

| INCH-POUND |

QQ-A-225G/GEN
28 SEPTEMBER 1990
SUPERSEDING
QQ-A-225F/GEN
27 NOVEMBER 1984

FEDERAL SPECIFICATION

ALUMINUM AND ALUMINUM ALLOY BAR, ROD, WIRE, OR SPECIAL SHAPES; ROLLED, DRAWN, OR COLD FINISHED; GENERAL SPECIFICATION FOR

This Federal specification was approved by the Commissioner,
Federal Supply Service, General Service Administration,
for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers the general requirements for aluminum and aluminum alloy bar, rod, wire, or special shapes; rolled, drawn, or cold finished. Specific requirements for any product are covered by the applicable detail specification (see 6.3).

1.2 Classification.

1.2.1 Tempers. Product lying within the scope of this specification shall be classified in tempers as specified in the detail specifications. The definitions of tempers shall be as specified in ANSI H35.1.

2. APPLICABLE DOCUMENTS

2.1 Government publications. The issues of the following documents, in effect on date of invitation for bids or solicitation for offers form a part of this specification to the extent specified herein.

Federal Standards

FED-STD-123 - Marking for Shipment (Civil Agencies)

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions, as outlined under General Information in the Index of Federal Specifications, Standards, and Commercial Item Descriptions. The Index, which includes cumulative bimonthly

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Systems Engineering and Standardization Department (Code 53), Commanding Officer, Naval Air Engineering Center, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426 appearing at the end of this document or by letter.

AMSC N/A

FSC 9525

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supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.)

(Single copies of this specification, and other Federal specifications and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from the General Services Administration Business Service Centers in Boston, MA; New York, NY; Philadelphia, PA; Washington, DC; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Houston, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.)

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions for established distribution points in their agencies.)

Military Specifications:

MIL-H-6088 - Heat Treatment of Aluminum Alloys

Military Standards:

MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
 MIL-STD-1537 - Electrical Conductivity Test for Measurement of Heat Treatment of Aluminum Alloys, Eddy Current Method
 MIL-STD-2154 - Inspection, Ultrasonic, Wrought, Metals, Process for

(Copies of military specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring 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. Unless a specific issue is identified, the issue in effect on date of invitation for bid or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards:

B557 - Tension Testing Wrought and Cast Aluminum and Magnesium-Alloy Products
 B660 - Packaging/Packing of Aluminum and Magnesium Products
 B666 - Identification Marking of Aluminum Products
 E34 - Chemical Analysis of Aluminum and Aluminum Alloys
 E227 - Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique
 E290 - Semi-Guided Bend Test for Ductility of Metallic Materials
 E607 - Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique, Nitrogen Atmosphere
 E1251 - Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Argon Atmosphere, Point-to-Plane, Unipolar Self-Initiating Capacitor Discharge

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G47 - Susceptibility to Stress Corrosion Cracking of High-Strength Aluminum Alloy Products

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187)

American National Standards Institute (ANSI) Standards

H35.2 - Dimensional Tolerances for Aluminum Mill Products

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

National Motor Freight Traffic Association, Inc., Agent

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 2200 Mill Road, Alexandria, Virginia 22314-4677.)

Uniform Classification Committee, Agent

Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606-5945.)

* 2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

* 2.4 Streamlining. This document has been streamlined. Appendix A to QQ-A-225 lists those documents required for QQ-A-225 acquisition and is a mandatory part of QQ-A-225. Those documents listed in Appendix A have the same status as those referenced directly in QQ-A-225 (first tier documents). All other documents, referenced through tiering, may be used as guidance and information to supplement QQ-A-225.

3. REQUIREMENTS

3.1 General requirements. Each product covered by this specification shall meet the requirements specified herein and in the applicable detail specification.

3.2 Chemical composition. The chemical composition of any product shall be as specified in the applicable detail specification.

3.3 Mechanical properties.

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* 3.3.1 Tensile properties of products other than wire. Products other than wire shall exhibit tensile properties meeting requirements of applicable detail specifications. The requirements for minimum elongation shall not apply to any product of nominal thickness less than 0.062 inch, or to product of such configuration or dimensions that a test specimen complying with ASTM B557 cannot be prepared.

3.3.2 Tensile properties of wire. Elongation and yield strength need not be determined when the product is wire of a nominal diameter of 0.125 inch or less.

3.3.3 Tensile properties of product sizes and tempers not covered by a detail specification. Tensile properties of such product shall be as specified in the contract or purchase order (see 6.2).

* 3.3.4 Bend properties. When minimum bend properties are specified in the detail specification or other procurement documents, test specimens shall be prepared and tested in accordance with 4.4.2.3 as applicable.

3.4 Dimensional tolerances. Unless otherwise specified, the dimensional tolerances shall not exceed those specified in ANSI H35.2. Tolerances for sizes not covered in ANSI H35.2 shall be as specified in the contract or purchase order (see 6.2).

* 3.5 Corrosion resistance. When testing for resistance to stress-corrosion cracking testing is specified in the detail specification or other procurement documents, specimens made from a product having at least a 0.750 inch diameter or thickness in the thinnest portion of the cross section shall show no evidence of cracking when stressed in tension in the short transverse direction and tested in accordance with 4.4.2.4.1.

* 3.6 Internal soundness. When specified (see 6.2), product of 0.500 inch through 6.000 inches thickness in the thinnest portion of the cross-section shall pass an ultrasonic inspection complying with MIL-STD-2154, as applicable to ultrasonic quality class levels specified in procurement documents. The maximum weight of each inspection unit (see 4.3.1) shall be 600 pounds for thicknesses ranging from 0.500 inch through 3.000 inches. The maximum weight of each inspection unit shall be 1000 pounds for units of thicknesses ranging from 3.001 through 6.000 inches.

* 3.6.1 Billets to be formed into wire, thin-section shapes, and thin-wall, tubing. When specified (see 6.2), billets to be formed into these products shall pass an ultrasonic inspection complying with MIL-STD-2154, as applicable to ultrasonic quality class levels specified in procurement documents. The maximum weight of each inspection unit shall be 600 pounds for nominal billet diameters or thicknesses ranging from 0.5 inch to 3.0 inches, and 1000 pounds for nominal diameters or thicknesses ranging beyond 3.0 inches to 6.0 inches.

* 3.7 Electrical conductivity. Electrical conductivities shall comply with requirements specified in detail specifications, as applicable to composition and temper (see 4.3.8 and 4.4.1.2).

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3.8 Heat treatment. Unless otherwise specified in the contract or purchase order, heat treatment to the applicable tempers designated in the detail specification (see 1.2.1) shall be in accordance with MIL-H-6088, as applicable.

3.9 Finish. Unless otherwise specified, rod up to and including 3.00 inches in nominal diameter, and bar up to and including 2.00 inches thick nominal (with maximum width for rectangles of 4.00 inches) shall be processed to size by cold finishing.

3.10 Marking for identification. Bar, rod, wire and special shapes shall be marked in accordance with ASTM B666, as applicable, and the detail specification, as required.

3.11 Workmanship. Finished product to be fabricated into aerospace parts, and parts having similar performance requirements (see 6.1), shall be uniform in quality and condition, clean, smooth, free from hard and soft spots, internal voids and cracks (see 3.6), pipes, laps, cracks and seams, surface folds and crevices, fins, kinks, damaged ends, and other injurious flaws. The levels of quality of finished product for relatively uncritical applications shall be as specified in applicable procurement documents. Discoloration which does not affect properties shall not be cause for rejection.

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) 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 that 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 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 inspections specified herein are quality conformance inspections.

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4.3 Sampling of product.

* 4.3.1 Unit of inspection. The unit of inspection for uncoiled product shall be one billet, bar, rod, or special shape. The unit of inspection for coiled product shall be one coil.

4.3.2 Inspection lot. An inspection lot shall be as follows:

4.3.2.1 Heat-treated material. For heat-treated tempers, an inspection lot shall consist of an identifiable quantity of inspection units of the same alloy, temper, cross-sectional configuration and dimensions traceable to a heat-treated lot or lots and subjected to inspection at one time.

4.3.2.2 Nonheat-treated material. For nonheat-treated tempers, an inspection lot shall consist of an identifiable quantity of inspection units of the same alloy, temper, cross-sectional configuration and dimensions subjected to inspection at one time.

4.3.3 Sampling for chemical analysis.

4.3.3.1 Ingot analysis. At least one sample shall be taken from each group of ingots of the same alloy, poured simultaneously from the same source of molten metal by the producer, and analyzed to determine conformance with 3.2. Ingots not conforming to the requirements of the specification shall be rejected. Complete ingot analysis records shall be available at the producer's plant to Government-authorized representatives upon request.

4.3.3.2 Analysis of product. Specimens of product shall be analyzed when the compliance of an inspection lot with 3.2 is doubtful. The sampling procedure applied shall comply with the most applicable procedure from among the following.

* 4.3.3.2.1 Ingot identities known. When ingot identities of the workpieces comprising an inspection lot are known, one specimen taken from one workpiece from among the product of each ingot shall be analyzed in accordance with 4.4.2.1. Ingot analysis certification may be substituted in place of performing chemical analysis unless disapproved by the procuring activity.

* 4.3.3.2.2 Ingot identities indeterminable. When the identities of ingots used to produce the units comprising the inspection lot can not be determined, specimens for analysis in accordance with 4.4.2.1 shall be taken using the most applicable procedure from among those following. When taking specimens, only one specimen shall be taken from any one inspection unit when more than one unit is available. Not more than one analysis per unit sample need be taken, except for verification.

* 4.3.3.2.2.1 Product having a nominal weight per inspection unit of less than one pound per lineal foot. From each inspection lot of such product weighing 1000 pounds or less, one specimen shall be taken. From each inspection lot weighing more than 1000 pounds, one additional specimen shall be taken from each 1000 pounds and remaining fraction thereof.

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* 4.3.3.2.2.2 Product having a nominal weight per inspection unit of one pound or more per lineal foot. From each lot of such product comprising 1000 lineal feet or less, one specimen shall be taken. From each inspection lot comprising more than 1000 lineal feet, one additional specimen shall be taken from each 1000 feet and remaining fraction thereof.

* 4.3.4 Sampling for tension and bend test. Specimens of product for testing to determine compliance with 3.3 shall be removed in compliance with the most applicable procedure from among the following.

* 4.3.4.1 Product having a nominal weight per inspection unit of less than one pound per lineal foot.

* 4.3.4.1.1 Lots weighing 1000 pounds or less. From each inspection lot of product weighing 1000 pounds or less, one specimen for the tension test, and, when specified, one specimen for the bend test shall be taken. Only one specimen for either test shall be taken from any one unit when the lot contains more than one unit.

* 4.3.4.1.2 Lots weighing more than 1000 pounds. From each inspection lot of product weighing more than 1000 pounds, one specimen for the tension test, and when specified, one specimen for the bend test shall be taken for each 1000 pounds and fraction thereof. Only one specimen for either test shall be taken from any one unit when the lot contains more than one unit.

* 4.3.4.2 Product having a nominal weight per inspection unit of one pound or more per lineal foot.

4.3.4.2.1 Lots having 1000 lineal feet or less. From each inspection lot of product consisting of 1000 lineal feet or less, one specimen for the tension test, and when specified, one specimen for the bend test shall be taken. Only one specimen for either test shall be taken from any one unit when the lot contains more than one unit.

* 4.3.4.2.2 Lots having more than 1000 lineal feet. From each inspection lot consisting of more than 1000 lineal feet, one specimen for the tension test, and when specified, one specimen for the bend test shall be taken for each 1000 lineal feet and fraction thereof. Only one specimen for either test shall be taken from any one unit when the lot contains more than one unit.

* 4.3.5 Sampling for inspection of workmanship, dimensions, and marking. Each length of rod, bar or special shape and each coil of wire or rod shall be inspected for compliance with 3.4, 3.9, 3.10 and 3.11. Producers may use statistical quality control procedures in lieu of inspecting each piece when those procedures and results are fully documented and available at the producers plant to the procuring activity.

4.3.6 Sampling for stress-corrosion tests. When thickness permits (see 3.5.1), two samples shall be taken for each 4000 pounds or less of the first three production lots of each of the applicable tempers for each size range listed in the table of minimum mechanical properties in the detail specification. Thereafter, surveillance testing shall be performed on at least one sample per month of the applicable tempers for each size range

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listed in the table of minimum properties of the detail specification produced during the month, unless otherwise specified in the detail specification or purchase orders.

* 4.3.7 Sampling for ultrasonic inspection. When ultrasonic inspection is specified, each inspection unit shall be inspected for conformance to 3.6.

4.3.8 Sampling for electrical conductivity tests. Such tests for lot acceptance according to the criteria of the applicable detail specification shall be performed on previously selected prepared specimens for the tension tests (see 4.3.4).

4.4 Test methods.

4.4.1 Nondestructive test and inspections.

4.4.1.1 Ultrasonic examinations. Such inspections, when specified (see 3.6 and 6.2), shall comply with MIL-STD-2154, as applicable.

* 4.4.1.2 Electrical conductivity tests. Samples selected in accordance with 4.3.8 shall be electrical conductivity tested in accordance with MIL-STD-1537.

4.4.1.3 Examination of preparation for delivery. When specified (see 6.2), an examination shall be made by a Government-authorized representative to determine compliance with the requirements of Section 5. The inspection unit shall be one shipping container fully prepared for delivery. A lot shall be as specified in ASTM B660. Sampling shall be in accordance with MIL-STD-105, Inspection Level S-1, AQL of 1.5 percent defective.

4.4.2 Procedures for destructive tests.

4.4.2.1 Chemical analysis. Chemical analysis shall be made by ASTM spectrochemical method E227, E607, or E1251. In case of dispute, a referee analysis shall be made by wet chemical procedures in accordance with ASTM E34.

4.4.2.2 Tension testing.

4.4.2.2.1 Types of specimens. Specimens for tension tests shall conform to ASTM B557, as applicable. When practicable, the material should be tested in full section.

4.4.2.2.2 Location of test specimens. For sections which are wholly or predominantly symmetrical, the tension test specimens shall be taken from the locations specified in Table I. For unsymmetrical sections, the specimens shall be taken from a location that most nearly satisfies the intent of Table I. Unless otherwise specified in the contract or purchase order, for odd-shaped sections only the predominant part shall be tested.

4.4.2.2.3 Evaluation of tensile properties. Tensile strength, yield strength and elongation shall be determined in accordance with ASTM B557.

Table I. Location of axis of specimen.

| Section thickness or width (inches) | Location of axis of specimen with respect to thickness (T) and width (W) of section | |
|-------------------------------------|---|-------|
| | Thickness | Width |
| Up thru 1.500 incl | T/2 | W/2 |
| Greater than 1.500 | T/4 | W/4 |

4.4.2.3 Bending. When bend properties are specified, bend-test specimens prepared in accordance with the applicable requirements of ASTM E290, shall be bent through an angle of 180 degrees over a diameter equal to N times the diameter or least thickness of the specimen. Specimens shall be bent by either pressure or blows. The value for N shall be as specified in the detail specification.

4.4.2.4 Corrosion tests.

4.4.2.4.1 Resistance to stress-corrosion cracking. Test specimens shall be of configurations and dimensions complying with ASTM G47, as applicable to product cross-sectional configuration and dimensions, and tested in accordance with ASTM G47, as applicable, as specified in the detail specification or purchase order. Before and during testing the specimens shall be stressed as specified in the detail specification.

4.5 Rejection and retests.

4.5.1 Rejection. Where one or more test specimens fail to meet the requirements of the detail specification, the lot represented by the specimen or specimens shall be subject to rejection except as otherwise provided in a sampling plan approved by the procuring activity or in 4.5.2. When no sampling plan is provided, or approved by the procuring activity, and when there is evidence that indicates that a failed specimen was not representative of the lot of material, and when the detail specification does not specify otherwise, at least two specimens shall be selected to replace each test specimen which failed. All specimens so selected for retest shall meet the requirements of the specification or the lot shall be rejected.

* 4.5.2 Retests. In the event of failure of one or more representative specimens retest of two additional specimens for each failing specimen from the lot will be permitted. If one of the retest specimens fail, the lot shall be rejected with no further retesting permitted.

4.5.3 Resubmittal of rejected lots. Lots rejected for failure to meet the requirements of the detail specification may be resubmitted for test provided the producer has reworked the lots, as necessary, to correct the deficiencies or has removed the nonconforming material.

4.6 Certified test reports. When specified within the contract or purchase order, the contractor shall furnish with each shipment, or as otherwise instructed, three copies of certified test reports listing results of all tests performed on each lot, and certification that material composition of each lot meets specified requirements (see 6.5).

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5. PREPARATION FOR DELIVERY

* 5.1 Preservation and packing. Preservation and packing shall be level A or C in compliance with ASTM B660 and as specified in the procurement documents. Commercial level shall apply when no level is specified.

5.2 Marking.

5.2.1 Civil agencies. Marking shall be in accordance with FED-STD-123 or as specified in the contract or purchase order.

5.2.2 Military activities. Marking for shipment shall be as specified in ASTM B660.

6. NOTES

6.1 Intended use. (See applicable detail specification.)

6.2 Ordering data. (See applicable detail specification.)

6.2.1 Examination for preparation for delivery, if necessary (see 4.4.1.3).

6.3 List of detail specifications. The following detail specifications have been issued for bar, rod, wire and special shapes.

QQ-A-225/1 - Aluminum 1100, Bar, Rod and Wire; Rolled, Drawn or Cold Finished.

QQ-A-225/2 - Aluminum Alloy 3003, Bar, Rod and Wire; Rolled, Drawn or Cold Finished.

QQ-A-225/3 - Aluminum Alloy 2011, Bar, Rod and Wire; Rolled, Drawn or Cold Finished.

QQ-A-225/4 - Aluminum Alloy 2014, Bar, Rod, Wire and Special Shapes; Rolled, Drawn or Cold Finished.

QQ-A-225/5 - Aluminum Alloy 2017, Bar, Rod, and Wire; Rolled, Drawn or Cold Finished.

QQ-A-225/6 - Aluminum Alloy 2024, Bar, Rod, and Wire; Rolled, Drawn or Cold Finished.

QQ-A-225/7 - Aluminum Alloy 5052, Bar, Rod, and Wire; Rolled, Drawn or Cold Finished.

QQ-A-225/8 - Aluminum Alloy 6061, Bar, Rod, Wire and Special Shapes; Rolled, Drawn or Cold Finished.

QQ-A-225/9 - Aluminum Alloy 7075, Bar, Rod, Wire and Special Shapes; Rolled, Drawn or Cold Finished.

QQ-A-225/10 - Aluminum Alloy 6262, Bar, Rod and Wire; Rolled, Drawn or Cold Finished.

* 6.4 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Description (DID) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID is 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.

| <u>Reference Paragraph</u> | <u>DID Number</u> | <u>DID Title</u> | <u>Suggested Tailoring</u> |
|----------------------------|-------------------|------------------|----------------------------|
| 4.6 | DI-MISC-80653 | Test Reports | |

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

6.5 Standard composition control practice. It is standard practice in the United States aluminum industry to determine conformance to the chemical composition limits prior to further processing of ingots into wrought products. Due to the continuous nature of the process, it is not practical to keep a specific ingot analysis identified with a specific quantity of finished material.

6.6 Definitions.

6.6.1 Bar. A solid section that is long in relation to its cross-sectional dimensions, having a symmetrical cross-section that is square or rectangular with sharp or rounded corners or edges, or is a regular hexagon or octagon, and whose width or greatest distance between parallel faces is 3/8 inch or greater.

6.6.2 Rod. A solid round section 3/8 inch or greater in diameter, whose length is great in relation to its diameter.

6.6.3 Wire. A solid wrought product that is long in relation to its symmetrical cross-section which is square or rectangular (excluding flattened wire) with sharp or rounded corners or edges, or is round, hexagonal or octagonal. This product has a diameter, width, or greatest distance between parallel faces of less than 3/8 inch.

6.6.4 Special shapes. A rolled or drawn wrought product that is long in relation to its cross-sectional dimensions, and has a cross-section other than that of sheet, plate, wire, rod, bar, tube, or structural shapes. The thickness of any element of a shape shall be deemed to be the smallest dimension of that element.

* 6.6.5 Cold finishing. Cold finishing is a metalworking process wherein an unheated workpiece is given a small reduction in cross-section in order to

control dimensions, gain a smoother surface, and/or impart a slight hardening for improved machinability.

6.7 International standardization agreements. Certain provisions of this specification are the subject of international standardization agreement ABC-NAVY-STD-44. When amendment, revision, or cancellation of this specification is proposed which affects or violates the international agreement concerned, the preparing activity will take appropriate reconciliation action through international standardization channels.

* 6.8 Internal soundness and general workmanship. Requirement for internal soundness and general workmanship of product covered herein should be no more stringent than is necessary to assure satisfactory fabricability into specified parts and the successful performance of these parts in service. Some guidelines for selecting these requirements and quality assurance measures may be found in MIL-I-6870.

* 6.9 Tailoring. When QQ-A-225 is tailored in an acquisition, Appendix A must be tailored accordingly. In particular, when Appendix A is tailored, specific attention must be given to the chain of referencing. For example, if a first tier reference document in QQ-A-225 is tailored out, all of the reference documents which are tiered to that first tier reference document must also be tailored out.

* 6.10 Streamlining. For QQ-A-225 acquisitions, the required portions of all QQ-A-225 tier reference documents shall be limited to the portion(s) described in the "Applicability" column of Table I in Appendix A.

* 6.11 Changes from previous issue. The margins of this specification are marked with asterisks 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, irrespective of the marginal notations and relationship to the last previous issue.

MILITARY INTEREST:

CIVIL AGENCY COORDINATING ACTIVITIES:

Custodians:

Army-MR
Air Force-20

GSA-FSS
DOE-BPA
NASA-JFK

Review Activities:

Army-AR, CR, EA
Air Force-99
DLA-IS

PREPARING ACTIVITY:

NAVY-AS

(DOD Project No. 9525-0174)

User Activities:

Navy-EC, MC, SH

APPENDIX A

STREAMLINING INFORMATION

10. SCOPE

10.1 Scope. This Appendix is a list of documents referenced in QQ-A-225 or tiered to documents referenced in QQ-A-225. These documents have the same status as those referenced directly in QQ-A-225 (first tier documents). This Appendix is a mandatory part of this specification. The requirements of the documents contained herein is intended for compliance.

10.2 Application. This Appendix identifies the applicability of the documents referenced in QQ-A-225 or tiered to documents referenced in QQ-A-225 through the 2nd tier. Only the portion(s) of a document listed in Table I of this Appendix and described in the "Applicability" column is pertinent in the use of QQ-A-225. If QQ-A-225 is tailored in acquisition, this Appendix must also be tailored.

20. DOCUMENTS

20.1 Documents. The documents listed herein and corresponding applicability data have been identified as required. All other documents referenced through tiering are not considered required and may be used for guidance and information.

TABLE I. Required documents and corresponding applicability data.

| DOCUMENT NUMBER: | DOCUMENT TITLE: | APPLICABILITY: | REFERENCED BY: |
|------------------|-----------------|----------------|----------------|
|------------------|-----------------|----------------|----------------|

First Tier (1 of 17 documents)

| | | | |
|-------------|----------------------|---|----------|
| FED-STD-123 | Marking for Shipment | Due to the extensive number of variables associated with marking, applicable sections of marking documents cannot be identified prior to acquisition. All marking requirements of the zero tier document must be met, unless otherwise specified in the contract. | QQ-A-225 |
|-------------|----------------------|---|----------|

Second Tier

| | | | |
|--------------|--|-----------|-------------|
| MIL-STD-1189 | Standard Department of Defense Bar Code Symbology | Bar codes | FED-STD-123 |
|--------------|--|-----------|-------------|

The remaining second tier references, tiered to FED-STD-123, are for guidance and information.

First Tier (2 of 17 documents)

| | | | |
|------------|-----------------------------------|---|----------|
| MIL-H-6088 | Heat Treatment of Aluminum Alloys | Heat treating of aluminum alloy listed in the applicable detail specification | QQ-A-225 |
|------------|-----------------------------------|---|----------|

Second Tier

| | | | |
|---------------|-----------------------------------|-----------------|------------|
| MIL-S-10699 | Salts, Heat Treating (For Metals) | Class II salts | MIL-H-6088 |
| MIL-STD-45662 | Calibration System Requirements | Entire document | MIL-H-6088 |

The remaining second tier references, tiered to MIL-H-6088, are for guidance and information.

First Tier (3 of 17 documents)

| | | | |
|-------------|--|---|----------|
| MIL-STD-105 | Sampling Procedures and Tables for Inspection by Attributes | Requirements for inspection level S-1, AQL 1.5 percent defective | QQ-A-225 |
|-------------|--|---|----------|

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TABLE I. Required documents and corresponding applicability data. (continued)

| DOCUMENT NUMBER: | DOCUMENT TITLE: | APPLICABILITY: | REFERENCED BY: |
|------------------|-----------------|----------------|----------------|
|------------------|-----------------|----------------|----------------|

Second Tier
(no other documents referenced)

First Tier (4 of 17 documents)

| | | | |
|--------------|---|-----------------|----------|
| MIL-STD-1537 | Electrical Conductivity for Measurement of Heat Treatment of Aluminum Alloys, Eddy Current Method | Entire document | QQ-A-225 |
|--------------|---|-----------------|----------|

Second Tier

| | | | |
|-------------|--|--------------------------------|--------------|
| MIL-STD-410 | Non-Destructive Testing Personnel Qualification and Certification (Eddy Current, Liquid Penetrant, Magnetic Particle, Radiographic and Ultrasonic) | Eddy current testing personnel | MIL-STD-1537 |
|-------------|--|--------------------------------|--------------|

| | | | |
|---------------|---------------------------------|-----------------|--------------|
| MIL-STD-45662 | Calibration System Requirements | Entire document | MIL-STD-1537 |
|---------------|---------------------------------|-----------------|--------------|

The remaining second tier references, tiered to MIL-STD-1537, are for guidance and information.

First Tier (5 of 17 documents)

| | | | |
|--------------|--|---|----------|
| MIL-STD-2154 | Inspection, Ultrasonic, Wrought, Metals, Process | Ultrasonic inspection procedure for alloy listed in the applicable detail specification | QQ-A-225 |
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Second Tier

| | | | |
|-------------|--|------------------------------|--------------|
| MIL-STD-410 | Non-Destructive Testing Personnel Qualification and Certification (Eddy Current, Liquid Penetrant, Magnetic Particle, Radiographic and Ultrasonic) | Ultrasonic testing personnel | MIL-STD-2154 |
|-------------|--|------------------------------|--------------|

TABLE I. Required documents and corresponding applicability data. (continued)

| DOCUMENT NUMBER: | DOCUMENT TITLE: | APPLICABILITY: | REFERENCED BY: |
|--------------------|--|---------------------------------|----------------|
| <u>Second Tier</u> | | | |
| ASTM B594 | Standard Method for Ultrasonic Inspection of Aluminum-Alloy Wrought Products for Aerospace Applications | Ultrasonic inspection procedure | MIL-STD-2154 |
| ASTM E127 | Fabricating and Checking Aluminum Alloy Ultrasonic Standard Reference Blocks, Recommended Practice for | Ultrasonic reference blocks | MIL-STD-2154 |
| ASTM E317 | Performance Characteristics of Ultrasonic Pulse-Echo Testing Systems, Without the Use of Electronic Measurement Instruments, Practice for Evaluating | Pulse-echo testing systems | MIL-STD-2154 |

The remaining second tier references, tiered to MIL-STD-2154, are for guidance and information.

First Tier (6 of 17 documents)

| | | | |
|-----------|---|---|----------|
| ASTM B557 | Tension Testing of Wrought and Cast Aluminum and Magnesium Alloy Products | Tension testing of aluminum bar, rod, wire and special shapes | QQ-A-225 |
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Second Tier

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|---------|--|---|-----------|
| ASTM E4 | Methods of Load Verification of Testing Machines | Requirements for testing machines and range of testing machines loading | ASTM B557 |
|---------|--|---|-----------|

The remaining second tier references, tiered to ASTM B557, are for guidance and information.

First Tier (7 of 17 documents)

| | | | |
|---|--|--|----------|
| ASTM B660 (Replaces MIL-STD-649C) | Packaging/Packing of Aluminum and Magnesium Products | Due to the extensive number of variables associated with packaging, applicable sections of packaging documents cannot be | QQ-A-225 |
|---|--|--|----------|

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TABLE I. Required documents and corresponding applicability data. (continued)

| | | | |
|------------------|-----------------|----------------|----------------|
| DOCUMENT NUMBER: | DOCUMENT TITLE: | APPLICABILITY: | REFERENCED BY: |
|------------------|-----------------|----------------|----------------|

identified prior to acquisition. All packaging requirements of the zero tier document must be met, unless otherwise specified in the contract.

First Tier (8 of 17 documents)

| | | | |
|-----------|---|-----------------|----------|
| ASTM B666 | Identification Marking of Aluminum Products | Entire document | QQ-A-225 |
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Second Tier

The second tier references, tiered to ASTM B666, are for guidance and information.

First Tier (9 of 17 documents)

| | | | |
|----------|---|--|----------|
| ASTM E34 | Chemical Analysis of Aluminum and Aluminum Alloys | Wet chemical test for referee analysis of chemical composition | QQ-A-225 |
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Second Tier

The second tier references, tiered to ASTM E34, are for guidance and information.

First Tier (10 of 17 documents)

| | | | |
|-----------|---|---|----------|
| ASTM E227 | Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique | Spectrochemical method to test for chemical composition | QQ-A-225 |
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Second Tier

The remaining second tier references, tiered to ASTM E227, are for guidance and information.

First Tier (11 of 17 documents)

| | | | |
|-----------|---|-----------------|----------|
| ASTM E290 | Semi-Guided Bend Test for Ductility of Metallic Materials | Entire Document | QQ-A-225 |
|-----------|---|-----------------|----------|

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TABLE 1. Required documents and corresponding applicability data. (continued)

DOCUMENT NUMBER: DOCUMENT TITLE: APPLICABILITY: REFERENCED BY:

Second Tier

The remaining second tier references, tiered to ASTM E290, are for guidance and information.

First Tier (12 of 17 documents)

| | | | |
|-----------|---|--|----------|
| ASTM E607 | Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Point-to-Plane Technique, Nitrogen Atmosphere | Spectrochemical method to test for chemical composition | QQ-A-225 |
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Second Tier

The remaining second tier references, tiered to ASTM E607, are for guidance and information.

First Tier (13 of 17 documents)

| | | | |
|------------|---|--|----------|
| ASTM E1251 | Optical Emission Spectrometric Analysis of Aluminum and Aluminum Alloys by the Argon Atmosphere, Point-to-Plane, Unipolar Self-Initiating Capacitor Discharge | Spectrochemical method to test for chemical composition | QQ-A-225 |
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Second Tier

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|------|---|--------------------------|-------------|
| E172 | Practice for Describing and Specifying the Excitation Source in Emission Spectrochemical Analysis | Excitation source | ASTM E 1251 |
| E406 | Practice for Using Controlled Atmospheres in Spectrochemical Analysis | Gas flow system | ASTM E 1251 |
| E716 | Practices for Sampling Aluminum and Aluminum Alloys for Spectrochemical Analysis | Preparation of specimens | ASTM E 1251 |

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TABLE I. Required documents and corresponding applicability data. (continued)

| DOCUMENT NUMBER: | DOCUMENT TITLE: | APPLICABILITY: | REFERENCED BY: |
|------------------|-----------------|----------------|----------------|
|------------------|-----------------|----------------|----------------|

The remaining second tier references, tiered to ASTM E1251, are for guidance and information.

First Tier (14 of 17 documents)

| | | | |
|----------|--|-----------------|----------|
| ASTM G47 | Standard Test Method for Determining Susceptibility to Stress-Corrosion Cracking of High Strength Aluminum Alloy Products | Entire document | QQ-A-225 |
|----------|--|-----------------|----------|

Second tier

| | | | |
|----------|--|-------------------|----------|
| ASTM G38 | Practice for Making and Using the C-Ring Stress-Corrosion Cracking Test Specimen | Stressing methods | ASTM G47 |
|----------|--|-------------------|----------|

Second tier

| | | | |
|----------|---|---|----------|
| ASTM G44 | Recommended Practice for Alternate Immersion Stress Corrosion Testing in 3.5% Sodium Chloride Solution | Entire document | ASTM G47 |
| ASTM G49 | Recommended Practice for Preparation and Use of Direct Tension Stress Corrosion Specimens | Test specimens and stressing methods (constant strain) | ASTM G47 |

The remaining second tier references, tiered to ASTM G47, are for guidance and information.

First Tier (15 of 17 documents)

| | | | |
|------------|---|---|----------|
| ANSI H35.2 | American National Standard, Dimensional Tolerances for Aluminum Mill Products | Tolerances for wire, rod, bar -rolled or cold finished | QQ-A-225 |
|------------|---|---|----------|

Second Tier (no other documents referenced)

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TABLE I. Required documents and corresponding applicability data. (continued)

| DOCUMENT NUMBER: DOCUMENT TITLE: | APPLICABILITY: | REFERENCED BY: |
|--|---|----------------|
| <u>First Tier (16 of 17 documents)</u> | | |
| National Motor Freight Classification | Due to the extensive number of variables associated with packaging, applicable sections of packaging documents cannot be identified prior to acquisition. All packaging requirements of the zero tier document must be met, unless otherwise specified in the contract. | QQ-A-225 |
| <u>First Tier (17 of 17 documents)</u> | | |
| Uniform Freight Classification | Due to the extensive number of variables associated with packaging, applicable sections of packaging documents cannot be identified prior to acquisition. All packaging requirements of the zero tier document must be met, unless otherwise specified in the contract. | QQ-A-225 |

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
QQ-A-225G/GEN

2. DOCUMENT DATE (YYMMDD)
28 September 90

3. DOCUMENT TITLE Aluminum and Aluminum Alloy Bar, Rod, Wire, or Special Shapes, Rolled, Drawn, or Cold Finished; General Specification For

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

a. NAME

Commanding Officer
NAEC, SESD Code 53

b. TELEPHONE (Include Area Code)

(1) Commercial (2) AUTOVON
(908) 323-7455 624-7455

c. ADDRESS (Include Zip Code)

Lakehurst, NJ 08733-5100

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