

MIL-R-3390F
8 September 1988
SUPERSEDING
MIL-R-3390E
16 November 1971

MILITARY SPECIFICATION

RINGS, DEE

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

1. SCOPE

1.1 Scope. This specification covers dee rings for use on various equipage items (see 6.1).

1.2 Classification. Dee rings shall be of the configurations shown by letter designations on Drawing 4-1-454 or 4-1-455, as specified (see 6.2) and shall be of the following classes and sizes for the configuration shown. Configuration X shall be style 1 (without roller) or style 2 (with roller) as specified (see 6.2).

1.2.1 Classes. Classes of dee rings shall be as follows (see 6.1).

- Class 1 - Brass
- Class 2 - Steel Wire
- Class 3 - Malleable Iron
- Class 4 - Nickel-Silver Alloy
- Class 5 - Molding Plastic (Nylon) Rigid

1.2.2 Sizes. Configurations A, D, K, L, W, and X are available in various sizes as shown on Drawing 4-1-454 and as specified (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 5365

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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 specification to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation.

SPECIFICATIONS

FEDERAL

QQ-B-613	- Brass, Leaded and Nonleaded; Flat Products (Plate, Bar, Sheet, and Strip)
QQ-B-637	- Brass, Naval: Flat Rod, Wire, Shapes, Forgings, and Flat Products with Finished Edges (Bar, Flat Wire, and Strip)
QQ-C-320	- Chromium Plating (Electrodeposited)
QQ-C-390	- Copper Alloy Castings (Including Cast Bar)
QQ-P-416	- Plating, Cadmium (Electrodeposited)
QQ-W-321	- Wire, Copper Alloy
QQ-W-461	- Wire, Steel, Carbon (Round, Bare and Coated)
TT-E-529	- Enamel, Alkyd, Semigloss
PPP-B-566	- Boxes, Folding, Paperboard
PPP-B-601	- Boxes, Wood, Cleated Plywood
PPP-B-621	- Boxes, Wood, Nailed and Lock-Corner
PPP-B-636	- Boxes, Shipping, Fiberboard
PPP-B-676	- Boxes, Setup

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MIL-F-495	- Finish, Chemical, Black, For Copper Alloys
MIL-L-10547	- Liners, Case, and Sheet, Overwrap; Water-Vaporproof or Waterproof, Flexible

STANDARDS

FEDERAL

FED-STD-151	- Metals; Test Methods
FED-STD-595	- Colors

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- MIL-STD-105 - Sampling Procedures and Tables For Inspection
by Attributes
- MIL-STD-129 - Marking for Shipment and Storage

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

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues shall be those in effect on the date of the solicitation.

DRAWINGS

U.S. ARMY NATICK RESEARCH, DEVELOPMENT, AND ENGINEERING CENTER

- 4-1-454 - Rings, DEE, SYM A, C, D, K, L, M, U, W, and X
- 4-1-455 - Rings, DEE, SYM B, E, F, G, H, J, R, T, and V

(Copies of drawings, publications, and other Government documents required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

- * 2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the issues of the documents which are DOD adopted shall be those listed in the issue of the DODISS specified in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS shall be the issues of the nongovernment documents which are current on the date of the solicitation.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- A 47 - Specification for Malleable Iron Castings
- B 633 - Specification for Electrodeposited Coatings of
Zinc on Iron and Steel
- D 3951 - Standard Practice for Commercial Packaging
- D 4066 - Specification for Nylon Injection and Extrusion
Materials

(Copies should be obtained from the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

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

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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. Nothing in this specification, however, shall supersede applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

- * 3.1 First article. When specified in the contract or purchase order, a sample shall be subjected to first article inspection (see 4.3, 6.2, and 6.3).

3.2 Materials. The materials specified shall conform to applicable specifications and requirements specified hereinafter. Commercial tolerances apply to wire diameters. The use of recycled material is encouraged (see 3.2.8 and 6.4).

3.2.1 Copper alloy casting. The copper alloy (brass) castings shall conform to alloy No. A3 of QQ-C-390.

3.2.2 Brass sheet or strip. The brass sheet or strip shall conform to copper alloy No's. 260 or 268, temper half-hard of QQ-B-613.

3.2.3 Wire, copper alloy. The copper alloy wire shall conform to copper alloy No's 260 or 270 quarter-hard temper of QQ-W-321, or copper alloy No's. 462 or 464, temper half-hard or light annealed of QQ-B-637.

3.2.4 Steel wire. Steel wire shall conform to steel Number 1006, 1008, or 1010, finish 1, annealed in process, of QQ-W-461.

- * 3.2.5 Malleable iron. Malleable iron castings shall conform to grade 35018 of ASTM A 47.

3.2.6 Nickel-silver alloy. Nickel-silver alloy castings shall conform to table I for chemical composition when tested as specified in 4.4.1.

TABLE I. Chemical composition, copper-nickel-zinc alloy

Material	Percent
Copper	55.0 to 64.0
Nickel	18.0 (Min.)
Zinc	Remainder
Iron	0.35 (Max.)
Other	0.25 (Max.)

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- * 3.2.7 Enamel. The enamel shall be enamel alkyd, semigloss conforming to type II of TT-E-529.
- * 3.2.8 Plastic, nylon. The plastic dee rings shall be molded from virgin nylon conforming to PA 181, polyamide nylon, Group 1 (66 nylon), class 8 (weather stabilized), Grade 1 of ASTM D 4066. Clean unburned plastic material in the form of imperfect parts, sprues, runners or other scrap of the same composition as the virgin material, and produced in the molding or finishing operation, may be reground and mixed with the virgin material specified. When reground is mixed with the virgin material, the reground shall not exceed a level of 25 percent by weight of the blended mixture (see 6.4).

3.3 Design and construction. The design and construction of the rings shall conform to Drawings 4-1-454, and 4-1-455 and the requirements specified herein. All burrs, sharp edges and slivers shall be removed before application of finish.

- * 3.3.1 Class 1. At the option of the supplier, class 1 rings shall be cast of brass material specified in 3.2.1 or formed of brass wire specified in 3.2.3, except when one material only is shown on the applicable drawing. Available configurations are A, B, E, F, G, H, J, K, L, W, and X. After forming to shape and locating the joint as shown on the drawing, the joint shall be joined by butt resistance welding or brazing. The completed joints shall be round and smooth and free from cracks, burns, or reduced areas.

3.3.2 Class 2 rings. Class 2 rings shall be fabricated of steel wire specified in 3.2.4. After forming to shape and locating the joint as shown on the drawing, the joint shall be butted and welded, except that unless otherwise specified (see 6.2), configuration "A" rings shall be butted only. The welds shall be sound, not porous, and free from cracks, burns or reduced areas. The welds shall be ground smooth and free from rough edges. Available configurations are indicated on the drawings by the letters A, D, E, F, H, K, L, M, R, T, U, V, and X.

3.3.3 Class 3. Class 3 rings shall be cast from malleable iron specified in 3.2.5. Available configurations are A, B, E, F, G, J, W, and X.

3.3.4 Class 4. Class 4 rings shall be cast from nickel-silver alloy specified in 3.2.6, conforming to configuration C.

3.3.5 Class 1, 3, and 4 rings (castings). Class 1, 3, and 4 rings castings shall be free from porosity, blow holes, warp, and clearly noticeable digs and gouges.

3.3.6 Rollers. The rollers required for configurations U, V, and X (style 2) shall be fabricated of brass sheet or strip specified in 3.2.2, and to the dimensions shown on Drawings. After assembly to the straight section of the ring, the rollers shall rotate freely without binding, and the joint of the roller along its entire length shall be butted evenly.

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3.3.7 Class 5. Class 5 rings shall be molded of plastic specified in 3.2.8 and shall conform to configuration identified by letter X on Drawing 4-1-454.

3.4 Finishes. The finished rings shall be free from corrosion, dirt, discoloration and areas of no finish. Finishes shall be as follows:

3.4.1 Black chemical. Black chemical finish shall conform to MIL-F-495.

3.4.2 Zinc-plate.

* 3.4.2.1 Zinc-plate without enameling. Zinc-plate without enameling shall conform to type II, SC2 of ASTM B 633.

* 3.4.2.2 Zinc-plate with enameling. Zinc-plate with enameling shall conform to type II, SC2 of ASTM B 633, followed by baking enamel. The enamel shall conform to 3.2.7.

3.4.3 Cadmium plate. Cadmium plate shall conform to class 1, or 2, type I or II of QQ-P-416.

3.4.4 Chromium plate. Chromium plate shall conform to class 1 of QQ-C-320.

3.4.5 Class 1 rings. All class 1 rings, except configuration L, shall be finished as specified in 3.4.1.

3.4.5.1 Configuration L. Configuration L, except dimension 1 inch by 7/8 inch, class 1 rings shall be given a bright polished finish. Configuration L, class 1 ring dimension 1 inch by 7/8 inch shall be given either a bright polished finish or a chromium finish specified in 3.4.4, as specified (see 6.2). The chromium plate thickness shall be not less than 0.0002 inch.

3.4.6 Class 2 rings. All class 2 rings, except configurations L and X, shall be given a finish specified in 3.4.2.2. The enamel coating shall level out to a uniform dry film thickness without orange peel, wrinkles, drops, streaks or areas of no film.

3.4.6.1 Configuration L. At the option of the supplier, configuration L, class 2 rings shall be given either the finish specified in 3.4.2.1 or the class 2, type II finish specified in 3.4.3.

3.4.6.2 Configuration X. Configuration X, class 2 rings shall be given the type I, class 2 finish specified in 3.4.2.1 or the class 1, type I finish specified in 3.4.3, as specified (see 6.2).

3.4.7 Class 3 rings. All class 3 rings shall be given the finish specified in 3.4.2.2. The enamel coating shall level out to a uniform dry film thickness without orange peel, wrinkles, drops, streaks or areas of no film.

3.4.8 Class 4 rings. All class 4 rings shall be ground and polished to a bright finish.

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3.4.9 Class 5 rings. The surfaces of the class 5 dee rings shall have a smooth and lusterless or semi-gloss finish. All surfaces shall be free of dirt, dust and foreign matter inclusion. The finish shall be produced from a die which has the cavity surfaces finished in a vapor blast, water hone, or similar satin finish, and not result from the application of any protective coating lacquers or other materials. The resultant surface gloss shall not exceed that of semi-gloss color black chip number 27038 of FED-STD-595 by visual comparison.

- * 3.5 Workmanship. The rings shall conform to the quality of product established by this document and the occurrence of defects shall not exceed the applicable acceptable quality levels.

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 this document where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.
 - * 4.1.1 Responsibility for compliance. All items must meet all requirements of sections 3 and 5. The inspection set forth in this document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirement in the document shall not relieve the contractor of the responsibility of assuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling in quality conformance does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to acceptance of defective material.
 - * 4.1.2 Responsibility for dimensional requirements. Unless otherwise specified in the contract or purchase order, the contractor is responsible for assuring that all specified dimensions have been met. When dimensions cannot be examined on the end item, inspection shall be made at any point or at all points in the manufacturing process necessary to assure compliance with all dimensional requirements (see 4.4.3.2).
- * 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).

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* 4.3 First article inspection. When a first article is required (see 6.2), it shall be examined for the defects specified in table III, dimensions specified, or failure to pass any test. The presence of any defect shall be cause for rejection of the first article.

* 4.4 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

* 4.4.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this document or applicable purchase document. In addition, copper-nickel-zinc alloy shall be tested as specified in table II. Nonconformance to the requirements of 3.2.6 shall constitute cause for rejection of the lot.

4.4.1.1 Inspection of nylon plastic material. Each batch of reground material, when applicable, shall be inspected for compliance with the requirements specified in 3.2.8. Any batch containing reground nylon plastic material exceeding 25 percent of a blended mixture with virgin nylon material shall be cause for rejection of the batch.

4.4.2 In-process inspection.

4.4.2.1 Process examination. In-process examination shall be conducted to insure that class 2 and class 3 rings, except configurations L and X, have had the phosphate treated zinc-plate applied before enameling as specified in 3.4.2.2. When nonconformance is noted, correction shall be made to the affected items and process.

4.4.2.2 In-process visual examination of welded or brazed rings without roller. When applicable, welded or brazed ring configurations requiring rollers shall be examined before finishing and assembling the roller, to determine conformance to 3.3.1 or 3.3.2. The lot shall be all unfinished rings without roller assembled of one class, configuration and size offered for inspection at one time. The sample unit for this examination shall be one ring. The inspection level shall be S-1 and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 4.0.

4.4.3 End item inspection.

4.4.3.1 End item visual examination. The end items shall be examined for the defects listed in table III. The lot size shall be expressed in units of finished rings of one class, size, configuration, and style, as applicable. The sample unit shall be one completely fabricated and finished ring. The inspection level shall be level II and the AQL, expressed in terms of defects per hundred units, shall be 2.5 for major defects and 6.5 for total (major and minor combined) defects.

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TABLE II. Material tests, copper-nickel-zinc alloy

Lot expressed in terms of	Characteristic	Requirement para.	Test method	Number of de- terminations	Sample unit	Results reported as	Inspection level
(100 pounds)				(composite)			
Copper-nickel- zinc alloy	Chemical composition	3.2.6	111 or 112 of FED-STD-151	2 for each element	4 oz. of material	Nearest 0.1 percent each element	S-1

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TABLE III. End item visual defects

Examine	Defect	Classification	
		Major	Minor
Finish:			
General	Not type specified	X	
	Evidence of corrosion	X	
Black chemical	Color not as specified		X
	Finish not clean and uniform		X
	Area of no finish or finish discolored		X
Enamel	Area of no film or color not as specified	X	
	Separation of color, or finish rough (i.e., lint, dust, dirt or other foreign matter imbedded in finish)		X
	Finish not continuous, smooth and adherent (i.e., orange peel, wrinkles, drops, streaks)		X
Zinc, chromium and cadmium plated	Coating omitted, or area of no coating	X	
	Coating not smooth, uniform, fine-grained, or not tightly adherent (i.e., flaky, blistered or peeling); or coating is scratched, stained, discolored, shaded, broken or cut through, or is not free from pits, modules or indications of burning		X
Plastic	Not smooth, lusterless or semigloss black	X	
	Gloss exceeds color chip No. 27038 when compared visually		X
Polished finish	Polish not bright	X	
	Buff drag, cloudy, hazy, or mottle finish clearly noticeable		X

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TABLE III. End item visual defects (cont'd)

Examine	Defect	Classification	
		Major	Minor
Construction and workmanship	Sharp edge or projection that may cause injury	X	
	Cracked, broken, bent, malformed or damaged	X	
	Pronounced tool or forming marks		X
Casting	Miscast, incomplete, or contains blowholes, or evidence of porosity	X	
Roller (when applicable)	Does not turn freely	X	
	Joint not butted	X	
Workmanship of welds or brazing	Weld or brazing missing, unless welding is not required		X
	Completely broken or not fused	X	
	Cracked, partially broken, incomplete, or evidence of poor fusion or burn through		X
	Evidence that weld contains gas pockets or has been undercut, or that excess flux or spatter has not been removed		X

* 4.4.3.2 End item dimensional examination. The end items shall be examined for compliance with all dimensions specified. The lot size shall be expressed in units of finished rings of one class, size, configuration, and style, as applicable. The sample unit shall be one completely fabricated and finished ring. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 4.0.

4.4.4 Packaging examination. The fully packaged end items shall be examined for the defects listed below. The lot size shall be expressed in units of shipping containers. The sample unit shall be one shipping container fully packaged. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

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<u>Examine</u>	<u>Defect</u>
Marking (exterior and interior)	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application
Materials	Any component missing, damaged, or not as specified
Workmanship	Inadequate application of components, such as incomplete sealing or closure of flap, improper taping, loose strapping, or inadequate stapling Bulged or distorted container
Content	Number per container is more or less than required

5. PACKAGING

5.1 Preservation. Preservation shall be level A or Commercial as specified (see 6.2).

* 5.1.1 Level A. Unless otherwise specified, rings of one class, style, configuration, and size only shall be unit packed in a snug-fitting fiberboard box conforming to grade W5c or W5s, style RSC of PPP-B-636. Each box shall be agitated from time to time while filling to assure a compact and well filled box. The weight of contents of each box shall not exceed 20 pounds. When specified (see 6.2), rings shall be unit packed in quantities specified in boxes conforming to PPP-B-566 or PPP-B-676. Closure shall be in accordance with the appendix of the applicable box document.

* 5.1.2 Commercial. Rings shall be preserved in accordance with ASTM D 3951.

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

* 5.2.1 Level A packing. Rings of one class, style, configuration, and size only preserved as specified in 5.1 shall be packed in a snug-fitting shipping container conforming to overseas type of PPP-B-601 or class 2, style 2 of PPP-B-621. When rings are packed in boxes conforming to PPP-B-566 or PPP-B-676, each cleated plywood or nailed wood shipping container shall be provided with a type I or II, grade C case liner conforming to MIL-L-10547. Closure and reinforcing shall be in accordance with the appendix of the applicable specification. The weight of contents of each shipping container shall not exceed 120 pounds.

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5.2.2 Level B packing. Rings of one class, style, configuration, and size only, preserved as specified in 5.1, shall be packed in a snug-fitting shipping container conforming to style FTC, type CF, variety DW, class domestic, grade 350 of PPP-B-636; domestic type, style A or B of PPP-B-601 or class 1, style 2 of PPP-B-621. The weight of contents of each shipping container shall not exceed 120 pounds.

5.2.2.1 Level B shipping container. When specified (see 6.2), the shipping container shall be a grade V3c, V3s, or V4s fiberboard box fabricated in accordance with PPP-B-636 and closed in accordance with the appendix of PPP-B-636.

5.2.3 Commercial packing. Rings, preserved as specified in 5.1, shall be packed in accordance with ASTM D 3951.

5.3 Marking. In addition to any special marking required by the contract or purchase order, unit packs and shipping containers, shall be marked in accordance with MIL-STD-129 or ASTM D 3951, as applicable. Each interior package and shipping container shall be marked with the quantity of rings contained therein.

6. NOTES

6.1 Intended use.

6.1.1 Class 1 rings. Class 1 rings, other than configurations W, X, and L, are intended for use in connection with textile, webbing and leather items where the corrosion products of ferrous metals may adversely affect the textile, webbing and leather items.

6.1.2 Classes 2 and 3 rings. Classes 2 and 3 rings, other than configurations X and D are intended for use as alternates to class 1 rings in periods of emergency. These also may be used where a specific requirement for additional strength is necessary.

6.1.3 Class 4 rings. Class 4 rings are intended for use on animal equipment in special applications where high resistance to corrosion is required.

6.1.4 Configurations W, X, and L rings. Configuration W rings are generally used on Munition Command items; configuration X rings are generally used on Weapons Command items; configuration L rings are generally used on Electronic Command items.

6.1.5 Configuration D rings. Configuration D rings are generally used on animal equipment.

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6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. Configuration and, when applicable, size required (see 1.2 and 1.2.2).
- c. Style required when applicable (see 1.2).
- d. Class required (see 1.2.1).
- e. When a first article is required (see 3.1, 4.3, and 6.3).
- f. When configuration A ring shall be welded (see 3.3.2).
- g. Finish required (see 3.4.5.1 and 3.4.6.2).
- h. Selection of applicable levels of packaging and packing (see 5.1 and 5.2).
- i. When specific quantities of one class, style, configuration and size are required (see 5.1.1).
- j. Whether weather-resistant class fiberboard shipping containers are required for level B shipments (see 5.2.2.1).

* 6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should include specific instructions in all acquisition instruments regarding arrangements for selection, inspection, and approval of the first article.

* 6.4 Recycled material. It is encouraged that recycled material be used when practical as long as it meets the requirements of this document (see 3.2 and 3.2.8).

* 6.5 Subject term (key word) listing.

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6.6 Changes from previous issue. The margins of this document are marked with an asterisk (*) to indicate where changes (additions, modifications, corrections, deletions) 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, as written, irrespective of the marginal notations and relationship to the last previous issue.

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Custodians:

Army - GL
Air Force - 99

Review activities:

Army - AR
Air Force - 82
DLA - IS

User activities:

Army - ME
Navy - MC

Preparing activity:

Army - GL
Project No. 5365-0136