MIL-T-81306A
28 March 1986
SUPERSEDING
MIL-T-81306(AS)
29 July 1966

MILITARY SPECIFICATION

TOOL, FORMING, FOR ADJUSTABLE PLASTIC AND METAL CABLE STRAPS

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

1. SCOPE

1.1 Scope. This specification covers hand operated tools for adjustable plastic and metal cable straps, thick and thin type, used in aircraft and missiles (see 6.1).

1.2 Classification. Tools shall be furnished in the dimensions and capacities as specified in the applicable MS standards.

2. REFERENCED DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation form a part of this specification to the extent specified herein (see 2.4.1).

SPECIFICATIONS

Federal

PPP-P-40	Packaging and Packing of Hand Tools

Military

MIL-S-23190	Straps, Clamps; and Mounting Hardware, Plastic and Metal for Cable Harness Tying and Support
MIL-S-23190/3	Strap, Tiedown, Adjustable, Corrosion Resistant Steel, Type VI, Class 1

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Systems Engineering and Standardization Department (SESD) (Code 93), Naval Air Engineering Center, Lakehurst, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5120

STANDARDS

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-109	Quality Assurance Terms and Definitions
MIL-STD-202	Test Methods for Electronic and Electric Component Parts
MS3367	Strap, Tiedown, Adjustable, Self-Clinching, Plastic, Type I, Class 1
MS3368	Strap, Tiedown, Identification, Adjustable, Self-Clinching, Plastic, Type II, Class I
MS90387	Tool, Hand, for Adjustable Cable Straps

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. The issues of documents which have not been adopted shall be those in effect on the date of the cited DODISS (see 2.4.2).

ASTM

*ASTM D4066	Nylon Injection and Extrusion Materials (PA)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

2.4 Source of documents.

2.4.1 Government specifications, standards and handbooks. Copies of the referenced federal and military specifications, standards and handbooks are available from the Department of Defense Single Stock Point, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. For specific acquisition functions, these documents should be obtained from the contracting activity or as directed by the contracting activity.

2.4.2 Sources for nongovernment publications. Nongovernment documents are generally available for reference from libraries and technical groups. The documents listed may be obtained as follows:

a. ASTM: Application for copies should be addressed to the American Society for Testing Materials, 1916 Race Street, Philadelphia, PA 19103.

*DOD adopted.

3. REQUIREMENTS

3.1 Qualification. The forming tools furnished under this specification shall be products which have been subjected to and which have passed the qualification tests specified herein. They shall have conformed to the applicable military standards (MS) or other approved standard and shall have been listed on or approved for listing on the Qualified Products List. In the event of any conflict between requirements of this specification and the applicable military standards (MS), the latter shall govern.

3.2 Data. Unless otherwise specified in the contract or order, no data (other than reports and drawings accompanying qualification samples) are required by this specification or any of the documents referenced in Section 2 herein (see 6.2).

3.3 Materials and components. Materials and components shall conform to the applicable specifications and military standards as listed or required herein. Materials which are not covered by applicable specifications or standards, or which are not specifically described herein, shall be of the best quality and suitable for the purpose intended.

3.3.1 Finish. Where the finish is not specified in the applicable standard, all metal parts shall be of, or treated with a corrosion resistant material that will withstand the corrosion test of 4.6.8.

3.4 Design and construction. The tool shall be a hand operated type, capable of making a satisfactory junction of the cable straps to their respective wire bundles. The tool shall consist of a complete assembly of the operating mechanism, guide clip, handles and pawl. The tool shall be constructed to withstand stresses, shock, vibration and any other conditions incident to service use. The design shall provide for rigidity of parts and resistance to fatigue. The tool shall conform to the applicable military standards.

3.4.1 Frame. The frame of the tool shall be as specified on the applicable military standards. The frame shall be capable of withstanding the compression force encountered during tightening and cutting off the cable strap.

3.4.2 Pawl device. The pawl is a spring loaded device that contacts the strap when the handle is depressed and advances the strap a minimum of 3/16 of an inch with each stroke of the handle. When the installation is complete, the pawl returns to its original position freely as the handle is opened.

3.4.3 Guide clip. The guide clip shall position the strap in the tool.

3.4.4 Spring return of handle. The handle of the tool shall return freely and immediately to the fully open position when the cutting or tensioning operation is completed. This action shall apply with the tool in any plane or position, with or without a cable strap positioned in the tool.

3.5 Dimensions. The hand tool dimensions shall conform to the applicable military standards.

3.6 Performance. The hand tools shall comply with all the test and inspection requirements of this specification.

3.7 Workmanship. The hand tool, including all parts, shall be so constructed and finished that it shall be free from all defects which may affect proper functioning in service. There shall be no sharp edges, burrs, or other defects which are potential hazards to the operator of the tool. The tool shall conform to the quality and grade of product established by this specification. The occurrence of defects shall not exceed the acceptance criteria established herein.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. The Government reserves the right to perform any of the inspections set forth in the specifications where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

4.1.1 Inspection terms. Military Standard MIL-STD-109 shall govern definition of terms used herein.

4.2 Classification of tests. The inspection and testing of the forming tools shall be classified as follows:

a. Qualification inspection (4.3).

b. Quality conformance inspection (4.4).

4.3 Qualification inspection. The qualification inspection shall consist of all examinations and tests specified in this specification and applicable military standards (MS) or detail specifications. Qualification inspection shall not be performed without a letter of authorization from the activity designated responsible for qualification. Any change in the contractor's process control inspections, quality conformance inspections, or manufacturing control drawings (editorial changes are acceptable) without the express approval of the activity responsible for qualification may result in loss of qualification for that product.

4.3.1 Qualification test samples. The qualification test samples shall consist of three (3) forming tools of each type for which qualification is desired. Deposition of tested samples shall be determined by the activity responsible for qualification (see 6.3). Untested samples may be required to be submitted with the manufacturer test report (4.3.3).

4.3.2 Qualification by similarity. Qualification by similarity to components previously qualified or to be qualified may be provided by the activity designated responsible for qualification (6.3). Request for such qualification must be technically justified in writing to the responsible activity.

4.3.3 Test report. The contractor shall furnish the activity responsible for qualification one certified test report containing the following information:

a. A copy of the letter of authorization from the activity responsible for qualification.

b. The quantitative results for all tests required by this specification.

c. The component-material inspection verification data (3.3).

d. The manufacturing control drawing numbers for the component including the latest revision designators and drawing dates.

e. A tabulated comparison between the dimensions specified in this specification and that specified in the manufacturing control drawings.

4.4 Quality conformance inspection. Quality conformance inspections shall consist of:

a. Individual inspection (4.4.1).

b. Sampling inspection (4.4.2).

4.4.1 Individual inspection. Each tool shall be subjected to the examination of product (4.6.1).

4.4.2 Sampling inspection. Samples shall be selected at random in accordance with MIL-STD-105 inspection level S-2 with an acceptance number of zero and subjected to:

a. Spring return of handle (4.6.2).

b. Pawl (4.6.3).

c. Tensile strength (4.6.6).

4.4.3 Resubmitted inspection lots. Resubmitted lots shall be inspected in accordance with MIL-STD-105 using a tightened inspection. Before an inspection lot is resubmitted, full particulars causing previous rejected and the action taken to correct them shall be furnished by the contractor to the Government Inspector.

4.5 Test conditions.

4.5.1 Atmospheric conditions. Unless otherwise specified, all tests shall be conducted at an atmospheric pressure of 28 to 31 inches of mercury, a temperature of 68° to 85°F (20° to 30°C) and a relative humidity of 30 to 80 percent.

4.6 Inspection methods.

4.6.1 Examination of product. Forming tools and their component parts shall be thoroughly examined to determine conformance to the requirements of this specification. Tools shall be in accordance with the applicable military standard.

4.6.2 Spring return of handle. This test shall be conducted with and without each adjustable cable strap accommodated by the tool. The handle and the pawl assembly of the tool shall automatically return to their fully open positions upon completion of the cutting or tension operation. The tool shall be tested in the vertical and horizontal planes. When testing in the horizontal plane the pawl shall be facing downward.

4.6.3 Pawl test. Place the cable strap through the strap guide. Close the handle of the tool, bottoming on the stop without cutting the strap. Mark the strap again. The distance between the marks shall be a minimum of 3/16 of an inch. The pawl shall return freely as the handle is opened.

4.6.4 High compression force. The tool shall perform satisfactorily after a compression force of 150 pounds is exerted on the tool handle at a point 1 ± 1/8 inches from the extremity of the handle.

4.6.5 Normal compression force. The maximum compression force of Table I shall not be exceeded when cutting off the largest size cable strap accommodated by the tool. The compression force shall be measured at a point on the tool handle 1 ± 1/8 inches from the extremity of the handle.

TABLE I

Tool	Nylon Stock		Tension Force (Lbs Min)	Compression Force (Lbs Max)	Test Samples
	Thick ±.005	Wide ±.010			
MS90387-1	.047	.187	5	50	MS3367-2 & 4
MS90387-2	.078	.290	15	100	MS3367-3
MS90387-3 1/	.015	.33	20	125	M23190/3-6

1/ Metal stock required.

4.6.6 Tensile strength. The straps shall be subjected to and comply with the tensile test requirement of MIL-S-23190.

4.6.7 Low temperature performance. The cable strap tool, four of each size cable strap, and the appropriate wire bundle, fabricated in accordance with MIL-S-23190, shall be maintained at a temperature of -15° + 2°C for a period of one hour; the cable strap shall then be installed to its appropriate wire bundle while still at this temperature. The mechanical performance of the tool and the actual installation shall be satisfactory during and after this test. The straps shall be subjected to and comply with the tensile test requirements of MIL-S-23190.

4.6.8 Corrosion. One tool shall be subjected to a salt spray (corrosion) test in accordance with MIL-STD-202, Method 101, Condition A. The tool shall then be dried for 12 hours in a circulating air oven at a temperature of 38° + 3°C (100.4°F). Upon removal from the oven the hand tool shall comply to 4.6.5 and 4.6.6, and shall not exhibit basic metal on plated or treated parts.

4.6.9 Life cycle. The tool shall withstand a total of 15,000 cycles conducted in two phases. One phase shall be a 10,000 cycle test for tensioning, and the second phase shall be a 5000 cycle test for tensioning and cutting, performed in the sequence shown by paragraph 4.6.9.1 and 4.6.9.2. Unstressed oriented polyamide (nylon) stock conforming to ASTM D4066, type PA111 or metal stock conforming to QQ-S-766, class 302, 304 or 316 shall be used for both phases. The stock shall have the dimensions specified in Table I. The nylon stock or metal stock shall be fed to the tool in such a manner that the action of the pawl, when the tool is operated, shall exert on the nylon stock or metal stock the tension force specified in Table I. The compression force exerted on the handles of the tool at a point 1 + 1/8 inch from the extremity of the handles shall not exceed that shown in Table I during the tests. After each 2500 cycles, the tool shall be tested by satisfactorily installing five straps, as specified in Table I, around a bundle of wires fabricated in accordance with MIL-S-23190. During the tests made on the wire bundles, the compression force exerted on the handles of the tool at a point 1 + 1/8 inch from the extremity of the handles shall not exceed that shown in Table I.

4.6.9.1 Tension cycle test. The tool shall withstand 10,000 tensioning cycles. A cycle shall consist of closing the tool to a point just prior to the cutting position, and return the handle to a fully open position. During this test the cutting edge of the tool shall not come in contact with the nylon stock or metal stock. On automatic tensioning tools the tension adjustment shall be set above minimum requirements of Table I.

4.6.9.2 Cutting cycle test. The tool shall withstand 5000 tension and cutting cycles. A cycle shall consist of closing the tool through the cutting position and return the handle to the fully open position. A 1-1/2 + 1/4 inch length of the nylon stock or metal stock shall be fed into the tool at the start of each cycle for this test.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with PPP-P-40 for Level A or C as specified (see 6.2).

6. NOTES

6.1 Intended use. Forming tools covered by this specification are intended for installing MIL-S-23190 cable straps on wire bundles in the sizes specified on the applicable MS standard or detail specification.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number and date of this specification.

b. Tool desired and applicable MS part number.

c. Quantity desired.

d. Selection of applicable levels of packaging (see Section 5).

e. Data requirements (see 3.2).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for such products as have, prior to the time set for opening of bids, been tested and approved 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 suppliers is called to this requirement and manufacturers are urged to arranged 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 or orders for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Air Systems Command, Navy Department, Washington, DC 20361; however, information pertaining to qualification of products may be obtained from the Commanding Officer, Naval Avionics Center, 6000 East 21st Street, Attention: B/714, Indianapolis, IN 46218.

6.4 Changes from previous issues. Asterisks (or vertical lines) are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:
Army - CR
Navy - AS
Air Force - 85

Review activities:
Army -
Navy - EC
Air Force - 11, 17, 99

User activities:
Army -
Navy - SH, OS
Air Force -

Preparing activity:
Navy - AS
(Project No. 5120-B027)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-T-81306A	Tools, Forming, For Adjustable Plastic and Metal Cable Straps

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

DD FORM 82 MAR 1426

PREVIOUS EDITION IS OBSOLETE.