

**INCH-POUND**

MIL-DTL-28628D  
25 November 1997  
SUPERSEDING  
MIL-C-28628C(YD)  
8 July 1991

## DETAIL SPECIFICATION

### CAMEL, WOOD, MARINE; SINGLE LOG CONFIGURATION, UNTREATED AND TREATED

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

#### 1. SCOPE

1.1 Scope. This specification covers single log configuration marine wood camels, treated and untreated, hereinafter referred to as log camels.

1.2 Classification. Log camels shall be of the following types and classes, as specified (see 6.2).

Type I - Treated.

- Class 1 - Moderate borer hazard.
- Class 2 - Severe borer hazard.
- Class 3 - Dual treatment.

Type II - Untreated.

#### 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: Commanding Officer (Code 15E2), Naval Construction Battalion Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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specified requirements documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Non-Government publications. The following documents 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).

## ASTM

- ASTM A 36 - Carbon Structural Steel.
- ASTM A 53 - Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
- ASTM A 153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.
- ASTM D 25 - Round Timber Piles.

(Application for copies should be addressed the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

## AMERICAN WELDING SOCIETY, INC. (AWS)

- AWS D1.1 - Structural Welding Code, Steel.

(Application for copies should be addressed to the American Welding Society, Inc., 550 N.W. LeJeune Rd., Miami, FL 33126.)

## AMERICAN WOOD-PRESERVERS ASSOCIATION (AWPA)

- AWPA C1 - All Timber Products - Preservative Treatment by Pressure Processes.
- AWPA C3 - Piles, Pressure Treatment.

(Application for copies should be addressed to the American Wood-Preservers Association, 3246 Fall Creek Highway, Suite 190, Granbury, TX 76049-7979.)

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 Description. Log camels shall consist of natural wood logs over 20 inches (508 millimetre (mm)) in diameter at the butt. Type I log camels shall be treated as specified (see 3.7.1 and 6.2),

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and type II shall be untreated. When specified (see 6.2 and 6.7), the logs shall be lathe turned to a uniform nominal diameter along the entire length of the log.

3.2 First article. When specified (see 6.2) a sample log camel shall be subjected to first article inspection in accordance with 4.2.

3.3 Materials. Materials used shall be free from defects which would adversely affect the performance or maintainability of individual components or of the overall assembly. Materials not specified herein shall be of the same quality used for the intended purpose in commercial practice. Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this specification are to be new and fabricated using materials produced from recovered materials to the maximum extent possible 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. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification.

3.3.1 Wood for log camels. Logs selected for treatment shall have sufficient sapwood thickness to ensure the required penetration and retention are achieved (see 3.6). The wood shall be sound and free from decay, red heart, or insect attack except insect damage consisting of holes 0.06-inch (1.6 mm) or less in diameter or surface scoring or channeling is permitted. Logs used for camels shall conform to ASTM D 25, except as modified by this specification.

3.3.1.1 Species. Treated (type I) log camels shall be of either Coastal Douglas Fir or Southern Pine. Alternative species used for untreated (type II) log camels shall retain their shape, have adequate buoyancy (see 3.3.1.5), and have fiber strength and density similar to the treated, type I camel log species.

3.3.1.2 Scars. Logs may have sound turpentine scars which are undamaged by insects. No scars shall be greater than 3 feet (914 mm) in length.

3.3.1.3 Foreign material. Logs shall be free of all nails, spikes, and other metal except as specified herein.

3.3.1.4 Straightness. The distance from the center of a cross section to a straight line from center of butt to center of tip shall be not greater than 1-inch per 10 feet (25 mm per 3 048 mm) of log length.

3.3.1.5 Buoyancy. When tested as described in 4.3, the freeboard (that portion of the log above the water surface) of each log, prior to treatment, shall be no less than 20 percent of the log's diameter.

3.3.2 Pipe. Pipe for hawse pipes shall be not less than 4-inch (102 mm) double extra strong pipe conforming to ASTM A 53.

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3.3.3 Steel plate. Steel plate for hawse pipe flange shall conform to ASTM A 36.

3.4 Size. Log camels shall be specified by length and either diameter or circumference. Log camels of natural taper shall be specified by minimum butt circumference and lathe turned logs shall be specified by diameter.

3.4.1 Length. Log camels shall be 30, 35, 40, or 50 feet (9 144, 10 668, 12 192, or 15 240 mm) in length as specified (see 6.2), and have a tolerance of + 1-foot, - 0-foot (+ 305 mm, - 0 mm). Special lengths, when specified (see 6.2), shall be specified in 2-foot (610 mm) multiples under 40 feet (12 192 mm) and 5-foot (1 524 mm) multiples over 40 feet (12 192 mm). Ends shall be cut square to the centerline.

3.4.2 Cross section.

3.4.2.1 30, 40, and 50-foot (9 144, 12 192, and 15 240 mm) logs. The nominal minimum butt circumference of 30, 40, and 50-foot (9 144, 12 192, and 15 240 mm) log camels shall be 63, 75, or 87 inches (1 600, 1 905, or 2 210 mm) as specified (see 6.2). All circumference measurements are taken under the bark. Tip circumference shall not be less than the values given in table I.

TABLE I. Specified butt circumference with minimum tip circumference (diameter approximated).

<u>Required minimum butt circumference (inches) (mm)</u>			
Length (in/feet) (mm)	63 (1 600 mm) (20 (508 mm) Dia)	75 (1 905 mm) (24 (610 mm) Dia)	87 (2 210) (28 (711 mm) Dia)
	Minimum allowable tip circumference		
30 (9 144 mm)	47 (1 194 mm) (15 (381 mm) Dia)	59 (1 499 mm) (19 (483 mm) Dia)	72 (1 829 mm) (23 (584 mm) Dia)
40 (12 192 mm)	42 (1 067 mm) (13 (330 mm) Dia)	54 (1 372 mm) (17 (432 mm) Dia)	67 (1 702 mm) (21 (533 mm) Dia)
50 (15 240 mm)	37 (940 mm) (11 (279 mm) Dia)	49 (1 295 mm) (15 (381 mm) Dia)	62 (1 575 mm) (19 (483 mm) Dia)

3.4.2.2 35-foot (10 668 mm) logs. Unless otherwise specified (see 6.2), 35-foot (10 668 mm) log camels shall have a tip diameter of not less than 35 inches (889 mm). The butt diameter shall be not more than 10 percent greater than the tip diameter. The equivalent diameter, when turned on a lathe, shall be approximately 14 inches (356 mm).

3.4.2.3 Lathe turned log camels. When lathe turned log camels are specified (see 3.1 and 6.2), the diameter of any perpendicular cross section on the log shall not vary by more than  $\pm 1$ -inch ( $\pm 25$  mm) from the specified nominal diameter.

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3.4.3 Roundness. The ratio of the maximum to minimum diameter at any perpendicular cross section shall be not greater than 1:2.

### 3.5 Bark removal.

3.5.1 Type I. Type I log camels shall be clean peeled. Clean peeled logs shall have not less than 80 percent of the inner bark, well distributed over the entire surface of the log, removed. The logs shall have no strip of inner bark larger than 1-inch by 6 inches (25 mm by 152 mm) remaining.

3.5.2 Type II. Type II log camels shall be either rough peeled or unpeeled as specified (see 6.2). Rough peeled logs require the complete removal of all outer bark, while unpeeled logs require no bark removal.

3.6 Incising. Unless otherwise specified (see 6.2), incising of type I log camels shall be permitted before treatment (see 3.3.1). When lathe turned logs are specified (see 3.1 and 6.2), they shall be full length incised to accommodate the loss of sapwood and permit the required penetration and retention of preservative treatment (see 6.8).

### 3.7 Treatment.

3.7.1 Wood preservative treatment. Treatment for type I log camels shall be class 1, 2, or 3 as specified (see 6.2) and shall be performed after holes for hawse pipes have been drilled. Preservative treatments and minimum retention for each class shall conform to the applicable requirements of the AWP standards for treatment (see table II).

TABLE II. Treatment for type I camel logs.

Class	Hazard	Treatment	AWPA Standard for Treatment
1	Moderate borer hazard (teredo and pholad present, no limnoria tripunctata).	Creosote or creosote coal tar.	C1 and C3 (for marine piles).
2	Severe borer hazard (teredo and limnoria tripunctata present, no pholads).	ACA*, CCA*, or ACZA*.	C1 and C3 (for marine piles).

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TABLE II. Treatment for type I camel logs - Continued.

Class	Hazard	Treatment	AWPA Standard for Treatment
3	Dual treatments (limnoria tripunctata and pholads present).	First treatment ACA, CCA, or ACZA. Second treatment creosote or creosote coal-tar.	C1 and C3 (for marine piles).
*ACA, CCA, and ACZA are abbreviations for Ammoniacal Copper Arsenate Chromated Copper Arsenate and Ammoniacal Copper Zinc Arsenate, respectively.			

3.7.1.1 Certification. The quality mark for the class of log camel shall be applied to each treated log in accordance with an American Lumber Standards Committee (ALSC) accredited quality control agency. The quality mark shall be an indication of conformance to the requirements of treatment and retention for type I log camels.

3.7.2 Treatment of steel. Steel used in construction of hawse pipes shall be hot dip galvanized in accordance with ASTM A 153.

3.8 Hawse pipes. When specified (see 6.2), hawse pipes shall be installed in each end of log camels. Steel plate washers shall be welded as flanges to each end of the pipe, after insertion of the pipe in the log. Steel plate washers shall be not less than 7.5-inch (191 mm) diameter by 0.5-inch (13 mm) thick. The hawse pipes shall be located at a distance of 20 percent of the total log length from each end of the camel.

### 3.9 Workmanship.

3.9.1 Welding. Welding procedures shall be in accordance with AWS D1.1. Welds shall be of sufficient size and shape to develop the full strength of the parts connected by the welds. Welds shall transmit stress without permanent deformation or failure when the parts connected by the weld are subjected to proof and service loadings.

## 4. VERIFICATION

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

- a. First article inspection (see 4.2).
- b. Conformance inspection (see 4.3).

4.2 First article inspection. The first article inspection shall be performed on one complete camel log when a first article is required (see 3.2 and 6.2). This inspection shall include the examinations of 4.4 and the test of 4.5. The first article may be either a first production item or a standard production item from the supplier's current inventory provided the item meets the

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requirements of the specification and is representative of the design, construction, and manufacturing technique applicable to the remaining items to be furnished under the contract.

4.3 Conformance inspection. The quality conformance inspection shall include the examinations of 4.4 and the buoyancy test of 4.5. Unless otherwise specified (see 6.2), the inspection will be performed at the point of production.

4.4 Examination. Each log camel shall be examined for compliance with the requirements in section 3 of this specification. This element of inspection shall encompass all visual examinations, dimensional measurements, review of certificates of inspection, and check for the approved agency quality mark. Any log camel having one or more defects shall be cause for rejection of that camel.

4.4.1 Examination before treatment. Type I log camels shall be examined for compliance with the requirements of 3.3 through 3.5.1, within 10 days prior to treatment.

4.4.2 Examination after treatment. After preservative treatment, and installation of hawse pipes if required, type I log camels shall be examined for compliance with 3.6 through 3.9.1.

4.5 Buoyancy test. Prior to treatment, each log shall be placed in water and allowed to float freely. The log shall conform to the buoyancy requirements of 3.3.1.5.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

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

6.1 Intended use. Log camels are intended for use as a floating device to breast out a vessel from a pier or mooring, or to separate two vessels to provide protection to the vessels and minimize damage to pier pilings. The log camels covered in this specification are for fresh water or sea water use.



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6.1.1 Type I, class 1. Type I, class 1 log camels are for use in marine waters in those areas of moderate borer hazard where limnoria tripunctata attack is limited or not expected (primarily in northern latitudes but with exceptions in both northern and southern latitudes).

6.1.2 Type I, class 2. Type I, class 2 log camels are for use in marine waters in those areas of severe borer hazard where limnoria tripunctata attack is known or expected and where pholad attack is absent.

6.1.3 Type I, class 3. Type I, class 3 log camels are for use in marine waters in those areas of severe borer hazard where limnoria tripunctata and pholad attack is known or expected.

6.1.4 Type II. Type II, untreated log camels are for use in fresh water, where there is no marine borer hazard.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Type and class of log camels required (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2).
- d. Treatment for type I log camels (see 3.1 and 3.7.1).
- e. When logs are to be lathe turned to uniform nominal diameter (see 3.1 and 3.4.2.3).
- f. When first article is required (see 3.2 and 4.2).
- g. Length(s) of log camel(s) and when special lengths are required (see 3.4.1).
- h. Nominal butt circumference for 30, 40, or 50-foot (9 144, 12 192, or 15 240 mm) log camels (see 3.4.2.1).
- i. When diameter of 35-foot (10 668 mm) logs is other than specified (see 3.4.2.2).
- j. Whether type II log camels are to be rough peeled or unpeeled (see 3.5.2).
- k. When incising of type I camel log before treatment is not permitted (see 3.6).
- l. When hawse pipes are to be installed (see 3.8).
- m. When conformance inspection is to be performed at other than the point of production (see 4.3).
- n. Packaging requirements (see 5.1).

6.3 Related documents. Additional documents which are not directly referenced, but may be required for review or in the performance of a contract are listed below:

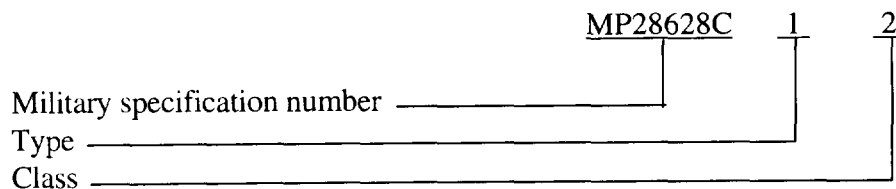
AWPA	A1	-	Analysis of Creosote and Oil-Type Preservatives.
AWPA	A2	-	Analysis of Water Borne Preservatives and Fire Retardant Formulations.
AWPA	A4	-	Sampling Wood Preservatives.
AWPA	A6	-	Determination of Oil-Type Preservatives and Water in Wood.
AWPA	A7	-	Wet Ashing Procedure for Preparing Wood for Chemical Analysis.
AWPA	A8	-	Qualitative Recovery of Creosote or Creosote-Coal Tar Solution from Freshly Treated Piles, Poles or Timbers (Squeeze Method).



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- AWPA A9 - Analysis of Treated Wood and Treating Solutions by X-ray Emission Spectroscopy.
- AWPA A10 - Analysis of CCA Treating Solutions and CCA Treated Wood by Colorimetry.
- AWPA A11 - Analysis of Treated Wood and Treating Solutions by Atomic Absorption Spectroscopy.
- AWPA M2 - Inspection of Treated Timber Products.
- AWPA M6 - Brands Used on Forest Products.
- AWPA P1 - Coal Tar Creosote for Land and Fresh Water Use.
- AWPA P2 - Creosote-Coal Tar Solutions.
- AWPA P12 - Creosote-Coal Tar Solutions to be used in the Treatment of Marine (Coastal Waters) Piles and Timbers.
- AWPA P13 - Coal Tar Creosote to be used in the Treatment of Marine (Coastal Waters) Piles and Timbers.
- Best Management Practices (BMP) For the Use of Treated Wood in Aquatic Environments.

6.4 Part or Identifying Numbers (PINs). The specification number, type, and class are combined to form PINs for each item covered by this document (see 1.2). PINs for the lot camels are established as follows:



6.5 Subject term (key word) listing.

Buoyancy  
 Coastal Douglas Fir  
 Hawse pipes  
 Marine borer hazard  
 Mooring  
 Pier pilings  
 Preservative treatment  
 Southern Pine  
 Vessel

6.6 Supersession data. This specification replaces Military Specification MIL-C-28628C(YD) dated 8 July 1991.

6.7 Hawse pipes. Hawse pipes as specified in 3.7 constitute one design which may or may not be acceptable to Commands utilizing this acquisition document. Commands desiring to utilize other hawse pipe designs should specify the design as a deviation to the basic specification.

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6.8 Lathe-turned logs. In specifying lathe-turned log camels, it must be noted that the lathe will likely remove a considerable portion of the sapwood. The result is difficulty in reaching desired preservative retention levels, even when the log is incised as described in 3.5.

6.9 Classification cross reference. Classifications used in this specification (see 1.2) are identical to those found in the superseded Military Specification MIL-C-28628C(YD).

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

## Custodians:

Army - MT

Navy - YD1

Air Force - 99

## Preparing Activity:

Navy - YD1

(Project 1945-N076)

# 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-DTL-28628D

2. DOCUMENT DATE (YYMMDD)  
971125

### 3. DOCUMENT TITLE

CAMEL, WOOD, MARINE: SINGLE LOG CONFIGURATION, UNTREATED AND TREATED

### 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)*  
(1) Commercial  
(2) AUTOVON  
*(if applicable)*

7. DATE SUBMITTED  
(YYMMDD)

### 8. PREPARING ACTIVITY

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ROBERT J. BRICKEY

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c. ADDRESS *(Include Zip Code)*

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