

INCH-POUND

MIL-B-24220A(SH)

9 November 1990

SUPERSEDING

MIL-B-24220(SHIPS)

28 July 1966

(See 6.8)

## MILITARY SPECIFICATION

### BLOCKS, TACKLE, SYNTHETIC ROPE

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification covers single- and multiple-sheave tackle blocks and snatch blocks.

1.2 Classification. The synthetic rope tackle blocks are of the following types and classes, as specified (see 6.2).

Type I - Blocks, steel.

Class 1 - Single sheave.

Class 2 - Double sheave.

Class 3 - Triple sheave.

Type II - Blocks, snatch, steel, safety-locking.

Type III - Blocks, wood, nontoppling.

Class 1 - Double, loose, swivel hook.

Class 2 - Triple, loose, swivel hook.

Class 3 - Double, loose, swivel releasing hook.

Type IV - Blocks, steel, nontoppling.

Class 1 - Double, loose, swivel hook.

Class 2 - Triple, loose, swivel hook.

Class 3 - Double, loose, swivel releasing hook.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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## 2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

## SPECIFICATIONS

## FEDERAL

- RR-C-271 - Chains and Attachments, Welded and Weldless.
- PPP-F-320 - Fiberboard: Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes.

## MILITARY

- MIL-B-3865 - Blocks, Rope, Tackle: Packaging of.
- MIL-L-19140 - Lumber and Plywood, Fire-Retardant Treated.

## STANDARDS

## FEDERAL

- FED-STD-H28 - Screw-Thread Standards for Federal Services.

## MILITARY

- MIL-STD-130 - Identification Marking of U.S. Military Property.
- MIL-STD-278 - Welding and Casting Standard.

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- A 27 - Standard Specification for Steel Castings Carbon, for General Application. (DoD adopted)
- A 36 - Standard Specification for Structural Steel. (DoD adopted)
- A 108 - Standard Specification for Steel Bars, Carbon, Cold Finished, Standard Quality. (DoD adopted)
- A 109 - Standard Specification for Steel, Strip, Carbon, Cold Rolled. (DoD adopted)

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## ASTM (Continued)

- A 148 - Standard Specification for Steel Casting, High Strength, For Structural Purposes. (DoD adopted)
- A 153 - Standard Specification for Zinc Coating (Hot Dip) on Iron and Steel Hardware. (DoD adopted)
- A 569 - Standard Specification for Steel, Carbon (0.15 Maximum Percent), Hot Rolled Sheet and Strip Commercial Quality. (DoD adopted)
- A 668 - Standard Specification for Steel Forgings, Carbon and Alloy, for General Industrial Use.
- B 438 - Standard Specification for Sintered Bronze Bearings (Oil Impregnated).

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

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

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

### 3. REQUIREMENTS

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.4) in accordance with 4.2.1.

3.2 Design and construction. Block design shall be as shown in tables I and II, and on figures 1 through 5, as applicable as to type, class, style, size and rig specified (see 6.2). Each block shall be free from any defects that would adversely affect the performance or maintainability of individual components. Replacement parts shall be manufactured to standard tolerances to permit replacement without requiring modification. All parts subject to wear shall be readily accessible for replacement, adjustment, or repair.

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TABLE I. Shell length, working load, and sheave size for types I, III, and IV blocks.

Shell length minimum	Safe working load			For rope size		Sheave size		
	Single sheave	Double sheave	Triple sheave	Diameter approximate	Circumference nominal	Outside diameter minimum	Thickness at rim, minimum	Center pin diameter minimum
(inches)	(pounds)	(pounds)	(pounds)	(inches)	(inches)	(inches)	(inches)	(inches)
4	2,000	3,000	4,000	1/2	1-1/2	2-1/4	5/8	1/2
6	4,000	5,000	6,000	5/8	2	3-1/2	1	5/8
8	5,000	7,000	9,000	7/8	2-3/4	4-1/2	1-3/8	3/4
10	6,000	9,000	11,000	1-1/8	3-1/2	6-1/4	1-1/2	7/8
12	10,000	15,000	20,000	1-5/16	4	8	1-5/8	1
14	16,000	30,000	36,000	1-5/8	5	9-1/2	1-7/8	1-1/8

TABLE II. Shell length, working load, and sheave size for type II blocks.

Shell length minimum	Safe working load	Rope size		Sheave size		
		Diameter approximate	Circumference nominal	Outside diameter minimum	Thickness at rim, minimum	Center pin diameter minimum
(inches)	(pounds)	(inches)	(inches)	(inches)	(inches)	(inches)
6	4,000	5/8	2	3	1-1/8	5/8
8	5,000	7/8	2-3/4	4-1/2	1-3/8	3/4
10	6,000	1-1/8	3-1/2	5-3/4	1-7/8	7/8
12	10,000	1-5/16	4	6-3/4	2-1/8	1
14	16,000	1-5/8	5	8	2-1/4	1-1/8
16	20,000	2	6	9	2-5/8	1-1/2

### 3.3 Physical requirements.

3.3.1 Safe working load. The safe working load (SWL) shall be based on a safety factor of 5 on the breaking strength of the complete block including the rig assembly. The SWL, rope size, and sheave size shall be as shown in tables I and II as applicable for the type block specified. The SWL shall be given in pounds.

3.3.2 Proof load. The block and assembly shall not show evidence of deformation, distortion, cracks, or permanent set of any component part (see 4.5.1).

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3.3.3 Breaking load. The block and assembly shall not fail at loads less than 5 times the SWL specified in tables I and II (see 4.5.2).

3.4 Material. Material shall be as specified herein. Material not definitely specified shall be selected by the contractor and shall be subject to all provisions of this specification (see 6.3 and appendix).

3.4.1 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.4.2 Castings. Castings shall be of uniform quality, free of blowholes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects. Strength and other essential physical properties of the castings shall conform to ASTM A 27 for carbon steel and ASTM A 148 for low alloy steel.

3.4.3 Forgings. Forgings shall be of uniform quality, free of flash, scale, cracks, hard spots, cold shuts, and excessive cooling stresses. Strength and other essential physical properties of the forgings shall conform to ASTM A 668.

3.4.4 Welding. Welding (if necessary) shall be performed in accordance with MIL-STD-278. Welding shall not be used to repair blocks.

3.4.5 Fastening devices. Screws, pins, bolts, and similar parts subject to removal, tightening or adjustment shall not be swaged, peened, staked, or otherwise permanently deformed.

3.4.6 Threads. Threaded parts shall be in accordance with FED-STD-H28.

3.4.7 Surface. All castings, forgings, stampings, and welded parts shall be cleaned and free of sand, dirt, fins, sprues, scale, flux, or other harmful or extraneous material. External surfaces shall be free from burrs, sharp edges, and corners.

3.4.8 Coatings.

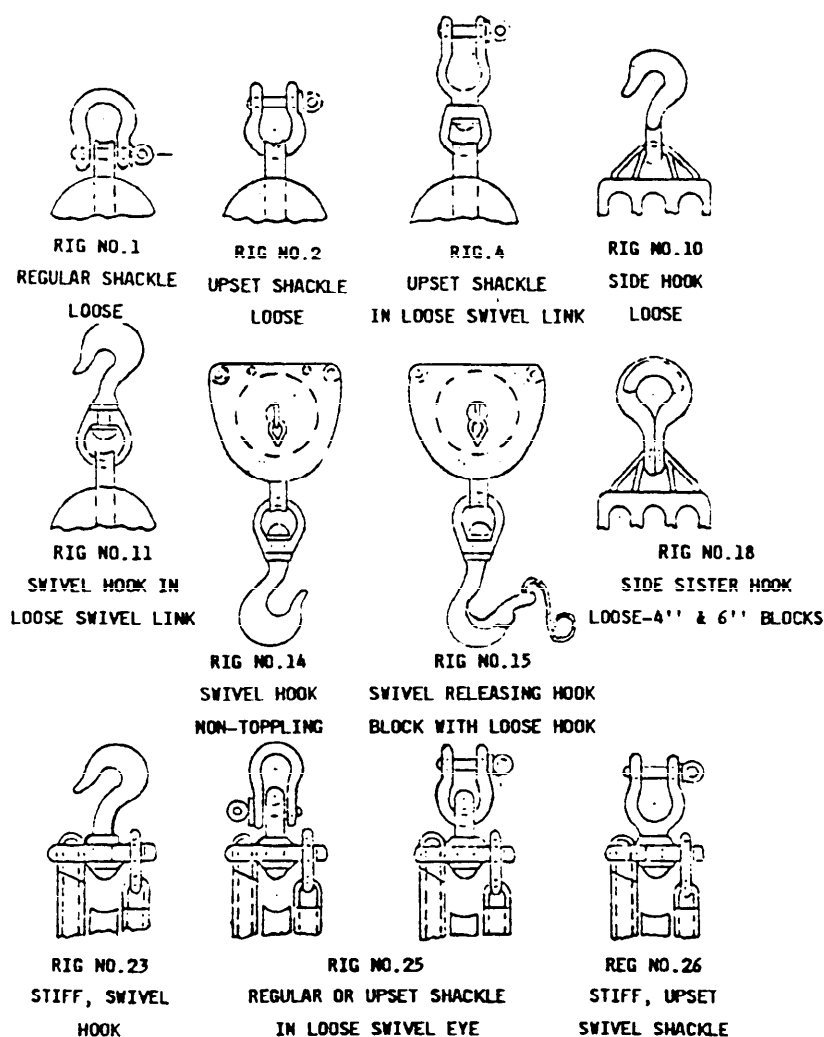
3.4.8.1 Lacquering. Completed wood shells for type III blocks shall, after having been thoroughly and properly sanded, be dipped in high-grade, clear dipping varnish or lacquer, allowed to air dry, and then covered with quick drying varnish or lacquer as a final coat before shipment.

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3.4.8.2 Galvanizing. Ferrous metal surfaces of blocks, except bearing surfaces and bushings, shall be hot dip galvanized in accordance with ASTM A 153, class B3. The basic metal shall be clean and free from defects that will impair appearance or protective value of the coating. Galvanizing shall be done prior to assembly of component parts.

## 3.5 Rigs.

3.5.1 Assembly. Blocks and fittings of corresponding size and strength shall be assembled into rigs and identified by rig numbers (see figure 1 and 3.6). Special blocks and rigs not designated on figure 1 shall be assembled as specified in the contract or order (see 6.2).



NOTE: Rigs are identified by number only. Each rig consists of a block with fittings assembled as shown.

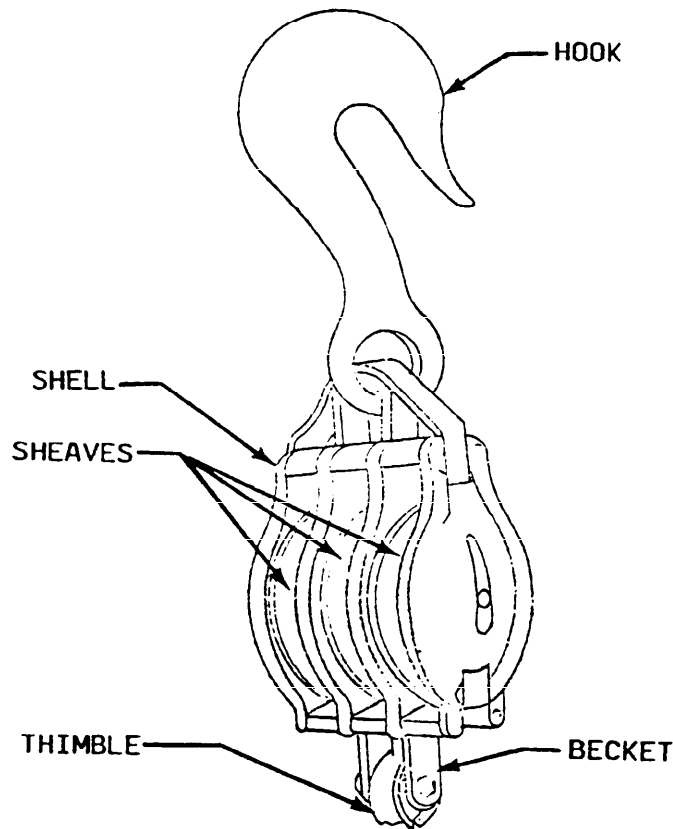
FIGURE 1. Rigs and fittings for wood and metal synthetic rope blocks.

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3.6 Identification markings. Each block assembly shall be permanently and legibly marked by stamping the shell plate or strap with the manufacturer's name or trade-mark, the safe working load, the rig number, the sheave diameter, and the corresponding rope circumference as specified in 3.2 (see tables I and II) abbreviations may be used. Identification marking shall be in accordance with MIL-STD-130.

3.7 Detail requirements.

3.7.1 Type I blocks, steel. Type I, steel blocks, shall be in accordance with 3.2 and 3.3, figure 2, and as specified in 3.7.1.1 through 3.7.1.8 in the class, size and rig specified (see 6.2).



NOTE: Rig 10, with becket, shown.

FIGURE 2. Type I block, steel.

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3.7.1.1 Shells. Shells shall be made of steel casting, structural steel, or forged carbon steel hot rolled sheet, as required, conforming to ASTM A 27, A 36, A 148, A 569, or A 668. The edges shall be well rounded or flanged to protect the rope and to provide additional stiffness so that they will not spring or bind under extreme lateral rope pulls. The sheaves shall bear against the shells at the hubs only and not wear against other portions of shells. Shells shall be assembled with bolts and secured with lock nuts.

3.7.1.2 Straps. Straps shall be of steel conforming to ASTM A 36, A 109, or A 569. Outer straps shall be flush with the inner surface of outer cheeks. Inner straps shall be flush with center pieces. Straps shall extend sufficiently beyond the center pin to insure strength and rigidity for the block. Straps shall provide adequate bearing support for the center pin for sheave loads to be transmitted to the fitting, and shall be finished to provide a bearing surface for sheave hub ends.

3.7.1.3 Sheaves. Unless otherwise specified, sheaves shall be cast steel, conforming to ASTM A 27, or forged steel conforming to ASTM A 668, and shall be designed to prevent cutting action on the rope. The rim and tread section of each sheave shall be properly grooved to fit the contour of the rope under load conditions. The sheaves shall be concentric with the bore, and shall be designed so that only the hub bears against the shell. Side play shall not exceed 1/16 inch. Sheaves shall have a smooth-running action. Sheaves shall conform to 3.2 (see table I).

3.7.1.4 Bushings. Each sheave shall be furnished with a one-piece bronze bushing conforming to ASTM B 438, class B, which shall be pressed into the sheave with sufficient tightness to prevent slippage under extreme loads. The bushing shall be equal in length to the sheave thickness at the hub and shall have a minimum wall thickness of 3/16 inch.

3.7.1.4.1 Roller bearings. Bearings shall be tapered roller bearings, which can take both load and side thrust, and hold the sheave centrally so it cannot chafe or wear on the sides. The bearings shall be locked in a grease packed chamber with felt washers to retain the grease and exclude dirt.

3.7.1.5 Center pin. The center pin shall be carbon steel conforming to ASTM A 108 having a carbon content of 0.25 to 0.50 percent. The pin shall transmit the sheave load to the shell or straps without rotating (see tables I and II for minimum pin diameters).

3.7.1.6 Becket. Unless otherwise specified (see 6.2), type I blocks shall be furnished with a becket. The becket shall be formed by the extension of the strap ends, and shall show no distortion with the rope dead-ended at the becket and the loads specified in tables I and II suspended from the hook.

3.7.1.7 Fittings. Each block shall be combined with a shackle, swivel shackle, hook, swivel hook or sister hooks as specified (see 6.2) by using a rig number shown on figure 1 to identify the type of fitting required. Fittings safety factors shall be as specified in 3.3.



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3.7.1.7.1 Hook. The hook shall be drop forged of forging-grade steel and shall be the flattened type, with substantially heavier sections at the areas which take the maximum stress. Hook safety factors shall be as specified in 3.3.

3.7.1.7.2 Screw pin anchor shackle. Anchor shackle shall conform to type IV, class 1 of RR-C-271.

3.7.1.7.3 Swivel shackle. Swivel shackle shall be forged from carbon steel. The shackle shall be fitted to the block by means of a swivel as shown on figure 1, rig 4. Shackle shall be free to travel through 360 degrees, independent of the position of the block. The yield point of the swivel shackle shall be greater than the proof load of the block.

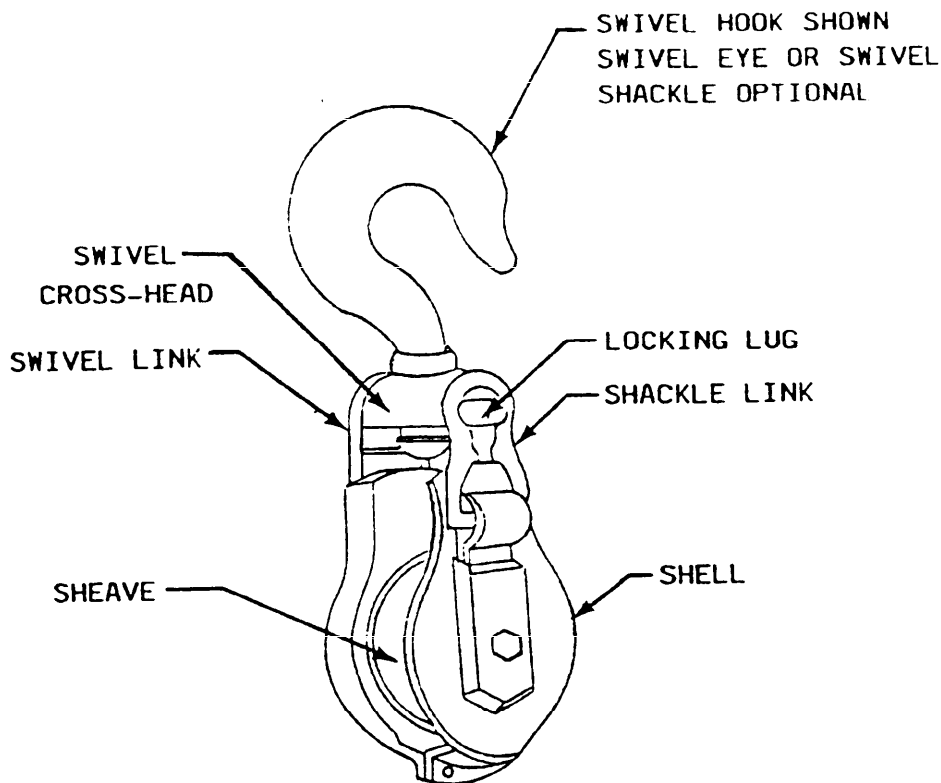
3.7.1.7.4 Swivel hook. Swivel hook shall be forged from carbon steel and with substantially heavier sections at the areas which take the maximum stress. The hook shall be fitted to the block by means of a loose swivel link, as shown on figure 1. The hook shall be free to travel through 360 degrees independent of the position of the block. The yield point of swivel hook shall be more than the proof test load of the block.

3.7.1.7.5 Sister hooks. Sister hooks shall be forged from carbon steel. Hooks shall be fitted to the blocks by means of loose side eyes as shown on figure 1, rig 18.

3.7.1.8 Spacers and roller guides. Spacers shall be provided as required to make the block a strong, rugged unit with the required sheave clearances. Roller guides shall be provided as required to prevent the rope from coming out of the sheaves when the block is overhauled.

3.7.2 Type II blocks, snatch, steel safety-locking. Type II snatch blocks shall be in accordance with 3.2, 3.3, table II, figure 3, and as specified in 3.7.2.1 through 3.7.2.7 in the class and rig specified (see 6.2).

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NOTE: Rig 23 shown.

FIGURE 3. Type II block, snatch, steel, safety-locking.

3.7.2.1 Shells. The shells shall be formed from steel as specified in 3.7.1.1 and shall be flanged to provide additional stiffness so that they will not spring or bend under extreme lateral rope pulls and to protect the rope. Shell pieces shall be secured together at bottom.

3.7.2.2 Straps. Straps shall be of steel as specified in 3.7.1.2. Each strap shall be of rugged one-piece construction and shall extend the full length of the shell pieces. Straps shall be securely welded, riveted, or bolted to the shell pieces, and shall furnish bearing support for the center pin and connections to transmit extreme loads from the sheave to the fittings.

3.7.2.3 Sheaves. Sheaves shall be as specified in 3.7.1.3, except that dimensions shall be in accordance with table II.

3.7.2.4 Bushings. Bushings shall be as specified in 3.7.1.4.

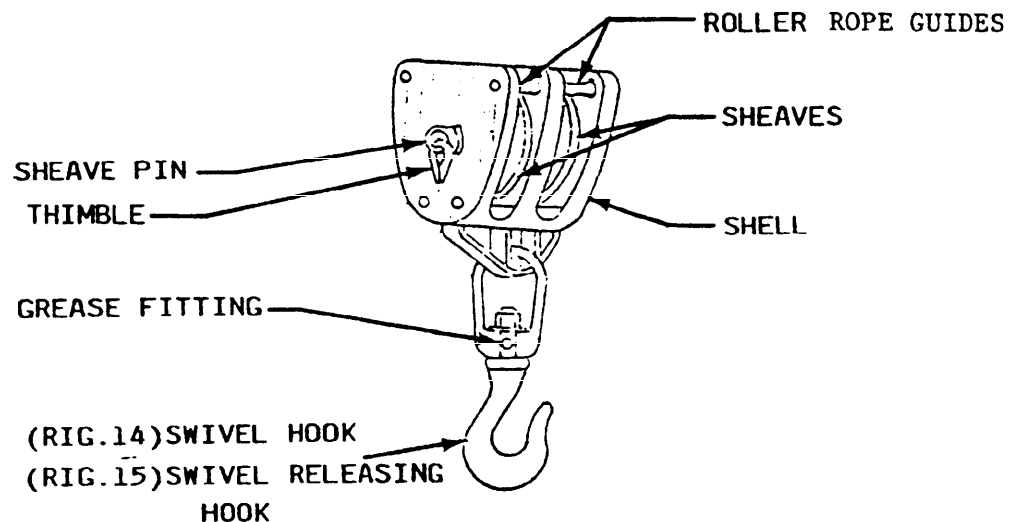
3.7.2.5 Center pin. The center pin shall be as specified in 3.7.1.5.

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3.7.2.6 Shell separators. A solid, one-piece, steel separator, or three metal tubing spacers shall be used to separate the shells. When a separator is used, three substantial rivets, each passing through the separator, shall hold the shell pieces in place. The center rivet shall pass through the straps. Separators shall bear on the shell plates over the entire area between the rivets. When tubing spacers are used, bolts secured by nuts shall be used to fasten the shells together.

3.7.2.7 Fittings. Each snatch block shall be combined with a swivel hook, swivel eye, or swivel shackle, as specified by rig number shown on figure 1. The fittings shall be attached to the block by a cross-head in which it is free to travel through 360 degrees. With the block closed, the fittings shall be positioned so that the block is symmetrically loaded. Fittings shall be of forged steel and shall meet the strength requirements specified in table II.

3.7.3 Type III blocks, wood, nontoppling. Type III nontoppling blocks shall be in accordance with 3.2, figure 4, and as specified in 3.7.3.1 through 3.7.3.6.3, in the class, size and rig specified (see 6.2).



NOTE: Rig 14 and 15 shown.

FIGURE 4. Type III nontoppling block, wood.

3.7.3.1 Shells. Select grade, kiln or air dried birch, beech, or hard maple shall be used for wood shells. Cheeks, centerpieces, and spreaders comprising the shell shall be fastened securely together to form a strong rigid unit. Shells of heavy wide mortise wood blocks shall be cross bolted. The design shall be such that the shells carry no part of the load.

3.7.3.2 Straps. Straps shall be as specified in 3.7.1.2.

3.7.3.3 Sheaves. Sheaves shall be as specified in 3.7.1.3.

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3.7.3.4 Bushings. Bushings shall be as specified in 3.7.1.4.

3.7.3.5 Center pin. The center pin shall be as specified in 3.7.1.5. In addition, one end of the pin shall have an eye, and be provided with a thimble.

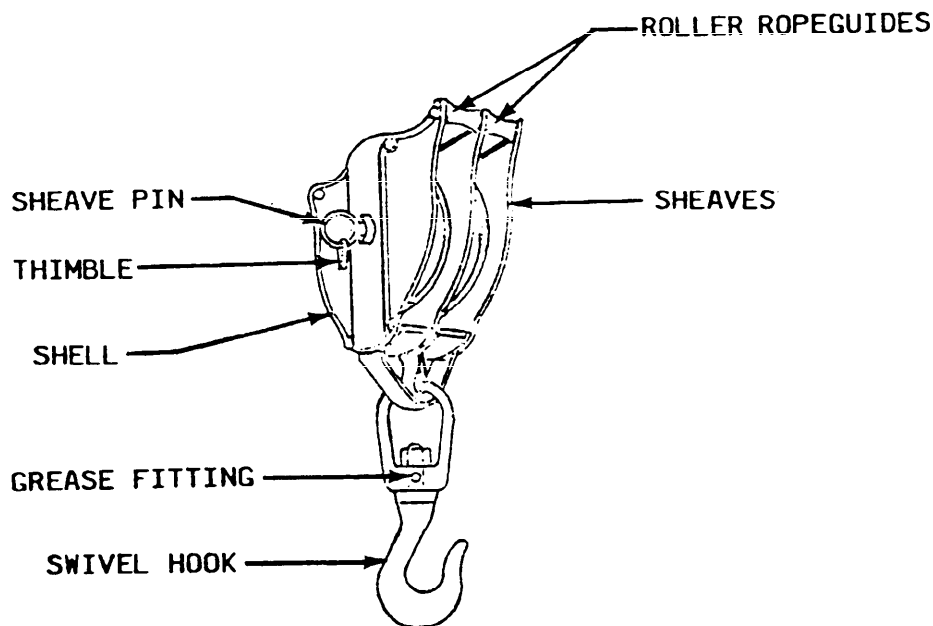
3.7.3.6 Fittings. Each block shall be fitted as ordered with a swivel hook or swivel release hook (see 6.2).

3.7.3.6.1 Hook. The hook shall be drop forged of forging-grade steel and shall be the flattened type, with substantially heavier sections at the areas which take the maximum stress.

3.7.3.6.2 Swivel. Swivel hooks shall be free to swivel through 360 degrees. The swivel body shall be provided with recessed hydraulic grease fitting, 1/8 inch national pipe thread, straight, hydraulic, ball check type. Grease grooves shall be provided to lubricate all friction parts of the swivel. The bearing washer shall be provided with radial grease grooves on the horizontal bearing surface.

3.7.3.6.3 Rollers. Guide rollers shall be provided in the upper corners of the block as shown on figure 4 for rigs 14 and 15.

3.7.4 Type IV - Blocks, steel, nontoppling. Type IV nontoppling blocks shall be as shown on figure 5 and as specified in 3.7.3 except that shells shall be as specified in 3.7.1.1 (see 6.2).



NOTE: Rig 14 and 15 shown.

FIGURE 5. Type IV non-toppling block, steel.

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## 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 (examinations and tests) 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of the manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

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

- (a) First article inspection (see 4.2.1).
- (b) Quality conformance inspection (see 4.2.2).

4.2.1 First article inspection. The first article inspection shall be performed on one block when a first article is required (see 3.1 and 6.2). The inspection shall consist of the examination specified in 4.4 and the tests specified in 4.5. Presence of one or more defects, or failure of either test shall be cause for rejection.

4.2.2 Quality conformance inspection. The quality conformance inspection shall consist of the examination specified in 4.4 and the tests specified in 4.5.

4.3 Lot. A lot shall consist of blocks of the same size, type, class, and rig of blocks offered for delivery at one time under one contract or order.

4.3.1 Sampling for examination. Sample blocks shall be selected at random from each lot in accordance with table III. Any sample block having one or more defects specified in table V shall be rejected. If any defects are noted in the original sample blocks, additional blocks shall be randomly selected as specified in the original sampling plan and if any defects specified in 4.4 are noted, the entire lot shall be rejected.

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TABLE III. Sampling for examination.

Lot size	Sample size
2 - 8	2
9 - 15	3
16 - 25	5
26 - 50	8
51 - 90	13
91 - 150	20
151 - 280	32
281 - 500	50
501 - 1200	80
1201 - 3200	125

4.3.2 Sampling for proof test. Sample blocks shall be randomly selected from each lot in accordance with table IV, for the proof test specified in 4.5.1. If any block fails this test, the entire lot shall be rejected. Sample blocks passing the proof test may be reused for the breaking load test.

4.3.3 Sampling for minimum breaking strength test. Sample blocks shall be selected in accordance with table IV for the minimum breaking strength test specified in 4.5.2. If any block fails this test, the entire lot shall be rejected.

TABLE IV. Sampling for tests.

Lot size	Sample size	
	Proof test	Breaking strength test
2 - 8	2	2
9 - 15	2	2
16 - 25	3	2
26 - 50	5	2
51 - 90	5	3
91 - 150	8	3
151 - 280	13	3
281 - 500	13	3
501 - 1200	20	5
1201 - 3200	32	5

4.4 Examination. Each sample block selected in accordance with 4.3.1 shall be examined to verify conformance to all the requirements of this specification not involving tests. Defects shall be classified in accordance with table V.

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TABLE V. Classification of defects.

Categories	Defects
101	Block type and class nonconforming; not for specified size of rope.
102	Material nonconforming; evidence of cracks, blowholes, excessive porosity, hard spots, shrinkage defects, foreign inclusions, cold shuts, sprues, fins, flash, and scale.
103	Incomplete; component parts missing, not secured, not positioned, fitted or assembled as specified.
104	Rigs and fittings nonconforming; inoperative, evidence of binding, misalignment of components or excessive looseness.
105	Welding nonconforming; evidence of cracks, nonfusion, deep undercut, slag inclusions, porosity, and incomplete or under-size welds.
106	Galvanizing nonconforming, evidence of uncoated areas, not smooth, not free from blisters, lumps, sharp projections or excess coating.
107	Evidence of unauthorized welding.
108	Evidence of permanent deformation of fastening devices subject to removal; evidence of swaging, peening or staking.
109	Fastening devices subject to removal not in alignment, inoperable; excessive looseness.
110	Threads nonconforming; size, length and fit not as required; not matching threads with components; stripped, crossed, cracked and incomplete.
111	Shell material not as specified; components not fastened securely; not cross bolted as specified.
112	Straps malformed; fail to support center pin as specified.
113	Sheave outside diameter and thickness less than the minimum specified.
114	Sheave fails to turn freely by hand; loose or wobbly on pin, side play exceeds specified tolerance.
115	Sheave rim and tread section not grooved to fit specified size of rope; surfaces not smooth, evidence of sharp edges, burrs or projections.
116	Sheave rim not concentric with bore.
117	Bushing nonconforming; loose in sheave, length not as specified, wall thickness less than the minimum specified.
118	Bushing bore nonconforming for center pin.
119	Bushing not grooved for self-lubricating as specified.
120	Center pin diameter less than specified, surfaces not smooth; evidence that pin rotates in shell or strap.
121	Lock device nonconforming, inoperative, fails to lock shackle link in position, prevents opening of block for quick entry of rope.
122	Hook, eye or shackle fails to swivel as specified.

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TABLE V. Classification of defects - Continued.

Categories	Defects
123	Swivel, crosshead and link nonconforming.
124	Identical parts not interchangeable.
125	Surfaces not free of sharp edges and corners or burrs; not clean.
126	Marking; manufacturer's name or trade-mark not permanent; missing or not legible.

4.5 Test procedures. Each sample block shall be subjected to the tests specified in 4.5.1 and 4.5.2.

4.5.1 Proof load test. Each sample block (see 4.3.2) shall be proof tested to twice the safe work load specified in tables I and II. The applicable proof load shall be applied to the block assembly and held for a period of not less than 10 minutes. At the conclusion of the test, the block and its components shall be carefully examined and measured for signs of fracture, permanent set, or evidence of instability, deformation, excessive wear, or mechanical defects.

4.5.2 Minimum breaking strength test. Each sample block (see 4.3.3) shall be tested to destruction. A steadily increasing load shall be applied until failure occurs. The block assembly when tested to destruction shall not fail at loads less than 5 times the safe working load specified in tables I and II.

4.5.3 Possible test failures.

(a) Proof test load:

- (1) Evidence of deformation, distortion or permanent set, or signs of failure in the form of incipient cracks in block or any component part after subjecting block assembly to stipulated proof test load.

(b) Minimum breaking strength test:

- (1) Breaking strength of block assembly less than minimum value.

4.6 Inspection of packaging. Sample packs and the inspection of preservation, packing and marking for shipment, stowage and storage shall be in accordance with the requirements of section 5 and the documents specified therein.

## 5. PACKAGING

(The packaging requirements specified herein apply only for direct Government acquisition. For the extent of applicability of the packaging or preparation for delivery requirements of referenced documents listed in section 2, see 6.5.)



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5.1 General.5.1.1 Navy fire-retardant requirements.

- (a) Treated lumber and plywood. When specified (see 6.2), all lumber and plywood including laminated veneer material used in shipping container and pallet construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated material conforming to MIL-L-19140 as follows:

Levels A and B - Type II - weather resistant.  
Category 1 - general use.

Level C - Type I - non-weather resistant.  
Category 1 - general use.

- (b) Fiberboard. Unless otherwise specified (see 6.2), fiberboard used in the construction of class-domestic, non-weather resistant fiberboard and cleated fiberboard boxes including interior packing forms shall meet the flamespread index and the specific optic density requirements of PPP-F-320 and amendments thereto.
- (c) Cushioning and wrapping materials. The use of excelsior, newspaper, shredded paper (all types), and similar hygroscopic or nonneutral materials and all types of loose fill materials for packaging applications such as cushioning, fill, stuffing, and dunnage is prohibited. Materials selected for cushioning and wrapping shall have properties (characteristics) for resistance to fire (see 6.6). Cushioning or wrapping materials, as applicable, shall be provided to prevent item and package damage and to prevent free movement of the container contents.

5.2 Packaging requirements. The packaging (preservation, packing and marking) requirements shall be in accordance with MIL-B-3865 for the level (A or commercial) of preservation; level of packing (A, B or commercial), marking including bar coding and other packaging acquisitioning options therein as specified (see 6.2).

## 6. NOTES

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

6.1 Intended use. Types I, II, III and IV blocks covered by this document are intended to be used with synthetic rope.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- (a) Title, number, and date of this specification.
- (b) Type, class, size, and rig (see 1.2, 3.7.1, 3.7.2, 3.7.3, and 3.7.4).

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- (c) Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- (d) When first article inspection is required (see 3.1).
- (e) Shell length, sheave and rope size (see 3.2).
- (f) Assembly of special blocks and rigs (see 3.5.1).
- (g) If beackets are to be furnished with type I blocks (see 3.7.1.6).
- (h) Fittings required (see 3.7.1.7 and 3.7.3.6).
- (i) Locking connections required (see 3.7.3).
- (j) When fire-retardant packaging materials are required (see 5.1.1(a) and (b)) as applicable.
- (k) Preservation, packing and marking requirements required (see 5.2).

6.3 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DoD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423.

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
3.4 and appendix	DI-MISC-80652	Technical information reports	-----

The above DID's were those cleared as of the date of this specification. The current issue of DoD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.4 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a preproduction sample, a first article sample, a first production item, (see 3.1), and the number of items to be tested as specified in 4.2.1. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results, and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.5 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.

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6.6 Cushioning and wrapping materials (see 5.1.1(c)). Materials having properties for resistance to fire and acceptable for use within unit packs and shipping containers for Navy acquisitions are:

<u>Material</u>	<u>Specification</u>
Paper, kraft, treated (fire-resistant)	A-A-1894
Paper, kraft, wrapping	UU-P-268, type II, grade C or D
Fiberboard	PPP-F-320, class-domestic/fire-retardant
Plastic film, flexible, cellular	PPP-C-795, class 3 - fire-retardant
Polystyrene expanded, resilient	PPP-C-850, grade SE
Plastic, open cell, cushioning	PPP-C-1842, type I, style B
Bound fiber	PPP-C-1120, type III or IV, class C
Rubber, latex foam	MIL-R-5001, grade A
Rubber, cellular	MIL-R-6130, grade A
Fibrous glass	MIL-C-17435
Polystyrene foam	MIL-P-19644, type II
Rubber, cellular, synthetic	MIL-R-20092, class 5
Polyurethane foam	MIL-P-26514
Polyurethane foam, flexible, open cell	MIL-F-81334
Foam-in-place packaging materials: general specification for	MIL-F-83671
Foam, combustion, retardant, for cushioning supply items aboard Navy ships	MIL-F-87090

6.7 Subject term (key word) listing.

Center pin  
Non-toppling block  
Rig  
Sheave  
Sister hook

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

Preparing activity:  
Navy - SH  
(Project 3940-N018)

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## APPENDIX A

### TECHNICAL INFORMATION REPORT TECHNICAL CONTENT REQUIREMENTS

#### 10. SCOPE

10.1 Scope. This appendix covers technical content requirements that should be included in the technical reports when required by the contract or purchase order. This appendix is mandatory only when data item description DI-MISC-80652 is cited on the DD Form 1423.

#### 20. APPLICABLE DOCUMENTS

This section is not applicable to this appendix.

#### 30. TECHNICAL REPORTS

##### 30.1 Technical report contents.

30.1.1 Identification of material and finishes. The manufacturer shall identify the specific material, material finish or treatment for use with components or subcomponents.

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

**I RECOMMEND A CHANGE:****1. DOCUMENT NUMBER**

MIL-B-24220A(SH)

**2. DOCUMENT DATE (YYMMDD)**

9 November 1990

**3. DOCUMENT TITLE**

BLOCKS, TACKLE, SYNTHETIC ROPE

**4. NATURE OF CHANGE** (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)**5. REASON FOR RECOMMENDATION****6. SUBMITTER****a. NAME** (Last, First, Middle Initial)**b. ORGANIZATION****c. ADDRESS** (Include Zip Code)**d. TELEPHONE** (Include Area Code)**e. DATE SUBMITTED**

(1) Commercial

(2) AUTOVON

(If Applicable)

**8. PREPARING ACTIVITY****a. NAME** Technical Point of Contact (TPOC):

Mr. Jack Hall, NAVSEA 56W23

**b. TELEPHONE** (Include Area Code)

(1) Commercial

(2) AUTOVON

PLEASE ADDRESS ALL CORRESPONDENCE AS FOLLOWS:

TPOC: (703) 602-1844

8-332-1844

**c. ADDRESS** (Include Zip Code)

Commander, Naval Sea Systems Command  
Department of the Navy (SEA 5523)  
Washington, DC 20362-5101

**IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:**

Defense Quality and Standardization Office  
5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466  
Telephone (703) 756-2340 AUTOVON 289-2340