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AEROSPACE MATERIAL SPECIFICATION

SAE AMS 5792A

Issued JAN 1986
Revised JUL 1992
Reaffirmed SEP 1998

Submitted for recognition as an American National Standard

Superseding AMS 5792

Powder, Plasma Spray
50 (88WC - 12Co) + 35 (70Ni - 16.5Cr - 4Fe - 4Si - 3.8B) + 15 (80Ni - 20Al)
Three-Component Mixture

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1. SCOPE:

1.1 Form:

This specification covers a blend of tungsten carbide-cobalt aggregate, a nickel alloy, and a nickel aluminum aggregate 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 applicable issue of referenced publications shall be the issue in effect on the date of the purchase order.

2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 214 Sieve Analysis of Granular Metal Powders
ASTM C 117 Material Finer Than 75-µm (No. 200) Sieve in Mineral Aggregates by Washing

2.2 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-2073-1 DOD Materiel, Procedures for Development and Application of Packaging Requirements

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3. TECHNICAL REQUIREMENTS:

3.1 Material:

Powder shall be a blend of 48 to 52% by weight of tungsten carbide-cobalt aggregate, 14 to 16% by weight of nickel-aluminum aggregate, and the remainder a nickel alloy. The component powders, prior to blending, shall conform to the compositions of 3.2.1, 3.2.2, and 3.2.3, respectively, and shall have particle size distributions as shown in 3.3.1 for each component powder.

3.2 Composition:

Powder shall conform to the percentages by weight shown in Table 1, Table 2, and Table 3, determined by wet chemical methods, by spectrochemical methods, or by other analytical methods acceptable to purchaser.

3.2.1 Tungsten Carbide-Cobalt Aggregate:

TABLE 1 - Composition

Element	min	max
Carbon	5.15	--
Cobalt	11.50	13.00
Tungsten	81.00	--
Iron	--	1.5
Other Impurities, each (3.2.1.1)	--	0.50

3.2.1.1 Determination not required for routine acceptance.

3.2.2 Nickel-Aluminum Composite:

TABLE 2 - Composition

Element	min	max
Aluminum	17.00	20.00
Impurities, total (3.2.1.1)	--	1.00
Nickel	remainder	

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3.2.3 Nickel Alloy:

TABLE 1 - Composition

Element	min	max
Carbon	0.6	1.3
Silicon	3.0	5.0
Chromium	13.0	20.0
Boron	2.75	4.75
Iron	3.0	5.0
Cobalt (3.2.1.1)	--	1.0
Nickel	remainder	

3.3 Properties:

Powder shall conform to the following requirements:

3.3.1 Particle Size Distribution: Each component powder shall have particle size distribution shown in Table 4, determined before blending. Sieve analysis shall be performed in accordance with ASTM B 214 or ASTM C 117; the method of testing used shall be reported.

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TABLE 4 - Particle Size Distribution

U.S. Standard Sieve		Tungsten Carbide-Cobalt Aggregate % by weight minimum	Tungsten Carbide-Cobalt Aggregate % by weight maximum	Nickel-Aluminum Aggregate % by weight minimum	Nickel-Aluminum Aggregate % by weight maximum	Nickel Alloy % by weight minimum	Nickel Alloy % by weight maximum
Passing through	170 (90 µm)	--	--	99	--	--	--
Passing through	200 (75 µm)	--	--	90	--	99	--
Retained on	270 (53 µm)	--	--	80	--	--	20
Retained on	325 (45 µm)	--	5	--	--	--	--

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; acceptance standards and test methods shall be as agreed upon by purchaser and vendor.

3.4 Quality:

The component powders shall be thoroughly blended. The blend of powders, as received by purchaser, shall be 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. 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 for 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.

4.2.1 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, contracting officer, or request for procurement.

4.3 Sampling and Testing:

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 batches of raw materials under the same fixed conditions and presented for vendor's inspection at one time.

4.3.1.2 When a statistical sampling plan has 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 shall state that such plan was used.

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

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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 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 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. This report shall include the purchase order number, lot number, AMS 5792A, 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:

POWDER, PLASMA SPRAY
AMS 5792A
MANUFACTURER'S IDENTIFICATION _____
LOT NUMBER _____
QUANTITY _____

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