INCH-POUND

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DETAIL SPECIFICATION

TOOL, INSTALLATION FOR ADJUSTABLE PLASTIC AND METAL TIEDOWN 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 tools used to install SAE-AS23190 tiedown straps on wire bundles (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3 and 4 of this specification, whether or not they are listed.

Comments, suggestions, or questions on this document should be addressed to the Naval Air Systems Command (Commander, Naval Air Warfare Center Aircraft Division, Code 491000B120-3, Highway 547, Lakehurst, NJ 08733-5100), or e-mailed to thomas.omara@navy.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at http://assist.daps.dla.mil/.

AMSC N/A FSC 5120

2.2 Government documents.

2.2.1 Specification and standards. The following specification and standards form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATION

MS90387	-	Tool, Hand, Adjustable for Plastic and Metal Tiedown Straps.

DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-1916	-	DoD Preferred Methods for Acceptance of Product.
MIL-STD-202	-	Test Method Standard Electronic and Electrical Component Parts

(Copies of these documents are available online at http://assist.daps.dla.mil/quicksearch/ or http://assist.daps.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM-A666	-	Steel Sheet, Strip, Plate and Flat Bar, Austenitic Stainless, Annealed or Cold-Worked. (DoD Adopted.)
ASTM-D4066	-	Nylon Injection and Extrusion Materials (PA). (DoD Adopted.)

(Copies of these documents are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE)

SAE-AS23190	-	Straps, Clamps, and Mounting Hardware, Plastic and Metal for Cable Harness Tying and Support. (DoD Adopted.)
SAE-AS23190/3	-	Straps, Clamps, and Mounting Hardware, Plastic and Metal for Cable Harness Tying and Support Strap, Tiedown, Adjustable, Corrosion Resistant Steel Type VI, Class 1. (DoD Adopted.)
SAE-AS33671	-	Strap, Tiedown, Electrical Components, Adjustable, Self-Clinching, Plastic, Type I, Class 1. (DoD Adopted.)

(Copies of these documents are available from the Society of Automotive Engineers, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or http://www.sae.org)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes preference. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

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

3.2 Qualification. The installation tools furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.2 and 6.3).

3.3 Materials and components. Materials and components used in the fabrication of tools covered by this specification shall be capable of meeting the requirements of this specification and MS90387.

3.3.1 Finish. All metal parts shall withstand the corrosion test of 4.5.8.

3.4 Design and construction. The tool shall be hand operated and capable of applying tiedown straps to their respective wire bundles. The tools shall consist of all components required to attach the strap assembly to the bundle and sever the scrap end of the strap. The tool shall be constructed to withstand stress, shock, vibration and any other conditions incident to service use. The design shall provide for rigidity of parts and resistance to fatigue.

3.4.1 Frame. The frame of the tool shall be as specified in MS90387. The frame shall be capable of withstanding the forces encountered during tightening and cutting of the tiedown strap.

3.4.2 Gripping device. The gripping device shall be spring-loaded, contact the strap when the handle is depressed and advance the strap a minimum of 3/16 of an inch with each stroke of the handle. After installation of the strap around the wire bundle has been completed, the gripping device shall return to its original position freely as the handle is opened.

3.4.3 Guidance. Provision shall be made to guide the strap into the working position in the tool.

3.4.4 Spring return of handle. The handle of the tool shall return freely and immediately to the fully opened position when released after the tension and cutting operation has been completed. This action shall apply with the tool in any plane or position, with or without a tiedown strap position in the tool.

3.5 Dimensions. The installation tool dimensions shall conform to MS90387.

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

3.7 Workmanship. The installation tool, including all parts, shall be so constructed and finished that it shall be free from all defects that may affect proper functioning in service. There shall be no sharp edges, burrs, or other defects that are potential hazards to the operator of the tool.

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein, are classified as follows:

a. Qualification inspection (see 4.2).

b. Conformance inspection (see 4.3).

4.2 Qualification inspection. Qualification inspection shall consist of all examinations and tests specified in this specification and MS90387.

4.2.1 Qualification test samples. The qualification test samples shall consist of three (3) forming tools of each type for which qualification is desired.

4.2.2 Qualification of additional tools. Qualification by similarity to qualified components or to components submitted for qualification is permissible when materials, designs, and manufacturing processes are similar. The manufacturer shall provide to the qualifying activity, full details of the similarities and differences of the components and manufacturing processes, and a proposed qualification test program that will address the differences. Testing shall not begin until the manufacturer's proposal has been approved or modified by the qualifying activity.

4.3 Conformance inspection. Conformance inspections shall consist of:

a. End item inspection (see 4.3.1).

b. Sampling inspection (see 4.3.2).

4.3.1 End item inspection. Each tool shall be subjected to the examination of product (see 4.5.1). Alternately, a previously accepted system of in-process controls is permitted to be substituted for individual end item inspection per MIL-STD-1916.

4.3.2 Sampling inspection. Samples shall be selected at random in accordance with MIL-STD-1916 for lot sampling by attributes, verification level 1:

a. Spring return of handle (see 4.5.2).

b. Gripping device (see 4.5.3).

c. High compression force (see 4.5.4).

d. Normal compression force (see 4.5.5).

e. Tensile strength (see 4.5.6).

4.4 Test conditions.

4.4.1 Atmospheric conditions. Unless otherwise specified herein, all tests shall be conducted at an atmospheric pressure of 28 to 31 inches of mercury, a temperature of 20º to 29.44 ºC (68 º to 85 ºF) and a relative humidity of 30 to 80 percent.

4.5 Inspection methods.

4.5.1 Examination of product. Installation tools and their component parts shall be visually examined to determine conformance to the requirements of this specification and MS90387.

4.5.2 Spring return of handle. This test shall be conducted with and without each adjustable tiedown strap accommodated by the tool. The handle and gripping device assembly of the tool shall automatically return to their fully open position upon completion of the tension and cutting operations. The tool shall be tested in the vertical and horizontal planes. When testing in the horizontal plane, the gripping device shall be facing downward.

4.5.3 Gripping device test. Place the applicable SAE-AS33671 or SAE-AS23190/3 tiedown strap specified in table I through the strap guide and mark the strap at the point of entry into the tool. Close the handle of the tool, bottoming on the stop without cutting the strap. Mark the strap again at the point of entry into the tool. The distance between the marks shall not be less than 3/16 of an inch, indicating the effective stroke length of the tool. The gripping device shall return freely as the handle is opened.

4.5.4 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 inch from the extremity of the handle.

TABLE I. Normal compression forces.

Tool	Nylon stock		Compression force (lbs. max)	Strap test sample part numbers
	Thick ±.005	Wide ± .010		
MS90387-1	.047	.187	50	MS3367-2 & -4
MS90387-2	.078	.290	100	MS3367-2 & -3
1/ MS90387-3	.015	.330	125	M23190/3-2 & /3-6
MS90387-4	.095	.510	100	MS3367-3 & -13
MS90387-5	.047	.187	50	MS3367-2 & -4

1/ Metal stock required.

4.5.5 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, at the highest tension setting, using the normal compression process. The compression force shall be measured at a point on the tool handle 1 ± 1/8 inch from the extremity of the handle.

4.5.6 Tensile strength. The straps shall be subjected to and comply with the tensile test requirement of SAE-AS23190.

4.5.7 Low temperature performance. The tiedown strap tool, four of each size cable strap, and wire bundle, fabricated in accordance with SAE-AS23190, shall be maintained at a temperature of -15 º ± 2 ºC for a period of one hour. The tiedown strap shall then be installed to its wire bundle while at this temperature. The tool shall continue to function during and after this test. The test straps shall comply with the requirements of SAE-AS23190. It is permissible for a change in the tightness of the bundle if the temperature of the bundle is allowed to return to normal environmental conditions.

4.5.8 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. After the tool is dry, it shall comply with 4.5.6 and 4.5.7 and shall not exhibit basis metal on plated or treated parts. White or black residue is permitted as long as the tool function is not impaired.

4.5.9 Life cycle. The tool shall withstand a total of 15,000 tension and cut cycles. Unstressed polyamide (nylon) stock conforming to ASTM D4066, type PA111 or metal stock conforming to ASTM A666, type 304, 304, or 316 shall be used in lieu of straps. The stock shall have the dimensions specified in table I. The nylon or metal stock shall be fed to the tool in such a manner that the action of the gripping device, when the tool is operated, shall exert tension corresponding to the maximum tool tension setting for the strap size being tested. A cycle shall consist of closing the tool through the cutting position and returning the handle to the full open position. After each 2500 cycles, the tool shall be tested by installing the straps as specified in table I around a bundle of wires fabricated in accordance with SAE-AS23190. At no time during this test shall the compression force, required to be exerted on the handles of the tool at a point 1 ± 1/8-inch from the extremity of the handles, exceed that shown in table I.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. 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.

6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. Hand operated tools covered by this specification are intended to be used for installation of adjustable plastic and metal tiedown straps, thick and thin type, used in aircraft and missiles. These tools are used in extreme environments not encountered by commercially available tools.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number and date of the specification.

b. Issue of the DoDISS to be cited in the solicitation and if required, the specific issue of individual documents referenced (see 2.1 and 2.3).

c. Tool desired and applicable part number.

d. Quantity desired.

e. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL No. 81306 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufactures 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 or orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from the Commander, Naval Air Systems Command, AIR-4.4.5.3, 22229 Elmer Road, Building 2360, Patuxent River, MD 20670-1900 or by e-mail at richard.clarkson@navy.mil.

6.4 Subject (key word) listing.

Frame
Gripping device
Hand operated tools
Handle

6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - AS
Air Force - 11

Review activities:
Navy - EC, OS, SH
Air Force - 99
DLA - GS

Preparing activity:
Navy - AS
(Project 5120-2006-002)

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations can change, you should verify the currency of the information above using the ASSIST Online database at http://assist.daps.dla.mil/.