

FEDERAL SPECIFICATION

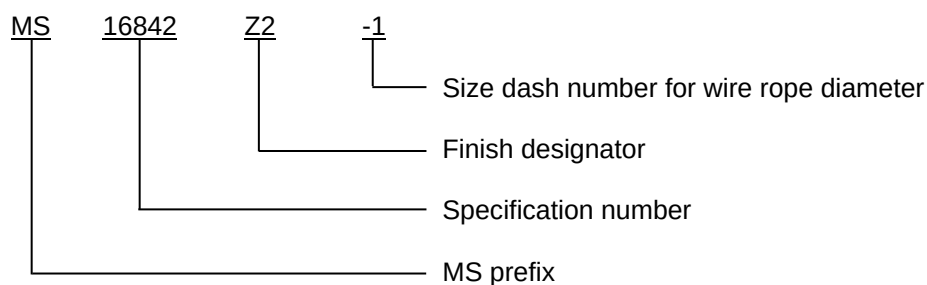
CLAMPS, WIRE ROPE

The General Services Administration has authorized the use of this federal specification by all federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers clamps, wire rope, bolted, and clamps, wire rope, threaded. These clamps are also commercially known as clips, wire rope.

1.2 Part or Identifying Number (PIN). The PIN consists of the letters MS, the specification number a letter and number for finish designator, and dash number for wire rope diameter example:



Comments, suggestions, or questions on this document should be addressed to: DLA Land and Maritime, Attn: DSCC-VAI, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to FluidFlow@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.



1.3 Classification.

1.3.1 Types and classes. Clamps are of the following types and classes (see 6.1).

Type I – Single grip, single saddle, with U-bolts and nuts (MS16842).

Class 1. Steel saddle

Class 2. Malleable-iron saddle

Type II - Double grip, double saddle, with U-bolt and nuts (FF-C-450/1).

Type III - Double grip, double saddle, with bolts and nuts (MS51868).

Class 1. Assembled with integral L-shaped bolts and nuts (MS51868).

Class 2. Assembled with separate hex headed bolts and nuts (MS51868).

Type IV - Double grip, two taper threaded half clamps with mating hexagon nut (MS16843).

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.

2.2 Government documents.

2.2.1 Specifications standards, and handbooks. The following specifications, standards, and handbooks 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.

Federal Specifications

FF-C-450/1 - Clamp, Wire Rope, Double-Grip, Steel, Double Saddled, Type II

Federal Standards

FED-STD-H28 - Screw-Threads Standards for Federal Services

Military Specifications

MS16842 - Clamp, Wire Rope, Saddled, Single-Grip, Steel, Type I (Malleable-Iron and Steel Saddle)

MS16843 - Clamp, Wire Rope (Double Grip), Threaded, Steel, Type IV

MS51868 - Clamp, Wire Rope, Double Saddled, Double-Grip, Steel, Type III

Military Standards

MIL-STD-130 - Identification Marking of U.S. Military Property

(Copies of these documents are available online at <http://quicksearch.dla.mil>.)

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.

ASME INTERNATIONAL

ASME-B18.2.2 - Nuts for General Applications: Machine Screw Nuts, Hex, Square, Hex Flange, and Coupling Nuts (Inch Series)

(Copies of these documents are available online at <http://www.asme.org>.)

ASTM INTERNATIONAL

ASTM-A47/A47M - Standard Specification for Ferritic Malleable Iron Castings
ASTM-A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
ASTM-B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel
ASTM-B695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel
ASTM-E1444/E1444M - Standard Practice for Magnetic Particle Testing

(Copies of these documents are available online at <http://www.astm.org>.)

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO/IEC DIS 17025 - General requirements for the competence of testing and calibration laboratories
ISO 10683 - Fasteners - Non-Electrolytically Applied Zinc Flake Coatings

(Copies of these documents are available online at <http://www.iso.ch>.)

NCSL INTERNATIONAL

NCSL-Z540.3 - Requirements for the Calibration of Measuring and Test Equipment

(Copies of these documents are available online at <http://www.ncsli.org>.)

SAE INTERNATIONAL

SAE-AMS-QQ-P-416 - Plating, Cadmium (Electrodeposited)
SAE-J429 - Mechanical and Quality Requirements for Externally Threaded Fasteners

(Copies of these documents are available online at www.sae.org.)

2.3 Order of precedence. Unless otherwise noted herein or in the contract, 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 precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

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

3.2 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.3.

3.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3.4 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.4.1 Used, rebuilt, or remanufactured components. No used, rebuilt, or remanufactured components, pieces or parts shall be incorporated on the clamps.

3.4.2 Ozone depleting substances (ODS). Class I and II ozone depleting substances (ODS) shall not be used in MIL-DTL-18866 or any referenced procedures.

3.5 Materials.

3.5.1 Type I, class 1 clamps (see MS16842). Materials for saddles, bolts, and nuts shall be carbon steel, the properties of which shall withstand, without distortion, the torque test of 4.5.3. Saddles shall be made of steel forgings for wire rope sizes up through 2 inches inclusive; of steel castings for wire rope sizes larger than 2 inches.

3.5.2 Type I, class 2 clamps (see MS16842). Material for bolts and nuts shall be carbon steel, the properties of which shall withstand, without distortion, the torque test of 4.5.3. Saddles shall be made of malleable iron, grade 32510, in accordance with ASTM-A47/A47M.

3.5.3 Type II clamps (see FF-C-450/1). Material for bolts, saddles, and nuts shall be carbon steel the properties of which shall withstand, without distortion, the torque test of 4.5.3. Saddles shall be made of forged steel.

3.5.4 Type III clamps (see MS51868). Material for Class 1 clamps and Class 2 saddles and nuts shall be carbon steel. Class 2 bolts shall be SAE-J429, grade 5 steel or better. The properties of all type III clamps shall withstand, without distortion, the torque test of 4.5.3. Class 1 saddles with integral L-shaped bolts and Class 2 saddles shall be forged.

3.5.5 Type IV clamps (see MS16843). Material for type IV clamp bodies shall be of forged steel 1035 to 1040. The mating hexagon nut shall also be made of 1035 to 1040 steel.

3.6 Bolts.

3.6.1 Bolt threads. Thread series of bolts after zinc flake, hot dip zinc (galvanized) coating, electrodeposited zinc coating, mechanically deposited zinc coating, or electrodeposited cadmium plating shall be Unified Coarse (UNC) Class 2A in accordance with FED-STD-H28.

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3.6.2 Thread methods. Bolt threads may be rolled or cut at the option of the manufacturer. Threads shall not be recut or rerolled after hot dip zinc (galvanized) coating, zinc flake, electrodeposited zinc coating, mechanically deposited zinc coating, or electrodeposited cadmium plating.

3.7 Nuts.

3.7.1 Nut threads. Nut threads shall be of the same series and class as the bolts on which they are to be used (see 3.6.1). Hot dip zinc (galvanized) coated nuts shall be tapped after coating except those galvanized nuts used with type III, class 2 clamps whose threads shall be cut oversize prior to being hot dip (galvanized) coated and then recut after coating to maintain a proper fit with the mating bolt. Electrodeposited and zinc flake threaded nuts shall not be recut after coating and plating.

3.7.2 Nut types. Nuts for types I, II, and III clamps (MS16842, FF-C-450/1, and MS51868) shall be heavy, hexagon, nuts or flat nuts in accordance with ASME-B18.2.2 except nuts for type I, class 2 (malleable iron) saddles shall conform to the hexagon, flat nut of ASME-B18.2.2.

3.8 Dimensions, weights and clamp size. Dimensions, weights, and clamp size of wire rope clamps shall be in accordance with the applicable ASME or MS sheets, as applicable and as otherwise specified herein, see 3.1. Clamp sizes are designated by the diameter of the wire rope with which they are used.

3.9 Construction.

3.9.1 Configuration. Configuration details of clamp components may be to the contractor's design; however, the clamps assembled shall be as specified in FF-C-450/1, MS16842, MS16843, and MS51868, and shall conform to the applicable description of this specification (see 6.2).

3.9.1.1 Type I clamps (MS16842). Type I clamps shall be in accordance with MS16842, the following details shall apply:

- a. The inside width between the parallel U-bolts legs shall be at least 1/16 inch greater than the nominal wire rope diameter for size one inch and under and 1/8 inch greater for sizes over one inch.
- b. The thread length on U-bolt legs shall be sufficient to permit properly gripping a rope doubled over.
- c. For a given size, the minimum number of recommended clamps to use in conjunction with a wire rope is specified on the MS sheet.

3.9.1.1.1 Saddles (Type I, MS16842). Saddles for class 1 and 2 of type I, the following details shall apply:

- a. Clamps shall have a semicircular path running in the longitudinal direction of the rope, sided by two wings on each side of the path for guiding the U-bolt and nesting the wire rope.
- b. The rope path shall have corrugations to accommodate a rope having a right-hand helix.
- c. The two holes for the U-bolt legs shall be dimensioned and spaced to fit the legs without binding.
- d. For a given size, the minimum number of recommended clamps to use in conjunction with a wire rope is specified on the MS sheet.

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3.9.1.2 Type II clamps (FF-C-450/1). Type II clamps shall be in accordance with FF-C-450/1, the following details shall apply:

- a. The width between the parallel U-bolt legs with saddles assembled shall accommodate the applicable wire rope.
- b. The thread length on the U-bolt legs shall be sufficient to permit the saddles to grip two ropes between saddles with nuts fully engaged.

3.9.1.2.1 Saddles (Type II, FF-C-450/1). The “loop” saddle for type II clamps, which in the assembly is slipped between the U-bolt legs, shall be formed with outside grooves and two top ridges for centering and holding it inside the U-bolt loop, the following details shall apply:

- a. The “clamping” saddle shall be of a rectangular shape with taper ends and shall have the eyes dimensioned and spaced to fit the U-bolt legs without binding.
- b. The “loop” and “clamping” saddles shall be grooved for nesting the wire rope.
- c. These grooves shall be made with corrugations running in the direction of the rope strands of a rope having a right hand helix and they shall be formed to give the maximum grip in the longitudinal direction with the rope remaining straight.

3.9.1.3 Type III clamps (MS51868). Type III clamps shall be in accordance with MS51868, the following details shall apply:

- a. The width between the bolts of the assembled clamp shall accommodate the applicable wire rope.
- b. The clamps shall have the eyes so dimensioned and spaced that the halves assemble without binding.
- c. For a given size, the minimum number of recommended clamps to use in conjunction with a wire rope is specified on the MS sheet.

3.9.1.3.1 Bolts and saddles (Type III, MS51868). The following details shall apply:

- a. The L-shaped bolt with integral clamp saddle for class 1 clamps shall be in accordance with MS51868 (see figure titled; “Clamp, double grip, double saddled wire rope - type III, class 1”).
- b. The saddle and bolt assembly for class 2 clamps shall be in accordance with MS51868 (see figure titled; “Clamp, double grip, double saddled wire rope - type III, class 2”).
- c. Saddles of both classes shall be grooved for nesting the wire rope.
- d. These grooves shall be made to run in the direction of the rope strands having a right-hand helix and they shall be formed to give the maximum grip in the longitudinal direction with the rope remaining straight.
- e. The thread length on the bolt section shall be sufficient to permit the saddles to grip two ropes between saddles with nuts fully engaged.

3.9.1.4 Type IV clamps (MS16843). Type IV clamps shall be in accordance with MS16843, the following details shall apply:

- a. The threads of the component half clamps and nut shall be tapered and be in alignment when assembled.
- b. Each half clamp shall have the inside channel either cross corrugated or helically grooved for nesting the wire rope.
- c. Helical grooves shall run in the direction of the strands of a rope having a right-hand lay, unless a left-hand lay is specified (see 6.2).
- d. The nuts shall have no visible evidence of cracks and when specified (see 6.2) shall be capable of passing the magnetic particle test of 4.5.5.

3.9.2 Assembly. Clamps of the same size, type, and class, with the exception of type IV (MS16843) shall assemble readily with random selection of component parts. Type IV half clamps are made in matching pairs and parts are not interchangeable.

3.9.3 Identification marking. Clamps shall be legibly and permanently marked with size and the manufacturer's identifying mark in accordance with MIL-STD-130.

3.9.4 Protective finish. Protective coating shall be one of the following:

- a. Mechanically deposited zinc coating in accordance with ASTM-B695, class 50, type II (chromate).
- b. Zinc coated (hot dip galvanized) in accordance with ASTM-A153/A153M or zinc coating (electrodeposited) in accordance with ASTM-B633, Fe/Zn 5, type VI.
- c. Zinc flake coating flZn/nc/TL/960h/x in accordance with ISO 10683.
- d. Cadmium plated, in accordance with SAE-AMS-QQ-P-416, type II, class 3.

3.9.4.1 Environmental safety note. Cadmium and chromate type II, which uses a hexavalent chromium, is not recommended. To the users of this document, it is recommended that the use of carbon steel material with cadmium or chromate type II plating be used only when other materials and finishes specified in this document cannot meet performance requirements.

3.9.4.2 Plating thickness verification (cadmium and zinc plating's). Plating thickness shall be measured in accordance with 4.5.2 and shall meet the requirements of 3.9.4.

3.10 Performance.

3.10.1 Torque tests type I, II, and III clamps (see 4.5.5). Type I, II, and III clamps (MS16842, FF-C-450/1, and MS51868) clamps shall be capable of passing the torque tests specified in 4.5.5.

3.10.2 Clamp grip (see 4.5.4). Type IV clamps (MS16843) the clamp grip shall be not less than 90 percent of its applicable wire rope rated breaking strength for sizes 1/4 inch and under and not less than 85 percent for sizes over 1/4 inch., see 4.5.4.

3.10.3 Magnetic particle test type IV nuts. Nuts for type IV clamps (MS16843) shall be capable of passing the magnetic particle test of 4.5.5 when such test is required in the contract or order (see 3.9.1.4 and 6.2).

3.11 Workmanship. All component parts of clamps shall be free of defects such as burrs, fins, sharp edges, cracks, flaws, corrosion, and malformations. Threads and corrugations shall be clean and properly formed. Coating, as specified (see 3.9.4), shall be adherent and shall cover all surfaces uniformly.

4. VERIFICATION

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

- a. First article inspection (see 4.3).
- b. Conformance inspection (see 4.4).

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 that supplies and services conform to prescribed requirements.

4.2 Test equipment and inspection facilities. The contractor shall establish and maintain a calibration system in accordance with ISO/IEC DIS 17025 and NCSL-Z540.3.

4.3 First article inspection. First article inspection shall consist of the tests in [table I](#).

4.3.1 First article. First article inspection shall be performed at a laboratory acceptable to the Government on sample units produced with equipment and procedures used in production.

4.3.2 Samples for first article. Unless otherwise specified, after award of the contract or order, the manufacturer shall forward three clamps, from randomly selected samples. The samples shall be representative of the construction, workmanship, components, and materials to be used during production. When a manufacturer is in continuous production of clamps from one contract to another or has demonstrated within the past 2 years the capability to meet the requirements of this specification, inspection of additional first article samples for a new contract may be waived at the discretion of the acquiring activity (see [6.2](#)). Approval of the first article samples or the waiving of first article inspection does not preclude the requirements for performing conformance inspection. First article samples shall be furnished to the Government as directed by the contracting officer (see [6.2](#)).

4.3.3 Inspection routine. Samples randomly selected from each lot shall be subjected to the first article inspections specified in [table I](#).

4.3.4 Lot. A lot shall consist of all clamps of the same type, size, material, and manufactured under essentially the same conditions and submitted for acceptance at one time, see [6.2](#).

4.3.5 Failures. One or more failures shall be cause for refusal to grant first article approval.

4.3.6 Disposition of samples. First article samples shall be furnished to the Government as directed by the contracting officer (see [6.2](#)). Unless otherwise specified, after award of the contract or order, the manufacturer shall forward, from randomly selected samples, 1 clamp. The sample shall be representative of the construction, workmanship, components, and materials to be used during production.

4.3.7 First article information. First article information shall be furnished to the Government as directed by the contracting officer (see [6.2](#)). Upon completion of first article inspection, the Government activity responsible for conducting the inspection program (see [6.2](#)), shall report the results of the inspection, with appropriate recommendation, to the contracting officer. Approval of the first article samples or the waiving of first article inspection does not preclude the requirements for performing conformance inspection.

4.3.8 Waivers or deviations to specification requirements. All waivers or deviations to specification requirements shall be coordinated through the preparing activity; DLA Land and Maritime, Attn: VAI, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to Fluidflow@dla.mil.

TABLE I. First article inspection.

Inspection	Requirement paragraph	Inspection paragraph
Visual inspection	3.1 , 3.5 , 3.6 , 3.7 , 3.9 and 3.11	4.5.1
Verification of plating thickness	3.9.4.2	4.5.2
Torque test <u>1/</u>	3.5.1 , 3.5.2 , 3.5.3 , or 3.5.4	4.5.3
Clamp grip <u>2/</u>	3.10.2	4.5.4
Magnetic particle test <u>3/</u>	3.10.1 and 3.10.3	4.5.5
Malleable-iron test <u>4/</u>	3.5.2	4.5.6

1/ Applicable to types I, II, and III clamps (MS16842, FF-C-450/1, and MS51868).

2/ Applicable to IV clamps (MS16843).

3/ Applicable to type IV nuts (MS16843).

4/ Applicable to malleable-iron saddles type I, class 2 clamps (MS16843).

4.3.9 Sampling tests. A sample of clamps shall be randomly selected in accordance with [table II](#) if one or more defects are found, the lot shall be rescreened and defects removed. After screening and removal of defects, a new sample of clamps shall be randomly selected in accordance with [table I](#), if one or more defects are found in the second sample, the lot shall be rejected and shall not be supplied to this specification. in accordance with [table I](#). The selected clamp type shall be subjected to all the sampling tests listed in [4.3](#).

4.3.10 Rejection and retest. When one or more clamps fail to meet the specification, acceptance of all clamps will be withheld until the extent and cause of failure are determined. After corrections have been made, all necessary tests shall be repeated.

4.3.11 Sampling plan. Accept on zero, for general inspection as specified in [table I](#).

TABLE II. Sampling plan.

Lot Size			Sample size
2	to	12	All
13	to	150	13
151	to	280	20
281	to	500	29
501	to	1,200	34
1,201	to	3,200	42

4.3.12 Sampling for protective finish tests. A random sample of clamp types including nuts U-bolts, and saddles as applicable.

4.3.13 Sampling for torque test. A random sample of types I, II, and III clamps (MS16842, FF-C-450/1, and MS51868), as applicable, see [4.3.4](#).

4.3.14 Sampling of type IV (MS16842) nuts for magnetic particle inspection (see [6.2](#)). When magnetic particle inspection is specified in the contract or order, a random sample of type IV nuts shall be taken from each lot see [4.3.4](#).

4.4 Conformance inspection.

4.4.1 Individual tests. Inspection of the product for delivery shall consist of subjecting each clamp to the individual tests specified in table III.

TABLE III. Individual inspection.

Inspection	Requirement paragraph	Test method paragraph
Visual inspection	3.1, 3.5, 3.6, 3.7, 3.9 and 3.11	4.5.1
Clamp grip <u>1/</u>	3.10.2	4.5.4
Magnetic particle test <u>2/</u>	3.10.1 and 3.10.3	4.5.5
Malleable-iron test <u>3/</u>	3.5.2	4.5.6

1/ Applicable to MS16843 type IV clamps.

2/ Applicable MS16843 to type IV nuts.

3/ Applicable to MS16843 malleable-iron saddles type I, class 2 clamps.

4.4.1.1 Individual test failures. Any item failing to meet the requirements of the individual tests shall be immediately removed from the lot. The entire lot shall be inspected for that particular defect and then the entire lot shall be re-inspected at the next higher inspection level. Any item failing to meet the requirements of the individual inspection, the entire lot shall be rejected and not supplied to the contract.

4.5 Test methods.

4.5.1 Visual inspection. Each clamp taken as specified in 4.3.9 shall be examined to verify conformance with the materials, construction, dimensions, identification of product of this specification and the applicable specification sheets. Any clamp in the sample containing one or more defects shall be rejected and if the number of defective clamps exceeds the acceptable number for the sample, the lot represented by the sample shall be rejected.

4.5.2 Verification of clamp plating thickness cadmium or zinc. The clamp and all parts shall be verified. Verification of finish plating shall be measured in accordance with ASTM B499, ASTM B567, or ASTM B568. A cross-sectioning method, such as that specified by ASTM B487 or ASTM B748, can also be used as a referee method to confirm the precision when thicknesses of 30 microinches (0.76 µm) or above are used. The zinc plating thickness may also be measured in accordance with ASTM B633 or ASTM B695 as applicable. The following details shall apply:

- a. When applicable a minimum of five points shall be measured on the clamp surface. The clamp and subassembly parts may be rotated, but measurement points shall be progressively further from the last point. Readings shall not be averaged. Measurements shall be as follows:

- (1) One measurement shall be taken at a point on the front radius and rear radius.
- (2) Three measurements shall be taken in the middle areas.

4.5.3 Torque test of types I, II, and III clamps (MS16842, FF-C-450/1, and MS51868). Unless otherwise stated in contract or order, each sample of 4.2.5 shall be tested by the contractor as follows (see 3.5.1, 3.5.2, 3.5.3, and 3.5.4). The following details shall apply:

- Two steel rods, of the same diameter as the wire rope for which the clamp is intended, shall be inserted in the clamp opening (see figure 1). Dimension "A" is the rod diameter.
- The clamp nuts shall be tightened with a torque wrench to the applicable torque values specified in table IV.
- Tightening shall be accomplished progressively by applying torque alternately to each nut in increments of ten percent of the maximum torque values for the size clamp being tested.
- The maximum torque on each nut shall be held for ten minutes.
- After the ten minute period, clamps shall be disassembled and visually examined for distortion, then tested by being reassembled and disassembled by hand without tools.
- Clamps unable to perform this test shall be considered defective.

NOTE: This torque test does not apply to MS16843 type IV clamps.

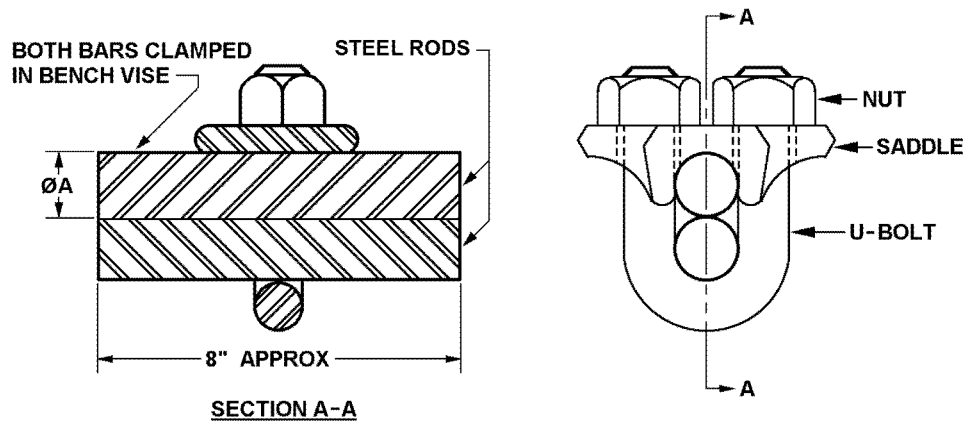


FIGURE 1. Arrangement for tightening wire rope clamps over steel rods.

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TABLE IV. Torque values for torque testing only 1/
(Applies to wire rope clamp nuts).

Nominal clamp size wire rope	Nut torque				
	Type I		Type II	Type III	
	Class 1	Class 2		Class 1	Class 2
1/8 (.125)	34 in-lbs	---	34 in-lbs	34 in-lbs	---
3/16 (.188)	66 in-lbs	32 in-lbs	78 in-lbs	78 in-lbs	14 ft-lbs
1/4 (.250)	12 ft-lbs	12 ft-lbs	144 in-lbs	144 in-lbs	24 ft-lbs
5/16 (.313)	18.5 ft-lbs	12 ft-lbs	222 in-lbs	222 in-lbs	40 ft-lbs
3/8 (.375)	25 ft-lbs	18.5 ft-lbs	25 ft-lbs	25 ft-lbs	66 ft-lbs
7/16 (.438)	35 ft-lbs	18.5 ft-lbs	35 ft-lbs	35 ft-lbs	100 ft-lbs
1/2 (.500)	35 ft-lbs	25 ft-lbs	43 ft-lbs	43 ft-lbs	100 ft-lbs
9/16 (.563)	50 ft-lbs	35 ft-lbs	50 ft-lbs	50 ft-lbs	146 ft-lbs
5/8 (.625)	50 ft-lbs	35 ft-lbs	75 ft-lbs	75 ft-lbs	146 ft-lbs
3/4 (.750)	100 ft-lbs	50 ft-lbs	100 ft-lbs	100 ft-lbs	200 ft-lbs
7/8 (.875)	140 ft-lbs	100 ft-lbs	140 ft-lbs	140 ft-lbs	335 ft-lbs
1 (1.000)	140 ft-lbs	100 ft-lbs	190 ft-lbs	190 ft-lbs	335 ft-lbs
1-1/8 (1.125)	140 ft-lbs	140 ft-lbs	220 ft-lbs	220 ft-lbs	335 ft-lbs
1-1/4 (1.250)	275 ft-lbs	140 ft-lbs	275 ft-lbs	275 ft-lbs	500 ft-lbs
1-3/8 (1.375)	275 ft-lbs	275 ft-lbs	340 ft-lbs	340 ft-lbs	500 ft-lbs
1-1/2 (1.500)	275 ft-lbs	275 ft-lbs	420 ft-lbs	420 ft-lbs	775 ft-lbs
1-5/8 (1.625)	420 ft-lbs		480 ft-lbs	480 ft-lbs	
1-3/4 (1.750)	590 ft-lbs		590 ft-lbs	590 ft-lbs	
2 (2.000)	750 ft-lbs		750 ft-lbs	750 ft-lbs	
2-1/4 (2.250)	750 ft-lbs		820 ft-lbs	820 ft-lbs	
2-1/2 (2.500)	750 ft-lbs		1150 ft-lbs	1150 ft-lbs	
2-3/4 (2.750)	750 ft-lbs		1450 ft-lbs	1450 ft-lbs	
3 (3.000)	1200 ft-lbs		1650 ft-lbs	1650 ft-lbs	

1/ Not to be used for application nut torque values.

4.5.4 Clamp grip type IV clamps (MS16843) (see 3.10.2). The contractor shall furnish an Underwriter's Laboratories, Inc. approved test report. When this listing is not available, the contractor shall submit proof that the clamp grip conforms to 3.10.2 (see 6.2).

4.5.5 Magnetic particle test (see 3.10.1 and 3.10.3). When specified in the contract or order, magnetic particle test of type I, and II clamps and type IV nuts (MS16843) as applicable shall be examined and tested in accordance with ASTM- E1444/E1444M (see 3.10.1, 3.10.3 and 6.2).

4.5.6 Malleable-iron test. When malleable-iron saddles type I, class 2 clamps (MS16842) are specified, the contractor shall furnish, prior to production, a test report by a laboratory acceptable to the Government that the malleable-iron employed for saddles meets the requirements of 3.5.2. In lieu of such report, the contractor shall carry out necessary tests of the iron under Government surveillance to show conformance with 3.5.2.

5. PACKAGING

5.1 Packaging. 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 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 packaging activities within the Military Service or Defense Agency, or within the Military Service 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.

6.1.1 Type I, II and III clamps, bolted. MS16842 type I, FF-C-450/1, type II, and MS5186, type III, wire rope clamps are intended for use on wire rope eye-loop connections or complete-loop, end-to-end connections where socketing or splicing is not feasible when a nonpermanent or temporary joint is required. The clamps also may be used in an end-to-end connection to make a continuous length wire rope, but in emergency cases only.

6.1.2 Single-saddle clamps. Single-saddle wire rope clamps MS16842, type I, may be used interchangeably with double-saddle wire rope clamps FF-C-450/1, type II and MS5186, type III, class 1, on wire ropes of the same diameter but should not be used interchangeably with MS51868 type III, class 2 clamps. MS16842 single-saddle wire rope clamps should be placed on eye-loop connections with their U-bolts on the dead or short end of the rope.

6.1.3 Positioning of components. Wire rope clamps should be placed on the wire rope connection with the corrugations in their saddles coinciding with the lay of the wire rope. The nuts on the clamps should be retightened immediately after the initial loading, and at frequent intervals of time thereafter. For the recommended number of type I, class 1 clamps, see MS16842, for type III, class 1 or class 2 clamps, see MS51868.

6.1.4 MS16843 type IV clamps, threaded. Type IV wire rope clamps consist of a split, taper thread body and mating hexagonal nut and are intended for use on wire rope eye-loops.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Slash sheet or MS PIN (see 1.2).
- c. If first article is required (see 4.3.1).
- d. Design sample, if required (see 4.3.6).
- e. Name and address of the first article inspection test facility to which first article samples are to be forwarded (see 4.3.7) and the name and address of the Government activity responsible for conducting the first article inspection program (see 6.3).
- f. Name and address of the Government activity responsible for receiving a production sample (see 4.3.6).
- g. Packaging requirements (see 5.1).
- h. MS16843 Type IV clamp grip. Manufacturer is to furnish an Underwriter's Laboratories, Inc. approved test report. When this listing is not available, the contractor is to submit proof that the clamp grip conforms to 4.5.4.
- j. If required type IV clamps specified in MS16843 are to be magnetic particle inspection, (see 4.5.5).
- k. A test report by a laboratory acceptable to the Government or under Government surveillance that the malleable-iron employed for MS16842 saddles (see 4.5.6) meets the requirements of 3.5.2.

6.3 First article. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first article samples, see 4.3.7. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

6.3.1 Defense Logistics Agency (DLA) waiver of first article test. A waiver of a first article testing will only be considered by DLA when the contractor has delivered the same item within the last 3 years, has no unfavorable quality history, has not changed processes, or changed any subcontractors. DLA will not accept first article testing results outside the stated requirements.

6.4 Guidance on use of alternative parts with less hazardous or nonhazardous materials. This specification provides for a number of alternative plating's and materials via the PIN. Users should select the PIN with the least hazardous material that meets the form, fit and function requirements of their application.

6.5 Military procurement. Personnel within the Military Departments refer to:

MS16842 for type I, class 1 clamps
FF-C-450/1 for type II double grip clamp
MS51868 for type III, class 1 and class 2 clamps
MS16843 for type IV clamps.

6.6 Item name. Defined in accordance with the approved item name in Cataloging Handbook H6, "Clamps, wire rope, bolted" and "Clamps, wire rope, threaded" covered by this specification are also identified as "Clips, wire rope" by manufacturers and commercial users.

6.7 Subject term (key word) listing.

Bolts
Cadmium
Hexavalent chromate
Magnetic
Malleable
Nuts
Saddle
Zinc

6.8 Guidance on use of alternative parts with less hazardous or non-hazardous materials. This specification provides for a number of alternative plating materials via the PIN. Users should select the PIN with the least hazardous material that meets the form, fit, and function requirements of their application.

6.9 Changes from previous issue. 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

MILITARY INTERESTS:

Custodians:

Army - AR
Navy - SH
Air Force - 99
DLA - CC

Review activities:

Army - AT, AV, CR4, GL
Navy - MC, SA, YD
Air Force - 71

CIVIL AGENCY
COORDINATING ACTIVITY:

GSA - FSA

Preparing activity:
DLA - CC

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