MILITARY SPECIFICATION

SWITCHES, ROTARY (CIRCUIT SELECTOR, LOW CURRENT CAPACITY),
GENERAL SPECIFICATION FOR

This amendment forms a part of MIL-S-3786F, dated 29 July 1990, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 1

Beneficial comments box, preparing activity address, delete and substitute the following:

"Defense Electronics Supply Center, ATTN: DESC-ELDM, Dayton, OH 45444-5765".

PAGE 4

2.1.1, SPECIFICATIONS, FEDERAL, delete the following:

"L-P-385 - Plastic Molding and Extrusion Material, Polychlorotrifluoroethylene
"QQ-P-416 - Plating, Cadmium (Electrodeposited)."

2.1.1, SPECIFICATIONS, FEDERAL, QQ-S-571, title, delete and substitute the following:

"Solder, Electronic, (96 to 485°C)."

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2.1.1, SPECIFICATIONS, MILITARY, delete the following:

"MIL-P-997 - Plastic Material, Laminated, Thermosetting, Electrical Insulation· Sheets, Glass Cloth, Silicone Resin.
"MIL-P-13949 - Plastic Sheet, Laminated, Metal-Clad (For Printed Wiring), General Specification for.
"MIL-P-18177 - Plastic Sheet, Laminated, Thermosetting, Glass Fiber Base, Epoxy-Resin."
"MS35333 - Washer, Lock, Flat-Internal Tooth."

2.1.1, SPECIFICATIONS, MILITARY, add the following:

"MIL-S-13949/4 - Sheet, Printed Wiring Board, Laminated, Base Material GF (Woven E-Glass Reinforcement, Majority Difunctional Epoxy Resin, Flame Resistant, Metal Clad or Unclad).
"MIL-M-24519 - Molding Plastics, Electrical, Thermoplastic."

2.1.1, SPECIFICATIONS, MILITARY, MIL-F-14256 and MIL-S-28786, respectively, titles, delete and substitute the following:

"Flux, Soldering, Liquid, Paste Flux, Solder-Paste and Solder Flux (for Electronic/Electrical Use), General Specification for."

"Switches, Electrical and Fiber Optic, Packaging of "

2.1.1, STANDARDS, FEDERAL, delete the following:

"FED-STD-406 - Plastics: Methods of Testing."

2.1.1, STANDARDS, MILITARY, delete the following:

"MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
"MIL-STD-45662 - Calibration Systems Requirements."

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2 1.1, after military standards listing, add the following

"COMMERCIAL ITEM DESCRIPTIONS

A-A-55609 - Washer, Lock, Flat-Internal Tooth "

2.2, AMERICAN SOCIETY FOR TESTING AND MATERIALS, delete the following publication:

"ASTM B633 - Zinc On Iron and Steel, Electrodeposited Coatings of "

2.2, after the ASTM address, add the following·

"AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

ANSI/NCSL Z540-1 - General Requirements for Calibration Laboratories and Measuring and Test 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.

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."

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2.2, after the SAE address, add the following·

"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.)"

3.2.2, delete and substitute the following:

"3.2.2 Switches covered by specification sheets but not identified by military PIN's. Switches which are the same as those covered by a military PIN except for minor differences which do not change the basic materials, design or construction of the qualified switch, and which do not effect performance of the switch. Unless otherwise specified (see 3.1), these variations are limited to location of stops; length and shape of operating shaft or flat; circuit variations; size, shape or angle of terminations; deck to deck spacing; addition of a shield; length of mounting bushing; terminal marking; addition of spring return, push to turn, or pull to turn assembly; larger angles of throw; and selected switches with tighter tolerances. The type designation (see 1.2.2) shall be specified in the complementary documents, such as service drawings or ordering data sheets (see 6.2.2); and the switch identification marking shall be in accordance with 3.31.1.2. Such switches shall be acquired from sources listed on the qualified products list for the applicable style."

PAGE 7

3.4.1, first sentence, delete and substitute the following.

"All metal parts, other than current-carrying parts, shall be of corrosion-resistant material; or nickel plated in accordance with class 1, grade G, of QQ-N-290; or anodized in accordance with MIL-A-8625, to resist corrosion. Other protective finishes, as approved by the qualifying activity, may be utilized, provided that the manufacturer submits acceptable evidence of performance during the qualification test program on the submitted product "

3 4 1.2, delete and substitute the following:

"3.4 1 2 Tin plated finishes. Use of pure tin plating is prohibited as a final finish and as a undercoat (see 6 16) Use of tin-lead (Sn-Pb) finishes is acceptable provided that the minimum lead content is 3 percent

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"3.4.1.3 Dissimilar metals (see 6 13). When dissimilar metals are used in intimate contact with each other, protection against electrolysis and corrosion shall be provided. The use of dissimilar metals in contact, which tend toward active electrolytic corrosion (particularly brass, copper, or steel used in contact with aluminum alloy) is not acceptable. However, metal plating or spraying of dissimilar base metals to provide similar or suitable abutting surfaces is permitted. The use of dissimilar metals separated by a suitable insulating material is also permitted. Dissimilar metals are defined in MIL-STD-889. The use of corrosion-resistant steel in contact with cadmium plating is allowed "

3.4.2.2, delete and substitute the following:

"3.4.2.2 Plastic No cotton-base laminates or cotton or cellulose filled molding materials shall be used. Thermoplastics shall not be used for the stator When used, thermoplastic material shall conform to ASTM D4066 or MIL-M-24519. 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 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."

3.4.2.3, delete in its entirety.

3.4.2.5, line three, delete "MIL-P-13949" and substitute "MIL-S-13949/4".

PAGE 8

3.5.1.4, first sentence, delete and substitute the following·

"Each switch shall be provided with hexagon nuts, as specified (see 3.1), in accordance with MS25082, one internal tooth lockwasher in accordance with A-A-55609; and one nonturn device (see 3.5.7)."

PAGE 9

3.5.4, line 6, delete "hot tin dip, ".

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3.23, end of paragraph, add the following: "The contact resistance shall be as specified in 3.9 or 3.9.1 as applicable."

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4.1.2, last sentence. Delete "MIL-STD-45662" and substitute "ANSI/NCSL Z540-1, ISO-10012-1, or equivalent system as approved by the qualifying activity".

TABLE VIII, delete and substitute the following:

" TABLE VIII. Materials inspection.

Material	Requirement paragraph	Applicable document
Metal or plating treatment	3.4.1 through 3.4.1.2	QQ-N-290, MIL-A-8625
Insulation		
Ceramic or glass-bonded mica	3.4.2.1	MIL-I-10
Plastic	3.4.2.2	ASTM D4066, MIL-M-24519, UL94
Fungus resistance	3.4.2.4	MIL-STD-454
Printed-wiring board	3.4.2.5	MIL-S-13949/4, MIL-I-46058
Protective coatings & finishes	3.4.3	
Solder	3.4.4	QQ-S-571
Soldering flux	3 4 4	MIL-F-14256
Terminals	3.5.4	

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TABLE IX, delete "Group V (4 sample units)" and substitute "Group V (4 sample units for each electrical load)"

PAGE 18

4.7.1 2 1, delete and substitute the following:

"4.7 1 2.1 Sampling plan Statistical sampling shall be in accordance with tables X and X-1 Separate, randomly selected groups of samples are 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 X-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 X-1, subgroup 2 sampling plan."

4.7 1.2.2, delete and substitute the following:

"4 7 1.2.2 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 again in accordance with tables X and X-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."

TABLE X, delete and substitute the following:

" TABLE X. Group A inspection.

Inspection	Requirement paragraph	Test method paragraph	Sampling plan
Subgroup 1 Visual and mechanical examination Design and construction Marking Workmanship	 3.1 and 3.4 through 3.5.7 3 31 3.32	4.8.1	See 4.7.1.2.1.1
Subgroup 2 Circuit configuration	3.6	4.8.2	See 4.7.1.2.1.2

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After table X, add table X-1 as follows

" TABLE X-1 Zero defect sampling plan

Lot size	Number of switches to be tested	
	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

TABLE XI, delete and substitute the following:

" TABLE XI. Group B inspection.

Inspection	Requirement paragraph	Test method paragraph	Sampling plan
Torque (applicable to manually operated switches)	3 7	4.8.3 1.1 and 4 8.3.2	
Dielectric withstanding voltage	3.15	4.8.10	
Coil current (when applicable)	3.16	4.8.11	See 4.7.1.3.1
Contact resistance 1/	3.9	4.8.5	
Positive shaft grounding (when specified, see 3.1)	3 10	4.8.5.2	

1/ When low level circuit is specified, contact resistance shall be low level (see 4.8.5.1). Terminal pull test is not applicable."

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4.7.1.3.1, delete and substitute the following

"4 7.1.3 1 Sampling plan. Samples shall be randomly selected in accordance with table X-1, subgroup 1 sampling plan. The sample size shall be based on the inspection lot size from which the sample was selected for group A inspection. For acceptance of the lot there shall be zero occurrences of defects "

4.7.1.3.2, delete and substitute the following:

"4.7.1.3.2 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 again in accordance with tables X-1 and XI. 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."

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4 7.2.1.3, first sentence, delete and substitute the following:

"If a sample fails to pass group C inspection, the contractor shall immediately notify the qualifying activity and the cognizant inspection activity of the failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials, processes, and so forth, and which are considered subject to the same failure."

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PAGE 29

4 8 18 1a, second sentence, delete and substitute the following

"Unless otherwise specified (see 3.1), inductive loads shall meet the electrical performance requirements of MIL-I-81023 "

PAGE 42

6.3, lines 9 and 10, qualifying activity address, delete and substitute the following.

"Defense Electronics Supply Center, ATTN· DESC-ELSP, Dayton, OH 45444-5764"

PAGE 45

After 6.15, add the following paragraph·

"6.16 Tin plated finishes Tin plating is prohibited (see 3.4.1.2) since it may result in tin whisker growth Tin whisker growth can adversely affect the operation of electronic equipment. For additional information on this matter, refer to ASTM B545 (Standard Specification for Electrodeposited Coating of Tin)."

DD 1426 form, item 8, delete and substitute the following· a. "Defense Electronics Supply Center, ATTN: DESC-ELDM"; b (1) "513-296-8271", b (2) "986-8271"; c. "Dayton, OH 45444-5765".

CONCLUDING MATERIAL

Custodians.
Army - ER
Navy - EC
Air Force - 85

Review activities:
Army - AR, AT, AV, MI
Navy - AS, CG, MC, OS
Air Force - 19, 99

Preparing activity:
DLA - ES

(Project 5930-1600)

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