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17 July 1986
SUPERSEDING
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(See 6.9)

FEDERAL SPECIFICATION

CHAINS AND ATTACHMENTS, WELDED AND WELDLESS

This specification is approved by the Commisioner, Office of Federal Supply and Services, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers welded and weldless chain of commercial quality together with sundry attachments more commonly used with this chain.

1.1.1 Federal specification coverage. Federal specifications do not include all types, grades, classes, styles, and so forth, of the commodities indicated by the title of the specification, or which are commercially available, but are intended to cover the types, and so forth, which are suitable for Federal Government requirements.

1.2 Classification.

1.2.1 Chain. Chain shall be of the following types, classes, and styles, as specified (see 6.2):

Type I - Chain, welded steel.
- Class 1 - Alloy chain.
- Class 2 - High test chain.
- Class 4 - Proof coil chain.
- Class 5 - Twist link chain.
  - Style 1 - Long-link pattern (coil).
  - Style 2 - Short-link pattern (machine).

Type II - Chain, weldless.
- Class 1 - Single-loop pattern.
- Class 2 - Double-loop pattern.
- Class 3 - Sash chain.
- Class 4 - Flat-link chain.
- Class 5 - Bead chain.
- Class 6 - Safety chain.
- Class 7 - Single-jack chain.
- Class 8 - Double-jack chain.
- Class 9 - Ladder chain.
- Class 10 - Register chain.
- Class 11 - Mechanical communication chain.

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1.2.2 Attachments. Attachments shall be of the following types and classes, as specified (see 6.2):

Type II - Connecting links.
Type III - Repair or end lap links.
Type IV - Shackles.
Class 1 - Screw pin anchor shackles.
Class 2 - Screw pin chain shackles.
Class 4 - Round pin anchor shackles.
Class 5 - Round pin chain shackles.
Class 6 - Bolt type anchor shackles.
Type V - Hooks.
Class 1 - Slip hooks with direct eye.
Class 2 - Grab hooks with direct eye (standard).
Class 3 - Hoist or sling hooks with direct eye.
Class 4 - Bale hooks.
Class 5 - Box hooks.
Class 6 - Barrel hooks.
Type VI - Rings.
Type VII - Swivels.
Class 1 - Chain swivel.
Class 2 - Eye and eye swivel.
Class 3 - Jaw and eye swivel.
Type IX - Bead chain fasteners.
Type X - Bead chain couplings.
Type XI - Bead chain insulating coupling.
Type XIII - Pear shaped links.

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

TT-V-51 - Varnish; Asphalt.
PPP-B-601 - Boxes, Wood, Cleated-Plywood.
PPP-B-621 - Boxes, Wood, Nailed and Lock-Corner.
PPP-B-636 - Boxes, Shipping, Fiberboard.
PPP-D-729 - Drums, Shipping and Storage, Steel, 55-Gallon (208 Liters).
PPP-P-704 - Pails, Metal: (Shipping, Steel 1 Through 12 Gallons).

Federal Standards:

FED-STD-H28 - Screw Thread Standards for Federal Services.
FED-STD-123 - Marking for Shipment (Civil Agencies).

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and Commercial Item Descriptions as outlined under General Information in the Index of Federal Specifications, Standards, and Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Copies of listed federal and military standards, specifications, Commercial Item Descriptions (CIDs), handbooks and associated documents listed in the Department of Defense Index of Specifications and Standards (DoDISS), should be obtained from the DoD Single Stock Point, Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120. Copies of industry association documents should be obtained from the sponsor. Copies of all other listed documents should be obtained from the contracting activity or as directed by the contracting officer.

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards, and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specifications:

MIL-P-116 - Preservation, Methods of.
MIL-L-10547 - Liners, Case, and Sheet, Overwrap; Water-Vaporproof or Waterproof, Flexible.

Military Standards:

MIL-STD-129 - Marking for Shipment and Storage.
MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-147 - Palletized Unit Loads.

(Copies of military specifications and standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 143 - Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement.

A 153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware. (DoD adopted)

A 304 - Standard Practice for Alloy Steel Bars Subject to End Quench Hardenability Requirements. (DoD adopted)

A 322 - Standard Specification for Steel Bars, Alloy, Standard Grades. (DoD adopted)

A 466 - Standard Specification for Weldless Carbon Steel Chain.

A 467 - Standard Specification for Machine and Coil Chain.

A 576 - Standard Specification for Steel Bars, Carbon, Hot Wrought, Special Quality. (DoD adopted)

B 633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel. (DoD adopted)

B 695 - Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.

D 3951 - Standard Practice for Commercial Packaging. (DoD adopted)

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Metric units.

2.3.1 Table IIA, type I, class 1, welded steel alloy chain; table IIIA, type I, class 2, welded steel high test chain; and table IVA, type I, class 4, welded steel proof coil chain. Expressing values in metric units has been included for acquisition. When replacement of previously installed chain requires exact measurements, the inch-pound measurements provided in tables II, III, and IV respectively shall be used.

2.3.2 The weights and measures in the inch-pound system are to be regarded as the standard.

3. REQUIREMENTS

3.1 Material.

3.1.1 Type I, chain, welded steel.

3.1.1.1 General. The material for type I steel chain shall conform to the chemical composition shown in table I.

TABLE I. Chemical composition.

Element	Maximum amount
	Percent
Carbon	[1]0.35
Phosphorus	0.050
Sulfur	0.050
Silicon	0.35

[1] Steel with carbon 0.50 (maximum) is permitted for attachments or attachment parts, types II to VII, inclusive, provided the fabrication is done without welding.

3.1.1.2 Type I steel.

3.1.1.2.1 Type I, class 1, alloy chain (type V, class 1, 2, and 3 hooks, type VI rings and type XII pear shaped links). Type I, class 1 material shall be an alloy steel made in accordance with ASTM A 322 or A 304. Any one of the compositions in accordance with ASTM A 322 or A 304 which meets the requirements as shown in table I may be used. The chain and attachments shall be heat-treated, as required to produce the physical requirements as specified in tables II, IIA, XVI, XVII, XVIII, XIX and XXVI.

3.1.1.2.2 Type I, class 2, high-test chain. Type I, class 2 material shall be carbon steel made in accordance with ASTM A 576. Any one of the compositions in accordance with ASTM A 576 which meets the requirements of table I may be used. The chain shall be heat-treated, as required, to produce the physical requirements specified in tables III and IIIA.

3.1.1.2.3 Type I, classes 4 and 5 chain (type II connecting links, type III repair or end lap links, type IV shackles, and type VII swivels). Type I, classes 4 and 5 chain and attachments, material shall be carbon steel made in accordance with ASTM A 576, which meets the requirements shown in table I. The chain and attachments shall be treated, as required by the physical requirements specified in tables IV, IVA, IX, X, XI, XII, XIII, XIV, XV, XX, XXI and XXII.

3.1.2 Type II, chain, weldless. Classes 1, 2, 3, 4, 7, 8, 9, and 10 shall be made of steel, bronze, or brass, as specified (see 6.2). Class 6 shall be made of either steel, brass, or aluminum, as specified (see 6.2). Class 11 shall be made of brass.

3.1.3 Recovered materials. The offeror/contractor is encouraged to use recovered materials in accordance with Public Law 94-580 to the maximum extent practicable.

3.2 Methods of fabrication.

3.2.1 Type I, chain welded.

3.2.1.1 Type I, class 1, alloy steel chain shall be in accordance with ASTM A 322 or ASTM A 304. All other type I steel chain shall be in accordance with ASTM A 576.

3.3 Finish.

3.3.1 General. When specified (see 6.2), the following finishes for chain and attachments are available and may be substituted for those hereinafter specified:

(a) Self-colored (uncoated).
(b) Bright finish (uncoated).
(c) Blacked finish.
(d) Zinc-coated.

3.3.1.1 Type I, chain, welded. Unless otherwise specified (see 6.2), chain up to 3/4 inch in size with the exception of type I, class 5, shall be furnished self-colored. Type I, class 5 shall be furnished in bright finish. The 3/4 inch-size chain and larger shall be blacked finished. Blacked finish shall consist of one coat of asphalt varnish in accordance with TT-V-51. The coating shall not be applied until after all required inspections and tests have been completed and it has been ascertained that the chain otherwise conforms to this specification.

3.3.1.2 Type II, chain, weldless. Unless otherwise specified (see 6.2), the chain shall be bright-finished.

3.3.1.3 Attachments. Unless otherwise specified (see 6.2), all attachments, except type IV, shackles, type V, class 1, 2, 3, and 6 hooks, type VII swivels, shall be self-colored. Type IV shackles, type V, class 1, 2, 3, and 6 hooks and type VII swivels shall be zinc-coated.

3.3.1.4 Zinc coating. Where zinc coating is specified, the coating may be applied by the hot-dip (galvanizing) process, by the electrodeposition process, or by the mechanically deposited coating process at the contractor's option. If the hot-dip process is used, the coating shall be applied in accordance with ASTM A 153, class B3; if the electrodeposition process is used, it shall be in accordance with ASTM B 633, type II, class Fe/Zn 13, and if the mechanically deposited coating process is used, it shall be in accordance with ASTM B 695, type II, class 12. When the electrodeposition process is used, the coating shall be done on screw parts after threading and tapping is completed. When the hot-dip process is used, internal threads may be tapped or retapped after galvanizing. Zinc coating shall be adherent, smooth, and free from injurious lumps, blisters, dross or flux.

3.3.1.4.1 Where zinc coating of alloy steel is specified, the safeguarding against embrittlement and procedure for detecting embrittlement, shall be in accordance with ASTM A 143.

3.4 Detail requirements.

3.4.1 Type I, chain welded.

3.4.1.1 General. The dimensions, physical requirements, weights and other detailed data, shall be shown in the respective tables.

3.4.1.1.1 The actual diameter (bar or rod size) of the material in all-welded chain, measured at any point, shall be not less than the nominal (trade) size of the chain.

3.4.1.2 Type I, class 1, steel, alloy chain. The alloy chain shall be similar to figure 1 and shall conform to the dimensions and physical requirements shown in tables II or IIA.

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FIGURE 1. Type I, class 1, welded, steel, alloy chain.

TABLE II. Type I, class 1, welded, steel, alloy chain.

Nominal (trade) size of chain	Maximum inside length of links	Maximum inside width of links	Minimum weight per 100 feet	Safe working load	Proof load	Minimum breaking load
Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds
1/4	0.975	0.455	72	3,600	7,200	14,400
3/8	1.333	.650	127	6,400	12,800	25,600
1/2	1.56	.845	226	11,400	22,800	45,600
5/8	1.82	.975	365	17,800	35,600	71,200
3/4	2.08	1.17	520	25,650	51,300	102,600
7/8	2.34	1.30	720	34,900	69,800	139,600
1	2.80	1.43	925	45,600	91,200	182,400
1-1/4	3.705	2.048	1,465	71,250	142,500	285,000

TABLE IIA. Type I, class 1, welded, steel alloy chain.

Nominal chain size (mm)	Max length 100 links (meters)	Inside width min - max (mm)	Safe working load (Kg)	Proof test (kilonewtons)	Breaking load minimum (kilonewtons)
7.0	2.24	8.75 - 10.50	1,500	30.8	61.6
10.0	3.20	12.50 - 15.00	3,200	63.0	126.0
13.0	4.16	16.25 - 19.50	5,400	107.0	214.0
16.0	5.12	20.00 - 24.00	8,000	161.0	322.0
20.0	6.40	25.00 - 30.00	12,500	252.0	504.0
22.0	7.04	27.50 - 33.00	15,500	305.0	610.0
26.0	8.32	32.50 - 39.00	21,600	425.0	850.0
32.0	10.24	40.00 - 48.00	32,000	644.0	1,288.0

3.4.1.3. Type I, class 2, steel, high test chain. The high test chain shall be similar to figure 2 and shall conform to the dimensions and physical requirements shown in tables III or IIIA.

SH 131692

FIGURE 2. Type I, class 2, welded steel, high test chain.

TABLE III. Type I, class 2, welded steel, high test chain.

Nominal (trade) size of chain	Actual size of material (bar)	Maximum inside length of links	Maximum inside width of links	Minimum weight per 100 feet	Safe working load	Proof load	Minimum breaking load
Inches	Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds
1/4	9/32	0.863	0.416	77	2,600	4,300	7,750
5/16	11/32	1.056	.50	110	3,900	6,400	11,600
3/8	13/32	1.199	.591	155	5,400	8,900	16,200
1/2	17/32	1.505	.773	264	9,200	15,300	27,600
5/8	21/32	1.95	.955	394	12,300	19,500	36,900
3/4	25/32	2.226	1.17	576	16,800	27,000	50,400

TABLE IIIA. Type I, class 2, welded steel, high test chain.

Nominal chain size (mm)	Max length 100 links (meters)	Inside width minimum (mm)	Safe working load (Kg)	Proof test (kilonewtons)	Breaking load minimum (kilonewtons)
5.5	2.48	7.7	520	10.2	20.4
7.0	3.15	9.8	840	16.6	33.1
8.0	3.28	11.2	1,100	21.6	43.2
10.0	3.50	14.0	1,720	33.8	67.6
13.0	4.55	18.2	2,900	57.1	114.2
16.0	5.60	20.0	4,400	86.5	172.9
20.0	7.00	25.0	6,870	135.1	270.2

3.4.1.4 Type I, class 4, steel, proof coil chain. The proof coil chain shall be similar to figure 3 and shall conform to the dimensions and physical requirements shown in tables IV or IVA.

SH 131693

FIGURE 3. Type I, class 4, welded steel, proof coil chain.

TABLE IV. Type I, class 4, welded steel, proof coil chain.

Nominal (trade) size of chain Inch	Actual size of material	Nominal inside link dimensions, inches		Length, 100 links, (max)	Weight 100 feet, (max)	Safe working load	Proof load (min)	Breaking load (min)
	Inches	Length	Width					
				Inches	Pounds	Pounds	Pounds	Pounds
3/16	7/32	0.95	0.40	99	42	750	1,500	3,000
1/4	9/32	1.00	.50	104	76	1,250	2,500	5,000
5/16	11/32	1.10	.50	114	115	1,900	3,800	7,600
3/8	13/32	1.23	.62	128	166	2,650	5,300	10,600
1/2	17/32	1.50	.81	156	289	4,500	9,000	18,000
5/8	21/32	1.87	1.00	194	425	6,900	13,800	27,600
3/4	25/32	2.12	1.12	220	612	9,750	19,500	39,000
7/8	29/32	2.50	1.37	260	811	11,375	22,750	45,500
1	1-1/32	2.75	1.50	286	1045	13,950	27,900	55,800

TABLE IVA. Type I, class 4, welded steel, proof coil chain.

Nominal chain size (mm)	Max length 100 links (meters)	Inside width minimum (mm)	Safe working load (Kg)	Proof test (kilonewtons)	Breaking load minimum (kilonewtons)
5.5	2.48	7.7	360	7.1	14.3
7.0	3.15	9.8	580	11.6	23.1
8.0	3.28	11.2	760	15.1	30.2
10.0	3.50	14.0	1,200	23.6	47.1
13.0	4.55	18.2	2,030	39.8	79.6
16.0	5.60	20.0	3,070	60.3	120.6
20.0	7.00	25.0	4,800	94.2	188.5

3.4.1.5 Type I, class 5, style 1, steel, twist-link chain, (coil) long-link pattern. The long-link chain shall be similar to figure 4, and shall conform to the dimensions and physical requirements as specified in ASTM A 467.

SH 131694

FIGURE 4. Type I, class 5, style 1, welded steel, twist-link (coil) chain, long-link pattern.

3.4.1.6 Type I, class 5, style 2, steel, twist-link (machine) chain, short-link pattern. The short-link chain shall be similar to figure 5, and shall be in accordance with the dimensions and physical requirements as specified in ASTM A 467.

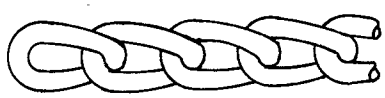

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FIGURE 5. Type I, class 5, style 2, welded steel, twist-link (machine) chain, short-link pattern.

3.4.2 Type II, chain, weldless.

3.4.2.1 General. The dimensions, physical requirements, weights, and other detailed data, shall be as shown in the respective tables.

3.4.2.2 Class 1, single-loop pattern. The single-loop pattern chain shall be similar to figure 6, and shall be in accordance with ASTM A 466.

SH 131697

FIGURE 6. Type II, class 1, weldless chain, single-loop pattern.

3.4.2.3 Class 2, double-loop pattern. The double-loop pattern chain shall be similar to figure 7, and shall be in accordance with ASTM A 466.

SH 131698

FIGURE 7. Type II, class 2, weldless, double-loop pattern chain.

3.4.2.4 Class 3, sash chain. The sash chain shall be similar to figure 8, and shall be in accordance with ASTM A 466.

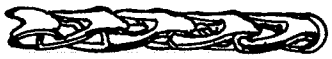

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FIGURE 8. Type II, class 3, weldless sash chain.

3.4.2.5 Class 4, flat-link chain. The flat-link chain shall be similar to figure 9, and shall be in accordance with the requirements as shown in table V.

SH 131700

FIGURE 9. Type II, class 4, weldless, flat-link chain.

TABLE V. Type II, class 4, weldless, flat-link chain.

Nominal metal thickness	Number of links per foot (approx)	Weight per 100 feet (approx)		Breaking loads (min) [1]		Trade number
		Steel	Brass	Steel	Brass	
Inch		Pounds	Pounds	Pounds	Pounds	
0.083	8-1/2	16	17	1,600	1,120	2-0
.065	17	12-1/2	13	990	695	113
.103	9-3/4	35	37	2,190	1,535	210
.125	9	40	42	3,240	2,270	280

[1] Maximum safe working load is 25 percent of breaking loads.

3.4.2.6 Class 5, bead chain. The bead chain shall be similar to figure 10, and shall be in accordance with the requirements as shown in table VI.

SH 131701

FIGURE 10. Type II, class 5, weldless, bead chain.

TABLE VI. Type II, class 5, weldless, bead chain.

Nominal diameter of beads (approx)	Metal thickness (approx)	Number of beads per foot (approx)	Weight per 100 feet (approx)	Breaking loads (min)	Trade number
Inch	Inch		Pounds	Pounds	
3/32	0.010	102	0.7	15	3
1/8	.014	72	1.5	28	6
3/16	.017	50	2.6	45	10
1/4	.020	40	4.8	90	13
3/8	.034	24	10.8	200	20

3.4.2.7 Class 6, safety chain. The safety chain shall be similar to figure 11, and shall be in accordance with ASTM A 466.

SH 131702

FIGURE 11. Type II, class 6, weldless, safety chain.

3.4.2.8 Class 7, single-jack chain. The single-jack chain shall be similar to figure 12, and shall be in accordance with ASTM A 466.

SH 131703

FIGURE 12. Type II, class 7, weldless, single-jack chain.

3.4.2.9 Class 8, double-jack chain. The double-jack chain shall be similar to figure 13, and shall be in accordance with ASTM A 466.

SH 131704

FIGURE 13. Type II, class 8, weldless, double-jack chain.

3.4.2.10 Class 9, ladder chain. The ladder chain shall be similar to figure 14, and shall be in accordance with the requirements as shown in table VII.

SH 131705

FIGURE 14. Type II, class 9, weldless, ladder chain.

TABLE VII. Type II, class 9, weldless, ladder chain.

Nominal size of chain	Number of links per foot (approx)	Weight per 100 feet (approx)	Breaking loads (min)	
			Steel	Brass or bronze
Inch		Pounds	Pounds	Pounds
0.036	64	4/5	45	40
.048	42	2-1/2	70	60
.055	34	3-1/2	85	75
.080	25	6	145	130

3.4.2.11 Class 10, register chain. The register chain shall be similar to figure 15, and shall be in accordance with ASTM A 466.

SH 131706

FIGURE 15. Type II, class 10, weldless, register chain.

3.4.2.12 Class 11, mechanical communication chain. The mechanical communication chain shall be similar to figure 16, and shall be in accordance with the requirements as shown in table VIII.

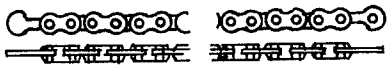

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FIGURE 16. Type II, class 11, weldless, mechanical communication chain.

TABLE VIII. Type II, class 11, weldless, mechanical communication chain.

Nominal thickness outside links	Nominal thickness inside links	Width (max)	Pitch between center to center of pins (approx)	Number of links per foot (approx)	Breaking load (min)
Inch	Inch	Inch	Inch		Pounds
1/16	1/8	1/4	3/8	32	800

3.4.2.12.1 Each end of the completed chain shall be fitted with a large brass link for the attachment of transmission wires.

3.4.2.12.2 The total length of the finished chain shall be approximately 30 inches.

3.5 Attachments.

3.5.1 Type II, connecting links. Connecting links shall be forged from carbon steel as specified in 3.1.1.2.3, shall be similar to figure 17, and shall be in accordance with the dimensions and physical requirements as shown in table IX. The 3/16, 1/4 and 5/16 inch sizes shall have rivets only, no interlocking lugs.

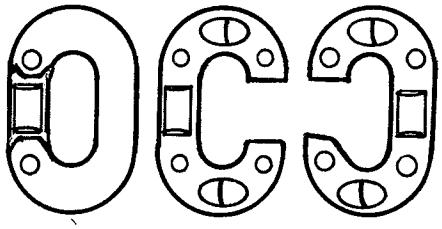

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FIGURE 17. Type II, connecting links.

TABLE IX. Type II, connecting links.

Size	Outside dimensions of links (approx)	Weight per dozen (approx)	Safe working load	Proof load	Breaking loads (min)
Inches	Inches	Pounds	Pounds	Pounds	Pounds
3/16	1-1/4 by 3/4	3/8	650	1,300	2,600
1/4	1-1/2 by 1	3/4	1,125	2,250	4,500
5/16	1-11/16 by 1-3/16	1	1,700	3,400	6,800
3/8	2-1/16 by 1-3/8	2	2,325	4,650	9,300
7/16	2-3/8 by 1-1/2	3-1/8	3,125	6,250	12,500
1/2	2-5/8 by 1-3/4	4-1/2	4,125	8,250	16,500
9/16	3 by 1-15/16	6-5/8	5,125	10,250	20,500
5/8	3-5/16 by 2-3/16	9	6,250	12,500	25,000
11/16	3-1/2 by 2-5/16	11	6,825	13,650	27,300
3/4	3-7/8 by 2-1/2	14-1/2	8,850	17,700	35,400
7/8	4-1/2 by 2-15/16	20-1/4	12,000	24,000	48,000
1	5 by 3-1/4	29	15,500	31,000	62,000
1-1/8	5-5/8 by 3-1/2	40	19,500	39,000	78,000
1-1/4	6-1/8 by 4	53-1/2	24,000	48,000	96,000
1-3/8	6-3/4 by 4-3/4	75	28,750	57,500	115,000
1-1/2	7-1/4 by 5-1/8	103	34,000	68,000	136,000
1-5/8	8 by 5-1/2	131	42,000	84,000	168,000
1-7/8	9 by 6-1/4	216	64,000	128,000	256,000

3.5.2 Type III, repair or end lap links. End lap links shall be formed from carbon steel as specified in 3.1.1.2.3. Links shall be of the end lap type, shall be similar to figure 18, and shall be in accordance with the dimensions and weights as shown in table X.

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FIGURE 18. Type III, repair or end lap links.

TABLE X. Type III, repair or end lap links.

Diameter of metal	Length inside	Safe working load	Weight per 100 links (approx)	Breaking load (min)
Inch	Inches	Pounds	Pounds	Pounds
3/16	1	225	5	900
7/32	1-1/4	250	5.75	1,000
1/4	1-1/4	325	7.2	1,300
1/4	1-1/2	325	9	1,300
1/4	2	325	10.25	1,300
9/32	1-1/4	375	9.3	1,500
5/16	1-1/2	675	14.5	2,700
5/16	2	625	17	2,500
3/8	1-5/8	1,050	22	4,200
3/8	2	1,000	25	4,000
1/2	2-1/2	1,525	54	6,100

3.5.3 Type IV shackles.

3.5.3.1 General. Shackles, together with their pins and bolts shall be forged from carbon steel as specified in 3.1.1.2.3.

3.5.3.1.1 Threads. Screw-pin shackles shall be threaded after fabrication to final size and shape. Threads shall conform to FED-STD-H28 for Unified Coarse (UNC) threads unless the corresponding fine threads are specified, (see 6.2). Threads on zinc-coated or self-colored finished shackles shall be not looser than class one fit. The male threads of zinc-coated shackles may be undercut, as necessary, so that after coating they will properly mate (not less than class one fit) with the standard size female threads.

3.5.3.1.2 Proof loads. Shackles shall withstand the proof loads shown in the respective class tables when tested as specified in 4.4.2.2.1, without developing surface rupture or defects which would interfere with serviceability or prevent disassembly of the pin. After proof loading, screw-pin shackles shall be disassembled by hand after the first half turn.

3.5.3.1.3 Breaking loads. Shackles shall withstand, without breaking, the breaking loads shown in the respective class tables when tested as specified in 4.4.2.2.2.

3.5.3.1.4 Ductility. Shackles shall be sufficiently ductile that when fractured, the fractured member shall show a permanent distortion before breaking. If the pin fractures, it shall show a permanent bend of not less than 20 degrees. If the body fractures, it shall show a permanent mid-shackle set of not less than 15 percent of the original spread between bows.

3.5.3.1.5 Marking. Each shackle body shall be permanently and legibly marked in raised or stamped letters on the side of the shackle bow with an identifying manufacturer's name or trademark, shackle size, and the recommended safe working load. Shackle pins and bolts shall be unmarked. Shackle markings shall be raised or stamped letters or figures of the maximum practical height permitted by the size of the shackle being marked, but not to exceed 3/4 inch in height by 1/8 inch in relief. Stamping dies shall be of the round bottom, low stress type. Marking location shall be such as not to interfere with the serviceability of the shackle assembly.

3.5.3.2 Class 1, screw pin anchor shackles. The screw pin anchor shackles shall be similar to figure 19, and shall be in accordance with the dimensions and physical requirements as shown in table XI.

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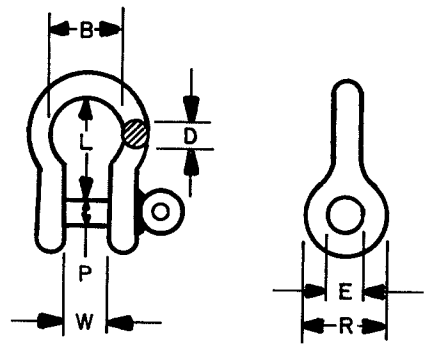

FIGURE 19. Type IV, class 1, screw pin anchor shackles.

TABLE XI. Type IV class 1 screw pin anchor shackles.

Size (D) min	Diameter pin (P) min	Diameter unthreaded eye (E) max	Width between eyes (W)		Length inside (L)		Width bow (B) min	Major diameter threaded eye max	Diameter outside eye (R) max	Weight per 100 shackles approx	Safe working load	Proof load	Breaking load min
			Nominal	Tolerance	Nominal	Tolerance							
Inches	Inches	Inches	Inches	Inch[1]	Inches	Inch[1]	Inch	Inches	Inches	Pounds	Pounds	Pounds	Pounds
3/16	1/4	5/16	3/8	1/16	7/8	1/16	9/16	9/32	5/8	5	520	1,040	2,600
1/4	5/16	13/32	15/32	1/16	1-1/8	1/16	3/4	11/32	7/8	12	710	1,420	3,550
5/16	3/8	15/32	17/32	1/16	1-1/4	1/16	13/16	13/32	1	18	1,060	2,120	5,300
3/8	7/16	17/32	21/32	1/16	1-7/16	1/8	15/16	15/32	1-1/8	30	1,590	3,180	7,950
7/16	1/2	19/32	23/32	1/16	1-11/16	1/8	1-1/16	17/32	1-1/4	49	2,170	4,340	10,850
1/2	5/8	23/32	13/16	1/16	1-7/8	1/8	1-3/16	21/32	1-3/8	74	2,830	5,660	14,150
9/16	5/8	23/32	7/8	1/16	2-1/8	1/8	1-5/8	21/32	1-5/8	92	3,580	7,160	17,900
5/8	3/4	27/32	1-1/16	1/16	2-13/32	1/8	1-1/2	25/32	1-7/8	144	4,420	8,840	22,100
3/4	7/8	31/32	1-1/4	1/16	2-27/32	1/4	1-3/4	29/32	2-1/8	216	6,360	12,720	31,800
7/8	1	1-3/32	1-7/16	1/16	3-5/16	1/4	2	1-1/32	2-3/8	337	8,650	17,300	43,250
1	1-1/8	1-7/32	1-11/16	1/16	3-3/4	1/4	2-5/16	1-5/32	2-5/8	530	11,310	22,620	56,550
1-1/8	1-1/4	1-11/32	1-13/16	1/16	4-1/4	1/4	2-5/8	1-19/64	2-7/8	700	13,360	26,720	66,800
1-1/4	1-3/8	1-15/32	2-1/32	1/16	4-11/16	1/4	2-7/8	1-27/64	3-1/4	960	16,500	33,000	82,500
1-3/8	1-1/2	1-5/8	2-1/4	1/8	5-1/4	1/4	3-1/4	1-35/64	3-1/2	1,260	19,800	39,600	99,800
1-1/2	1-5/8	1-3/4	2-3/8	1/8	5-3/4	1/4	3-3/8	1-43/64	3-3/4	1,730	23,740	47,480	118,700
1-5/8	1-3/4	1-7/8	2-5/8	1/8	6-1/4	1/4	4	1-51/64	4-1/8	2,200	27,900	55,800	139,500
1-3/4	2	2-5/32	2-7/8	1/8	7	1/4	4-1/2	2-3/64	4-1/2	2,780	32,320	64,640	161,600
2	2-1/4	2-13/32	3-1/4	1/8	7-3/4	1/2	5-1/4	2-19/64	5-1/4	4,110	42,220	84,440	211,100
2-1/4	2-1/2	2-21/32	3-7/8	1/8	9-1/4	1/2	5-1/2	2-35/64	5-3/4	5,650	54,000	108,000	270,000
2-1/2	2-3/4	2-29/32	4-1/8	1/8	10-1/2	1/2	6-3/4	2-51/64	6-1/4	8,350	67,600	135,200	338,000

[1] Plus or minus

3.5.3.3 Class 2, screw pin chain shackles. The screw pin chain shackles shall be similar to figure 20, and shall be in accordance with the dimensions and physical requirements as shown in table XII.

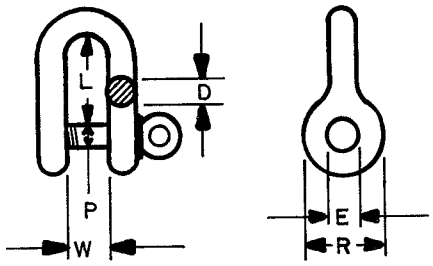

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FIGURE 20. Type IV, class 2, screw pin chain shackles.

TABLE XII. Type IV, class 2, screw pin chain shackles.

Size (D) min	Diameter pin (P) min	Diameter Unthreaded eye (E) max	Width between eyes (W)		Length inside (L)		Major Diameter threaded eye max	Diameter outside eye (R) max	Weight per 100 shackles approx	Safe working load	Proof load	Breaking load min
			Nominal	Tolerance	Nominal	Tolerance						
Inches	Inches	Inches	Inches	Inch[1]	Inches	Inch[1]	Inches	Inches	Pounds	Pounds	Pounds	Pounds
3/16	1/4	5/16	3/8	1/16	3/4	1/16	9/32	5/8	5	520	1,040	2,600
1/4	5/16	13/32	15/32	1/16	7/8	1/16	11/32	7/8	11	710	1,420	3,550
5/16	3/8	15/32	17/32	1/16	1-1/32	1/16	13/32	1	17	1,060	2,120	5,300
3/8	7/16	17/32	21/32	1/16	1-1/4	1/8	15/32	1-1/8	28	1,590	3,180	7,950
7/16	1/2	19/32	23/32	1/16	1-7/16	1/8	17/32	1-1/4	42	2,170	4,340	10,850
1/2	5/8	23/32	13/16	1/16	1-5/8	1/8	21/32	1-3/8	68	2,830	5,660	14,150
9/16	5/8	23/32	7/8	1/16	1-13/16	1/8	21/32	1-5/8	88	3,580	7,160	17,900
5/8	3/4	27/32	1-1/16	1/16	2	1/8	25/32	1-7/8	121	4,420	8,840	22,100
3/4	7/8	31/32	1-1/4	1/16	2-3/8	1/4	29/32	2-1/8	214	6,360	12,720	31,800
7/8	1	1-3/32	1-7/16	1/16	2-13/16	1/4	1-1/32	2-3/8	310	8,650	17,300	43,250
1	1-1/8	1-7/32	1-11/16	1/16	3-3/16	1/4	1-5/32	2-5/8	450	11,310	22,620	56,550
1-1/8	1-1/4	1-11/32	1-13/16	1/16	3-9/16	1/4	1-19/64	2-7/8	660	13,360	26,720	66,800
1-1/4	1-3/8	1-15/32	2-1/32	1/16	3-15/16	1/4	1-27/64	3-1/4	890	16,500	33,000	82,500
1-3/8	1-1/2	1-5/8	2-1/4	1/8	4-7/16	1/4	1-35/64	3-1/2	1,200	19,800	39,600	99,800
1-1/2	1-5/8	1-3/4	2-3/8	1/8	4-7/8	1/4	1-43/64	3-3/4	1,620	23,740	47,480	118,700
1-5/8	1-3/4	1-7/8	2-5/8	1/8	5-1/4	1/4	1-51/64	4-1/8	2,020	27,900	55,800	139,500
1-3/4	2	2-5/32	2-7/8	1/8	5-3/4	1/4	2-3/64	4-1/2	2,500	32,320	64,640	161,600
2	2-1/4	2-13/32	3-1/4	1/8	6-3/4	1/2	2-19/64	5-1/4	3,600	42,220	84,440	211,100
2-1/4	2-1/2	2-21/32	3-7/8	1/8	7-1/8	1/2	2-35/64	5-3/4	5,000	54,000	108,000	270,000
2-1/2	2-3/4	2-29/32	4-1/8	1/8	8	1/2	2-51/64	6-1/4	7,400	67,600	135,200	338,000

[1] Plus or minus

3.5.3.4 Class 4, round pin anchor shackles. The round pin anchor shackles shall be similar to figure 21 and shall be in accordance with the dimensions and physical requirements as shown in table XIII. Cotter pin shall be provided.

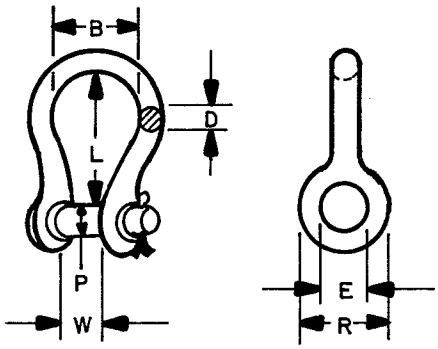

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FIGURE 21. Type IV, class 4, round pin anchor shackles.

TABLE XIII. Type IV, class 4, round pin anchor shackles.

Size (D) min	Diameter pin (P) min	Diameter inside eye (E) max	Width between eyes (W)		Length inside (L)		Width bow (B) min	Diameter outside eye (R) max	Weight per 100 shackles approx	Safe working load	Proof load	Breaking load min
			Nominal	Tolerance	Nominal	Tolerance						
Inches	Inches	Inches	Inches	Inch[1]	Inches	Inch[1]	Inches	Inches	Pounds	Pounds	Pounds	Pounds
3/16	1/4	19/64	3/8	1/16	7/8	1/16	9/16	5/8	5	520	1,040	2,600
1/4	5/16	13/32	15/32	1/16	1-1/8	1/16	3/4	7/8	12	710	1,420	3,550
5/16	3/8	15/32	17/32	1/16	1-1/4	1/16	13/16	1	18	1,060	2,120	5,300
3/8	7/16	17/32	21/32	1/16	1-7/16	1/8	15/16	1-1/8	30	1,590	3,180	7,950
7/16	1/2	19/32	23/32	1/16	1-11/16	1/8	1-1/16	1-1/4	49	2,170	4,340	10,850
1/2	5/8	23/32	13/16	1/16	1-7/8	1/8	1-3/16	1-3/8	74	2,830	5,660	14,150
9/16	5/8	23/32	7/8	1/16	2-1/8	1/8	1-5/8	1-5/8	92	3,580	7,160	17,900
5/8	3/4	27/32	1-1/6	1/16	2-13/32	1/8	1-1/2	1-7/8	144	4,420	8,840	22,100
3/4	7/8	31/32	1-1/4	1/16	2-27/32	1/4	1-3/4	2-1/8	216	6,360	12,720	31,800
7/8	1	1-3/32	1-7/16	1/16	3-5/16	1/4	2	2-3/8	337	8,650	17,300	43,250
1	1-1/8	1-7/32	1-11/16	1/16	3-3/4	1/4	2-5/16	2-5/8	530	11,310	22,620	56,550
1-1/8	1-1/4	1-11/32	1-13/16	1/16	4-1/4	1/4	2-5/8	2-7/8	700	13,360	26,720	66,800
1-1/4	1-3/8	1-15/32	2-1/32	1/16	4-11/16	1/4	2-7/8	3-1/4	960	16,500	33,000	82,500
1-3/8	1-1/2	1-5/8	2-1/4	1/8	5-1/4	1/4	3-1/4	3-1/2	1,260	19,800	39,600	99,800
1-1/2	1-5/8	1-3/4	2-3/8	1/8	5-3/4	1/4	3-3/8	3-3/4	1,730	23,740	47,480	118,700
1-5/8	1-3/4	1-7/8	2-5/8	1/8	6-1/4	1/4	4	4-1/8	2,200	27,900	55,800	139,500
1-3/4	2	2-5/32	2-7/8	1/8	7	1/4	4-1/2	4-1/2	2,780	32,320	64,640	161,600
2	2-1/4	2-13/32	3-1/4	1/8	7-3/4	1/2	5-1/4	5-1/4	4,110	42,220	84,440	211,100
2-1/4	2-1/2	2-21/32	3-7/8	1/8	9-1/4	1/2	5-1/2	5-3/4	5,650	54,000	108,000	270,000
2-1/2	2-3/4	2-29/32	4-1/8	1/8	10-1/2	1/2	6-3/4	6-1/4	8,350	67,600	135,200	338,000

[1] Plus or minus

3.5.3.5 Class 5, round pin chain shackles. The round pin chain shackles shall be similar to figure 22, and shall be in accordance with the dimensions and physical requirements as shown in table XIV. Cotter pin shall be provided.

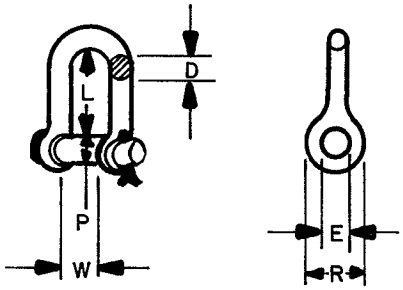

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FIGURE 22. Type IV, class 5, round pin chain shackles.

TABLE XIV. Type IV, class 5, round pin chain shackles.

Size (D) min	Diameter pin (P) min	Diameter eye (E) max	Width between eyes (W)		Length inside (L)		Diameter outside eye (R) max	Weight per 100 shackles approx	Safe working load	Proof load	Breaking load min
			Nominal	Tolerance	Nominal	Tolerance					
Inches	Inches	Inches	Inches	Inch[1]	Inches	Inch[1]	Inches	Pounds	Pounds	Pounds	Pounds
3/16	1/4	5/16	3/8	1/16	3/4	1/16	5/8	5	520	1,040	2,600
1/4	5/16	13/32	15/32	1/16	7/8	1/16	7/8	11	710	1,420	3,550
5/16	3/8	15/32	17/32	1/16	1-1/32	1/16	1	17	1,060	2,120	5,300
3/8	7/16	17/32	21/32	1/16	1-1/4	1/8	1-1/8	28	1,590	3,180	7,950
7/16	1/2	19/32	23/32	1/16	1-7/16	1/8	1-1/4	42	2,170	4,340	10,850
1/2	5/8	23/32	13/16	1/16	1-5/8	1/8	1-3/8	68	2,830	5,660	14,150
9/16	5/8	23/32	7/8	1/16	1-13/16	1/8	1-5/8	88	3,580	7,160	17,900
5/8	3/4	27/32	1-1/16	1/16	2	1/8	1-7/8	121	4,420	8,840	22,100
3/4	7/8	31/32	1-1/4	1/16	2-3/8	1/4	2-1/8	214	6,360	12,720	31,800
7/8	1	1-3/32	1-7/16	1/16	2-13/16	1/4	2-3/8	310	8,650	17,300	43,250
1	1-1/8	1-7/32	1-11/16	1/16	3-3/16	1/4	2-5/8	450	11,310	22,620	56,550
1-1/8	1-1/4	1-11/32	1-13/16	1/16	3-9/16	1/4	2-7/8	660	13,360	26,720	66,800
1-1/4	1-3/8	1-15/32	2-1/32	1/16	3-15/16	1/4	3-1/4	890	16,500	33,000	82,500
1-3/8	1-1/2	1-5/8	2-1/4	1/8	4-7/16	1/4	3-1/2	1,200	19,800	39,600	99,800
1-1/2	1-5/8	1-3/4	2-3/8	1/8	4-7/8	1/4	3-3/4	1,620	23,740	47,480	118,700
1-5/8	1-3/4	1-7/8	2-5/8	1/8	5-1/4	1/4	4-1/8	2,020	27,900	55,800	139,500
1-3/4	2	2-5/32	2-7/8	1/8	5-3/4	1/4	4-1/2	2,500	32,320	64,640	161,600
2	2-1/4	2-13/32	3-1/4	1/8	6-3/4	1/2	5-1/4	3,600	42,220	84,440	211,100
2-1/4	2-1/2	2-21/32	3-7/8	1/8	7-1/8	1/2	5-3/4	5,000	54,000	108,000	270,000
2-1/2	2-3/4	2-29/32	4-1/8	1/8	8	1/2	6-1/4	7,400	67,600	135,200	338,000

[1] Plus or minus

3.5.3.6 Class 6, bolt-type anchor shackles. The bolt-type anchor shackles shall be similar to figure 23 and shall be in accordance with the dimensions and physical requirements as shown in table XV. Bolt and nut shall have hexagon heads; cotter pin shall be provided.

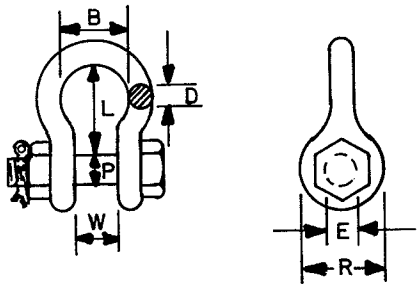

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FIGURE 23. Type IV, class 6, bolt-type anchor shackles.

TABLE XV. Type IV, class 6 bolt-type anchor shackles.

Size (D) min	Diameter bolt (P) min	Diameter inside eye (E) max	Width between eyes (W)		Length inside (L)		Width bow (B) min	Diameter outside eye (R) max	Weight per 100 shackles approx	Safe working load	Proof load	Breaking load min
			Nominal	Tolerance	Nominal	Tolerance						
Inches	Inches	Inches	Inches	Inch[1]	Inches	Inch[1]	Inches	Inches	Pounds	Pounds	Pounds	Pounds
1/2	5/8	23/32	13/16	1/16	1-7/8	1/8	1-3/16	1-3/8	82	2,830	5,660	14,150
5/8	3/4	27/32	1-1/16	1/16	2-13/32	1/8	1-1/2	1-7/8	158	4,420	8,840	22,100
3/4	7/8	31/32	1-1/4	1/16	2-27/32	1/4	1-3/4	2-1/8	280	6,360	12,720	31,800
7/8	1	1-3/32	1-7/16	1/16	3-5/16	1/4	2	2-3/8	395	8,650	17,300	43,250
1	1-1/8	1-7/32	1-11/16	1/16	3-3/4	1/4	2-5/16	2-5/8	560	11,310	22,620	56,550
1-1/8	1-1/4	1-11/32	1-13/16	1/16	4-1/4	1/4	2-5/8	2-7/8	785	13,360	26,720	66,800
1-1/4	1-3/8	1-15/32	2-1/32	1/16	4-11/16	1/4	2-7/8	3-1/4	1,120	16,500	33,000	82,500
1-3/8	1-1/2	1-5/8	2-1/4	1/8	5-1/4	1/4	3-1/4	3-1/2	1,520	19,800	39,600	99,800
1-1/2	1-5/8	1-3/4	2-3/8	1/8	5-3/4	1/4	3-3/8	3-3/4	1,950	23,740	47,480	118,700
1-5/8	1-3/4	1-7/8	2-5/8	1/8	6-1/4	1/4	4	4-1/8	2,410	27,900	55,800	139,500
1-3/4	2	2-5/32	2-7/8	1/8	7	1/4	4-1/2	4-1/2	3,130	32,320	64,640	161,600
2	2-1/4	2-13/32	3-1/4	1/8	7-3/4	1/2	5-1/4	5-1/4	4,630	42,220	84,440	211,100
2-1/4	2-1/2	2-21/32	3-7/8	1/8	9-1/4	1/2	5-1/2	5-3/4	5,650	54,000	108,000	270,000
2-1/2	2-3/4	2-29/32	4-1/8	1/8	10-1/2	1/2	6-3/4	6-1/4	9,400	67,600	135,200	338,000
2-3/4	3	3-5/32	4-1/2	1/8	11-1/4	1/2	7-1/4	6-1/4	11,500	81,000	162,000	405,000

[1] Plus or minus

3.5.4 Type V, hooks. The hooks shall be forged from alloy steel as specified in 3.1.1.2.1. Class 1, 2, 3, and 6 hooks shall be used with type I alloy chain.

3.5.4.1 Ductility. The class 1, 2, and 3 hooks shall be sufficiently ductile to permit the hook to open to at least twice the original throat gap without fracture.

3.5.4.1.1 Finish. Class 1, 2, and 3 hooks shall be zinc coated as specified in 3.3.1.4.

3.5.4.2 Class 1, slip hook with direct eye. The slip hooks shall have the eye parallel to the hook, shall be similar to figure 24, and shall be in accordance with the physical requirements as shown in table XVI.

SH 131715

FIGURE 24. Type V, class 1, slip hook with direct eye.

TABLE XVI. Type V, class 1, slip hook with direct eye.

Nominal size of chain	Weight each (approx)	Safe working load	Proof load	Minimum breaking load
Inch	Pounds	Pounds	Pounds	Pounds
1/4	0.4	3,600	7,200	14,400
3/8	1.0	6,400	12,800	25,600
1/2	2.5	11,400	22,800	45,600
5/8	3.1	17,800	35,600	71,200
3/4	6.0	25,650	51,300	102,600

3.5.4.3 Class 2, grab hooks, with direct eye (standard). Grab hooks shall have the eye parallel to the hook, shall be similar to figure 25, and shall be in accordance with the physical requirements as shown in table XVII.

SH 131716

FIGURE 25. Type V, class 2, grab hooks with direct eye (standard).

TABLE XVII. Type V, class 2, grab hooks with direct eye (standard).

Nominal size of chain	Weight each (approx)	Safe working load	Proof Load	Minimum breaking load
Inch	Pounds	Pounds	Pounds	Pounds
1/4	0.44	3,600	7,200	14,400
3/8	1.1	6,400	12,800	25,600
1/2	2.3	11,400	22,800	45,600
5/8	4.0	17,800	35,600	71,200
3/4	6.1	25,650	51,300	102,600

3.5.4.4 Class 3, hoist or sling hooks with direct eye. The hoist or sling hooks shall have the eye parallel to the hook, shall be similar to figure 26, and shall be in accordance with physical requirements as shown in table XVIII.

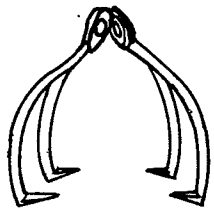
SH 131717

FIGURE 26. Type V, class 3, hoist or sling hook with direct eye.

TABLE XVIII. Type V, class 3, hoist or sling hook with direct eye.

Nominal size of chain	Weight each (approx)	Safe working load	Proof load	Minimum breaking load
Inch	Pounds	Pounds	Pounds	Pounds
1/4	0.7	3,600	7,200	14,400
3/8	1.5	6,400	12,800	25,600
1/2	3.0	11,400	22,800	45,600
5/8	5.1	17,800	35,600	71,200
3/4	8.0	25,650	51,300	102,600
7/8	11.0	34,900	69,800	139,600
1	18.0	45,600	91,200	182,400
1-1/4	33.0	71,250	142,500	285,000

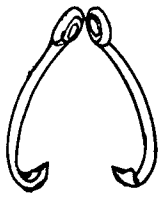
3.5.4.5 Class 4, bale hooks. Bale hooks shall be similar to figure 27 and shall be made with nominal shank diameters of 1/2, 5/8, 3/4, or 7/8 inch, as specified (see 6.2).



SH 131718

FIGURE 27. Type V, class 4, bale hooks.

3.5.4.6 Class 5, box hooks. Box hooks shall be similar to figure 28 and shall be made with nominal shank diameters of 1/2, 5/8, or 3/4 inch, as specified (see 6.2).



SH 131719

FIGURE 28. Type V, class 5, box hooks.

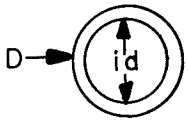
3.5.4.7 Class 6, barrel hooks. Barrel hooks shall be similar to figure 29, and shall be made with a nominal overall length of 5 inches. The hooks shall be proof tested in accordance with 4.4.2.3.1 to a proof load of 5,500 pounds.

SH 131720

FIGURE 29. Type V, class 6, barrel hooks.

3.5.5 Type VI rings. The rings shall be forged or welded from low alloy steel and in accordance with the chemical requirements as shown in table I. The rings shall be heat treated, and be similar to figure 30, and shall be in accordance with the sizes and weights as shown in table XIX.

3.5.5.1 Finish. Rings shall be zinc coated as specified in 3.3.1.4.



SH 131721

FIGURE 30. Type VI, rings.

TABLE XIX. Type VI, rings.

Diameter stock D	Inside diameter id	Weight each	Safe working load	Proof load	Breaking load min
Inches	Inches	Pounds	Pounds	Pounds	Pounds
3/4	4	1.8	6,400	12,800	38,400
7/8	4	2.6	7,200	14,400	43,200
7/8	5-1/2	3.4	5,600	11,200	33,600
1	4	3.5	10,800	21,600	64,800
1-1/8	6	6.5	10,400	20,800	62,400
1-1/4	7	6.8	17,000	34,000	102,000
1-3/8	6	10.38	19,000	38,000	114,000
1-1/2	6	11.7	34,900	69,800	209,400

3.5.6 Type VII, swivels.

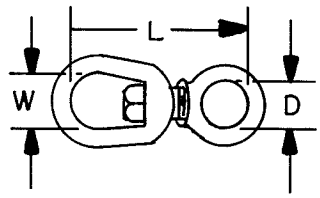
3.5.6.1 General. Swivels together with their pins shall be forged from carbon steel as specified in 3.1.1.2.3. Nuts shall be regular hex.

3.5.6.1.1 Finish. Swivels and pins shall be zinc-coated in accordance with 3.3.1.4.

3.5.6.1.2 Proof load. Swivels shall withstand the proof loads in the respective class tables when tested as specified in 4.4.2.5.1.

3.5.6.1.3 Breaking loads. Swivels shall withstand, without breaking, the breaking loads shown in the respective class tables when tested as specified in 4.4.2.5.1.

3.5.6.2 Class 1, chain swivels. The chain swivels shall be similar to figure 31 and shall be in accordance with the dimensions and physical requirements as shown in table XX.



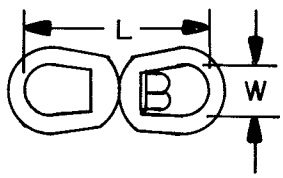
SH 131722

FIGURE 31. Type VII, class 1, chain swivels.

TABLE XX. Type VII, class 1, chain swivel.

Size	Length min L	Width W	Eye dia (min) D	Weight per 100 min	Safe working load	Proof load	Breaking load min
Inch	Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds
1/4	2-1/4	3/4	7/16	13	800	1,600	4,000
5/16	2-23/32	1	1/2	25	1,200	2,400	6,000
3/8	3-7/16	1-1/4	3/4	50	2,200	4,400	11,000
1/2	4-1/4	1-1/2	7/8	100	3,500	7,000	17,500
5/8	5-5/8	1-3/4	1-1/16	175	5,200	10,400	26,000
3/4	5-25/32	2	1-1/4	287	7,100	14,200	35,500

3.5.6.3 Class 2, eye and eye swivels. The eye and eye swivels shall be similar to figure 32 and shall be in accordance with the dimensions and physical requirements as shown in table XXI.



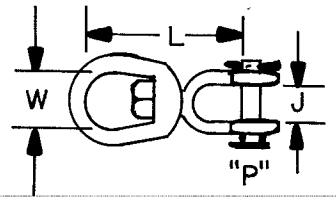
SH 131723

FIGURE 32. Type VII, class 2, eye and eye swivels.

TABLE XXI. Type VII, class 2, eye and eye swivels.

Size	Length min L	Width W	Weight per 100 min	Safe working load	Proof load	Breaking load min
Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds
1/4	2-7/8	3/4	17.5	800	1,600	4,000
5/16	3-1/2	1	32.5	1,200	2,400	6,000
3/8	4-1/4	1-1/4	63	2,200	4,400	11,000
1/2	5-7/16	1-1/2	132	3,500	7,000	17,500
5/8	6-9/16	1-3/4	250	5,200	10,400	26,000
3/4	7-3/16	2	375	7,100	14,200	35,500
7/8	8-3/8	2-1/4	600	9,200	18,400	46,000
1	9-5/8	2-1/2	900	11,600	23,200	56,200
1-1/8	10-3/8	2-3/4	1,246	15,000	30,000	75,000
1-1/4	11-1/8	3-1/8	1,637	18,000	36,000	90,000
1-1/2	17-1/8	4	4,906	45,000	90,000	225,000

3.5.6.4 Class 3, jaw and eye swivels. The jaw and eye swivels shall be similar to figure 33 and shall be in accordance with the dimensions and physical requirements as shown in table XXII.



SH 131724

FIGURE 33. Type VII, class 3, jaw and eye swivels.

TABLE XXII. Type VII, class 3, jaw and eye swivels.

Size	Length min L	Width W	Jaw opening min J	Pin dia P	Weight per 100 min	Safe working load	Proof load	Breaking load min
Inches	Inches	Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds
1/4	2-7/16	3/4	15/32	1/4	21	800	1,600	4,000
5/16	2-13/16	1	1/2	5/16	34	1,200	2,400	6,000
3/8	3-1/2	1-1/4	5/8	3/8	62	2,200	4,400	11,000
1/2	4-1/2	1-1/2	3/4	1/2	125	3,500	7,000	17,500
5/8	5-5/16	1-3/4	15/16	5/8	235	5,200	10,400	26,000
3/4	6-1/16	2	1-1/8	3/4	350	7,100	14,200	35,500
7/8	7	2-1/4	1-3/16	7/8	575	9,200	18,400	46,000
1	8-1/4	2-1/2	1-3/4	1-1/8	950	11,600	23,200	56,200
1-1/8	8-15/16	2-3/4	1-3/4	1-1/8	1,100	15,000	30,000	75,000
1-1/4	9-7/16	3-1/8	2-1/16	1-3/8	1,575	18,000	36,000	90,000
1-1/2	14-3/4	4	2-7/8	2-1/4	5,475	45,000	90,000	225,000

3.5.7 Type IX, bead-chain fasteners (standard couplings with eyelets). Bead-chain fasteners shall be made of brass, CRES, or steel, shall be similar to figure 34 and shall be in accordance with the dimensions and physical requirements as shown in table XXIII.

SH 131725

FIGURE 34. Type IX, bead-chain fasteners.

TABLE XXIII. Bead-chain fasteners.

Trade no.	Size of chain on which used	Length overall (approx)	Diameter of hole in eye (approx)	Weight per 100 couplings (approx)
	Inch	Inches	Inch	Pounds
6-AD	1/8	13/32	1/8	0.100
10-A	3/16	1/2	1/8	.187
10-AD	3/16	9/16	3/16	.250
13-AN	1/4	11/16	3/16	.312
20-A	3/8	1-1/32	1/4	1.320

3.5.8 Type X, bead-chain couplings. Bead-chain couplings shall be made of brass, CRES, or steel, shall be similar to figure 35 and shall be in accordance with the dimensions and physical requirements as shown in table XXIV.

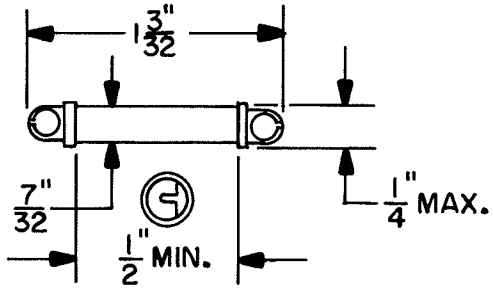
SH 131726

FIGURE 35. Type X, bead-chain couplings.

TABLE XXIV. Type X, bead-chain couplings.

Trade no.	Size of chain on which used	Length overall (approx)	Ring wire size (max)	Weight per 100 couplings (approx)
	Inch	Inch	Inch	Pound
3-L	3/32	3/8	---	0.0386
6-L	1/8	1/2	---	.085
10-B	3/16	17/32	1/8	.150
13-B	1/4	11/16	9/64	.420

3.5.9 Type XI, bead-chain insulating couplings. Bead-chain insulating couplings shall be as shown on figure 36, and shall be in accordance with the dimensions and physical requirements shown in table XXV. Couplings shall have a hard fiber body fitted at each end with a metal cap, having a hole and slot to receive bead chain. The couplings shall withstand dielectric strength tests as specified in 4.4.2.6.



SH 131727

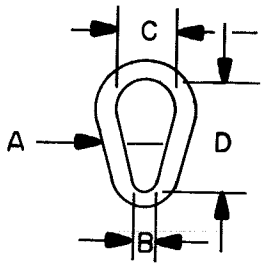
FIGURE 36. Type XI, bead-chain insulating couplings.

TABLE XXV. Type XI, bead-chain insulating couplings.

Size of chain with which used	Length overall (approx)	Distance between metal ends (min)	Diameter of fiber rod (approx)	Breaking load (min)
Inch	Inches	Inch	Inch	Pounds
1/8	1-3/32	1/2	7/32	25

3.5.10 Type XIII pear shaped links. The pear shaped links shall be forged or welded from low alloy steel and in accordance with chemical requirements shown in table I. The links shall be heat treated, and be similar to figure 37, and shall be in accordance with the sizes and weights as shown in table XXVI.

3.5.10.1 Galvanizing links. Links shall be galvanized as specified in 3.3.1.4.



SH 1319915

FIGURE 37. Type XIII pear shaped link.

TABLE XXVI. Type XIII pear shaped link.

Nominal diameter A	Inside widths B (min)	C (min)	Inside length D	Safe working load	Poof load	Breaking load min	Weight each (approx)
Inches	Inches	Inches	Inches	Pounds	Pounds	Pounds	Pounds
1/2	1	2	3	3,600	7,200	14,400	0.8
5/8	1-1/4	2-1/2	3-3/4	6,250	12,500	25,000	1.4
3/4	1-1/2	2-3/4	4-1/2	9,000	18,000	36,000	2.1
7/8	1-3/4	3	5-1/4	11,400	22,800	45,600	2.8
1	2	3-1/2	6	16,000	32,000	64,000	4.6
1-1/4	2 1/2	4-3/8	7-3/4	25,650	51,300	102,600	9.0
1-3/8	2-3/4	5	8-1/4	30,750	61,500	123,000	11.5
1-1/2	3	5-1/4	10-1/2	34,900	69,800	139,600	15.3

Inside dimensions are minimum

3.6 Workmanship. The chain and attachments shall be free from injurious imperfections that may impair appearance or serviceability. The forged and welded chain and attachments shall be free from fins, cracks, flaws or seams. The screw threads shall be true to form, clean cut, and free from injurious defects.

4. QUALITY ASSURANCE PROVISIONS

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 purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Quality conformance inspection. Quality conformance inspection shall consist of the examinations tests and as specified in 4.3 through 4.4.

4.2 Lot.

4.2.1 Type I chain. For the purpose of inspection, a lot shall consist of 200 feet or fraction thereof of the same type, class, style, and size, unless the chain is in one continuous length of over 200 feet, in which case the lot shall consist of the entire length of chain.

4.2.2 Type II chain. For the purpose of inspection, a lot shall consist of the same type, class, and size offered for delivery at one time.

4.2.3 Attachments. For the purpose of inspection, a lot shall consist of not more than 10,000 attachments made from the same material, of the same type and class offered for delivery at one time.

4.2.4 Chemical analysis. For the purpose of chemical analysis of type I welded chain and steel attachments, a lot shall consist of chain or attachments made from the same material of the following amount:

Steel-all material made from the same heat. In case heat cannot be identified, a lot shall consist of not more than 2,000 pounds of chain or attachments of the same type, class, and size.

4.2.5 Sampling procedures.

4.2.5.1 Chain.

4.2.5.1.2 Visual and dimensional inspection. A portion of each lot of chain shall be selected for visual and dimensional inspection. If lots comprise more than one length of chain, the sample links shall be selected equally from each lot.

4.2.5.1.3 Type I. A random sampling of links shall be selected from each lot in accordance with MIL-STD-105, general inspection level II, acceptable quality level (AQL) of 0.10.

4.2.5.1.4 Type II. A random sampling of links shall be selected from each lot in accordance with MIL-STD-105, general inspection level II, AQL 2.5.

4.2.5.1.5 Breaking and elongation test. A specimen not less than 2 feet long, cut from the finished chain, shall be selected from each lot for breaking and elongation test specified in 4.4.1.2 and 4.4.1.3. In the event that the lot of chain exceeds 200 feet in length, a test specimen shall be taken from each length of the chain.

4.2.5.2 Attachments.

4.2.5.2.1 Sampling for inspection. A random sample for proof test and breaking and ductility test shall be selected from each lot, except insulated couplings, in accordance with MIL-STD-105.

4.2.5.2.2 Sampling for quality conformance inspection. A random sample of attachments shall be selected from each lot with a general inspection level II, AQL 1.0, for the inspection specified in 4.3.2.

4.2.5.2.3 Sampling for proof tests. The random sampling of attachments specified in 4.2.5.2.2 with a general inspection level II, AQL 0.10, shall be proof tested as specified in 4.4.2. Samples used for and passing proof test may be reused for the breaking and ductility tests.

4.2.5.2.4 Sampling for breaking and ductility tests. A sample of attachments shall be randomly selected from the proofing samples with an inspection level S-1, AQL 1.0, for the breaking and ductility tests specified in 4.4.2.

4.2.5.2.5 Type XI, insulating couplings. The number of representative samples shall be selected from each lot as shown in table XXVII for the dielectric strength test as specified in 4.4.2.6.

TABLE XXVII. Sampling procedure (type XI couplings).

Number of couplings in lot	Number of samples to be selected for dielectric strength test
1 to 50	None
51 to 1,000	4
1,001 to 10,000	10

4.2.5.2.6 Chemical analysis. Steel chemistry of material for chain and attachments shall be determined from the certified mill data sheet or by analysis of either bars or from finished chain or attachments. One sample of not less than 2 ounces of drillings or cuttings shall be taken from each lot of chain or attachments and forwarded to a laboratory designated by the contracting activity.

4.3 Examination.

4.3.1 Chain. Each sample of chain selected as specified in 4.2.5.1 shall be examined to determine conformance with this specification regarding dimensions, finish, quality of welds, and other requirements. Chain shall be measured to the inside of the end links after the chain has been proof tested. In determining the length of chain, a load not exceeding 10 percent of the specified proof load shall be applied to take up the slack. In the event no proof load is specified for the chain, the length shall be measured after the slack has been thoroughly taken up.

4.3.1.1 Weight. Each lot of chain shall be weighed, recorded, and certified by the contractor.

4.3.2 Attachments. A random sample of attachments as specified in 4.2.5.2.2 shall be inspected to determine conformance with this specification regarding dimensions, weights, finish, quality of welds, and other requirements. If attachments are to be zinc coated, surface inspection shall be made before and after coating. Proof and breaking test shall be made after zinc coating.

4.3.3 Rejections.

4.3.3.1 Chain. If the chain fails to meet the requirements as specified in 4.3.1, the chain shall be rejected. Any lot that does not meet the weight specified in tables II, III and IV shall be rejected.

4.3.3.2 Attachments. If the sample attachments fail to conform to the requirements specified in 4.3.2, and the number of defective attachments is equal to or greater than the rejection number as specified in 4.2.5.2.2, the entire lot shall be rejected.

4.4 Tests.

4.4.1 Chain.

4.4.1.1 Order of tests. Breaking and elongation tests shall be conducted prior to proof tests. If the sample fails the breaking or elongation test, the lot shall be rejected.

4.4.1.2 Breaking test. The test sample shall be properly secured in the testing machine. The sample shall be free from twist. The holding arrangement shall be such that the stresses bearing on the end links of the test sample are the same as on the balance of the links. The chain will be considered to have passed the breaking test if it withstands the specified load for 15 seconds or if it breaks at a load greater than that specified in the respective tables.

4.4.1.3 Elongation test (for type I only). The elongation measurement shall be made on the remains of the breaking-test sample. The gauge length to be measured shall be between 12 and 18 inches as measured to the nearest link. The actual gauge length shall be determined prior to the breaking test. After the breaking test, the gauge shall be measured to determine the amount of elongation. The elongation shall be not less than 15 percent.

4.4.1.4 Proof test. Chain in each lot shall be proof-tested by subjecting it to the load specified in the applicable table. After proof test, the chain shall be thoroughly inspected. If any links show cold welding, surface rupture, deformation, inferior workmanship, or other defects, the entire lot shall be rejected.

4.4.2 Attachments.

4.4.2.1 Type II, connecting links. The fittings shall be subjected to the loads shown in the applicable tables either singly or in series. These tests shall be as specified in 4.4.1.2 and 4.4.1.4. If the number of links that fails the proof or breaking test equals or exceeds the rejection number specified in 4.2.5.2.3 and 4.2.5.2.4, the lot shall be rejected. One pair of every ten type II connecting links shall be visually inspected to insure that all links are interchangeable without applying force. The two halves shall fit concentrically to each other, and will mate (face flush fit), to each other, maintaining rivet-pin to hole alignment. The rivets shall be of sufficient diameter and length to completely fill countersunk holes when peened.

4.4.2.2 Type IV, shackles.

4.4.2.2.1 Proof test. Samples shall be subjected to proof loads shown in the applicable tables, either singly or in series. The diameter of the attachments used in proofing shall be not greater than the pin diameter of the shackle being tested and the application of the proof load shall be at the center of the pin. After releasing the proof load, each shackle shall be examined and disassembled as specified in 3.5.3.1.2.

4.4.2.2.2 Breaking and ductility tests. After proof testing, the required number of samples shall be subjected to the breaking loads shown in the applicable table. The diameter of the attachment used in the breaking test shall be not greater than the pin diameter of the shackle being tested; the application of the load shall be at the center of the pin. After breaking, the sample shall be inspected and measured to determine conformance with 3.5.3.1.4.

4.4.2.2.3 Rejections.

4.4.2.2.3.1 If the number of shackles that fails to pass the proof test equals or exceeds the rejection number specified in 4.2.5.2.3, all shackles in the lot shall be rejected.

4.4.2.2.3.2 If the number of shackles that fails to pass the breaking or ductility test, equals or exceeds the rejection number specified in 4.2.5.2.4, the lot shall be rejected.

4.4.2.3 Type V, hooks, classes 1, 2, 3, and 6.

4.4.2.3.1 Proof test. The samples shall be subjected to the proof loads shown in the applicable tables. Hooks shall withstand the proof test without any noticeable permanent opening of the hook at the throat.

4.4.2.3.2 Ductility test. The samples for classes 1, 2, and 3, after satisfactorily passing the proof test, shall be placed in a testing machine and pulled until the throat opening is twice the size, without rupture.

4.4.2.3.3 Rejections.

4.4.2.3.3.1 If the number of hooks that fails to pass the proof tests equals or exceeds the rejection number specified in 4.2.5.2.3 the lot shall be rejected.

4.4.2.3.3.2 If the number of hooks selected as specified in 4.2.5.2.4 for the ductility test fails to open the required amount, the lot shall be rejected.

4.4.2.4 Type VI, rings. Samples selected in accordance with 4.2.5.2.3 shall be subjected to the proof loads shown in table XIX. Prior to testing, the inside diameter of the ring shall be measured along the axis to which the load is to be applied. After applying the proof load, the diameter shall be remeasured and the sample shall be considered satisfactory if there is no increase in the diameter. Measurements may be made with dividers, inside calipers, or micrometers or other methods that an accuracy of not less than 0.001 inch per inch diameter may be obtained. Measurements shall be made with an accuracy of not less than 0.001 inch per inch of diameter.

4.4.2.4.1 Rejections. If the number of rings that fails to pass the proof test, equals or exceeds the rejection number specified in 4.2.5.2.3, all rings of the lot shall be rejected.

4.4.2.5 Type VII, swivels.

4.4.2.5.1 Proof and breaking tests. Samples shall be subjected to the proof and breaking loads shown in tables XX, XXI, and XXII, either singly or in series. The swivels shall withstand the proof loads without developing surface rupture or defects which would interfere with the serviceability.

4.4.2.5.2 Rejections.

4.4.2.5.2.1 If the number of swivels that fails to pass the proof test, equals or exceeds the rejection number specified in 4.2.5.2.3, all swivels in the lot shall be rejected.

4.4.2.5.2.2 If the number of swivels that fails to withstand the breaking load, equals or exceeds the rejection number specified in 4.2.5.2.4, shall cause the lot to be rejected.

4.4.2.6 Type XI, bead-chain insulating coupling dielectric strength test. Samples selected in accordance with table XXVII shall be tested for dielectric strength. One-half the number of samples shall be dried in a desiccator for 24 hours, removed, and immediately subjected to 10,000 volts. The remaining couplings shall be stored for 48 hours in an atmosphere of 35 degree Celsius, 90 percent relative humidity, and immediately subjected to 4,000 volts. A tolerance of plus 1 hour and plus or minus 2 percent relative humidity will be permitted. The difference in potential for both samples shall be maintained for 1 minute.

4.4.2.7 Type XIII, pear shaped links.

4.4.2.7.1 Proof test. Samples selected as specified in 4.2.5.2.3 shall be subjected to the proof loads as shown in table XXVI. Prior to testing, all dimensions shall be measured and recorded. After applying the test load, the links shall be remeasured and the samples shall be considered satisfactory if there are no dimensional changes.

4.4.2.7.2 Breaking load test. After proof testing, samples selected as specified in 4.2.5.2.4 shall be subjected to the minimum breaking strength as shown in table XXVI. Samples shall be considered unsatisfactory if any sample link fails to meet the breaking load.

4.4.2.7.3 Rejection.

4.4.2.7.3.1 If the number of links that fails to pass the proof tests, equals or exceeds the rejection number as specified in 4.2.5.2.3, the lot shall be rejected.

4.4.2.7.3.2 If the number of links that fails to pass the minimum breaking strength, equals or exceeds the rejection number as specified in 4.2.5.2.4, the lot shall be rejected.

4.5 Inspection of preparation for delivery. Preservation, packaging, packing, and marking shall be examined to determine conformance with the requirements of section 5.

4.5.1 Sample unit. The sample unit shall be one shipping container fully prepared for delivery. Sampling shall be in accordance with MIL-STD-105. The general inspection level shall be S-2 with an AQL of 4.0 expressed in terms of percent defective.

5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisitions.)

5.1 Preservation. Preservation shall be level A or commercial, as specified (see 6.2 and 6.5).

5.1.1 Level A. Chain and attachments, except black coated and zinc coated, shall be preserved in accordance with method I of MIL-P-116, using type P-1 or P-19 preservative. Black coated or zinc coated chain and attachments shall be preserved in accordance with method III of MIL-P-116.

5.1.1.1 Chain weighing less than 35 pounds per 100 feet and attachments weighing less than 5 pounds each shall be packed in fiberboard boxes conforming to PPP-B-636, class weather resistant. Box closure shall conform to method V as specified in the applicable box specification appendix thereto. The gross weight of the boxes shall not exceed the limitations of the applicable box specification.

5.1.1.2 Chain weighing in excess of 35 pounds per 100 feet and attachments weighing in excess of 5 pounds each shall be bulk packed in containers as specified in 5.2.

5.1.2 Commerical. Chain, chain and attachments shall be preserved in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, B, or commercial, as specified (see 6.2).

5.2.1 Level A. Chain and attachments preserved as specified (see 6.2) shall be packed in overseas type nailed wood, or wood-cleated plywood boxes in accordance with PPP-B-621, or PPP-B-601, respectively at the option of the contractor. Gross weight of shipping containers shall not exceed 200 pounds for unit packaged chain, attachments, or bulk packed attachments. Single chain lengths having a net weight of over 200 pounds, but not exceeding 1000 pounds shall be packed in overseas type nailed wood, wood-cleated plywood boxes, or drums in accordance with PPP-B-621, PPP-B-601, or PPP-D-729 (type III or IV) respectively, at the option of the contractor. The boxes shall be modified by the addition of 3- by 4-inch skids. Unless otherwise specified (see 6.2), single chain lengths exceeding 1000 pounds net weight shall be boxed, packed in drums, or shipped loose in accordance with the requirements of the applicable carrier. Wood or wood-cleated boxes shall be provided with waterproof case liners in accordance with MIL-L-10547 and sealed in accordance with the appendix thereto.

5.2.2 Level B. Chain and attachments packaged, as specified (see 6.2) shall be packed in domestic type nailed wood, or wood-cleated plywood boxes in accordance with PPP-B-621, PPP-B-601, or PPP-P-704, respectively at the option of the contractor. Gross weight of shipping containers shall not exceed 200 pounds for unit packaged chain, attachments, or bulk packed attachments. Single chain lengths having a net weight of over 200 pounds, but not exceeding 1000 pounds, shall be packed in domestic type nailed wood, or wood-cleated plywood boxes or drums in accordance with PPP-B-621, PPP-B-601, or PPP-D-729 (type III or IV) respectively at the option of the contractor. Boxes shall be modified by the addition of 2 by 4 inch skids. Unless otherwise specified (see 6.2), single chain lengths exceeding 1000 pounds net weight shall be boxed, packed in barrels, drums, or shipped loose in accordance with the requirements of the applicable carrier regulations.

5.2.3 Commercial. Packing shall be in accordance with ASTM D 3951.

5.3 Marking.

5.3.1 Military agencies. In addition to any special marking required by the contract or order (see 6.2), level A and B shipments shall be marked in accordance with MIL-STD-129, and commercial shall be marked in accordance with ASTM D 3951.

5.3.2 Civil agencies. In addition to any special marking required by the contract or order (see 6.2), unit packages and shipping containers shall be marked in accordance with FED-STD-123.

5.4 Palletization. Unitized loads, commensurate with the level of packing specified in the contract or order (see 6.2) shall be palletized in accordance with MIL-STD-147. Palletized loads shall be uniform in size and quantities to the greatest extent possible.

6. NOTES

6.1 Intended use.

6.1.1 Type I, chain, welded.

6.1.1.1 Type I is steel chain intended for general service. Type I, class 1 is a special analysis alloy steel recommended for hazardous overhead lifting and wherever long life and extremely high tensile strengths are desired. Type I, class 2 is a special analysis steel which is heat treated as required to produce a chain having high tensile strength and resistance to impact loads.

6.1.2 Type II, chain, weldless.

6.1.2.1 Type II, class 2, mechanical communication chain is intended for use in pulleys having a 5/16-inch groove used on a line of signal transmission of mechanical telegraphs.

6.1.3 Type IV, shackles.

6.1.3.1 Shackles in accordance with this specification are intended for general use including rigging. Where stronger shackles are required for special use, see MIL-S-24214, grade B high strength.

6.1.3.2 It is general practice to use a shackle one or two sizes larger than the chain with which used. The proof loads shown herein indicate the maximum loads which the shackles may be expected to withstand without distortion.

6.2 Ordering data. Acquisition documents shall specify the following:

(a) Title, number, and date of this specification.
(b) Type, class, and style of chain and attachments required (see 1.2.1 and 1.2.2).
(c) Material required for type II chain (see 3.1.2).
(d) Finish required, if other than that specified (see 3.3.1).
(e) If chain is to be other than self-colored (see 3.3.1.1).
(f) If chain is to be other than bright-finished (see 3.3.1.2).
(g) If attachments are to be other than self-colored (see 3.3.1.3).
(h) If fine threads are required for shackles (see 3.5.3.1.1).
(i) Size of chain and attachments required (see applicable tables and 3.5.4.5 and 3.5.4.6).
(j) Level of preservation, packaging, and packing required (see 5.1 and 5.2).
(k) If single chain lengths exceeding 1000 pounds net weight shall be shipped other than specified (see 5.2.1 and 5.2.2).
(l) Special marking, if required (see 5.3.1 and 5.3.2).
(m) When palletization is required (see 5.4).

6.3 Type I welded chain and type II chain should be paid for by the foot.

6.4 The illustrations herein are descriptive and not restrictive and are not intended to preclude the purchase of chain and attachments otherwise in accordance with this specification.

6.5 Development of modified or additional preservation, packaging, or packing in support of special requirements shall be the responsibility of the activity concerned.

6.6 Sub-contracted material and parts. The packaging requirements of referenced documents listed in section 2 do not apply when material and parts are acquired by the contractor for incorporation into the equipment and lose their separate identity when the equipment is shipped.

6.7 Deleted types, grades, and classes. The following items have been deleted from RR-C-271 since they are not available commercially:

Chain: Type I, grade A, class 1-Wrought-iron (double refined) crane chain.
Type I, grade B, class 1-Welded wrought iron (single refined) long link chain.
Type I, grade C, class 3-Welded steel, BBB coil chain, (use type I, grade C, class 4 instead).
Type I, class 6-Long Link conveyor chain.
Type III -Roller chain (see MIL-C-52058 or MIL-C-52223).

Attachments: Type I -End links.
Type IV, class 3 -Oval pin chain shackles.
Type V -Barrel hooks (large size only).
-class 7-can hooks
-class 8-stone-hoist hooks
-class 9-hogshead hooks
Type VIII -Sash attachments.
Type XII -Type grab links.

6.8 New classes. The classification for type VII and type XIII attachments have been expanded in this revision as follows:

Type VII - Swivels.
class 1-chain swivel
class 2-eye and eye swivel
class 3-jaw and eye swivel
Type XIII - Pear shaped links.

6.9 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

MILITARY INTERESTS:

Custodians

Army - ME
Navy - SH
Air Force - 99

Review Activities

Army - AR, AT, EA, MI
Navy - YD, MC
Air Force - 82
DLA - IS

User Activities

Army - GL, AV
Navy - CG, OS

CIVIL AGENCY COORDINATING ACTIVITIES:

GSA - FSS
NASA - JFK

PREPARING ACTIVITY:

Navy - SH
(Project 4010-0165)

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
RR-C-271C	

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)*

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