

INCH-POUND

MIL-DTL-543H
27 June 2025
SUPERSEDING
MIL-B-543G
11 April 1990

DETAIL SPECIFICATION

BUCKLES, TONGUELESS AND WEB STRAP

Inactive for new design after 16 June 1997

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

1. SCOPE

1.1 Scope. This specification covers metal buckles used on tentage and equipage items.

1.2 Classification. Buckles are of the following types, styles, classes, and sizes, as specified (see 6.2):

Type I – Buckle, tongueless, 1-Bar

Style 2 – (see Drawing 4-1-54)

Classes – 1 (brass), 3 (steel), 4 (aluminum)

Sizes – 5/8 inch, 3/4 inch, 1 inch, 1-1/4 inch, 1-1/2 inch

Type II – Buckle, tongueless, 2-Bar

Style 1 – (see Drawing 4-1-54)

Classes – 1 (brass), 3 (steel), 4 (aluminum)

Size – 1 inch

Style 2 – (see Drawing 4-1-54)

Class – 1 (brass)

Size – 3/4 inch

Style 3 – (see Drawing 4-1-54)

Classes – 1 (brass), 3 (steel), 4 (aluminum)

Size – 5/8 inch

Style 4 – (see Drawing 4-1-54)

Classes – 1 (brass), 3 (steel), 4 (aluminum)

Sizes – 1/2 inch, 5/8 inch, 3/4 inch, 1 inch, 1-1/2 inch, 2 inch

Style 5 – (see Drawing 4-1-54)

Classes – 1 (brass), 3 (steel), 4 (aluminum)

Size – 5/8 inch

Comments, suggestions, or questions on this document should be addressed to: DLA Land and Maritime, Attn: VAI, P.O. Box 3990, Columbus, OH 43218-3990, or emailed to FluidFlow@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.dla.mil>.

Type III – Buckle, double bar, with slide

Style 1 – (see Drawing 4-1-171)

Classes – 1 (brass), 5 (malleable iron)

Size – 1-1/2 inch

Style 2 – (see Drawing 4-1-171)

Classes – 1 (brass), 5 (malleable iron)

Size – 3/4 inch

Style 3 – (see Drawing 4-1-171)

Classes – 1 (brass), 3 (steel), 4 (aluminum)

Sizes – 5/8 inch, 3/4 inch, 1 inch, 1-1/4 inch, 1-1/2 inch

Type IV – Buckle, single bar, with lip, cotton webbing

Classes – 1 (brass), 3 (steel), 4 (aluminum)

Sizes – 5/8 inch, 1 inch

Type V – Buckle, quick release, non-slip, nylon webbing

Classes – 3 (steel), 4 (aluminum)

Sizes – 3/4 inch, 1 inch

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

2.2 Government documents.

2.2.1 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 cited in the solicitation or contract.

FEDERAL SPECIFICATIONS

TT-P-1757 - Primer Coating, ALKYD Base, One Component

(Copies of these documents are available online at <https://quicksearch.dla.mil>.)

DEPARTMENT OF DEFENSE SPECIFICATIONS

MIL-DTL-495 - Finish, Chemical, Black, for Copper Alloys

MIL-DTL-5541 - Chemical Conversion Coatings on Aluminum and Aluminum Alloys

(Copies of these documents are available online at <https://quicksearch.dla.mil>.)

2.2.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DRAWINGS

- | | |
|---------|--|
| 2-4-71 | - Buckles, Quick Release, Non-slip, Nylon webbing, Type V |
| 4-1-54 | - Buckles, Tongueless and Web Strap; Buckles – 1 Bar, Type I – 2 Bar, Type II |
| 4-1-171 | - Buckles, Tongueless and Web Strap; Buckles, Double Bar, With Slide, Type III |
| 4-1-202 | - Buckles, Tongueless and Web Strap; Buckle |

(Copies of the Drawings required by contractors in connection with specific acquisition functions may be obtained from the procuring activity at DSCC.cddwgs@dla.mil, or as directed by the contracting officer.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASTM INTERNATIONAL

- | | |
|-----------------|--|
| ASTM A47/A47M | - Standard Specification for Ferritic Malleable Iron Castings |
| ASTM A109/109M | - Standard Specification for Steel, Strip, Carbon (0.25 Maximum Percent), Cold-Rolled |
| ASTM B36/B36M | - Standard Specification for Brass Plate, Sheet, Strip, And Rolled Bar |
| ASTM B183 | - Standard Practice for Preparation of Low-Carbon Steel for Electroplating |
| ASTM B209/B209M | - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate |
| ASTM B242 | - Standard Guide for Preparation of High-Carbon Steel for Electroplating |
| ASTM B322 | - Standard Guide for Cleaning Metals Prior to Electroplating |
| ASTM B584 | - Standard Specification for Copper Alloy Sand Castings for General Applications |
| ASTM B633 | - Standard specification for Electrodeposited Coating of Zinc on Iron and Steel |
| ASTM D1005 | - Standard Test Method for Measurement of Dry-Film Thickness of Organic Coatings using Micrometers |

(Copies of these documents are available from <https://www.astm.org/>)

SAE INTERNATIONAL

- | | |
|-------------|--|
| SAE AMS2770 | - Heat Treatment of Wrought Aluminum Alloy Parts |
|-------------|--|

(Copies of these documents are available from <https://www.sae.org>)

AMERICAN SOCIETY FOR QUALITY (ASQ)

- | | |
|---------------|---|
| ASQ/ANSI Z1.4 | - SAMPLING PROCEDURES AND TABLES FOR INSPECTION BY ATTRIBUTES |
|---------------|---|

(Copies of these documents are available from <https://www.asq.org>)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), 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 in accordance with 4.2.

3.2 Material. The material shall be as specified herein. However, when a definite material is not specified, a material shall be used which will enable the buckles to meet the performance requirements of this specification. It is encouraged that recycled material be used when practical as long as it meets the requirements of this specification.

3.2.1 Copper base alloys.

3.2.1.1 Brass Sheet or Strip. Sheet or strip for class 1 buckles shall conform to copper alloy numbers C26000 or C26800, quarter-hard of ASTM B36/B36M.

3.2.1.2 Castings. Brass castings for class 1 buckles shall conform to alloy number C85400 of ASTM B584.

3.2.2 Steel strip, cold rolled. Cold-rolled steel strip for class 3 buckles shall conform to ASTM A109/A109M.

3.2.3 Aluminum.

3.2.3.1 Alloy 1100. Aluminum alloy for class 4 of types I, II, and III buckles shall conform to 1100, tempers H12 or H24 of ASTM B209/B209M.

3.2.3.2 Alloy 6061. Aluminum alloy for class 4 of types I, II, and III buckles shall conform to 6061, temper O of ASTM B209/209M.

3.2.4 Malleable iron. Malleable iron for class 5 buckles shall conform to ASTM A47/A47M.

3.3 Construction and dimensions. The construction and dimensions of the buckles shall conform to this specification and Drawings 2-4-71, 4-1-54, 4-1-171, and 4-1-202, as applicable.

3.3.1 Type IV and V aluminum buckles. After forming, the type IV and V aluminum buckles shall be heat treated to temper T-6 conforming to SAE AMS2770.

3.4 Finish. Prior to the application of a finish, all burrs and sharp edges shall be removed.

3.4.1 Class 1 brass buckles. Class 1 brass buckles shall be given a black chemical finish in accordance with MIL-DTL-495.

3.4.2 Class 3 steel and class 5 malleable iron buckles. Class 3 (steel) and class 5 (malleable iron) buckles shall be given a phosphate zinc plate treatment conforming to type IV, with a minimum thickness of 13 micrometers, of ASTM B633, followed by bake enameling. The enamel color shall be black and semi-gloss. The coating shall level out to a uniform dry thickness without peeling, blistering, flaking, streaking, or areas of no film.

3.4.2.1 Class 3 (steel) and class 5 (malleable iron) buckles alternate finish. As an alternative to phosphate zinc plate treatment specified in 3.4.2, class 3 steel and class 5 malleable iron buckles may be base plated using an electrodeposited brass coating as follows:

- a. The base metal shall be cleaned and prepared in accordance with ASTM B183, ASTM B242, or ASTM B322 as applicable
- b. The buckle shall then be brass plated to a minimum thickness of 0.0004 inches by electrodeposition of brass alloy number C26000 of ASTM B36/B36M.
- c. The buckle shall then be bake enameled as specified in 3.4.2.

3.4.3 Class 4 aluminum buckles. Class 4, aluminum buckles shall be prepared for painting as follows:

- a. All surfaces shall be prepared for painting in accordance with class 1A requirements of MIL-DTL-5541.
- b. The treated surfaces shall be coated with primer conforming to composition G or L, as applicable, color Y of TT-P-1757.
- c. The primed surface shall be coated with black semi-gloss enamel. The coating shall level out to uniform dry thickness without peeling, blistering, flaking, streaking, or areas of no film.

3.4.4 Epoxy powder coating. As an alternative to the finishes specified in 3.4.1 through 3.4.3, the buckles may be prepared and coated as follows:

- a. The buckles shall be prepared for coating by mechanical means. The surfaces shall be thoroughly and uniformly textured by sand blasting with 80-grit aluminum oxide. Prepared surfaces shall be kept clean during subsequent handling. Handling shall be by clean-gloved hands or by cleaning implements. The surfaces shall be retained in a clean environment. The surface shall be epoxy coated not more than 8 hours after sand blasting.
- b. The finish coating shall be black electrodeposited powder coating
- c. The electrodeposited epoxy powder coating shall be baked in accordance with commercial practice.
- d. The thickness of the baked coating shall be 0.003 ± 0.001 inch when tested as specified in 4.3.4.1.
- e. The final coating shall be smooth and uniform in appearance, free from wrinkles and streaks.

3.5 Marking for identification. Buckles shall be marked with the manufacturer's name or tradename, or trademark of code of such characters as to be identifiable with the manufacturer. The marking shall be permanently affixed by stamping or etching on the back of the buckle. The identification marks shall be incorporated in such a manner that the surface opposite to those markings shall show no signs of penetration or unevenness, or that distortion is not caused on any part of the buckle.

3.6 Recycled, recovered, environmentally preferable, or biobased materials. Recycled, recovered, environmentally preferable, or biobased materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.7 Workmanship. The end item shall conform to the quality of product established by this specification and the occurrence of defects shall not exceed the applicable acceptable quality limits (AQL).

4. VERIFICATION

4.1 Classification of inspections. 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. When first article inspection is required (see 3.1), a sample shall be examined for the defects specified in 4.3.3 and 4.3.4.

4.3 Conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with ASQ Z1.4.

4.3.1 Component and material inspection. Components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified or qualified in this specification or applicable purchase document.

4.3.2 In-process inspection. Examination shall be made of the following requirements, operations, or assemblies to establish conformance to specified requirements. Whenever nonconformance is noted, correction shall be made to the items affected, the lot in progress, and the operation. Parts which cannot be corrected shall be removed from production.

Requirement (when applicable)	Requirement paragraph
Heat treatment	3.3.1
Phosphate zinc plating	3.4.2
Electrodeposited brass coating	3.4.2.1
Chemical treatment	3.4.3
Priming	3.4.3
Epoxy powder coating	3.4.4

4.3.3 End item visual examination. The end items shall be examined for the defects listed in [Table I](#). The lot size shall be expressed in units of completely finished buckles of one type, style, class, and size. The inspection level shall be II.

TABLE I. End item visual defects

Examine	Defect	Classification	
		Major	Minor
Finish, black enamel (classes 3, 4, and 5)	Color not as specified.	101	
	Area of no film.		201
	Deep cuts, scratches, or abrasion exposing bare metal	102	
	Discoloration or slight scratches.		202
	Finish not uniform or adherent (e.g. blistered, peeling, drops, streaks, or flaking).		203
Finish, black chemical (class 1)	Color not as specified, or finish not clean and uniform		204
	Dirt, smudge, oil, grease, or other foreign matter on surfaces.		205
	Deep cuts or scratches.	103	
	Discoloration or slight scratches.		206
	Area of no finish, or finish discolored.		207
	Any evidence of corrosion under finish.	104	
Construction and workmanship (all classes, as applicable)	Design or type not as specified.		208
	Unsound casting; e.g. porous, pits, warped, cracked, fractured, sink marks, or contains blow holes.	105	
	Stampings distorted, bent, or malformed.	106	
	Mutilation such as metal mark, dig, or gouges noticeable.		209
	Digs, gouges, burrs, slivers, sharp edges, or tool marks.	107	
	Body, tongue, clamp, or slide bent or malformed.	108	
	Surface spotted or open-grained, e.g. appearing as pitted, porous, or crystalline.	109	
Assembly	Any component missing or not assembled.	110	
	Tongue, clamp, or slide will not function or requires excessive force to operate.	111	
	Tongue, clamp, or slide are poorly fitted to buckle body.		210
Identification marking	Missing, incomplete, illegible, or incorrect.		211
	Not stamped or etches on back of buckle as specified.		212
	Indication of penetration, unevenness, or distortion; marking on wrong side of buckle.		213

4.3.4 End item dimensional examination. The end items shall be examined for conformance to the dimensions specified on the drawings. Only those dimensions that can be evaluated without damaging or disassembling the end items shall be examined. Any dimension not within the specified tolerance shall be classified as a defect. The lot size shall be expressed in units of finished buckles. The inspection level shall be S-2.

4.3.4.1 Epoxy coating thickness examination (when applicable). The end item shall be examined for thickness of the epoxy coating in accordance with ASTM D1005. Three observations shall be made per sample unit. Any epoxy coating thickness less than that specified in 3.4.4 shall be classified as a defect. The lot size shall be expressed in units of buckles. The inspection level shall be S-2.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. 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

6.1 Intended use. The buckles are for use on items of equipment having strap-buckle-type fasteners.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type, style, class, and size of buckle required (see 1.2).
- c. When a first article inspection is required (see 3.1, 4.3).
- d. Packaging requirements (see 5.1).

6.3 Sample. For access to samples of buckles, address the contracting activity issuing the invitation for bids or request for proposal.

6.4 Subject term (key work) listing.

Equipage
Fasteners
Individual equipment
Strap
Tentage

6.5 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the previous issue

CONCLUDING MATERIAL

Custodians:

Army – GL
Air Force – 71
DLA – CC

Preparing activity:

DLA – CC

(Project 5340-2025-017)

Review activities:

Army – AR, AV, EA, MI
Navy – MC, SA

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.