Society of Automotive Engineers, Inc.
TWO PENNSYLVANIA PLAZA, NEW YORK, N.Y. 10001

AEROSPACE MATERIAL SPECIFICATION

AMS 7730A
Superseding AMS 7730
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DEPLETED URANIUM CASTINGS

1. SCOPE:

1.1 Form: This specification covers depleted uranium in the form of castings.

1.2 Application: Primarily for use as cast aircraft counterweights where it is desirable to produce compound contours without machining and where space limitations require the use of a high-density material. Applications in oxidizing atmospheres necessitate a protective coating.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications (AMS), shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., Two Pennsylvania Plaza, New York, New York 10001.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2645 - Fluorescent Penetrant Inspection
AMS 2646 - Contrast Dye Penetrant Inspection

2.2 ASTM Publications: Available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.

ASTM E8 - Tension Testing of Metallic Materials

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined by methods agreed upon by purchaser and vendor.

	min	max
Uranium	99.00	--
Carbon	--	0.07

3.2 Condition: As cast and cadmium plated.

3.3 Casting: Melting and casting shall be performed in vacuum unless melting and casting under inert atmosphere are permitted by purchaser. Molds shall be made of graphite or insoluble refractory material unless special casting techniques are used to prevent contamination with foreign materials. Extreme care shall be exercised to avoid contact of the molten metal with more soluble refractories such as those containing silica.

3.4 Test Specimens: Tensile test specimens shall be cast to represent each heat of metal in castings. The specimens shall be of standard proportions in accordance with ASTM E8 with 0.25 in. (6.35 mm) diameter at the reduced parallel gage section. They shall be cast to size in molds made of the same mold material and heat to the same temperature as the molds for castings and shall be cooled at approximately the same rate as the castings.

3.5 Plating: Castings shall be plated on all surfaces of the finish-machined castings. Plating shall consist of a copper flash on the basis metal followed by a uniform nickel flash and a final cadmium plate not less than 0.001 in. (0.0254 mm) thick on all exterior surfaces.

3.6 Properties:

3.6.1 Properties of Separately Cast Test Specimens:

3.6.1.1 Tensile Properties: Tensile test specimens produced in accordance with 3.4 and tested in accordance with ASTM E8 shall conform to the following requirements:

Tensile Strength, min	70,000 psi (483 MN/m^2)
Yield Strength at 0.2% Offset, min	35,000 psi (241 MN/m^2)
Elongation in 1 in. (25.4 mm) or 4D	6%

3.6.2 Properties of Castings:

3.6.2.1 Tensile Properties: When specified on the drawing or when agreed upon by purchaser and vendor, tensile test specimens conforming to ASTM E8 shall be machined from castings selected at random from the shipment. Size and location of such specimens and required tensile properties shall be as shown on the drawing or as agreed upon by purchaser and vendor.

3.6.2.2 Density: Shall be not lower than 0.673 lb per cu in. (18.82g/cm^3), unless otherwise specified.

3.6.3.3 Radiation Emission: The radiation emission of the casting, at the surface of the casting, shall be not greater than 220 mR (56.7 mC/kg) per hr, beta plus gamma. After cadmium plating, the radiation emission shall be not greater than 210 mR (54.2 mC/kg) per hour.

3.6.3.3.1 The radiation emission values of 3.6.3.3 are valid only if measured with a beta-gamma survey meter having a scale of 0-250 mR (0-64.5 mC/kg) per hr with a full scale accuracy of ± 10%. If any other instrument is used, conversion shall be required.

3.7 Quality:

3.7.1 Castings:

3.7.1.1 Castings shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts. Castings shall have smooth surfaces and shall be well cleaned.

3.7.1.2 Unless otherwise specified, repair of minor imperfections by inert gas shielded fusion welding is permitted; the repaired imperfection shall be not detrimental to fabrication or to performance of parts and shall be free from cracks, porosity, and other harmful imperfections as determined by penetrant inspection in accordance with AMS 2645 or AMS 2646.

3.7.1.3 Surface imperfections may be removed with suitable grinders or other tools but the blending of imperfections shall not result in dimensions outside the drawing limits.

3.7.2 Plating: Shall be smooth, fine grained, adherent to all surfaces of the finished part, and free from cracks, blisters, pits, nodules, and other defects.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor shall supply all samples and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.5. Purchaser reserves the right to perform such confirmatory testing as he deems necessary to assure that the product conforms to the requirements of this specification.

4.2 Classification of Tests: Tests to determine conformance to all technical requirements of this specification are classified as routine control tests.

4.3 Sampling: Shall be in accordance with the following:

4.3.1 Composition: One casting from each lot.

4.3.2 Tensile Properties: One test specimen from each lot except that when properties of specimens cut from castings are required one casting from each lot.

4.3.3 Density and Radiation Emission: One casting from each lot.

4.3.4 Statistical Sampling: Testing for tensile properties of each lot may be waived by the purchaser upon vendor's demonstration of a statistical sampling plan which will assure that the tensile properties of 3.6.1.1 and 3.6.2.1 will be met.

4.4 APPROVAL:

4.4.1 Sample castings from new or reworked patterns and the casting procedure shall be approved by purchaser before castings for production use are supplied, unless such approval be waived.

4.4.2 Vendor shall establish for production of sample castings of each part number the control factors of processing which will produce acceptable castings; this shall constitute the approved casting procedure and shall be used for producing production castings. If necessary to make any change in control factors of processing which could affect quality or properties of the castings, vendor shall submit for reapproval a statement of the revised operations and, when requested, sample castings. No production castings incorporating the revised operations shall be shipped prior to receipt of reapproval.

4.4.2.1 Control factors for producing castings include, but are not limited to the following:

Type of furnace and its capacity
Size of furnace charge
Furnace atmosphere
Fluxing or deoxidation procedure
Mold refractory formulation
Mold back-up material
Gating practices
Mold preheating temperature, pouring temperature or both
(Variations of ± 25 F (± 14 C) from established limits are acceptable)
Solidification rate and subsequent cooling procedures
Cleaning operations
Methods of routine inspection

4.4.2.1.1 Any of the above control factors of processing considered proprietary by the vendor may be assigned a code designation. Each variation in such factors shall be assigned a modified code designation.

4.5 Reports:

4.5.1 The vendor of the product shall furnish with each shipment three copies of a report showing the results of tests made on the product to determine conformance to the requirements of this specification. This report shall include the purchase order number, heat number (and code symbol if used), material specification number and its revision letter, part number, and quantity from each heat.

4.6 Resampling and Retesting: If any specimen used in the above tests fails to meet the specified requirements, disposition of the product may be based on the results of testing of three additional specimens for each original nonconforming specimen. Failure of any retest specimen to meet the specified requirements shall be cause for rejection of the castings in that shipment. Results of all tests shall be reported.