INCH-POUND

MIL-S-3950F
AMENDMENT 3
24 May 1996
SUPERSEDING
AMENDMENT 2
22 September 1980

MILITARY SPECIFICATION
SWITCHES, TOGGLE, ENVIRONMENTALLY SEALED,
GENERAL SPECIFICATION FOR

This amendment forms a part of MIL-S-3950F, dated 14 February 1976, and is approved for use by all Departments and Agencies of the Department of Defense

PAGE 1

- 2 1, SPECIFICATIONS, MILITARY, delete "MIL-P-997", "MIL-E-9500", "MIL-P-15037", "MIL-P-18177", "MIL-S-28786", "MIL-C-45662", and their associated titles

- 2 1, SPECIFICATIONS, MILITARY, add "MIL-C-47220 - Coolant Fluid, Dielectric "

- 2 1, SPECIFICATIONS, MILITARY, MIL-M-14 title, delete and substitute "Molding Compounds, Thermosetting"

- 2 1, STANDARDS, FEDERAL, delete "FED-STD-406" and its associated title

- 2 1, STANDARDS, FEDERAL, add "FED-STD-H28 - Screw Thread Standards for Federal Services"

PAGE 2

- 2 1, STANDARDS, MILITARY, delete "MIL-STD-105", "MIL-STD-1549", and their associated titles

- 2 1, add military handbook as follows

  "HANDBOOKS
  MIL-HDBK-454 - General Guidelines for Electronic Equipment "

- 2 2, delete and substitute the following

  "2 2 Non-Government publications The following documents form a part of this document to the extent specified herein Unless otherwise specified, the issue of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6 2)

  AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
  ANSI/NCSL Z540-1 - General Requirements for Calibration Laboratories and Measuring and Test Equipment
  ANSI/J-STD-002 - Solderability Tests for Component Leads, Terminations, Lugs, Terminals and Wires

  (Application for copies should be addressed to the American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036-8002, telephone 212-642-4900, fax 212-302-1286)

  AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
  ASTM E 1119 - Glycol, Industrial Grade Ethylene, Standard Specification for

  (Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103-1187.)

  INTERNATIONAL ORGANIZATION FOR STANDARDS (ISO)
  ISO 10012-1 - Quality Assurance Requirements for Measuring Equipment - Part 1, Meteorological Confirmation System for Measuring Equipment

  (Application for copies should be addressed to the American National Standards Institute (ANSI), 11 West 42nd Street, New York, NY 10036-8002, telephone 212-642-4900, fax 212-302-1286)

DISTRIBUTION STATEMENT A Approved for public release distribution is unlimited

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UNDERWRITERS LABORATORIES, INC (UL)
UL94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances

(Application for copies should be addressed to the Underwriters Laboratories, Inc , 333 Pfingsten Road, Northbrook, IL 60062-2002)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents These documents also may be available in or through libraries or other informational services)

2 3 Order of precedence In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specifications sheets, or MS standards), the text of this document takes precedence Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained "

PAGE 3

- 3 4 2, delete and substitute the following

"3 4 2 Plastic materials Unless otherwise specified (see 3 1), molded plastic material shall conform to MIL-M-14 Stacked laminations shall not be used for the switch body Other types of plastic materials may be used provided the manufacturer submits acceptable evidence of performance to the qualifying activity during the qualification test program on the submitted product The plastic material used shall be inert or fungus resistant in accordance with MIL-HDBK-454, guideline 4 The plastic material used in all external switch parts and enclosures shall be tested in accordance with UL94 and classified as 94V-0, this requirement applies to all materials for external parts and enclosures regardless of whether the material used is procured to a military specification or not "

- 3 5 3 3, delete the paragraph in its entirety

PAGE 4

- 3 5 5, at the end of the paragraph, add the following

"Crimp pin contacts, for switches with integrated wire termination, are not supplied with the switch "

- 3 5 7, line two, delete "Handbook H28" and substitute "FED-STD-H28"

- 3 6 1, delete and substitute the following

"3 6 1 Solderability (applicable to solderable terminals) When switches are tested as specified in 4 8 2, the criteria for acceptable solderability shall be in accordance with ANSI/J-STD-002

PAGE 6

3 7 2, delete and substitute

- "3 7 2 Terminal identification Unless otherwise specified (see 3 1), terminals shall be permanently marked in accordance with figure 1 Terminal positions not used need not be identified. Terminal marking on the side of the case is permissible "

PAGE 7

- 4 1 1, last line, delete "MIL-C-45662" and substitute "ANSI/NCSL Z540-1, ISO-10012-1, or equivalent system as approved by the qualifying activity"

- TABLE I, Material, Plastic, third column, delete "MIL-P-997", "MIL-P-15037", "MIL-P-18177", "FED-STD-406" and substitute "MIL-STD-454" and "UL94"

4 5 1, delete and substitute

"4 5 1 Sample For qualification inspection, the sample size shall be as specified in table II and the appendix to this specification The sample units which have been subjected to qualification inspection shall be forwarded to the preparing activity "

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PAGE 8

TABLE II, column 1, Examination or test, delete "Electrical overload and endurance" and substitute "Electrical overload, electrical endurance, intermediate current, low-level life, and temperature rise"

• TABLE II, fifth column under "Specimen" (specimen number 5) Delete "2" Also, delete "3", "4", "5", "6", "7", "8", and "9", and substitute "2", "3", "4", "5", "6", "7", and "8", respectively

• TABLE II, under "Specimen", add new column for specimen number 11 Also, in specimen number 11 column, add test sequence numbers "1" for "Solderability", and "2" for "Examination of product"

TABLE II, first column under "2 switches for each voltage, current and frequency" Delete "8" and "9" Also, delete "10", "11", "12", "13", "14", "15", and "16", and substitute "8", "9", "10", "11", "12", "13", and "14", respectively

PAGE 9

• 4 7 1 2, delete and substitute

"4 7 1 2 Group A inspection Group A inspection shall consist of the inspections specified in table III The inspections may be performed in any order, except dielectric withstanding voltage shall be performed after seal testing

"4 7 1 2 1 Sampling plan Statistical sampling shall be in accordance with tables III and III-1 A randomly selected group(s) of samples is required for subgroups 1 and 2 For acceptance of the lot there shall be zero occurrences of defects

"4 7 1 2 1 1 Subgroup 1 A sample of parts shall be randomly selected in accordance with table III-1, subgroup 1 sampling plan

"4 7 1 2 1 2 Subgroup 2 A sample of parts shall be randomly selected in accordance with table III-1, subgroup 2 sampling plan "

• TABLE III, delete and substitute the following

• TABLE III Group A inspection

Inspection	Requirement paragraph	Test method paragraph	Sampling plan
Subgroup 1			
Examination of product	3 1	4 8 1	
Material	3 4	4 3 and 4 8 1	See 4 7 1.2 1 1 1/
Design and construction	3 5	4 8 1	
Marking	3 7	4 8 1	
Workmanship	3 8	4.8 1	
Subgroup 2			
Switch sealing	3 6 18	4 8 19 1(b)	
Switching characteristics	3.6.3	4.8.4	See 4 7 1.2.1.2 1/
Dielectric withstanding voltage	3 6.8	4 8.9	
Contact voltage drop	3 6 7	4 8 8	

1/ At the option of the contractor, documented in-process inspection may be used to satisfy the requirements provided that all of the contractor's in-process control data on these tests are made available to the Government upon request "

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After table III, add table III-1 as follows

" TABLE III-1 Zero defect sampling plan

Lot size	Minimum number of switches to be tested 1/	
	Subgroup 1	Subgroup 2
1 - 8	5	All
9 - 15	5	13
16 - 25	5	13
26 - 50	5	13
51 - 90	7	13
91 - 150	11	13
151 - 280	13	20
281 - 500	16	29
501 - 1,200	19	34
1,201 - 3,200	23	42
3,201 - 10,000	29	50
10,001 - 35,000	35	60

1/ For lot sizes that are less than the required sample size, all switches shall be tested "

PAGE 10

4 7 1 3, delete and substitute the following

"4 7 1 3 Rejected lots If an inspection lot is rejected, the lot shall be 100 percent inspected for the defects noted The contractor may correct all of the defects or remove all of the defective units from the lot The lot shall then be sampled and inspected again in accordance with tables III and III-1 For acceptance, there shall be zero occurrences of defects. Such lots shall be separate from new lots and shall be clearly identified as reinspected lots "

4 7 2 1, delete and substitute the following

"4 7 2 1 Group B inspection Group B inspection shall be completed in accordance with table III-2, in the order shown, within each 3-year period after initial qualification When a manufacturer has switches qualified under various MS military standards or military specification sheets, the qualifying activity may authorize group B tests that do not require redundant testing on similar product features Group B inspection shall be performed on sample units that have been produced, using the same manufacturing facilities and processes normally used in production and which have passed group A inspection A manufacturer's normal quality control tests, production tests, and environmental tests may be used to fulfill all or part of group B inspection, however, all of group B inspection shall be completed as specified Data used may be accumulated within the previous 24 months "

4 7 2 1 1, delete and substitute the following

"4 7 2 1 1 Sampling plan The sampling plan and test procedures shall be as specified in the appendix to this specification The sample units shall be selected from current production If switches are not in current production, they may be selected from stock, however, all switches shall be date coded within 24 months of the required group B submittal date When there has been no production of a particular type of switch for a 3-year period, sample units shall be selected from the next production lot presented for acceptance and for each subsequent 3-year period "

4 7 2 1 2, line 1, delete "group C" and substitute "group B"

4 7.2 1 3, line 1, 7, and 10, delete "group C" and substitute "group B" (three places)

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* Following 4 7 2 1 3, add table III-2

"

TABLE III-2 Group B inspection

Inspection	Requirement paragraph	Test paragraph	Specimen											
			1	2	3	4	5	6	7	8	9	10	11	12
Mechanical endurance	3 6 9	4 8 10	X	X										
Electrical overload, electrical endurance, intermediate current, low level life, and temperature rise	3 6 10	4 8 11												
Overload circuit		4 8 11 1					X	X	X	X				
Resistive load (ac) 1/		4 8 11.2					X	X						
Inductive load (altitude) 2/		4 8 11 3							X	X				
Life, low level		4 8 11 6									X	X		
Temperature rise		4 8 11 7					X	X						
Contact voltage drop	3 6 7	4 8 8	X	X										
Shock	3 6 13	4 8 14			X	X								
Salt spray (corrosion)	3 6 14	4 8 15			X	X								
Solderability	3 6 1	4 8 2											X	X
Dielectric withstanding voltage (at atmospheric pressure)	3 6 8	4 8 9 1					X	X	X	X				
Examination of product	3 1	4 8 1	X	X	X	X	X	X	X	X	X	X	X	X
Switching characteristics	3 6 3	4 8 4	X	X	X	X	X	X	X	X	X	X		
Switch sealing 3/	3 6 18	4 8 19	X	X	X	X	X	X	X	X	X	X		

1/ Test at 115 volts, 60 Hz, 71°C
2/ Test at 28 V dc, 65,000 feet
3/ Only the odd-numbered specimens shall be opened by the manufacturer "

* 4 7 3, line 2, delete "preparing activity" and substitute "qualifying activity"

4 7 3, lines 3, 7, and 8, delete "group C" and substitute "group B" (three places)

PAGE 13

4 8 9(a), line 1, delete "group C" and substitute "group B"

4 8 9(c)(1), line 1, delete "group C" and substitute "group B"

4 8 9 1(a), line 1, delete "group C" and substitute "group B"

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4 8 19 1(a)
Line 1, delete "group C" and substitute "group B"
Line 4, delete "2 0 ±5" and substitute "2 0 ±0 5"

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PAGE 21

4 8 19 1(b), line 4, delete "2 ±5" and substitute "2 0 ± 0 5"

* 4 8 19 2(a)(2)c and 4 8 19 2(a)(2)d, delete and substitute the following

"c MIL-C-47220 - dielectric coolant fluid, silicate ester (Coolanol) or equivalent
"d ASTM E 1119 - ethylene glycol "

* 5 1, delete and substitute the following

"5 1 Packaging For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6 2) When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity "

PAGE 23

* 6 3, lines 9 and 10, qualifying activity address, delete and substitute "Defense Electronics Supply Center, ATTN DESC-ELSP, Dayton, OH 45444-5764"

* 6 4, first sentence, delete

* 6 5, line 1, delete "MS25196" and substitute "MIL-B-5423/16"

PAGE 26

10 1, line 2, delete "Group C" and substitute "group B"

20.2, title, delete "Group C" and substitute "Group B"

* 20 2 1, line 1, delete "table II" and substitute "table III-2 "

* 20 2 2, lines 3 and 5 (2 places), delete "table II" and substitute "table III-2"

PAGE 28

* 30 1, Brass Material, delete "QQ-B-626, alloy no 360" and substitute "ASTM B16, alloy UNS C36000"
MIL hardware, delete "MS25082-B21" and substitute "MS25082-B8"

* 30 1, Steel Finish delete "Cadmium plate QQ-P-416, type II, class 3" and substitute "Suitably protected to resist corrosion "
MIL hardware, delete "MS25082-21" and substitute "MS25082-8 "

* 30 1, Cres MIL hardware, delete "MS25082-C21" and substitute "MS25082-C8"

* 30 2, Steel Finish, delete "Cadmium plate QQ-P-416, type II, class 3" and substitute "Suitably protected to resist corrosion "
MIL hardware, delete "MS35333-121" and substitute "MS35333-126"

30 2, Cres MIL hardware, delete "None" and substitute "Can be replaced by MS35333-136"

PAGE 29

* 30 3, Steel Finish delete "Cadmium plate QQ-P-416, type II, class 3" and substitute "Suitably protected to resist corrosion "

* 40 1 Brass Material delete "QQ-B-626 alloy no 360" and substitute "ASTM B16 alloy UNS C36000"

* 40 1 Steel Finish, delete "Cadmium plate QQ-P-416, type II, class 3" and substitute "Suitably protected to resist corrosion "

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PAGE 30

* 40 2, Screw Material, delete "QQ-B-626, alloy no 360" and substitute "ASTM B16, alloy UNS C36000"

* 40 2, Lockwasher Material, delete "QQ-B-750, comp A" and substitute "ASTM B139, alloy UNS C51000"

* 40 3, Steel Finish, delete "Cadmium plate QQ-P-416, type II, class 3" and substitute "Suitably protected to resist corrosion "

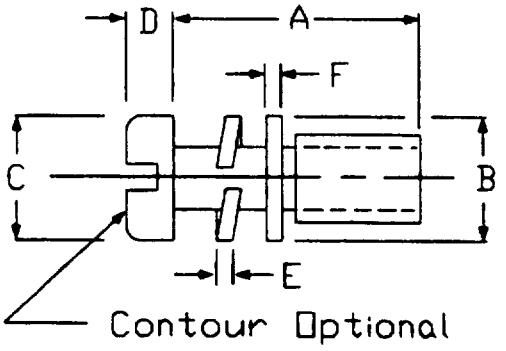
* 40 3, Bronze Material, delete "QQ-B-750, composition A" and substitute "ASTM B139, alloy UNS C51000"
  Finish, delete "Cadmium plate QQ-P-416, type II, class 3" and substitute "Suitably protected to resist corrosion "

40 3, note 1, delete and substitute

"1 Captive washers shall rotate freely on the terminal screw "

* Following 40 3, add the following

"40 4 Terminal screw with captive split ring lock washer



Inches	mm
010	0 25
020	0 51
031	0 79
037	0 94
071	1 80
087	2 21
138	3 51
248	6 30
256	6 50
.265	6 73
.280	7 11
290	7 37

		Thread size	A	B	C	D	E	F
		138-32 UNC-2A	.280 248	.265 Max	290 256	087 071	037 031	020 010
Screw (steel)	Material	FED-STD-66						
	Finish	Suitably protected to resist corrosion						
Helical lockwasher (steel)	Material	FED-STD-66						
	Finish	Suitably protected to resist corrosion						
Flat washer (steel)	Material	FED-STD-66						
	Finish	Suitably protected to resist corrosion						
Military hardware		Can be replaced with MS35206-226 screws and MS35338-41 lockwashers						

"

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* DD Form 1426, appearing at the end of the document, preparing activity address, delete and substitute "Defense Electronics Supply Center ATTN DESC-ELDM, Dayton, OH 45444-5765"

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CONCLUDING MATERIAL

Custodians
Army - CR
Navy - AS
Air Force - 85

Review activities
Army - AT, AR, AV, MI
Navy - MC
Air Force - 99

Preparing activity
DLA - ES

(Project 5930-1597)

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