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400 Commonwealth Dr., Warrendale, PA 15096

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

SAE AMS 5791

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Superseding AMS 5791

POWDER, PLASMA SPRAY
56.5Co - 25.5Cr - 10.5Ni - 7.5W

1. SCOPE:

1.1 Form: This specification covers a cobalt alloy in the form of powder.

1.2 Application: Primarily for producing plasma spray coatings to provide surfaces resistant to wear, corrosion, and abrasion.

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

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specification:

AMS 2350 - Standards and Test Methods

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

ASTM B214 - Sieve Analysis of Granular Metal Powders
ASTM C117 - Material Finer Than 75-μm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM E354 - Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

2.3 U.S. Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.3.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

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3. TECHNICAL REQUIREMENTS:

3.1 Composition: Powder shall conform to the following percentages by weight, determined by wet chemical methods in accordance with ASTM E354 or by spectrographic or other analytical methods approved by purchaser:

	min	max
Carbon	0.45	0.55
Manganese	--	1.00
Silicon	--	1.00
Phosphorus	--	0.04
Sulfur	--	0.04
Chromium	24.50	26.50
Nickel	9.50	11.50
Tungsten	7.00	8.00
Iron	--	2.00
Cobalt	remainder	

3.2 Condition: Powder shall be oxide reduced by heating within the range 955° to 1010°C (1750° to 1850°F) in vacuum or dry hydrogen atmosphere for 2 to 4 hours. This requirement will be waived if powder is produced by atomizing in an inert atmosphere.

3.3 Properties: Powder shall conform to the following requirements:

3.3.1 Particle Size Determination: Powder shall be supplied with the following particle size distribution. Sieve analysis shall be conducted in accordance with ASTM B214 or ASTM C117; the method of testing used shall be reported.

U.S. Sieve Size	% by weight, min
Passing through No. 170 (90 μm)	100
Passing through No. 200 (75 μm)	95
Retained on No. 325 (45 μm)	90

3.3.2 Flowability: Powder shall be visually examined for free flowing through a suitable powder feeder and spray gun. The powder stream shall allow the flow to be consistent and without excessive pulsation.

3.3.3 Plasma Spraying: Powder shall produce acceptable plasma spray coatings; standards for acceptance and method of test shall be as agreed upon by purchaser and vendor.

3.4 Quality: Powder, as received by purchaser, shall be thoroughly blended, uniform in color and quality, dry, and free from foreign materials and from imperfections detrimental to its spraying qualities.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of powder shall supply all samples for vendor's tests 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 sample and to perform any confirmatory testing deemed necessary to ensure that the powder 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 acceptance tests and as preproduction tests and shall be performed prior to or on the initial shipment of powder to a purchaser, on each lot, when a change in material, processing, or both, requires reapproval as in 4.2, and when purchaser deems confirmatory testing to be required.

4.2.1 For direct U.S. Military procurement, substantiating test data and, when requested, preproduction test material shall be submitted to the cognizant agency as directed by the procuring activity, the contracting officer, or the request for procurement.

4.3 Sampling: Shall be as follows:

4.3.1 For Acceptance Tests: Sufficient powder shall be taken at random from each lot to perform all required tests. The number of determinations for each requirement shall be as specified in the applicable test procedure or, if not specified therein, not less than three.

4.3.1.1 A lot shall be all powder produced in a single production run from the same batch of raw materials under the same fixed conditions and presented for vendor's inspection at one time. A lot may be packaged in small quantities and delivered separately under the basic lot approval provided lot identification is maintained.

4.3.1.2 When a statistical sampling plan and acceptance quality level (AQL) have been agreed upon by purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3.1 and the report of 4.5.1 shall state that such plan was used.

4.3.2 For Preproduction Tests: As agreed upon by purchaser and vendor.

4.4 Approval:

4.4.1 Sample powder shall be approved by purchaser before powder for production use is supplied, unless such approval be waived by purchaser. Results of tests on production powder shall be essentially equivalent to those on the approved sample powder.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production powder which are essentially the same as those used on the approved sample powder. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in material, processing, or both and, when requested, sample powder. Production powder made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

4.5.1 The vendor of powder shall furnish with each shipment a report showing the results of tests to determine conformance to the acceptance test requirements and stating that the powder conforms to the other technical requirements of this specification. This report shall include the purchase order number, AMS 5791, vendor's powder designation, lot number, and quantity.

4.5.2 The vendor of finished or semi-finished parts shall furnish with each shipment a report showing the purchase order number, AMS 5791, contractor or other direct supplier of powder, supplier's powder identification, part number, and quantity. When powder for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of powder to determine conformance to the requirements of this specification and shall include in the report either a statement that the powder conforms or copies of laboratory reports showing the results of tests to determine conformance.

4.6 Resampling and Retesting: If any specimen used in the above tests fail to meet the specified requirements, disposition of the powder may be based on the results of testing 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 powder represented and no additional testing shall be permitted. Results of all tests shall be reported.

5. PREPARATION FOR DELIVERY:

5.1 Identification:

5.1.1 Each container shall be permanently and legibly marked with not less than the following information:

POWDER, PLASMA SPRAY
AMS 5791
MANUFACTURER'S IDENTIFICATION _____
MANUFACTURER'S MATERIAL DESIGNATION _____
LOT NUMBER _____
QUANTITY _____