

MIL-B-11837C  
6 October 1983  
SUPERSEDING  
MIL-B-11837B  
22 April 1966

## MILITARY SPECIFICATION

### BLOCKS, TACKLE (WIRE ROPE, SNATCH, EXTRA-HEAVY DUTY)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. The specification covers single- and double-sheaved, manual- and self-locking snatch blocks.

1.2 Classification. Blocks shall be the following types, as specified (see 6.2).

- Type I - Manual locking.
- Type II - Self locking.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Mobility Equipment Research and Development Command, ATTN: DRDME-DS, Fort Belvoir, VA 22060 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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## SPECIFICATIONS

## MILITARY

- MIL-G-3859 - Grease Guns, Hand-Operated, Lever, Push and Screw Type.
- MIL-B-3865 - Blocks, Rope, Tackle: Packaging of.
- MIL-G-10924 - Grease, Automotive and Artillery.

## STANDARDS

## FEDERAL

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

## MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-889 - Dissimilar Metals.
- MIL-STD-1188 - Commercial Packaging of Supplies and Equipment.
- MS15003 - Fittings, Lubrication (Hydraulic) Surface Check, 1/8 Pipe Threads, Steel, Type III.

(Copies of 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. The issues of the documents which are indicated as DOD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

## AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM A148 - High-Strength Steel Castings for Structural Purposes.

ASTM A153 - Zinc Coating (Hot Dip on Iron and Steel Hardware).

(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.)

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2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

### 3. REQUIREMENTS

3.1 Description. The blocks shall consist of a single or double sheave as specified (see 6.2). Blocks shall be designed to accommodate the size rope shown in table I, as specified (see 6.2). Connections and fittings shall swing out of position to permit quick entry of the wire rope into sheave grooves without reeving.

3.2 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 4.3 and 6.3).

3.3 Material and components. Material and components shall be as specified herein. Materials not specified shall be selected by the contractor and shall be subject to all provisions of this specification (see 6.4).

3.3.1 Material deterioration and control. The blocks, tackle shall be fabricated from compatible materials, inherently corrosion or deterioration resistant or treated to provide protection against the various forms of corrosion and deterioration that may be encountered in any of the applicable storage and operating environment to which the item may be exposed.

3.3.2 Dissimilar metals. Dissimilar metals shall not be used in intimate contact with each other unless protected against galvanic corrosion. Dissimilar metals and methods of protection are defined and detailed in MIL-STD-889.

3.3.3 Identification of materials and finishes. The contractor shall identify the specific material, material finish or treatment for use with components and sub-components, and shall make information available, upon request, to the contracting officer or designated representative.

#### 3.4 Strength requirements.

3.4.1 Proof load. When subjected to the applicable proof load specified in table I, the block shall show no evidence of deformation, distortion, cracks, or permanent set of any component.

3.4.2 Ultimate strength. When tested to destruction, the block shall not fail at loads less than specified for the ultimate strength in table I. Failure of the hook or shackle shall occur before failure of any other component of the block.

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TABLE I. Strength requirements.

Rope size dia.	Safe working load	Proof test load	Ultimate strength
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(single sheave)

<u>inches</u>	<u>pounds</u>	<u>pounds</u>	<u>pounds</u>
1/2 to 5/8	10,000	20,000	40,000
3/4 to 7/8	20,000	40,000	80,000
7/8-1	30,000	60,000	120,000
1 to 1-1/8	50,000	100,000	200,000
1-1/8 to 1-1/4	80,000	160,000	320,000
1-1/4 to 1-1/2	90,000	180,000	360,000

(double sheave)

3/4-7/8	24,000	48,000	96,000
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3.5 Fastening devices. All pins, bolts, and similar parts shall be adjustable. Such parts shall not be swaged, peened, staked, or otherwise permanently deformed.

3.6 Threaded parts. Threaded parts shall conform to FED-STD-H28.

3.7 Shell plates. Shell plates shall be steel having a carbon content of not less than 0.18 percent. Each plate, except the center plate of double sheave blocks, shall have an impression or indentation gear pressed into its side or bead welded on its side extending through not less than 180 degrees around the top of the shell. The shell shall be recessed to accommodate the sheave rim to prevent jamming of rope between the shell and sheave. The shell plates shall fully shield the sheave, shall have smooth edges, and shall be designed so that the sheave will bear against the plates at the hubs only and will not wear against other portions of the plates. The thickness of shell shall be not less than that specified in table II. Plates shall be held in position with bolts, nuts, and pins to prevent distortion or spreading under load. Each block furnished with a two-piece strap shall have the shell plates held together at the bottom with not less than three bolts with nuts, and tubing spacers; the center bolt shall extend through each strap piece. The bolt and tubing spacers need not be furnished when the block is designed for a one-piece strap which bends around the bottom of the block and is welded or riveted to the bottom portion of the shell plates to hold the plates in position.

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TABLE II. Physical requirements.

Rope size	Sheave			Bushing		Center pin	Shell
	O.D.	Rim thickness (min.)	Hub thickness (min.)	I.D. (min.)	Wall thickness (min.)	Dia. (min.)	thickness (min.)

(single sheave)

(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)
1/2 to 5/8	6	1-1/4	1-3/8	1-1/2	7/32	1-1/4	1/8
3/4 to 7/8	8	1-1/2	1-5/8	2	1/4	1-1/2	1/8
7/8 to 1	10	1-3/4	1-7/8	2-1/4	1/4	1-1/2	3/16
1 to 1-1/8	12	2-1/4	2-3/8	2-1/2	5/16	1-3/4	1/4
1-1/8 to 1-1/4	14	2-3/4	2-7/8	3-1/4	5/16	2-1/4	5/16
1-1/4 to 1-1/2	16	2-7/8	3	3-1/2	3/8	2-1/2	5/16

(double sheave)

3/4-7/8	8	1-1/2	1-5/8	2	1/4	1-1/2	5/16
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3.8 Straps. Straps shall be one or two-piece construction as applicable to the style of block and shall extend the full length of the shell plates. Straps shall be forged medium steel having a carbon content from 0.25 to 0.50 percent and shall be heat treated, quenched, and tempered after forging. Each strap shall be welded, riveted, or bolted to the shell plates to hold the shell plates in position and to add rigidity to the block assembly. Straps shall provide bearing support for the center pin and connections to transmit extreme loads from the sheave to the connections.

3.9 Sheaves. Sheaves shall be cast steel conforming to ASTM A148, grade 80-40. The sheave groove shall be hardened to not less than Rockwell C35. Each sheave shall be fully enclosed in the shell housing. Sheave hubs shall be machined to bear against the shell with a smooth action. The rim and tread section shall withstand rope abrasion and prevent cutting action on the rope and shall be grooved to fit the contour of the rope under load conditions. Overall side play shall be not more than 1/8 inch.

3.10 Bushings. Each sheave shall be provided with a one-piece phosphor bronze bushing. The bushing shall be pressed into the hub of the sheave to prevent slippage under any load. The bushing shall have grease retaining grooves cut into its inside surface for pressure lubrication. The grease retaining grooves shall be arranged to insure lubrication of the entire bearing surface. The bushing shall conform to the dimensions specified in table II.

3.11 Center pin. The center pin shall transmit the sheave load to the shells or straps and shall serve as an axle for the sheaves. The pin shall be the shoulder type or shall be provided with a steel bearing sleeve. The pin shall have a flat head on one end and a jam nut secured with a cotter pin on the other end. Diameter of pin shall be as specified in table II. Grease channels shall be drilled through the pin and sleeve and a lubricating fitting shall be recessed into the head of the pin to provide pressure lubrication of the bearing surfaces. When provided, the bearing sleeve shall be closely fitted over the center pin and shall be clamped between the shell plates by the center pin nut. The pin and sleeve shall not rotate under any load condition. The pin and sleeve shall be cold drawn medium carbon steel having a carbon content from 0.25 to 0.50 percent.

3.12 Fittings. Each block shall be provided with a swivel hook or a drilled swivel eye and shackle or an oblong swivel eye with upset shackle as specified (see 6.2). Fittings shall be forged medium carbon steel having a carbon content from 0.25 to 0.50 percent, heat treated, quenched, and tempered after forging. The yield point of the fitting shall be greater than the proof test load of the block and the load required to cause failure of the fitting shall be less than the ultimate strength of the block assembly so that approaching failure of the block will be indicated by elongation or failure of the fitting. The shackle shall be an anchor or chain type as specified (see 6.2).

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3.12.1 Swivel hook. The hook shall be flattened with heavier sections at the points which take the maximum stress. The hook shall be fitted to the block by a yoke or cross head and shall be free to swivel in the yoke or cross head through 360 degrees, independent of the position of the block. The hook shall have a cam for attachment of a safety latch. With the block in the closed position, the hook shall be positioned to load the block symmetrically.

3.12.2 Drilled swivel eye and shackle. The shackle shall be fitted to the drilled swivel eye. The drilled swivel eye shall be attached to the block by a yoke or cross head and shall be free to rotate in the yoke or cross head through 360 degrees, independent of the position of the block. The shackle pin shall be secured in position to insure against accidental removal when the block is in use.

3.12.3 Oblong swivel eye with upset shackle. The shackle shall fit loosely in upset position to the oblong swivel eye. The oblong swivel eye shall be attached to the block by a yoke or cross head and shall be free to swivel in the yoke or cross head through 360 degrees, independent of the position of the block. The shackle pin shall be secured in position to insure against accidental removal when the block is in use.

3.13 Lubrication. Blocks shall be lubricated with grease conforming to MIL-G-10924. All surfaces requiring lubrication shall be provided with means of lubricating. Lubrication fittings shall conform to MS15003. Fittings shall be located in a protected position and shall be accessible to a grease gun conforming to MIL-G-3859 with a 10-inch flexible extension. Accessibility to fittings shall be provided without the removal or adjustment of accessories or parts. The block shall be assembled, tested, and delivered with the above grease. The bearings shall be cleaned before lubrication, because military greases are not always compatible with other greases. A tag shall be attached in a conspicuous place to indicate which military grease has been used.

3.14 Metal stamping. The National stock number, safe working load, size of wire rope to be used, manufacturer's code, and "U.S." shall be metal stamped on one shell plate of each block. The letters and numerals shall be as large as space permits.

3.15 Galvanizing. All metal surfaces of blocks except bearing surfaces shall be hot-dipped galvanized in accordance with ASTM A 153.

3.16 Type I, manual locking. Single and double sheave blocks shall be opened or locked manually by a latch pin which cannot be removed under load. The block shall be conveniently and quickly opened with a minimum of effort. The locking connections shall be forged medium carbon steel having a carbon content from 0.25 to 0.50 percent, heat treated, quenched, and tempered after forging. Connections shall consist of a yoke with attached fitting, latch pin, and a swivel pin. The latch pin shall be permanently attached to the block with a short length of weldless safety chain. Either sheave of the double sheave block may be unlocked independently of the other sheave.

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3.17 Type II, self-locking. Single and double sheave blocks shall have a self-locking safety device that shall hold the block closed under load conditions and insure against accidental opening. The cross head, links, and pins shall be forged medium carbon steel having a carbon content from 0.25 to 0.50 percent, heat treated, quenched, and tempered after forging. Double sheave blocks shall consist of a yoke or cross head with attached fittings consisting of two links and a latch or yoke pin to engage the links. The latch or yoke pin shall have a locking nose at each end. When the block is in closed position the locking nose shall lock the links in position. The yoke pin shall be welded to the yoke. The configuration shall insure that either link may be released independently of the other link by rocking the yoke or cross head in the appropriate direction.

3.18 Workmanship. The blocks shall be free from any characteristics or defects that may render them unsuitable or inefficient for intended purpose. All parts, components, and assemblies shall be clean and free of dirt, sand, fins, pits, flux, and extraneous material. Welding shall not be resorted to as a repair measure.

3.18.1 Castings. All castings shall be uniform quality and free from blow holes, porosity, hard spots, shrinkage defects, cracks, or other injurious defects. Strength and other essential physical properties of the castings shall be adequate throughout for the purposes intended.

#### 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 supplies and services conform to prescribed requirements.

4.1.1 Component and material inspection. The contractor is responsible for insuring that components and materials used are manufactured, examined, and tested in accordance with referenced specifications, standards, and drawings, as applicable.

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

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).
- c. Inspection of packaging (see 4.6).



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4.3 First article inspection.

4.3.1 Examination. Both first article blocks shall be examined as specified in 4.5.1. Presence of one or more defects shall be cause for rejection.

4.3.2 Tests. Both first article blocks shall be tested as specified in 4.5.2.1. One block shall be tested as specified in 4.5.2.2. Failure of any test shall be cause for rejection.

4.4 Quality conformance inspection.

4.4.1 Sampling. Sampling for examination, and for the test specified in 4.5.2.1, shall be in accordance with MIL-STD-105.

4.4.2 Examination. Samples selected in accordance with 4.4.1 shall be examined as specified in 4.5.1. AQL shall be 2.5 percent defective for major defects and 4.5 percent defective for minor defects.

4.4.3 Tests. Samples selected in accordance with 4.4.1 shall be tested as specified in 4.5.2.1. AQL shall be 2.5 percent defective.

4.5 Inspection procedure.

4.5.1 Examination. The blocks shall be examined as specified herein for the following defects:

Major

101. Dimensions not in conformance with table II.
102. Material not as specified.
103. Materials are not resistant to corrosion or deterioration or treated to be made resistant to corrosion or deterioration for the applicable storage and operating environment.
104. Dissimilar metals as defined in MIL-STD-889 are not effectively insulated from each other.
105. Contractor does not have documentation available for identification of material, material finishes or treatments.
106. Shell plate rope guard not as specified.
107. Shell plates do not fully shield the sheaves.
108. Shell plates have insufficient number of bolt and tubing spacers.
109. Parts specified not forged or heat treated.
110. Sheaves fail to turn freely by hand.
111. Sheaves loose or wobbly on the pin or side play exceeds 1/8 inch.
112. Sheave groove has rough surface.
113. Sheave groove does not accommodate the wire rope.

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114. Sheave rim eccentric with load.
115. Bushing loose in sheave.
116. Bushing grease grooves omitted.
117. Inefficient coverage of grease grooves over bearing surface of bushing.
118. Excessive tolerance between bushing bearing surface and center pin bearing surface.
119. Cotter key and grease fitting missing from center pin.
120. Center pin grease channel omitted.
121. Center pin shoulder or sleeve omitted.
122. Center pin rotates in shell.
123. Fittings fail to swivel freely through 360 degrees.
124. Fittings positioned off center of line of load.
125. Latch pin not attached to block with chain.
126. Locking device does not function in manner specified.
127. Lubrication (grease, fittings, accessibility, grease tag) not as specified.

#### Minor

201. Castings contain blow holes, porosity, hard spots, shrinkage, or cracks.
202. Welding defects such as slag inclusions, porosity cracks, or imperfect fusion.
203. Fastening devices peened, stacked or deformed; threads bruised, strapped, crossed, or worn not as specified.
204. Workmanship not as specified.
205. Metal stamping not as specified.

#### 4.5.2 Tests.

4.5.2.1 Proof load. Test the blocks in a testing machine equipped with a dial gage which will indicate the test load. Pass wire rope or round steel bar loops around the sheave or sheaves and attach to the fixed head of the testing machine. Attach block fitting to the moving head of the machine. Steadily apply load to the block until the applicable proof load specified in table I is reached. After the test of the block has been completed, disassemble the block and examine and measure all components. The divider method shall be used to measure for deformation and the magnetic particle inspection method shall be used to determine presence of cracks in all load carrying parts of the block. Nonconformance to 3.4.1, 3.7, and 3.12 shall constitute failure of this test.

4.5.2.2 Ultimate strength. One block of each type, sheave style, and size shall be selected at random from each contract or order and tested to destruction. Install the block assembly in a testing machine as specified in 4.5.2.1. Steadily apply load to the block until failure of the block or fittings occurs. Nonconformance to 3.4.2 and 3.12 shall constitute failure of this test.

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4.6 Inspection of packaging. Packaging shall be examined in accordance with the Quality Assurance Provisions of MIL-B-3865 and the requirements of MIL-STD-1188.

## 5. PACKAGING

5.1 Preservation, packing and marking. The blocks shall be preserved, packed and marked level A, level B or commercial as specified (see 6.2). Levels A and B preservation, packing and marking shall be in accordance with MIL-B-3865. Commercial preservation, packing and marking shall be in accordance with MIL-STD-1188.

## 6. NOTES

6.1 Intended use. The snatch blocks are extra-heavy duty grade used principally for towing, retrieving, and lifting military vehicles and equipment.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Type and size of block required (see 1.2 and 3.1).
- c. Whether block shall be single or double sheave (see 3.1).
- d. When a first article is required for inspection and approval (see 3.2, 4.3 and 6.3).
- e. Type of fitting required (see 3.12).
- f. Kind of shackle required (see 3.12).
- g. Degree of preservation and packing required (see 5.1).

6.3 First article. When a first article inspection is required, the item will be tested and should be a preproduction model. The first article should consist of 2 blocks of each type furnished. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, test, and approval of the first article.

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6.4 Recycled material. It is encouraged that recycled material be used, when practical, as long as it meets the requirements of this specification (see 3.3).

Custodians:

Army - ME  
Air Force - 99

Preparing activity:

Army - ME

Project 3940-0162

Review activities:

Army - ER  
Air Force - 84  
DLA - IS

User activity:

Navy - MC

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

*(See Instructions - Reverse Side)*

1. DOCUMENT NUMBER MIL-B-11837C		2. DOCUMENT TITLE Blocks, Tackle (Wire Rope, Snatch, Extra-Heavy Duty)	
3. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)	
5. ADDRESS (Street, City, State, ZIP Code)		<input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER (Specify): _____	
6. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
7. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		7b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
7c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	

TO DETACH THIS FORM, CUT ALONG THIS LINE.)