum.

Altitude: 70,000 feet (4.437 kPa).

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RF high potential withstanding voltage:

Voltage and frequency: 1,500 volts rms tested at a frequency from 5 to 7.5 MHz.

Leakage current: Not applicable.

Cable retention force:

Noncrimp assemblies: 75 pounds (333.62 N) minimum.

Crimp assemblies:

50 lbs. (222.41 N) minimum for cables .155-.189 inch (3.94 mm – 4.80 mm) OD.

60 lbs. (266.90 N) minimum for cables .190-.229 inch (4.83 mm – 5.82 mm) OD.

75 lbs. (333.62 N) minimum for cables .230-.249 inch (5.84 mm – 6.32 mm) OD.

90 lbs. (400.34 N) minimum for cables .250 inch (6.35 mm) OD and larger.

Coupling mechanism retention force: 100 pounds (444.82 N) minimum.

RF leakage: -90 dB minimum, tested at a frequency between 2 and 3 GHz. This requirement may be met by qualifying the straight connector version for the same cable in accordance with MIL-PRF-39012/1.

Insertion loss: .30 dB maximum at 10 GHz.

PIN: M39012/05- (dash number from table I or "B" number from table III).

Group qualification: See table II.

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TABLE II. Group qualification. ^{1/}

Group	Submission and qualification of any of the following connectors ^{2/} M39012/05	Qualifies the following connectors M39012/05
I	-X101	-X101
II	-X006	-X006
III	B0002 B0003	B0002 B0003
IV	-X004 -X005 -X016	-X004 -X005 -X016
V	-X014 -X016 -X017	-X014 -X016 -X017
VI	B0007 B0008 B0011	B0007 B0008 B0011
VII	B0009 B0010 B0012	B0009 B0010 B0012
VIII	-X501 -X502	-X501 -X502 -X503
IX	-X503	-X503
X	-X504	-X504

^{1/} 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 and be of the same materials and plating.

^{2/} 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. The part does not necessarily have to be the part initially qualified.

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TABLE III. Category B – nonfield replaceable (special tools may be required). 1/

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

PIN 2/ M39012/05B	Applicable cable 3/ M17/	Dimensions	Inches (millimeters) #	
			Minimum	Maximum
0002 4/	074-RG213 5/	A B C	1.312 (33.32)	1.531 (38.89) .827 (21.01) 2.375 (60.33)
0003 4/	75-RG214 5/			
0007 6/	2-RG6 7/			
0008 6/	6-RG11 7/ 62-RG144 5/ 7/ 8/			
0009 6/	065-RG165 5/ 8/			
0010 6/	073-RG212 5/ RG-222/U			
0011 6/	77-RG216 5/ 7/			
0012 6/	RG225/U 5/ 8/			

1/ For maintenance replacements for category B, see table V.

2/ For cross-reference of dash number to superseded PIN or type designation, see table IV.

3/ The latest version of each cable shall be applicable.

4/ Inactive for new design.

5/ Cable to be used when performing tests requiring cable except as in 7/ and 8/.

6/ These connectors have captivated center contacts.

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

8/ Cable to be used for the +200°C temperature cycling tests.

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

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TABLE IV. Supersession data. 1/ 2/

Preferred PIN M39012/05	Superseded PINs or superseded type designation
-0101	UG-594/U, M39012/05-0001
B0002	UG-1107/U, M39012/05-0002
B0003	UG-1708/U, M39012/05-0003
-0004	M39012/05-0015
-0005	M39012/05-0018
-0006	
B0007	M39012/05-0007
B0008	M39012/05-0008
B0009	M39012/05-0009
B0010	M39012/05-0010
B0011	M39012/05-0011
B0012	M39012/05-0012
-0014	
-0016	M39012/05-0013
-0017	
-0501	
-0502	
-0503	
-0504	

1/ The superseded PIN or the type designation is for reference only. Where a superseded PIN or type designation is not given, none was assigned or will be assigned. The PIN M39012/05-XXXX shall be used in all cases for marking and identifying the connector.

2/ The basic type designation includes all letter versions of the specified number, e.g., UG-18/U includes UG-18A/U, UG-18B/U, etc.

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TABLE V. Maintenance replacements for category B.

Category B number <u>1/</u>	Category C dash number	Category A dash number	Category D dash number
B0002	0004	0101	0502
B0003	0005	0101	0501
B0007	0016	0006	--
B0008	0014	0101	--
B0009	0004	0101	--
B0010	0016	0006	--
B0011	0017	0101	--
B0012	0005	0101	0501

1/ Category B connectors are for original installation only. They will not be stocked or procured by the Government.

Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. 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.

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

- MIL-STD-202
- MIL-STD-348
- FED-STD-H28
- MIL-DTL-22520
- MIL-PRF-39012/1
- SAE-AS39029

CONCLUDING MATERIAL

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

Preparing activity:
DLA – CC

(Project 5935-2009-072)

Review activities:
Army – AR, AT, EA, MI
Navy – AS, MC, OS, SH
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 <https://assist.daps.dla.mil>.