

MIL-S-21433A(SHIPS)  
 21 July 1959  
 SUPERSEDING  
 MIL-S-21433(SHIPS)  
 28 November 1958

**MILITARY SPECIFICATION**  
**SOCKETS, TURNBUCKLES, AND TURNBUCKLE ASSEMBLIES—**  
**WIRE ROPE, WEDGE, AND THREADED LOCK SLEEVE**

**1. SCOPE**

1.1 Scope. - This specification covers sockets, turnbuckles, and turnbuckle assemblies for making up end connections in wire rope installations as alternates for other wire rope connections (see 6. 1).

1.2 Classification. - Sockets, turnbuckles and turnbuckle assemblies shall be of the following types, classes, and forms as specified (see 6. 2):

**Type I - Wire rope sockets.**

- Class A - Open (standard clevis).
- Class B - Open (industrial clevis).
- Class C - Closed (standard eye).
- Class D - Closed (industrial eye).
- Class E - Closed (oval eye).
- Class F - Stud end.
- Class G - Coupling.
- Class H - Jointed handrail.
- Class J - Lifeline sister hook.
- Class K - Fixed slip-hook.
- Class L - Swivel slip-hook.

**Type II - Turnbuckles.**

- Class A - Wire rope double socket end pull.
  - Form 1 - With closed body.
  - Form 2 - With open body.
- Class B - Wire rope socket end pull and jaw end pull.
  - Form 1 - With closed body.
  - Form 2 - With open body.

**Type III - Turnbuckle assemblies.**

- Class A - Wire rope socket end pull and shackle equipped closed eye end pull.
- Class B - Wire rope socket end pull and sister hooks equipped end pull.
  - Form 1 - With closed body.
  - Form 2 - With open body.

**2. APPLICABLE DOCUMENTS**

2.1 The following specifications and standards, of the issue in effect on date of invitation for bids, form a part of this specification:

**SPECIFICATIONS**

**FEDERAL**

- 4-B-628 - Brass, Leaded and Non-Leaded; Rods, Shapes, Forgings and Flat Products With Finished Edges (Bars, Flat Wire and Strips).
- 4-P-416 - Plating, Cadmium (Electrodeposited).
- 4-Z-325 - Zinc Plating (Electrodeposited).
- RR-W-410 - Wire Rope and Wire Strand.

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## FEDERAL (cont'd.)

- PPP-B-566 - Boxes, Folding, Paperboard.
- PPP-B-585 - Boxes, Wood, Wirebound.
- PPP-B-591 - Boxes, Fiberboard, Wood-Cleated.
- PPP-B-601 - Boxes, Wood, Cleated-Plywood.
- PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
- PPP-B-636 - Boxes, Fiber.
- PPP-B-645 - Boxes, Folding, Fiberboard, Heavy Duty.
- PPP-B-665 - Boxes; Paperboard, Metal Stayed (Including Stay Material).
- PPP-B-676 - Boxes, Set-Up, Paperboard.
- PPP-T-76 - Tape, Pressure-Sensitive Adhesive, Paper, Water Resistant.
- PPP-T-97 - Tape, Pressure-Sensitive Adhesive, Filament Reinforced.

## MILITARY

- MIL-P-116 - Preservation, Methods of.
- MIL-N-994 - Naval Brass Bars, Plates, Rods, Sheets, Strips, Wire, Forgings, and Structural and Special Shaped Sections.
- MIL-B-10377 - Boxes: Wood-Cleated, Veneer, Paper Overlaid.
- MIL-L-10547 - Liners, Case, Waterproof.
- MIL-C-18173 - Corrosion Preventive Compound, Solvent Cutback, Cold-Appliation.
- MIL-B-16444 - Bronze, Hydraulic (Ounce Metal): Castings.
- MIL-Z-17871 - Zinc-Coating (Hot-Dip Galvanizing).
- MIL-S-20166 - Steel: Bars and Shapes (for Hull Construction) (Including Material for Drop and Miscellaneous Forgings).

## NAVY DEPARTMENT

General Specifications for Inspection of Material.

## STANDARDS

## MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-129 - Marking for Shipment and Storage.
- MIL-STD-130 - Identification Marking of U.S. Military Property.
- MIL-STD-147 - Palletized Unit Loads (40" X 48" 4-Way Partial and 4-Way Pallets).

(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.)

2.2 Other publications. - The following documents form a part of this specification. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

## NATIONAL BUREAU OF STANDARDS

Handbook H28 - Screw-Thread Standards for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington 25, D.C.)

## OFFICIAL CLASSIFICATION COMMITTEE

Uniform Freight Classification Rules.

(Applications for copies should be addressed to the Official Classification Committee, 1 Park Avenue at 33rd Street, New York 16, N.Y.)

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### 3. REQUIREMENTS

3.1 General design. - Wire rope sockets, turnbuckles, and turnbuckle assemblies shall consist essentially of the following parts:

- (a) A sleeve which slips over the end of the wire rope.
- (b) A tapered wedge which is inserted to separate and hold the strands of wire in the sleeve.
- (c) A covering socket, containing an inspection hole, for locking the assembly.

3.1.1 Wire rope with fiber core. - Applications utilizing wire rope with a fiber core shall be similar to figure 1.

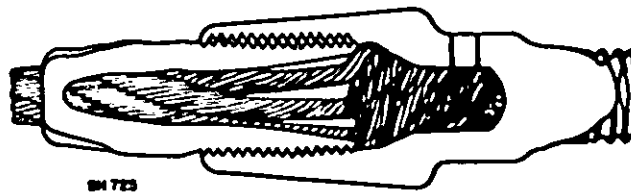


Figure 1 - Fiber core wedge, cutaway view showing inspection hole.

3.1.1.1 Wedges for use with six-strand wire ropes sizes 5/16-inch and smaller shall have no grooves. For all other six-strand wire ropes, the wedge shall have six grooves and shall be similar to figure 2.

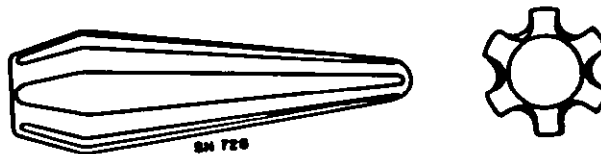


Figure 2 - Fiber core wedge 6-groove.

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3.1.1.2 Wedges for use with eight-strand wire ropes sizes 3/8-inch and smaller shall have no grooves. For all other eight-strand wire ropes, the wedge shall have eight grooves and shall be similar to figure 3.

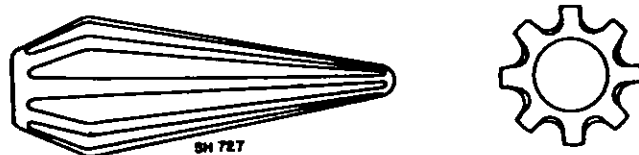


Figure 3 - Fiber core wedge, 8-groove.

3.1.2 Wire rope with independent wire rope core and wire rope with wire strand core. - Applications utilizing wire rope with either an independent wire rope core or a wire strand core shall be similar to figure 4.

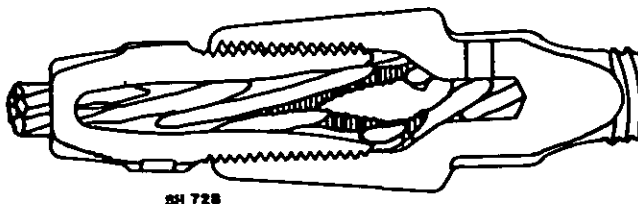


Figure 4 - Wire rope core and wire strand core wedge, cutaway view showing how wire is locked in place.

3.1.2.1 For wire rope with an independent wire rope core sizes 1/4-inch and smaller, the wedge shall be solid and shall be similar to figure 5.

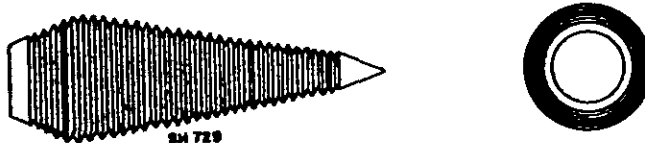


Figure 5 - Wire center wedge (solid).

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3.1.2.2 For wire rope with an independent wire rope core size  $5/16$  inch and larger, the wedges shall be two pieces similar to figure 6. For wire rope sizes  $5/16$ -inch to  $1/2$ -inch inclusive, the wedges shall not be grooved.



Figure 6 - Wire center wedge (two pieces).

3.1.2.3 Wedges for all strands of 7 or 19 wires, size  $1/4$ -inch and larger, shall be hollow and be similar to figure 7.

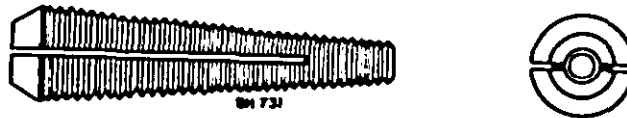


Figure 7 - Strand wedge (hollow).

3.2 Construction. - The wire rope sockets, turnbuckles, and turnbuckle assemblies shall be constructed as specified in 3.7 through 3.9 (see figures 8 through 22). They shall consist of parts which wire rope may be attached by mechanical gripping action without recourse to splicing or socketing.

3.3 Threaded parts. - Threaded parts shall conform to class 2A or class 2B of Hand

3.4 Sizes. - The size of the sockets, turnbuckles, and turnbuckle assemblies shall be as specified in Specification RR-W-410 and as specified (see 6.2).

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6.

3.5 Weight. The weight of the wire rope sockets, turnbuckles and turnbuckle assemblies shall not exceed the nominal weights shown in tables I and II.

Table I - Nominal weights, in pounds, of 10 assembled wire rope sockets and turnbuckle assemblies.

Type	Class and form	Material	Wire rope size - inches															
			1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2
I	A	Steel			6	8	12	20	27.5	46	46	78	116	170	182	195	500	500
I	B	Steel	1.5	2.5	3.5	7	9.5	16	21	34								
I	C	Steel			4.5	5.5	7.5	12.5	18	22	22	50	76	119				
I	D	Steel	1.5	2.5	4	5.5	8	15	18.5	30.5								
I	E	Steel			9.5	9.5	17	20.5	22	37.5	37.5	67	125	169	260	352		
I	F	Steel			5.5	7	10.5	19	21	38	38	68	98	142	193	221	480	480
I	G	Steel	2	2.5	4.5	7	8	16	22	38.5	38.5	83	109	179	284	284		
I	H	Bronze					13.5											
I	J	Bronze					22			28	38							
I	K	Steel			10.5	14.5	18.5	30.5	43	88	88	141	196	288				
I	L	Steel			15	18	28.5	40	53	105	105	169	222	319				
III	B - Form 1	Bronze					62			85								
III	B - Form 2	Bronze					31.5			54	62							

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Table II - Nominal weights, in pounds, of 10 assembled turnbuckles and turnbuckle assemblies.

Type	Class	Material	Takeup (inches)	Wire rope size - inches															
				1/8	3/16	1/4	5/16	3/8	7/16	1/2	9/16	5/8	3/4	7/8	1	1-1/8	1-1/4	1-3/8	1-1/2
II	A	Steel	2-7/8	3.2															
II	A	Steel	3-1/8		5.7														
II	A	Steel	6			19	22	22.5	52	56									
II	A	Steel	9			28	25.5	39	60	65									
II	A	Steel	12			28.5	31.5	52	72	75									
II	A	Steel	18								115	115	207	268	368	633			
II	A	Steel	24								139	139	241	314	433	633			
II	A	Steel	2-7/8	5.6												633			
II	B	Steel	3-1/8		6.2											723			1218
II	B	Steel	6			19	21	29.5	50	52									
II	B	Steel	9			25.5	25.5	38	60	62									
II	B	Steel	12			37	38	50	70	71	111	111	228	257	355	613			
II	B	Steel	18								133	133	268	305	451	701			
II	B	Steel	24										310	354	465	701	1161		1161
III	A	Steel	6			21	24.5	38	54	61									
III	A	Steel	9			25.5	28.5	43	65	72	116	116	232	288	402	667			
III	A	Steel	12			30.5	34	51	74	81	139	139	274	336	497	700			
III	A	Steel	18							96						755			
III	A	Steel	24										316	386	563	789	1370		1370

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Material. -.1 Steel wire rope sockets, turnbuckles, and turnbuckle assemblies. -

i.1.1 Component parts of type I, classes A, B, C, D, E, F, G, K and L wire rope sockets; classes A and B turnbuckles; and type III, class A turnbuckle assemblies shall be fabricated, not welding, from steel bar stock and forgings, except that type I, class A sockets may be made of steel bar stock, when specified in the contract or order. The composition of the material shall be such as to produce a product which, when tested as specified in 4.5.1 or 4.5.2, shall meet the tension load requirements of tables III, IV and 4.5.2 as applicable. In addition, the material in the steel wire rope sockets, turnbuckles, and turnbuckle assemblies shall conform to the elongation and bent test requirements for high tensile steel, grade HT, as specified in Specification MIL-S-20168.

Table III - Tension test loads for steel assembled sockets, turnbuckles, and turnbuckle assemblies used with wire rope having fiber core center.

Nominal diameter of wire rope	Proof load (80 percent of minimum breaking strength of wire rope)	Breaking load (85 percent of minimum breaking strength of wire rope)	Minimum breaking strength of 6 by 19 improved plow steel, uncoated, fiber core wire rope
Inches	Pounds	Pounds	Pounds
1/8	850	1,200	1,420
3/16	1,910	2,710	3,190
1/4	3,290	4,660	5,480
5/16	5,040	7,140	8,400
3/8	7,320	10,400	12,200
7/16	9,900	14,000	16,500
1/2	12,800	18,200	21,400
9/16	16,200	23,000	27,000
5/8	20,000	28,400	33,400
3/4	28,600	40,500	47,600
7/8	38,600	54,700	64,400
1	50,200	71,100	83,600
1-1/8	63,000	89,300	105,000
1-1/4	77,400	110,000	129,000
1-3/8	93,000	132,000	155,000
1-1/2	110,000	156,000	184,000
1-5/8	128,000	182,000	214,000



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Table IV - Tension test loads for steel assembled sockets, turnbuckles, and turnbuckle assemblies used with wire rope having independent wire rope core or wire strand core.

Nominal diameter of wire rope	Proof load (60 percent of minimum breaking strength of wire rope)	Breaking load (85 percent of minimum breaking strength of wire rope)	Minimum breaking strength of 6 by 19 improved plow steel, uncoated, independent wire rope core or wire strand core
Inches	Pounds	Pounds	Pounds
1/2	13,800	19,800	23,000
9/16	17,400	24,700	29,000
5/8	21,600	30,600	36,000
3/4	30,700	43,500	51,200
7/8	41,500	58,800	69,200
1	54,000	76,500	90,000
1-1/8	67,800	96,100	113,000
1-1/4	83,400	118,000	139,000
1-3/8	100,000	142,000	167,000
1-1/2	119,000	168,000	198,000
1-5/8	138,000	196,000	230,000

3.6.1.2 Wedges for size 5/16-inch and smaller steel wire rope shall be manufactured from free-cutting yellow brass rod conforming to composition 22 soft of Specification QQ-B-626. Wedges for size 3/8-inch and larger steel wire rope shall be fabricated from cast bronze conforming to Specification MIL-B-16444.

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**3.6.2 Bronze wire rope sockets and turnbuckle assemblies. -**

3.6.2.1 Component parts of type I, class A, wire rope sockets, when specified in the contract or order, and type I, classes H and J wire rope sockets and type III, class B turnbuckle assemblies shall be manufactured from bronze bar stock and forgings of a composition that will produce a product which, when tested as specified in 4.5.3 and 4.5.4, as applicable, shall meet the tension test load requirements of table V and 4.5.4. The material shall conform to the elongation and bend test requirements for bars as specified in Specification MIL-N-994.

Table V - Tension test loads for bronze wire rope sockets and turnbuckle assemblies used with bronze wire rope having fiber core center.

Nominal diameter of wire rope	Proof load (80 percent of minimum breaking strength of wire rope)	Breaking load (85 percent of minimum breaking strength of wire rope)	Minimum breaking strength of 6 by 19 phosphor bronze, fiber core, wire rope
Inch	Pounds	Pounds	Pounds
1/8	388	522	614
3/16	822	1,165	1,370
1/4	1,430	2,020	2,380
5/16	2,200	3,120	3,670
3/8	3,140	4,450	5,240
7/16	4,250	6,020	7,080
1/2	5,530	7,830	9,210
9/16	6,900	9,780	11,500
5/8	8,500	12,100	14,200
3/4	12,000	17,000	20,000
13/16	13,900	19,700	23,200
7/8	16,100	22,800	28,800

3.6.2.2 Wedges for size 5/16-inch and smaller bronze wire rope shall be manufactured from free-cutting yellow brass rod conforming to composition 22 soft of Specification QQ-B-626. Wedges for size 3/8-inch and larger bronze wire rope shall be fabricated from cast bronze conforming to Specification MIL-B-16444.

**3.7 Type I wire rope sockets. -**

3.7.1 Class A open (standard clevis). - Class A sockets shall consist of a clevis of appropriate design for attachment to structure or other fittings, clevis pin with nut, sleeve and wedge of dimensions suitable for the size of wire rope employed and shall be similar to figure 8. The material shall be as specified in 3.6.1.1 and 3.6.1.2 or 3.6.2.1 and 3.6.2.2, as specified (see 6.2).

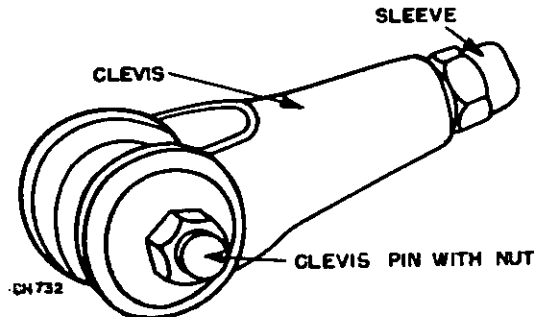


Figure 8 - Type I, class A, wire rope socket, open (standard clevis).

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3.7.2 Class B open (industrial clevis). - Class B sockets shall consist of a clevis of appropriate design for attachment to metal plate or similar support, clevis pin with cotter pin, sleeve and wedge of dimensions suitable for the size of wire rope employed and shall be similar to figure 9. The material shall be as specified in 3.6.1.1 and 3.6.1.2.

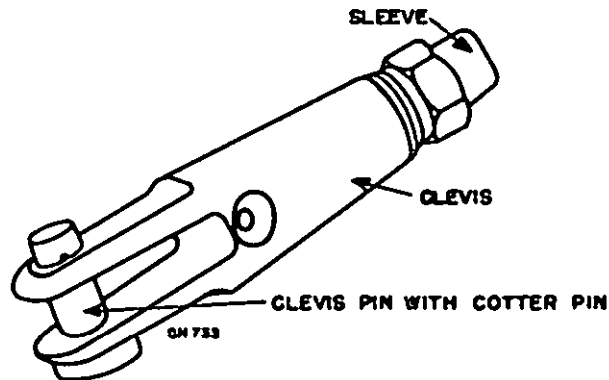


Figure 9 - Type I, class B, wire rope socket, open (industrial clevis).

3.7.3 Class C closed (standard eye). - Class C sockets shall consist of an eye of appropriate design for attachment to structure or other fittings, sleeve and wedge of dimensions suitable for the size of wire rope employed and shall be similar to figure 10. The material shall be as specified in 3.6.1.1 and 3.6.1.2.

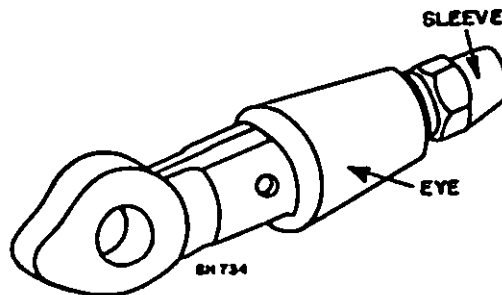


Figure 10 - Type I, class C, wire rope socket, closed (standard eye).

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3.7.7 Class G coupling. - Class G sockets shall consist of a body of hexagonal cross section into which is attached a left-hand and right-hand threaded sleeve with appropriate wedge and shall be similar to figure 14. The material shall be as specified in 3.6.1.1 and 3.6.1.2.

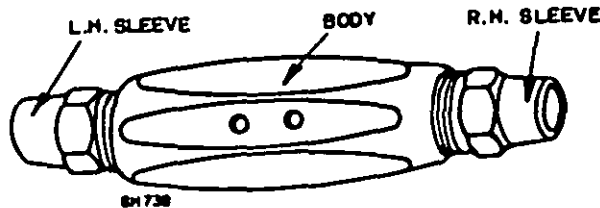


Figure 14 - Type I, class G, wire rope socket, coupling.

3.7.8 Class H jointed handrail. - Class H sockets shall consist of a jointed handrail fitting for use with hatch stanchions terminating in a sleeve with appropriate wedge and shall be similar to figure 15. The material shall be as specified in 3.6.2.1 and 3.6.2.2.

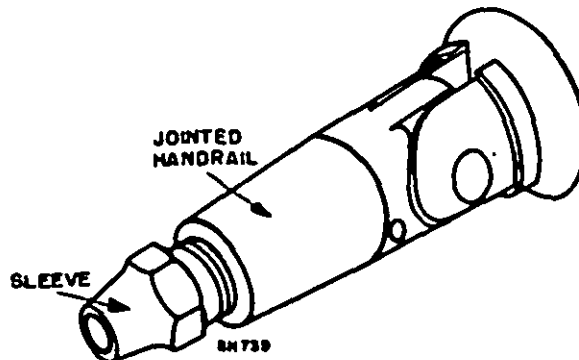


Figure 15 - Type I, class H, wire rope socket, jointed handrail.

3.7.9 Class J lifeline sister hook. - Class J sockets shall consist of a clevis with clevis pin and cotter pin attached to sister hooks at one end and a sleeve with wedge at the opposite end and shall be similar to figure 16. The material shall be as specified in 3.6.2.1 and 3.6.2.2.

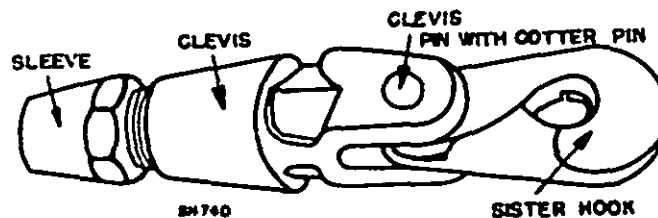


Figure 16 - Type I, class J, wire rope socket, lifeline sister hook.

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3.7.10 Class K fixed slip-hook. - Class K sockets shall consist of a body of hexagonal cross section into one end of which is threaded a slip hook and into the other end a sleeve with appropriate wedge. The assembly shall be of suitable design for attachment to structure or other sockets, turnbuckles, or turnbuckle assemblies and of dimensions suitable for the size of wire rope employed and shall be similar to figure 17. The material shall be as specified in 3.6.1.1 and 3.6.1.2.

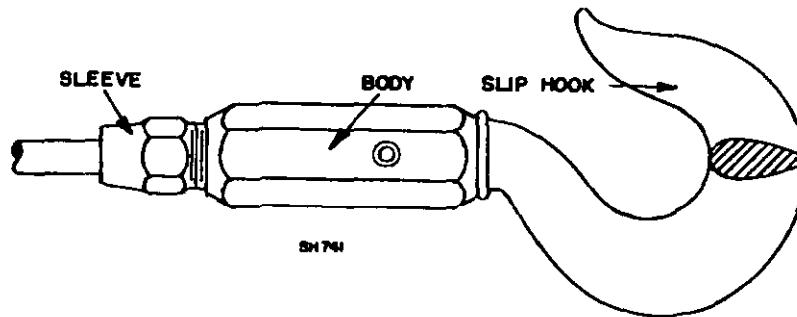


Figure 17 - Type I, class K, wire rope socket, fixed slip hook.

3.7.11 Class L swivel slip-hook. - Class L sockets shall consist of a body of hexagonal cross section with a set screw and shall be similar to figure 18. There shall be attached to the set screw end of the body a bushing, hook and nut; to the other end, a sleeve with appropriate wedge. The material shall be as specified in 3.6.1.1 and 3.6.1.2.

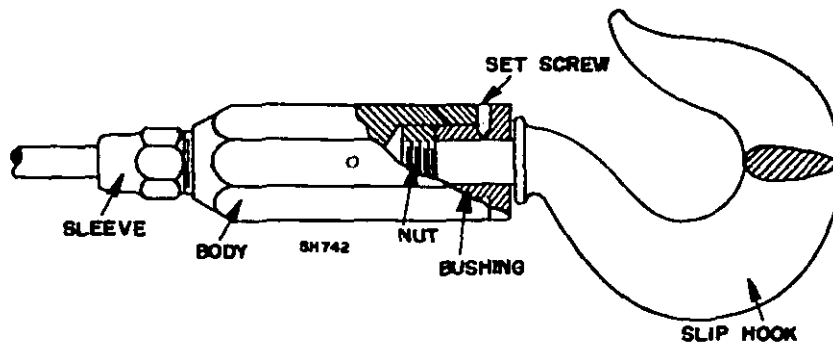
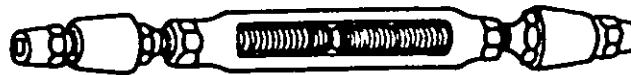


Figure 18 - Type I, class L, wire rope socket, swivel slip hook.

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**3.8 Type II turnbuckles, -**

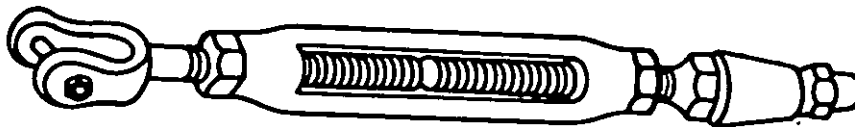
**3.8.1 Class A wire rope double socket end pull, -** Turnbuckles with end pull sockets shall consist of a regular open turnbuckle body with locknuts. Each end shall be fitted with sockets, sleeves and appropriate wedges and shall be similar to figure 19. The material shall be as specified in 3.6.1.1 and 3.6.1.2.



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Figure 19 - Type II, class A, turnbuckle, wire rope double socket end pull.

**3.8.2 Class B wire rope socket end pull and jaw end pull, -** Turnbuckles with socket and jaw end pulls shall consist of a regular open turnbuckle body with locknuts and shall be similar to figure 20. One end shall be fitted with a socket, sleeve and appropriate wedge. The other end shall be fitted with a jaw end fitting containing a clevis bolt and nut. The material shall be as specified in 3.6.1.1 and 3.6.1.2.



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Figure 20 - Type II, class B, turnbuckle, wire rope socket end pull and jaw end pull.

**3.9 Type III turnbuckle assemblies, -**

**3.9.1 Class A wire rope socket end pull and shackle equipped closed eye end pull, -** Class A turnbuckle assemblies shall consist of a regular open turnbuckle body with locknuts and shall be similar to figure 21. One end shall be fitted with a socket, sleeve and appropriate wedge. The other end shall be fitted with an eye to which shall be attached a heavy duty shackle and shackle pin. The material shall be as specified in 3.6.1.1 and 3.6.1.2.



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Figure 21 - Type III, class A, turnbuckle assembly, wire rope socket end pull and shackle equipped closed eye end pull.

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3.9.2 Class B wire rope socket end pull and sister hook equipped end pull. - Class B turnbuckle assemblies shall consist of an open, form 2, or closed, form 1, turnbuckle body with locknuts and shall be similar to figure 22. One end shall be fitted with a socket, sleeve and appropriate wedge. The other end shall be fitted with a clevis, clevis pin with cotter pin and sister hook arrangement. The material shall be as specified in 3.6.2.1 and 3.6.2.2.

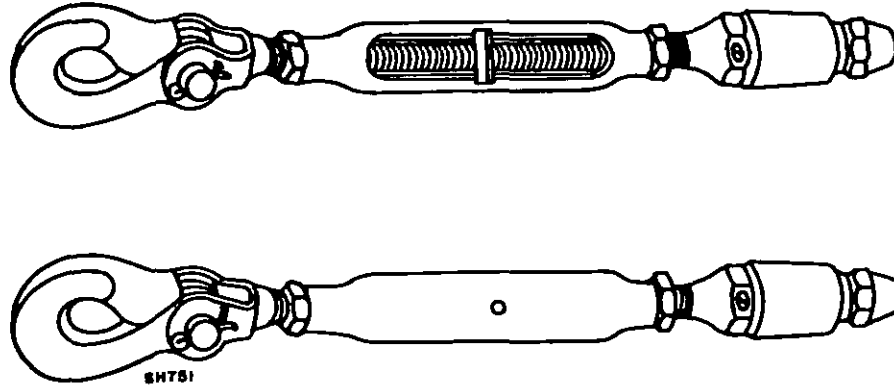


Figure 22 - Type III, class B, turnbuckle assembly, wire rope socket end pull and sister hook-equipped end pull.

3.10 Finish. - Steel wire rope sockets, turnbuckles and turnbuckle assemblies shall be self-colored, zinc-coated by the hot-dip process in accordance with Specification MIL-Z-17871, or plated with cadmium or be zinc electro-deposition in accordance with Specification QQ-P-418 or QQ-Z-325, as applicable, to a minimum thickness of 0.0005 inch, as specified (see 6.2). The zinc coating shall have a reasonably bright appearance and shall be smooth, continuous, adherent and substantially free from injurious blisters, lumps, gritty areas, acid spots, dross warts, flux and excess zinc on edges or other locations that will interfere with the mechanical performance of the wire rope sockets, turnbuckles, or turnbuckle assemblies. Electrodeposited cadmium or zinc shall be smooth, fine-grained, adherent and free from blisters, pits, nodules, indications of burning and other defects.

3.11 Marking. - Each wire rope socket, turnbuckle and turnbuckle assembly shall be marked in accordance with Standard MIL-STD-130. Markings shall include the manufacturer's name or trademark and the diameter of the size wire rope for which the assembly is designed.

3.12 Workmanship. - The workmanship shall be first class in every respect. Each wire rope socket, turnbuckle and turnbuckle assembly shall be free from imperfections which may impair serviceability or appearance.

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## 4. QUALITY ASSURANCE PROVISIONS

4.1 Unless otherwise specified herein the supplier is responsible for the performance of all inspection requirements prior to submission for Government inspection and acceptance. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order.

4.2 Approval of process tests and specimens. -

4.2.1 Approval. - In order that a supplier may be eligible to be awarded contracts or orders for wire rope sockets, turnbuckles, or turnbuckle assemblies, approval based on tests described herein shall be accomplished in accordance with instructions from the bureau or agency concerned.

4.2.2 Specimens for test. - At least four specimens, representing each type, class, form and size requiring approval by testing (see 4.2.1), shall be submitted to the testing laboratory designated by the bureau or agency concerned. In addition, an affidavit concerning conformance of the material with 3.6 shall be sent to the testing laboratory for evaluation.

4.2.2.1 Examination. - Each specimen shall be examined to verify compliance with the requirements of this specification.

4.2.2.2 Tests. - Specimens for test (see 4.2.2) shall be made up with wire rope of the size for which designated to form two sets of test samples for testing as described herein.

4.2.2.2.1 Type I, classes A to G wire rope sockets; type II, class A and B turnbuckles; and type III, class A turnbuckle assembly. - Each test sample shall be tested in accordance with 4.5.1.

4.2.2.2.1.1 When type I, class A wire rope sockets are specified in the contract or order each test sample shall be tested in accordance with 4.5.3.1.

4.2.2.2.2 Type I, class K and L wire rope sockets. - Each test sample shall be tested in accordance with 4.5.1 and 4.5.2.

4.2.2.2.3 Type I, class H sockets. - Each test sample shall be tested in accordance with 4.5.3.

4.2.2.2.4 Type I, class J wire rope sockets and type III, class B turnbuckle assembly. - Each test sample shall be tested in accordance with 4.5.4.

4.2.3 In the event that approval of process specimens meet material, examination and test requirements specified herein, approval may be granted by the bureau or agency concerned for the particular type, class, form and size wire rope socket, turnbuckle, or turnbuckle assembly tested. Whenever a specimen fails to conform to a specified requirement, additional samples manufactured under improved conditions may be submitted for retest.

4.3 Sampling for acceptance inspection. -

4.3.1 Lot. - All sockets, turnbuckles, or turnbuckle assemblies of the same type, class, form and size offered for delivery at one time shall be considered a lot for purposes of acceptance inspection.

4.3.2 Sampling for examination. - A random sample of sockets, turnbuckles, or turnbuckle assemblies shall be selected from each lot of material offered for examination of characteristics in accordance with Standard MIL-STD-105 at inspection level II, Acceptable Quality Level = 1.5 percent defective and shall be examined as specified in 4.4.1.

4.3.3 Sampling for tests. - A random sample of sockets, turnbuckles, or turnbuckle assemblies shall be selected by the inspector from each lot in accordance with Standard MIL-STD-105 at inspection level L-4 and shall be subjected to the tests specified in 4.4.2.



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4.5.3 Type I, class H wire rope socket. - Each sample socket shall be made up with phosphor bronze wire rope of the size designated and shall be tested to 60 percent of the minimum breaking strength of the wire rope (see table V) without appreciable deformation of any part of the socket assembly. They shall then be tested to the point of complete failure which shall not be less than 85 percent of the minimum rated breaking strength of the wire rope.

4.5.3.1 Type I, class A bronze wire rope sockets shall be tested in accordance with 4.5.3.

4.5.4 Type I, class J wire rope socket and type III, class B turnbuckle assembly. - Each sample socket and turnbuckle assembly shall be made up with phosphor bronze wire rope of the size designated and shall be proof tested to the load designated in table VII. Permanent set shall be less than 1/32-inch when measured after removal of the proof load. The assembled sample shall then be tested to failure of the sister hooks. Load at failure shall exceed the ultimate load to straighten value of table VII. The assembled sample, without the failed sister hooks, shall then be tested to the point of complete failure which shall not be less than 85 percent of the minimum rated breaking strength of the wire rope (see table V).

Table VII - Proof load and ultimate load to straighten for sister hooks of type I, class J wire rope socket and type III, class B turnbuckle assembly.

Nominal diameter of wire rope	Proof load	Ultimate load to straighten (min.)
Inch	Pounds	Pounds
7/16	2,000	7,000
9/16	3,500	7,500
5/8	4,000	8,000

4.6 Reinspection. - Rejected lots may be submitted for reinspection by the inspector provided the contractor, after having been informed of the reasons for rejection, has removed or repaired all nonconforming sockets, turnbuckles, or turnbuckle assemblies. Reinspection by the inspector shall consist of resampling in accordance with 4.3, as applicable, and inspecting to determine compliance with this specification.

4.7 Inspection procedures. - For Naval purchases, the general inspection procedures shall be in accordance with General Specifications for Inspection of Material.

## 5. PREPARATION FOR DELIVERY

### 5.1 Preservation and packaging. -

5.1.1 Level A. - Sockets, turnbuckles, or turnbuckle assemblies shall be preserved and packaged in accordance with method I or Specification MIL-P-116. Contact preservative shall conform to type P-1 or P-2 of Specification MIL-P-116. Compound conforming to grade 4 of Specification MIL-C-16173 shall be used when material is to be stored in shed or covered storage.

5.1.1.1 Sockets. - Sockets 3/8-inch and smaller shall be packaged in folding, set-up, metal-stayed paperboard or fiber boxes conforming to Specification PPP-B-566, PPP-B-676, PPP-B-665, or PPP-B-656 at the option of the contractor. Box closure shall be as specified in the applicable box specification. The gross weight of paperboard boxes shall not exceed 10 pounds; fiber boxes 20 pounds. Sockets of sizes 7/16-inch or larger shall be bulk packed, as specified in 5.2.1, 5.2.2 or 5.2.3, as applicable.

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5.1.1.2 Turnbuckles and turnbuckle assemblies. - Turnbuckles and turnbuckle assemblies for 1/2-inch wire rope size or less and not more than 8-inches in length shall be packaged in boxes conforming to Specification PPP-B-636. Larger sizes shall be bulk packed, as specified in 5.2.1, 5.2.2 or 5.2.3, as applicable.

5.1.2 Level C. - Sockets, turnbuckles, or turnbuckle assemblies shall be preserved and packaged in accordance with the manufacturer's commercial practice.

5.2 Packing. -

5.2.1 Level A. - Sockets, turnbuckles or turnbuckle assemblies of like type, class, form and size and packaged as specified (see 6.2) shall be packed in overseas type wirebound wood, fiberboard wood-cleated, wood cleated plywood, nailed wood, fiber, heavy duty fiberboard, wood-cleated veneer, and paper overlaid boxes conforming to Specifications PPP-B-585 (class 3), PPP-B-591, PPP-B-601, PPP-B-621, PPP-B-636 (grade 3, class 3), PPP-B-645 and MIL-B-10377, respectively, at the option of the contractor. Fiber boxes conforming to Specification PPP-B-636 shall be used as shipping containers for packaged commodities only and shall not be used as shipping containers for bulk packed commodities. Box closures and strapping shall be in accordance with the box specification and the appendix thereto, except fiber boxes shall be banded with tape conforming to type IV of Specification PPP-T-97 and the appendix thereto. Gross weight of wood and wood-cleated boxes shall not exceed 200 pounds; fiber boxes shall not exceed the weight limitations of the applicable box specification. Shipping containers for packaged items only shall be provided with caseliners conforming to Specification MIL-L-10547. Caseliners shall be closed and sealed in accordance with the appendix to Specification MIL-L-10547. Caseliners may be omitted for boxes conforming to Specification PPP-B-636 or PPP-B-645 of all joints and seams are sealed with at least 1-1/2-inch wide pressure sensitive tape conforming to Specification PPP-T-76.

5.2.1.1 Pallets. - When specified (see 6.2), wire rope sockets, turnbuckles and turnbuckle assemblies, sizes 1-1/8-inches or larger may be palletized in accordance with Standard MIL-STD-147. The gross weight of the pallets, when packed for shipment, shall not exceed 2,000 pounds.

5.2.2 Level B. - Sockets, turnbuckles, or turnbuckle assemblies of like type, class, form and size and packaged as specified (see 6.2) shall be packed in domestic type wood-cleated fiberboard, nailed wood, wirebound wood, wood-cleated plywood, wood-cleated veneer paper overlaid, fiberboard, or fiber boxes conforming to Specification PPP-B-591, PPP-B-621, PPP-B-585, PPP-B-601, MIL-B-10377, PPP-B-645, or PPP-B-636 (class 2), respectively, at the option of the contractor. Fiber boxes conforming to Specification PPP-B-636 shall be used as shipping containers for packaged commodities only, and shall not be used as shipping containers for bulk packed commodities. Box closure shall be as specified in the applicable box specification or appendix thereto. The gross weight of wood or wood-cleated boxes shall not exceed 200 pounds; fiber boxes shall not exceed the weight limitations of the applicable box specification.

5.2.2.1 Pallets. - When specified (see 6.2), wire rope sockets, turnbuckles and turnbuckle assemblies 1-1/8-inches or larger may be palletized, as specified in 5.2.1.1.

5.2.3 Level C. - Wire rope sockets, turnbuckles, or turnbuckles assemblies shall be packed in containers that will insure acceptance by common carrier and safe delivery at destination. Shipping containers shall comply with the Uniform Freight Classification Rules or regulations of other carriers as applicable to the mode of transportation.

5.3 Marking. - In addition to any special marking required by the contract or order or herein, shipments shall be marked in accordance with Standard MIL-STD-129.

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**6. NOTES****6.1 Intended use. -**

6.1.1 Wire rope sockets, turnbuckles and turnbuckle assemblies may be used in the following applications wherein the design has provided an adequate safety factor:

- (a) Ship's standing rigging.
- (b) Boat booms.
- (c) Lifelines.
- (d) Tiller ropes.
- (e) Wire rope antennae.
- (f) Towed devices involving use of armored electrical cable.

6.1.2 Poured (hot socketed) wire rope sockets should be used for all wire rope connections where the installation is required to develop 100 percent of the minimum breaking strength of the wire rope used.

**6.2 Ordering data. -** Procurement documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type, class, form and size required (see 1.2 and 3.4).
- (c) Material required for type I, class A sockets (see 3.7.1).
- (d) Type of wire rope to be used with item.
- (e) Coating - self-colored zinc, or cadmium (see 3.10).
- (f) Selection of applicable levels of preservation, packaging and packing (see 5.1 and 5.2).
- (g) Whether unit palletization is required (see 5.2.1.1 and 5.2.2.1).

6.3 The illustrations contained herein are descriptive and are not intended to preclude the purchase of wire rope sockets, turnbuckles and turnbuckle assemblies otherwise conforming to this specification.

**Notice.** - When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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Navy - Bureau of Ships  
(Project 4030-0005Sh)