

MILITARY SPECIFICATION

TOOL KITS, ELECTRICAL CONNECTORS, CONTACTS, AND CONNECTOR AND CABLE ACCESSORIES GENERAL SPECIFICATION FOR

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

1. SCOPE

1.1 Scope. This specification covers the general requirements for tool kits used for repair and maintenance of electrical connectors, contacts, and connector and cable accessories (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

- MMM-A-121 - Adhesive, Bonding Vulcanized Synthetic Rubber to Steel.
- MMM-A-130 - Adhesive, Contact.
- MMM-A-132 - Adhesive, Heat Resistant, Airframe Structural, Metal to Metal.
- MMM-A-134 - Adhesive, Epoxy Resin, Metal to Metal, Structural Bonding.
- PPP-C-1752 - Cushioning Material, Packaging, Uncellular Polyethylene Foam, Flexible.

MILITARY

- MIL-C-4150 - Case, Transit and Storage, Waterproof And Water-Vaporproof.
- MIL-P-19834 - Plates, Identification or Instruction, Metal Foil, Adhesive Backed, General Specification for.
- MIL-C-22520 - Crimping Tools, Terminal, Hand or Power Actuated, Wire Termination, and Tool Kit, General Specification for.
- MIL-T-48542 - Tool Sets, Shop Sets, and Kits (Hardware, Installation, Maintenance, Modification, and Tool), Packaging of.
- MIL-F-81334 - Foam, Plastic, Flexible, Open Cell, Polyester Type Polyurethane.
- MIL-I-81969 - Installing and Removal Tools, Connector Electrical Contact, General Specification for.
- MIL-T-83508 - Tools, Solderless Wrap, Hand or Power Actuated, Wire Termination.
- MIL-T-83507/6 - Tool Kits, Electrical Connectors, Contacts, and Connector and Cable Accessories, Pneumatic.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Engineering and Technical Support Division (AFLC/LOIE), Wright-Patterson AFB, Dayton, OH 45433, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

STANDARDS

FEDERAL

FED-STD-595 - Colors.

MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
 MIL-STD-108 - Definitions of and Basic Requirements for Enclosures for Electrical and Electronic Equipment.
 MIL-STD-130 - Identification Marking of US Military Property.
 MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts.
 MIL-STD-454 - Standard General Requirements for Electrical Equipment.
 MIL-STD-810 - Environmental Test Methods.

(Copies of specifications, standards, drawings and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of conflict between requirements of this specification and the specification sheet, the latter shall govern.

3.2 Qualification. Tool kits and contents therein furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.5 and 6.3).

3.3 Materials. Materials shall be as specified herein. However, when a definite material is not specified, a material shall be used which will enable the tool kits to meet the performance requirements of this specification and the applicable specification sheet. Acceptance or approval of any constituent material shall not be construed as a guaranty of the acceptance of the finished product.

3.3.1 Cases. Unless otherwise specified (see 3.1), case shall be of the following categories:

3.3.1.1 Category 1. Ruggedized case shall meet the following requirements of MIL-C-4150; 1.2-Type 1, Style 2, class A; 3.2, 3.2.1, 3.2.2, 3.2.2.1, 3.2.3, 3.2.4, 3.3, 3.3.1, 3.4, 3.4.1, 3.4.2, 3.4.3, 3.4.4, 3.5, 3.5.2, 3.5.4, 3.5.5, 3.5.6, 3.5.7, 3.6, 3.7, 3.8, 3.9.2, 3.10, 4.4.2.1, 4.5.2, 4.5.2.1, 4.5.2.2, 4.5.2.3, 4.5.2.4, 4.5.2.5, 4.5.3, 4.5.3.1, 4.5.3.3, 4.5.3.4 and 4.5.3.5.

3.3.1.2 Category 2. Environmental case shall meet the following requirements of MIL-STD-810; methods 500.1, 501.1 procedure II, 502.1, 505.1 procedure II, 506.1, 507.1 procedure II, 508.1, 509.1, 510.1, 512.1 procedure I, 514.1 procedure XI, 516.2 procedure II, except drop shall be on top and bottom only, unless otherwise specified.

3.3.1.3 Category 3. Nonenvironmental case shall meet the best commercial practice (see 3.1).

3.3.2 Adhesives. Unless otherwise specified (see 3.1), adhesive shall be in accordance with MMM-A-121, MMM-A-130, MMM-A-132, or MMM-A-134.

3.3.3 Cushioning material. Unless otherwise specified (see 3.1), cushioning material shall be in accordance with PPP-C-1752 or MIL-F-81334.

3.3.4 Dissimilar metals. When dissimilar metals are employed in intimate contact with each other, suitable protection against electrolytic corrosion shall be provided as specified in requirement 16 of MIL-STD-454.

3.4 Design and construction. Tool kits shall be of the design, construction, and physical dimensions specified (see 3.1).

3.4.1 Cases. Cases, metal or fiberglass shall be designed as specified (see 3.1).

3.4.2 Color. The tool kit color shall be in accordance with FED-STD-595.

3.4.3 Installing and removal tools. Unless otherwise specified (see 3.1), all installing and removal tools shall be in accordance with MIL-I-81969 or approved equivalent.

3.4.4 Crimping tools, dies, turret, positioners, and gages. Unless otherwise specified (see 3.1), all crimping tools, dies, turrets, positioners, and gages shall be in accordance with MIL-C-22520 or approved equivalent.

3.4.5 Heat gun, air/nitrogen. Unless otherwise specified (see 3.1), heat gun air/nitrogen shall be in accordance with MIL-T-83507/6.

3.4.6 Tools, solderless wrap. Unless otherwise specified (see 3.1), solderless wrap tools shall be in accordance with MIL-T-83508 or approved equivalent.

3.5 Case waterproof (fiberglass only) (when specified see 3.1). When the case is tested as specified in 4.7.2, there shall be no evidence of water/moisture accumulation inside the case.

3.6 Humidity (steady state). When the tool kit with contents is tested as specified in 4.7.3, there shall be no damage to any tools contained in the tool kit (see 3.1).

3.7 Salt spray (corrosion). When the tool kit with contents is tested as specified in 4.7.4, there shall be no evidence of corrosion that could impair the operation of the tools.

3.8 Shock (specified pulse) (when specified see 3.1). When the tool kit with contents is tested as specified in 4.7.5, there shall be no damage to either the case or the tools.

3.9 Marking. All marking shall be in accordance with MIL-STD-130 and shall be permanent and legible.

3.9.1 Nameplates. Nameplates on tool cases shall be marked with information as specified (see 3.1). The plates shall be 0.003 to 0.005 inch thick aluminum foil in accordance with MIL-P-19834 and shall be permanently mounted. Marking shall be black on a light background.

3.9.2 Content charts and instruction sheets. Content charts and instruction sheets shall be white vinyl 0.020 inch thick or approved equivalent with black lettering. The lettering shall be protected with a transparent coating.

3.10 Workmanship. The tool cases and tools contained therein shall have no sharp edges, burrs, or other features which are potential personal hazards to the operator during normal usage.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities shall be of sufficient accuracy, quality, and quantity to permit performance of the required inspection.

4.2 Classification of inspection. The inspection of the tool kit shall be classified as follows:

- a. Materials inspection (see 4.3).
- b. Qualification inspection (see 4.5).
- c. Quality conformance inspection (see 4.6).

4.3 Materials inspection. Materials inspection shall consist of certification supported by verifying data that the materials, as specified herein and on the specification sheet (see 3.1), used in fabricating the tool kits, are in accordance with the applicable referenced specifications or requirements prior to such fabrication.

4.4 Inspection conditions. Unless otherwise specified herein, all inspections shall be performed in accordance with the test conditions specified in the "GENERAL REQUIREMENTS" of MIL-STD-202.

4.5 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the Government on the sample unit produced with equipment and procedures normally used in production.

4.5.1 Sample size. One tool kit with contents shall be subjected to qualification inspection.

4.5.2 Inspection routine. The sample shall be subjected to the inspections specified in table I, in the order shown.

TABLE I. Qualification inspection.

Inspection	Requirement paragraph	Test method paragraph
Visual and mechanical examination- - -	3.1, 3.3, 3.4, 3.9, and 3.10	4.7.1
Case waterproof (when specified) - - - -	3.5	4.7.2
Humidity (steady state)- - - - - - - -	3.6	4.7.3
Salt spray (corrosion) - - - - - - - -	3.7	4.7.4
Shock (specified pulse) (when specified)	3.8	4.7.5

4.5.3 Failures. One failure shall be cause for refusal to grant qualification.

4.5.4 Retention of qualification. To retain qualification, the contractor shall forward a report at 12-month intervals to the qualifying activity. The qualifying activity shall establish the initial reporting date. The report shall consist of:

- a. A summary of the results of the tests performed for inspection of product for delivery, group A, indicating as a minimum the number of lots that have passed and the number that have failed. The results of tests of all reworked lots shall be identified and accounted for.
- b. A certification shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item as qualified. If during the reporting periods there has been a process or material change, the manufacturer may be required, at the discretion of the qualifying activity, to submit a representative product to testing in accordance with the qualification inspection requirements.

Failure to submit the report within 30 days after the end of each 12-month period may result in loss of qualification for the product. In addition to the periodic submission of inspection data, the contractor shall immediately notify the qualifying activity at any time during the 12-month period that the inspection data indicates failure of the qualified product to meet the requirements of this specification.

In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during three consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit a representative product from each group to testing in accordance with the qualification inspection requirements.

4.6 Quality conformance inspection.

4.6.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspection.

4.6.1.1 Inspection lot. An inspection lot shall consist of all tool kits covered by a single specification sheet, produced under essentially the same conditions, and offered for inspection at one time.

4.6.1.2 Group A inspection. Group A inspection shall consist of the examination specified in table II, in the order shown.

TABLE II. Group A inspection.

Inspection	Requirement paragraph	Test method paragraph	AQL (percent defective)	
			Major	Minor
Visual and mechanical examination:				
Material - - - - -	3.1, 3.3	4.7.1	0.65	---
Finish - - - - -	3.1, 3.3	4.7.1	1.5	---
Marking- - - - -	3.9	4.7.1	---	2.5
Workmanship- - - - -	3.10	4.7.1	1.0	---

4.6.1.2.1 Sampling plan. Statistical sampling and inspection shall be in accordance with MIL-STD-105 for general inspection level II. The acceptable quality level (AQL) shall be as specified in table II. Major and minor defects shall be as defined in MIL-STD-105.

4.6.1.2.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units, and resubmit for reinspection. Resubmitted lots shall be inspected using tightened inspection. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.6.1.2.3 Disposition of group A sample. The tool kit which has passed group A inspection may be delivered on the contract if the lot is accepted and the sample unit is still within specified tolerances.

4.6.2 Inspection of packaging. Packaging inspection shall be in accordance with MIL-T-45542.

4.7 Methods of examination and test.

4.7.1 Visual and mechanical examination. The tool kit and contents shall be examined to verify that the design, construction, physical dimensions, markings, and workmanship are in accordance with applicable requirements (see 3.1, 3.3, 3.4, 3.9, and 3.10).

4.7.2 Case waterproof (fiberglass only) (when specified see 3.1)(see 3.5). Fiberglass cases shall be tested in accordance with table III of MIL-STD-108, water-tight enclosure.

4.7.3 Humidity (steady state) (see 3.6). The tool kit and contents shall be tested in accordance with method 103 of MIL-STD-202. The following detail shall apply:

- a. Test condition letter - B.

4.7.4 Salt spray (corrosion) (see 3.7). The tool kit and contents shall be tested in accordance with method 101 of MIL-STD-202. The following detail shall apply:

- a. Test condition letter - B.

4.7.5 Shock (specified pulse) (when specified, see 3.1) (see 3.8). The tool kit and contents shall be tested in accordance with method 213 of MIL-STD-202. The following detail shall apply:

- a. Test condition letter - I.

5. PACKAGING

5.1 Packaging requirements. The requirement for packaging shall be in accordance with MIL-T-45542 for type I tool kits. In addition, unit packages and shipping containers shall be marked with the following information:

- a. Number (revision and amendment, if applicable) of this commodity specification.
- b. Military part number and title.
- c. Manufacturer's name.
- d. Manufacturer's part number.
- e. Month and year inspected.

6. NOTES.

6.1 Intended use. Tool kits and contents therein covered by this specification are intended to be used for repair and maintenance of electrical connectors, contacts, and connector and cable accessories, and other electric and electronic equipment as specified in MIL-STD-1646.

6.2 Ordering data. Procurement documents should specify the following:

6.2.1 Procurement requirements:

- a. Title, number, and date of this specification and applicable specification sheet.
- b. Military part numbers for tool kits as required.
- c. Quantity of tool kits desired.

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids, qualified for inclusion in the applicable qualified products list whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts for the products covered by this specification. The activity responsible for the qualified products list is the Engineering and Technical Support Division (AFLC/LOIE), Wright-Patterson AFB, Dayton, OH 45433; however, information pertaining to qualification of products may be obtained from the Defense Electronics Supply Center (DESC-E), 1507 Wilmington Pike, Dayton OH 45444.

6.3.1 Copies of "Provisions Governing Qualification" may be obtained upon application to Commanding Officer, Naval Supply Depot, 5801 Tabor Avenue, Philadelphia, Pennsylvania 19120.

6.4 Noncompliance. If a sample fails to pass periodic inspection, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such 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 materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After the corrective action has been taken periodic inspection shall be repeated on additional sample units (all inspections, or the inspection which the original sample failed, at the option of the qualifying activity). Group A inspection may be reinstated; however, final acceptance and shipment shall be withheld until the periodic inspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

Custodians:

Army - EL
Navy - AS
Air Force - 85

Preparing activity:

Air Force - 85

(Project 5180-0087)

Review activities:

Army - MI, MU, AV
Navy - EC, SH
Air Force - 11, 12, 17, 99
DLA - ES

User activities:

Army - AT, GL, ME
Navy - YD
Air Force - 19