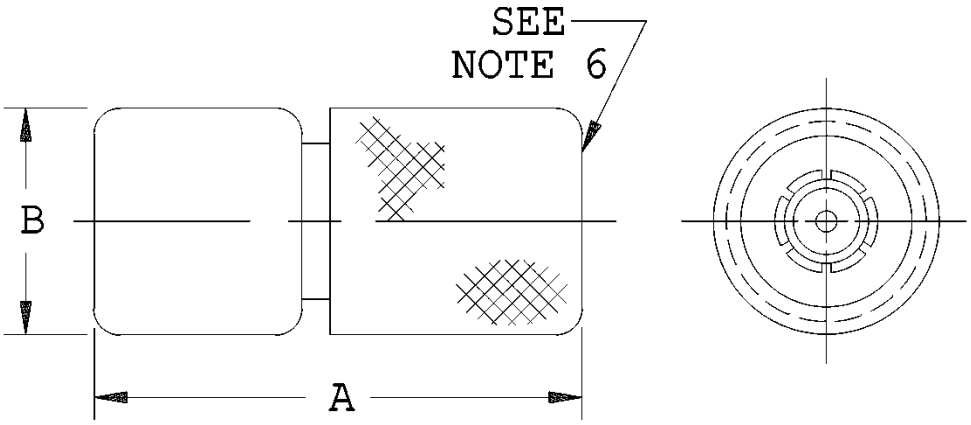
INCH-POUND
MIL-PRF-39012/35H
w/AMENDMENT 1
21 November 2016
SUPERSEDING
MIL-PRF-39012/35H
8 June 2011

PERFORMANCE SPECIFICATION SHEET

CONNECTORS, PLUG, ELECTRICAL, COAXIAL, RADIO FREQUENCY (SERIES SC (CABLED), PIN CONTACT, CLASS 2)

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

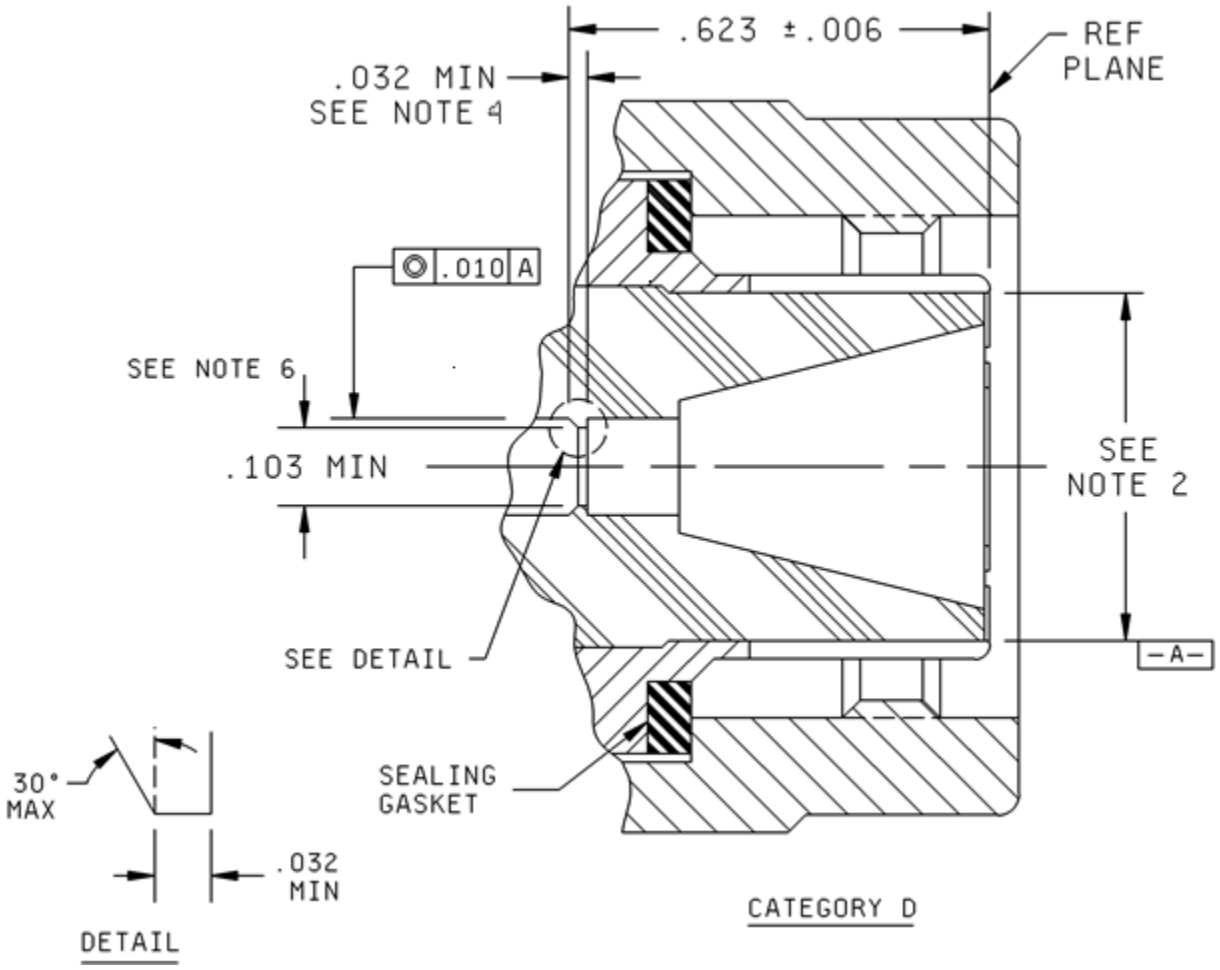
The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-PRF-39012.



Inches	mm	Inches	mm	Inches	mm	Inches	mm
.075	1.91	3.57	9.07	.690	17.53	.857	21.77
.095	2.41	3.61	9.17	.714	18.14	.995	25.27
.138	3.51	4.97	12.62	.722	18.34	1.005	25.53
.199	4.78	5.02	12.75	.835	21.21		

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

FIGURE 1. General configuration.



Inches	mm
.006	0.15
.010	0.25
.032	0.81
.103	2.62
.623	15.82

NOTES:
1. Dimensions are in inches. Metric equivalents are given for information only.
2. The ID of the outer contact, when inserted into a .411 inch (10.44 mm) maximum ring gauge, shall be .377 inch (9.58 mm) minimum.
3. All undimensioned pictorial configurations are for reference purposes only.
4. Chamfer is optional. If chamfer is used, put chamfer on a 30º maximum.
5. Dimension to meet connector performance requirements.

FIGURE 2. Category D captivation detail.

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

Dash No. 1/	Applicable cable 2/ M17/	Dimensions	Inches * (millimeters) maximum
CATEGORY A – FIELD SERVICEABLE (NO SPECIAL TOOLS REQUIRED) 3/			
X016	Cable group VIII 2-RG6 4/ 180-00001 4/ 112-RG304 5/	A B	(40.87) .828 (21.03)
X017	Cable group X 6-RG11 4/ 181-00001 4/ 62-RG144 4/ 127-RG393 5/ 86-00001 6/		
X018	Cable group XII 78-RG217 5/ 165-00001 188-00001	A B	1.875 (47.63) .891 (22.63)
X019	Cable group XIII 72-RG211 161-00001	A B	2.250 (57.15) 1.328 (33.73)
X020	Cable group XIV 79-RG218 5/		
X021	Cable group XI 74-RG215 5/	A B	2.250 (57.15) .891 (33.73)
X022	Cable group IX 92-RG115 5/ 6/	A B	1.609 (40.87) .828 (21.03)

See notes at end of table.

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

Dash No. 1/	Applicable cable 2/ M17/	Dimensions	Inches * (millimeters) maximum
CATEGORY C – FIELD REPLACEABLE (MIL-C-22520/5 CRIMP TOOL) SEE NOTE NEXT TO APPLICABLE CABLE GROUP FOR CRIMP DIE 3/ 7/			
X010	Cable group VIII 8/ 2-RG6 4/ 180-00001 4/ 112-RG304 5/	A B	2.250 (57.15) .828 (21.03)
X011	Cable group XA 9/ 65-RG165 5/ 6/		
X012	Cable group XB 9/ 127-RG393 5/ 86-00001 6/		
X013	Cable group XC 9/ 62-RG144 4/ 5/ 6/		
X014	Cable group IX 9/ 92-RG115 5/ 6/		
CATEGORY D – FIELD REPLACEABLE – DEFINED PIECE PARTS 3/ 7/ 10/			
X501	Cable group XB 127-RG393 5/ 86-00001 6/	A B	1.718 (43.64) .828 (21.03)
X502	Cable group XA 65-RG165 5/		
X503	Cable group VIB 128-RG400 5/ 60-RG142 6/	A B	1.625 (41.28) .828 (21.03)

See notes at end of table.

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

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/ These connectors are assembled, using the applicable crimp tool, to the specified cable stripped as shown on figure 4.

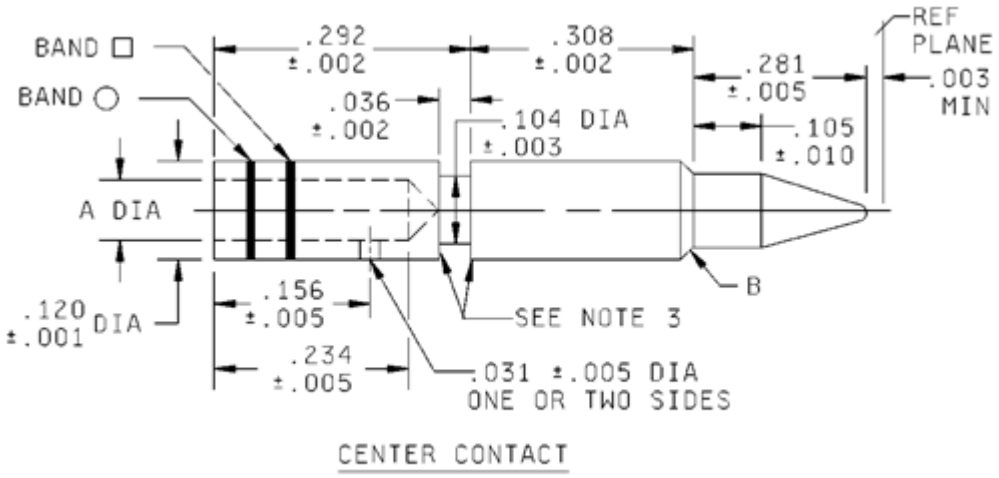
8/ M22520/5-35 closure A or M22520/5-55 closure A.

9/ M22520/5-61.

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

* 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 (http://www.amphenolrf.com/simple/PIM%20Paper.pdf). Silver is the preferred plating option.**



CENTER CONTACT

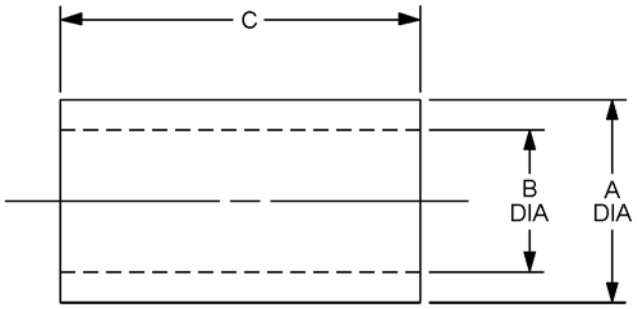
Inches	mm	Inches	mm	Inches	mm
.001	0.03	.031	0.79	.156	3.96
.002	0.05	.036	0.91	.234	5.94
.003	0.08	.104	2.64	.281	8.92
.005	0.13	.105	2.67	.292	7.42
.010	0.25	.120	3.05	.308	7.82

Dash No.	Contact No. 1/	A (inches)	Basic crimp tool 2/	Crimp die or positioner	Crimp tensile minimum	Color band □	Color band ○
X501 X502	38-10	.098 ±.002	M22520/1-01	M22520/1-14	60 pounds (266.90 N)	Red	White
X503	38-11	.043 +.001 -.002			20 pounds (88.96 N)	Blue	

1/ Contact numbers are for identification purposes only.
2/ Class 2 tool may be used by OEM (see MIL-DTL-22520).

NOTES:
1. Dimensions are in inches. Metric equivalents are given for information only.
2. Contact material shall be beryllium copper within one year from the date of this specification. Phosphor bronze contacts are acceptable for government use until stock is purged.
3. Crimp tensile test shall be in accordance with SAE-AS39029.
4. Maximum break of .003 inch (0.08 mm).
5. Copyright notice: All information disclosed in this specification sheet which is or may be copyrighted is reproduced herein with the express permission of the copyright owner.
6. Color bands shall be positioned such that no coloring material enters the inspection hole.

FIGURE 3. Contact and ferrule dimensions for category D only.

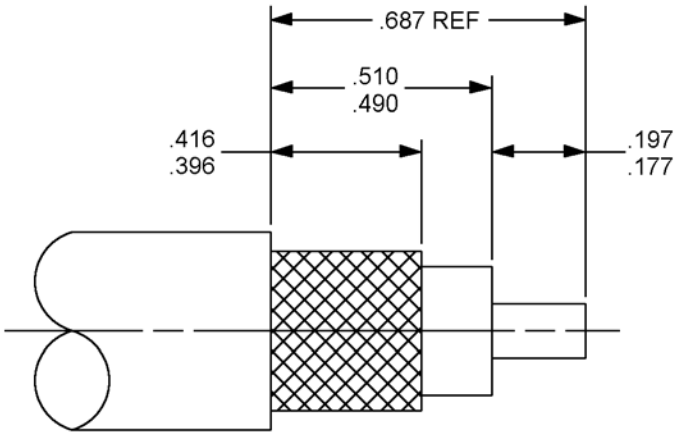


CRIMP FERRULE

Dash No.	Ferrule No. 1/	A	B	C ±.015	Basic crimp tool 2/	Crimp die or positioner M22520/5-
X501	38-50	.492 ±.003	.438 ±.003	.600	M22520/5-01	25 closure A or 61
X502	38-51	.492 ±.003	.418 ±.003	.600		
X503	38-52	.250 ±.003	.220 ±.003	.500		5, 11, 57 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 3. Contact and ferrule dimensions for category D only – Continued.



Inches	mm
.177	4.50
.197	5.00
.396	10.06
.416	10.57
.490	12.45
.510	12.95
.687	17.45

NOTES:
1. Dimensions are in inches. Metric equivalents are given for information only.

FIGURE 4. Cable stripping dimensions for field replaceable connectors.

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:

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

Force to engage and disengage:

Longitudinal force: Not applicable.

Torque: 6 inch-pounds, maximum.

Coupling proof torque: 15 inch-pounds.

Inspection conditions: For each test of threaded coupling connector where the test is performed on mated pairs, the pairs shall be torqued to 6 to 10 inch-pounds.

Mating characteristics: See MIL-STD-348 and figure 2 for dimensions.

Outer contact:

Test ring ID: .411 maximum, 16 microinch finish.

Insertion force: 15 pounds maximum when inserted a minimum of .125 inch.

Contacts with slotted members. Shall contact a .419 minimum diameter ring within .031 inch of their tip ends.

Hermetic seal: Not applicable.

Leakage (pressurized connectors): Not applicable.

Insulation resistance: In accordance with MIL-STD-202-302. 5,000 megaohms minimum.

Center contact retention: Applicable to captivated center contact connectors only.

Axial force: 15 pounds (66.72 N) minimum, for all cables except M17/60-RG142 and M17/128-RG400 which shall be 6 pounds (26.69 N) minimum.

Radial torque: Not applicable.

Salt atmosphere (corrosion): In accordance with MIL-STD-202-101.

Voltage standing wave ratio (VSWR): From 500 MHz to 11 GHz, or approximately 80 percent of the upper cutoff frequency of the cable, whichever is lower; 1.30, maximum.

Swept frequency VSWR setup:

Item 6: VSWR shall be less than 1.015 +.005F (F in GHz).

Item 16: VSWR shall be less than 1.015 +.005F (F in GHz).

Second set of VSWR checkout procedure – VSWR shall be less than 1.045 +.019F (F in GHz).

Group B inspection – VSWR shall be less than 1.10 +.01F (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.

	Initial	After environment
Center contact:	1.0	1.5
Outer contact (silver):	.15	Not applicable
Outer contact (nickel):	.30	Not applicable
Braid to body:	.05	Not applicable

Dielectric withstanding voltage at sea level: In accordance with MIL-STD-202-301. 3,000 volts rms minimum at sea level for connectors using other than M17/60-RG142 and M17/128-RG400 cables, 1,500 volts rms for connectors using these cables.

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

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

Thermal shock: In accordance with MIL-STD-202-107, 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: In accordance with MIL-STD-202-106. No measurements at high humidity. Insulation resistance shall be at least 200 megohms within 5 minutes after removal from humidity.

Corona level:

Voltage: 750 volts minimum.

Altitude: 70,000 feet (4.437 kPa).

RF high potential withstanding voltage:

Voltage and frequency: 2,500 volts rms tested at a frequency from 5 to 7.5 MHz.

Leakage current: Not applicable.

Cable retention force:

Non-crimp assemblies: 75 pounds (333.62 N) minimum.

Crimp assemblies:

50 lbs. minimum for cables .155 -.189 inch OD.
60 lbs. minimum for cables .190 - .229 inch OD.
75 lbs. minimum for cables .230 - .249 inch OD.
90 lbs. minimum for cables .250 inch OD and larger.

Coupling mechanism retention force: 100 pounds, minimum.

RF leakage: -90 dB minimum, tested at a frequency between 2 and 3 GHz..

RF insertion loss:

.15 dB maximum at 9 GHz.

.05 $\sqrt{F\ (GHz)}$ dB maximum tested at 3 and 6 GHz.

PIN: M39012/35 - (dash number from table I or 'B' number from table III).

Group qualification: See table II.

TABLE II. Group qualification and retention testing. 1/

Group	Submission and qualification of any of the following connectors 2/ M39012/35	Qualifies the following connectors M39012/35
I	-0017	-0015 -0016 -0017 -0018 -0019 -0020 -0021 -0022

See notes at end of table.

TABLE II. Group qualification and retention testing – Continued. 1/

Group	Submission and qualification of any of the following connectors 2/ M39012/35	Qualifies the following connectors M39012/35
II	B0024	B0023 B0024 B0025 B0026 B0027
III	-0011	-0010 -0011 -0012 -0013 -0014
IV	-0501 -0502	-0501 -0502 -0503
V	0503	-0503

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.

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.

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

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

PIN 2/ 3/ M39012/35B	Applicable cable 4/ M17/	Dimensions	Inches (millimeters) Maximum
0023	73-RG212 5/ 112-RG304	A B	2.250 (57.15) .828 (21.03)
0024	65-RG165 6/ 74-RG213 5/		
0025	75-RG214 5/ 86-00001 6/		
0026	6-RG11 5/ 7/ 62-RG144 6/ 7/		
0027	92-RG115 6/		

See notes at end of table.

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/ These connectors have captivated center contacts.

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

5/ Cable to be used when performing test requiring cable except as in 6/ and 7/.

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

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

TABLE IV. Supersession data. 1/

Preferred PIN M39012/35	Superseded PIN or type designation
-0010	
-0011	
-0012	
-0013	
-0014	
-0016	M39012/35-0001
-0017	M39012/35-0002
-0018	M39012/35-0003
-0019	M39012/35-0004
-0020	M39012/35-0005
-0021	M39012/35-0015
-0022	
B0023	M39012/35-0006, M23329/5-01, M23329/5-05, M39012/35-0023
B0024	M39012/35-0007
B0025	M39012/35-0008, M23329/5-02, M23329/5-04, M39012/35-0025
B0026	M39012/35-0009, M23329/5-09, M39012/35-0026
B0027	M39012/35-0027
-0501	
-0502	
-0503	

1/ The superseded PIN or 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 M39012/35-XXXX, where XXXX is the correct dash number, shall be used in all cases for marking and identifying the connector.

TABLE V. Maintenance replacements for category B.

Category B number 1/	Category C dash number	Category A dash number	Category D dash number
B0023	0010	0016	---------
B0024	0011	0017	0502
B0025	0012	0017	0501
B0026	0013	---------	---------
B0027	0014	0022	---------

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;

FED-STD-H28
MIL-STD-202-101
MIL-STD-202-106
MIL-STD-202-107
MIL-STD-202-204
MIL-STD-202-213
MIL-STD-202-301
MIL-STD-202-302
MIL-STD-348
MIL-DTL-22520
SAE-AS39029
MIL-C-22520/5

CONCLUDING MATERIAL

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

Preparing activity:
DLA - CC

(Project 5935-2016-207)

Review activities:
Army - AT, AR, AV, EA, MI
Navy - AS, MC, OS, SA, 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.dla.mil.