SAE Aerospace
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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5791B

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Superseding AMS 5791A

Cobalt Alloy, 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:

This product has been used typically for producing plasma spray coatings to provide surfaces resistant to wear, corrosion, and abrasion, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS:

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent supplied herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959 or www.astm.org.

ASTM B 214	Sieve Analysis of Granular Metal Powders
ASTM B 215	Sampling Finished Lots of Metal Powders
ASTM C 117	Material Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing
ASTM E 354	Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: custsvc@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Powder shall conform to the percentages by weight shown in Table 1, determined by wet chemical methods in accordance with ASTM E 354, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

TABLE 1 - Composition

Element	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 (1751 to 1850 °F) in vacuum or dry hydrogen atmosphere for 2 to 4 hours. This requirement shall 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 particle size distribution shown in Table 2. Sieve analysis shall be conducted in accordance with ASTM B 214 or ASTM C 117; the method of testing used shall be reported.

TABLE 2 - Particle Size Determination

U.S. Standard Sieve	Minimum % by weight
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 the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the powder conforms to specified requirements.

4.2 Classification of Tests:

All technical requirements are acceptance tests and 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 ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.3 Sampling and Testing:

Shall be in accordance with ASTM B 215; sufficient powder shall be taken 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 When a statistical sampling plan has been agreed upon by the purchaser and vendor, sampling shall be in accordance with such plan in lieu of sampling as in 4.3 and the report of 4.5 shall state that such plan was used.

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.

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, in manufacturing or inspection procedures, vendor shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample powder. Production powder made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Reports:

The vendor of powder shall furnish for each lot a report showing the composition, the method of testing used to determine particle size, and stating that the powder conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS 5791B, vendor's powder designation, and quantity.

4.6 Resampling and Retesting:

If any specimen used in the above tests fails 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. 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:

COBALT ALLOY, POWDER, PLASMA SPRAY
AMS 5791B
MANUFACTURER'S IDENTIFICATION _____
LOT NUMBER _____
QUANTITY _____

5.1.2 Each exterior container shall be legibly marked with not less than the following information in such a manner that the markings will not smear or be obliterated during normal handling or use:

COBALT ALLOY, POWDER, PLASMA SPRAY
AMS 5791B
MANUFACTURER'S IDENTIFICATION _____
PURCHASE ORDER NUMBER _____
LOT NUMBER _____
QUANTITY _____