INCH-POUND

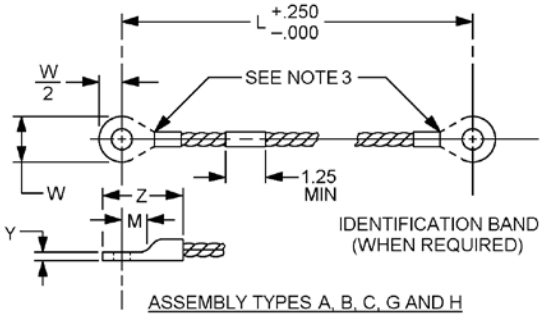
MIL-DTL-83413/8E
10 June 2015
SUPERSEDING
MIL-DTL-83413/8D
w/Amendment 1
30 July 2014

DETAIL SPECIFICATION SHEET

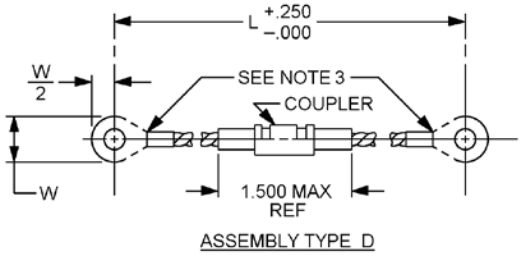
CONNECTORS AND ASSEMBLIES, ELECTRICAL, AIRCRAFT GROUNDING: TYPE IV JUMPER CABLE ASSEMBLY, LEAD, ELECTRICAL

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

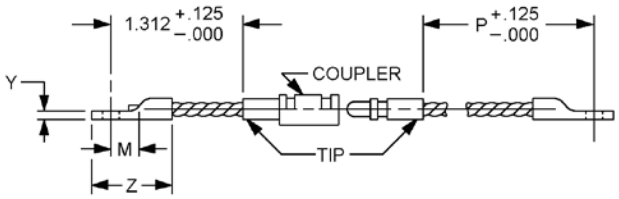
The requirements for acquiring the product described herein shall consist of this specification sheet and MIL-DTL-83413.



ASSEMBLY TYPES A, B, C, G AND H



ASSEMBLY TYPE D



ASSEMBLY TYPE E
SHORT END

ASSEMBLY TYPE F
LONG END

Inches	mm
.125	3.18
.250	6.35
1.25	31.75
1.312	33.32
1.500	38.10

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for information only.
3. Resistance readings to be taken at the junction of terminal barrels and tongues.
4. For assembly types I, J, K, and L where chafe guard/ identification label is used instead of the ID band, chafe guard must cover exposed cable length with a maximum gap of 0.120 inch between chafe guard end and start of terminal barrel insulation.

FIGURE 1. Jumper cable assembly.

TABLE I. Jumper assembly types and characteristics.

Jumper assembly type	Construc-tion type	Wire and terminal material	Wire size (see table II)	Available lug sizes (see tables III, IV, V, VI, VII, VIII, VIIII,)	Available cable length, see "L" or "P" dimensions on figure 1	Lightning tested	Fuel Compat-Ible 1/	Method of attaching terminals	Color of ID band or ID Chafe Guard	Supersedes and reference only for types I, J, K and L
A	Bonding	Copper	12	A thru J	002-999	No	No	Crimp	No band	MS25083-2
B	Current return	Copper	8	K,L,M,N,T,U	002-999	No	No	Crimp	No band	MS25083-4
C 2/	Bonding	Aluminum	10	O,P,Q,R,S (aluminum only)	003-999	No	Yes	Brazed 4/	Clear	MS25083-1 and -7
D 3/	Quick disconnect	Copper	12	A,B,C,D,E, F,G	003-999	No	No	Crimp	No band	MS25083-3
E 3/	Short end of quick disconnect	Copper	12	A,B,C,D,E, F,G	Fixed length	No	No	Crimp	No band	MS25083-3S
F 3/	Long end of quick disconnect	Copper	12	A,B,C,D,E, F,G	002-999	No	No	Crimp	No band	MS25083-3P
G	Bonding	Copper	12	A thru J	003-999	Yes	No	Crimp	Yellow	MS25083-5
H	Current return	Copper	8	K,L,M,N,T,U	003-999	Yes	No	Crimp	Yellow	MS25083-6
I 6/	Static Charge Bonding	Copper	14	A,B,C,D,E, F,G	003-999	No	No	Crimp	ID Black Chafe Guard	SS7039-7
J 5/	Static Charge Bonding	Steel	1/16	A,B,C,D,E, F,G	003-999	No	No	Crimp	ID Black Chafe Guard	SS7039-2
K 5/	Bonding	Steel	3/32	A,B,C,D,E, F,G	003-999	No	No	Crimp	ID Black Chafe Guard	SS7039-3
L 5/	Bonding	Steel	1/8	A,B,C,D	003-999	No	No	Crimp	ID Black Chafe Guard	SS7039-4

1/ Only fuel compatible jumper assemblies may be used within fuel tank and cells.
2/ Do not use outside fuel tanks and cells.
3/ Inactive for Air Force Airborne use after 9 December 1963.

TABLE I. Jumper assembly types and characteristics. – Continued.

4/ Dip braze terminals in accordance with AWS-C3.7 Specification for Aluminum Brazing. A coating is not required on interior strands of the cable, chemical conversion coating in accordance with MIL-DTL-5541, class 3 shall be applied after brazing. Inert gas welding using aluminum based solder or other means of termination may be used only if approved by the qualifying activity. Aluminum terminals may be crimped to the cable to facilitate dip brazing. Over crimping shall be avoided.

5/ Bonding jumper types J, K, and L are intended for use on aircraft structures where they are subjected to continuous and/ or excessive vibrations.

6/ Static charge bonding types I and J are used for static charge bonding applications. Static charge bonding types I and J shall not be used for lightning protection bonding, which requires conductor sizes of 12 AWG or larger.

TABLE II. Wire characteristics by jumper assembly type.

Jumper assembly type	Material	Stranding no. x AWG	Wire size	Assembly 1/ resistance (max-ohms)	Tensile strength (min-lb)	Crimp tool requirements	
						Crimping tools 2/	Crimping dies
A, G	Copper	(7 x 37) x 36	12	.00016xL + .00034 Ω	110	M22520/5-01 3/ or M22520/24-01	M22520/5-100
B, H	Copper	(7 x 95) x 36	8	.0006xL + .00016 Ω	225	SAE-AS5259/1	SAE-AS5259/1 3/
C	Aluminum	37 x 0.0167 inch	10	.00042xL + .00110 Ω	75	Not applicable	Not applicable
D	Copper	(7 x 37) x 36	12	.00016xL + .00034 Ω	5 to 28 4/	M22520/5-01 M22520/24-01	M22520/5-100
E	Copper	(7 x 37) x 36	12	.00057	110	M22520/5-01 M22520/24-01	M22520/5-100
F	Copper	(7 x 37) x 36	12	.00016xL + .00034 Ω	110	M22520/5-01 M22520/24-01	M22520/5-100
I 5/	Copper	(7 x 24) x 36	14	.00021xL +.00043 Ω	70	/6	/6
J 5/	Steel	(7 x 19)	1/16	.08333xL +.00043 Ω	70	/6	/6
K 5/	Steel	(7 x 19)	3/32	. 08333xL +.00043 Ω	110	/6	/6
L 5/	Steel	(7 x 19)	1/8	.08333xL +.00043 Ω	225	/6	/6

1/ Where L = length of the cable assembly in inches. Example: For a 24 inch type A assembly, assembly resistance = .00016 ohm/inch x 24 inches + .00034Ω = .00418 ohms (max).

2/ Alternate crimping tools which use the specified dies of this table or qualified class II copper terminal lugs in accordance with SAE-AS7928/1 (crimped with the tools and dies used to obtain the class II terminal lug approval), may be used to facilitate high volume production of copper jumpers. However, either of these options must be pre-approved by the qualifying activity before qualification tests are initiated on samples produced using these termination options.

TABLE II. Wire characteristics by jumper assembly type. – Continued.

3/ Application: M22520/5-01 and /5-100 for use on insulated terminals. M22520/24-01 and SAE-AS5259/1 for use on uninsulated terminals.
4/ Tensile strength for D jumper assemblies is 5 to 28 lbs, however for the separate assembly ends: E = 110 lbs and F=110 lbs.
5/ Notes 2/, 3/, & 4/ are not applicable to Jumper assembly types I, J, K, and L.
6/ See crimp tool manufacturer requirements.

TABLE III. Available lug sizes.
A,D,E,F & G type jumper assembly. 1/ 2/ 3/ 4/ 8/

Code letter lug size designation	For stud size	12 AWG Copper terminals (All types except type C, I, J, K, & L)	
		SAE-AS25036 Insulated	SAE-AS20659 Un-insulated
A	.138 (3.51)	-111	…
F	.138 (3.51)	…	-165
I	.164 (4.17)	-156	…
B	.190 (4.83)	-112	…
G	.190 (4.83)	…	-105
C	.250 (6.35)	-157	…
D	.312 (7.92)	-113	…
H 6/	.312 (7.92)	…	-106
E	.375 (9.53)	-114 5/	…
J 7/	.375 (9.53)	…	-128

1/ Dimensions are in inches. Metric equivalents are given for information only.
2/ Unless otherwise specified, tolerance is ±.005.
3/ Resistance readings to be taken at the junction of terminal barrels and tongues.
4/ Lightning current tests applicable to type G and H assemblies only.
5/ Size #10, #12, & #14 AWG wire only.
6/ Lug size designators D & H correspond to lug size D in Rev B, but were broken out separately for clarification.
7/ Lug size designators E & J correspond to lug size E in Rev B, but were broken out separately for clarification.
8/ For supersession information see table X.

TABLE IV. Available lug sizes.
B & H type jumper assembly. 1/ 2/ 3/ 4/ 8/

Code letter lug size designation	For stud size	8 AWG Copper terminals (All types except type C, I, J, K, & L)	
		SAE-AS25036 Insulated	SAE-AS20659 Uninsulated
T	.250 (6.35)	-116	…
U	.250 (6.35)	…	-141
K 6/	.312 (7.92)	-117 5/	…
L 6/	.312 (7.92)	…	-108 5/
M 7/	.375 (9.53)	-118	…
N 7/	.375 (9.53)	…	-129 5/
W	.164 (4.17)	…	-140
V	.190 (4.83)	…	-107
Z	.190 (4.83)	-115	…

1/ Dimensions are in inches. Metric equivalents are given for information only.
2/ Unless otherwise specified, tolerance is ±.005.
3/ Resistance readings to be taken at the junction of terminal barrels and tongues.
4/ Lightning current tests applicable to type G and H assemblies only.
5/ Size #8 AWG wire only.
6/ Lug size designators K & L correspond to lug size D in Rev B, but were broken out separately for clarification.
7/ Lug size designators M & N correspond to lug size E in Rev B, but were broken out separately for clarification.
8/ For supersession information see table XI.

TABLE V. Available lug sizes.
C type jumper assembly. 1/ 2/ 3/ 6/

Code letter lug size designation	For stud size	Aluminum terminal				
		Stud Hole ID	M min	W	Y	Z max
O	.138 (3.51)	.152 (3.86)	.218 (5.54)	.406 (10.31)	.083 (2.11)	1.172 (29.77)
		.142 (3.61)		.313 (7.95)	.037 (0.94)	
P	.190 (4.83)	.203 (5.16)	.250 (6.35)			
		.193 (4.90)				
Q	.250 (6.35)	.285 (7.24)	.281 (7.14)	.540 (13.72)		1.300 (33.02)
		.260 (6.60)		.450 (11.43)		
R 4/	.312 (7.92)	.343 (8.71)	.329 (8.36)	.741 (18.82)	.090 (2.29)	1.390 (35.31)
		.320 (8.13)		.531 (13.49)	.038 (0.97)	
S 5/	.375 (9.53)	.385 (9.78)	.343 (8.71)			1.626 (41.30)
		.410 (10.41)				

1/ Dimensions are in inches. Metric equivalents are given for information only.
2/ Unless otherwise specified, tolerance is ±.005.
3/ Resistance readings to be taken at the junction of terminal barrels and tongues.
4/ Lug size designators R correspond to lug size D in Rev B, but were broken out separately for clarification.
5/ Lug size designators S correspond to lug size E in Rev B, but were broken out separately for clarification.
6/ For supersession information see table XII.

TABLE VI. Available lug sizes.
I type jumper assembly. 1/ 2/ 3/ 4/ 5/ 6/

Code letter lug size designation	For stud size	12 AWG 6/ Copper terminals (type I jumper assembly)
		SAE-AS7928/1 Insulated
A	.138 (3.51)	-56
B	.164 (4.17)	-57
C	.190 (4.83)	-58
D	.250 (6.35)	-59
E	.312 (7.92)	-60
F	.375 (9.53)	-61
G	.500 (12.70)	-62

1/ Dimensions are in inches. Metric equivalents are given for information only.
2/ Unless otherwise specified, tolerance is ±.005.
3/ Resistance readings to be taken at the junction of terminal barrels and tongues.
4/ Lightning current tests applicable to type G and H assemblies only.
5/ Size 14 AWG wire only.
6/ Wire diameter slightly larger than concentric lay AWG due to rope lay construction. Terminal lug size have been selected accordingly.

TABLE VII. Available lug sizes.
J type jumper assembly. 1/ 2/ 3/ 4/ 5/

Code letter lug size designation	For stud size	14 AWG Copper terminals (type J jumper assembly)
		SAE-AS7928/1 Insulated
A	.138 (3.51)	-49
B	.164 (4.17)	-50
C	.190 (4.83)	-51
D	.250 (6.35)	-52
E	.312 (7.92)	-53
F	.375 (9.53)	-54
G	.500 (12.70)	-55

1/ Dimensions are in inches. Metric equivalents are given for information only.
2/ Unless otherwise specified, tolerance is ±.005.
3/ Resistance readings to be taken at the junction of terminal barrels and tongues.
4/ Lightning current tests applicable to type G and H assemblies only.
5/ Size 1/16 steel wire only.

TABLE VIII. Available lug sizes.
K type jumper assembly. 1/ 2/ 3/ 4/ 5/ 6/

Code letter lug size designation	For stud size	10 AWG 6/ Copper terminals (type K jumper assembly)
		SAE-AS7928/1 Insulated
A	.138 (3.51)	-63
B	.164 (4.17)	-64
C	.190 (4.83)	-65
D	.250 (6.35)	-66
E	.312 (7.92)	-67
F	.375 (9.53)	-68
G	.500 (12.70)	-69

1/ Dimensions are in inches. Metric equivalents are given for information only.
2/ Unless otherwise specified, tolerance is ±.005.
3/ Resistance readings to be taken at the junction of terminal barrels and tongues.
4/ Lightning current tests applicable to type G and H assemblies only.
5/ Size 3/32 steel wire only.
6/ Wire diameter slightly larger than concentric lay AWG due to rope lay construction. Terminal lug size have been selected accordingly.

TABLE VIIII. Available lug sizes.
L type jumper assembly. 1/ 2/ 3/ 4/ 5/ 6/

Code letter lug size designation	For stud size	8 AWG 6/ Copper terminals (type L jumper assembly)
		SAE-AS25036 Insulated
A	.190 (4.83)	-115
B	.250 (6.35)	-116
C	.312 (7.92)	-117
D	.375 (9.53)	-118

1/ Dimensions are in inches. Metric equivalents are given for information only.
2/ Unless otherwise specified, tolerance is ±.005.
3/ Resistance readings to be taken at the junction of terminal barrels and tongues.
4/ Lightning current tests applicable to type G and H assemblies only.
5/ Size 1/8 steel wire only.
6/ Wire diameter slightly larger than concentric lay AWG due to rope lay construction. Terminal lug size have been selected accordingly.

REQUIREMENTS:

Material:

For jumper types A, D, E, F, and G: Soft or drawn and annealed tin coated copper wire per ASTM- B172. Rope-lay-bunched member stranding consisting of 7 bunches of 37 individual strands of 36 AWG equivalent solid copper wire (259 individual wire strands with total approximate circular mill area 6475 with 12 AWG total equivalent).

For jumper type I: Soft or drawn and annealed tin coated copper wire per ASTM- B172. Rope-lay-bunched member stranding consisting of 7 bunches of 24 individual strands of 36 AWG equivalent solid copper wire (168 individual wire strands with total approximate circular mill area 4200 with 14 AWG total equivalent).

Aluminum wire (type C assembly): Size 10, 37 strands of 0.0167 inch, electrical grade, aluminum alloy, 1350 strands in accordance with ASTM-B230/B230M, concentric stranded, length of lay (pitch) .75 to 1.25 inch.

Jumper types B and H: Soft or drawn and annealed. Tin coated copper wire per ASTM-B172. Rope-lay-bunched member stranding consisting of 7 bunches of 95 individual strands of 36 AWG equivalent solid copper wire (665 individual wire strands with total approximate circular mill area 16625 with 8 AWG total equivalent).

For jumper types I, J, and K: Flexible, corrosion resistant steel wire rope, type I, composition B, per MIL-DTL-83420/2, construction type 7 x 19 rope-lay-bunched member stranding consisting of 7 bunches of 19 individual strands. (133 individual wire strands total).

Coupler (assembly types “D”, “E”, and “F” only): In accordance with MIL-DTL-6852.

Identification band (types C, G, and H only): Polyolefin, heat shrinkable in accordance with SAE-AMS-DTL-23053/5. Color specified in table I.

Chafe guard/ Identification label (types I and J only): Heat shrinkable electrical insulation tubing per SAE-AMS-DTL-23053/5, “Insulation Sleeving, Electrical, Heat Shrinkable, Polyolefin, Flexible, CLASS I, color black, .125" I.D. size.

Chafe guard/ Identification label (type K only): Heat shrinkable electrical insulation tubing Per SAE-AMS- DTL-23053/5, “Insulation Sleeving, Electrical, Heat Shrinkable, Polyolefin, Flexible, CLASS I, color black,.187" I.D. size.

Chafe guard/ Identification label (type L only): Heat shrinkable electrical insulation tubing Per SAE-AMS-DTL-23053/5, “Insulation Sleeving, Electrical, Heat Shrinkable, Polyolefin, Flexible, CLASS I, color black,.250" I.D. size.

Assembly resistance: See table II.

Tensile strength: See table II. Perform after the flexibility test in accordance with MIL-DTL-83413 group II qualification sequence. Omit assembly resistance as a tensile strength post test.

Crimping tools and crimping dies: See table II.

Marking (types C, G, and H only): Part or Identifying Number (PIN) shall be marked on the identification band. If the identification band is too short to accommodate the entire PIN on a single line, the PIN may be put on two lines or both sides of the identification band. Assembly type "C" parts shall be marked with an ink or fluid which is compatible with fuel. Assembly type "I, J, K, and L" parts shall be marked with white lettering in ink or fluid which is compatible with fuel.

Salt spray: 48 hours in accordance with test procedure EIA/ECA-364-26.

Salt spray: Not applicable to types J, K, and L.

Altitude-low temperature: Not applicable.

Dust: Not applicable.

Ozone exposure: Not applicable.

Lightning current: Not applicable to types A, B, C, D, E, F, I, J, K, and L.

Humidity: Not applicable to types J, K, and L.

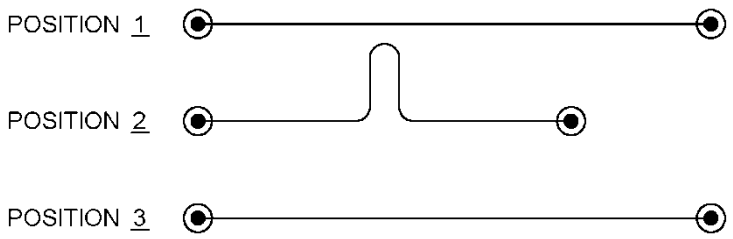
Temperature cycling: Not applicable to types J, K, and L.

Dimensions and configuration: See figure 2.

Flexibility: For type "C" aluminum assemblies, change the MIL-DTL-83413 test to the following: Twist and flex: prior to the tensile strength test of MIL-DTL-83413.

Test No. 1 – Twist test 2 half twists (360º) in a direction to tighten the wire weave. This is for clarification and to accommodate the short 3 inch C type jumper.

Test No. 2 – Flex 20 times.



NOTE: For copper assemblies the flexibility test in accordance with MIL-DTL-83413 shall be performed at a rate of 30-65 cycles/minute.

FIGURE 2. Twist and flex test.

Qualification required: The activity responsible for the qualified products list for this specification sheet is the DLA Land and Maritime, Columbus, DLA Land and Maritime-VQ, P.O. Box 3990, Columbus, Ohio 43218-3990.

TABLE X. Supersession table for the A, D, E, F & G type jumper assemblies.

Superseded LUG Code (Rev B)	Preferred LUG Code
A	A
F	F
I	I
B	B
G	G
C	C
D	D
D	H
E	E
E	J

TABLE XI. Supersession table.
B & H type jumper assembly.

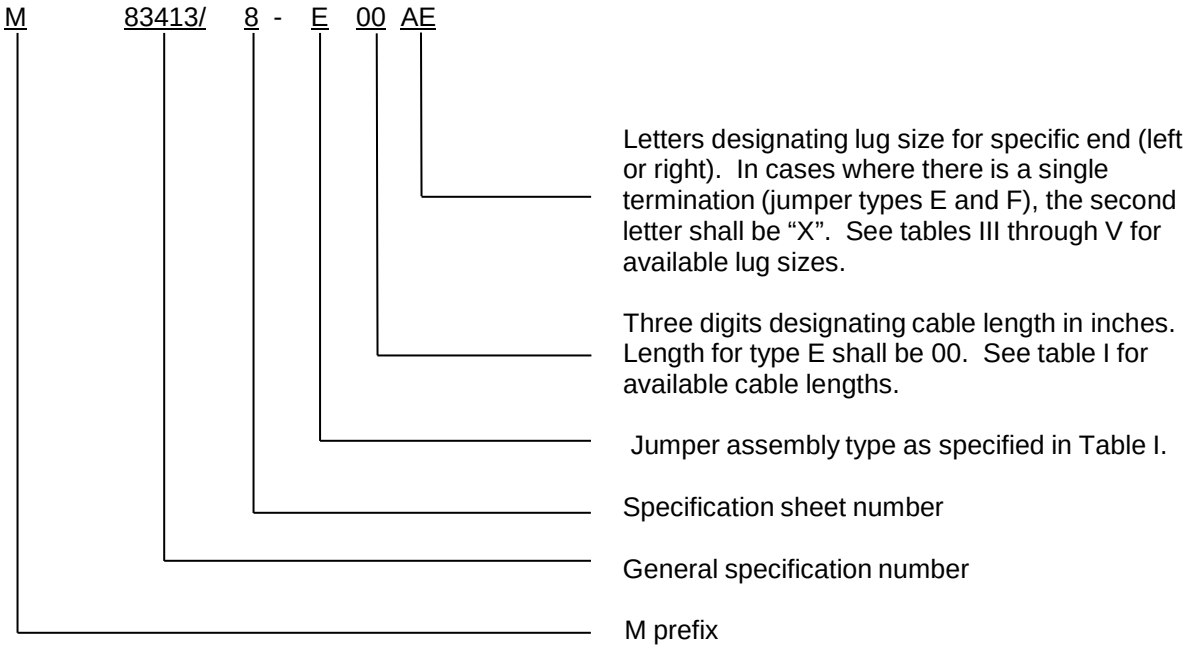
Superseded LUG Code (Rev B)	Preferred LUG Code
D	K
D	L
E	M
E	N
----	T (NEW)
----	U (NEW)

TABLE XII. Supersession table.
C type jumper assembly.

Superseded LUG Code (Rev B)	Preferred LUG Code
A	O
B	P
C	Q
D	R
E	S
F	No replacement 1/
G	No replacement 1/

1/ AS20659 is copper, uninsulated. This jumper is aluminum.

Example of PIN: M83413/8-E00AE



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 previous issue.

Referenced documents. In addition to MIL-DTL-83413, this document references the following:

AWS-C3.7
MIL-DTL-5541
SAE-AS5259/1
SAE-AS7928/1
SAE-AS25036
SAE-AS20659
ASTM-B172
ASTM-B230/B230M
MIL-DTL-83420/2
MIL-DTL-6852
SAE-AMS-DTL-23053/5
EIA/ECA-364-26

CONCLUDING MATERIAL

Custodians:
Army - AV
Navy - AS
Air Force - 85
DLA - CC

Preparing activity:
DLA - CC

(Project 6150-2015-001)

Review activities:
Army - AR, CR, CR4, MI
Navy - MC
Air Force - 71, 99
DLA -GS

NOTE: The activities listed above were interested in this document as 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.