

Powder, Chromium Carbide Plus Nickel-Chromium Alloy  
 $75\text{Cr}_2\text{C}_3 + 25$  (80Ni - 20Cr Alloy)

#### RATIONALE

AMS7875E is a Five Year Review and update of this specification that corrects the package size.

#### 1. SCOPE

##### 1.1 Form

This specification covers a blend of chromium carbide and a nickel-chromium alloy in the form of powder.

##### 1.2 Application

This product has been used typically for producing plasma spray coatings to provide wear and fretting resistant surfaces, 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 specified 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 International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, [www.astm.org](http://www.astm.org).

ASTM B 214 Sieve Analysis of Granular Metal Powders

ASTM B 215 Sampling Finished Lots of Metal Powders

ASTM C 1070 Determining Particle Size Distribution of Alumina or Quartz by Laser Light Scattering

ASTM E 354 Chemical Analysis of High-Temperature, Electrical, Magnetic, and Other Similar Iron, Nickel, and Cobalt Alloys

ASTM E 363 Chemical Analysis of Chromium and Ferrochromium

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### 3. TECHNICAL REQUIREMENTS

#### 3.1 Material

Shall be a blend of 74.00 to 76.00% by weight chromium carbide and 24.00 to 26.00% by weight nickel-chromium alloy powders. The component powders, prior to blending, shall conform to the compositions of 3.2.1 and 3.2.2, respectively, and shall have particle size distribution as shown in 3.4.1 for each component powder.

#### 3.2 Composition

Shall conform to the percentages by weight shown in Tables 1 and 2, determined by wet chemical methods in accordance with ASTM E 363 for the chromium carbide and ASTM E 354 for the nickel-chromium alloy, or by spectrographic or other analytical methods approved by purchaser:

##### 3.2.1 Chromium Carbide

TABLE 1 - COMPOSITION

Element	min	max
Total Carbon	12.50	--
Silicon	--	0.10
Chromium	85.50	--
Iron	--	0.70

##### 3.2.2 Nickel-Chromium Alloy

TABLE 2 - COMPOSITION

Element	min	max
Carbon	--	0.25
Manganese	--	2.50
Silicon	--	1.50
Chromium	18.00	22.50
Nickel	76.00	80.00
Iron	--	1.00

3.2.3 When specified, vendor shall supply purchaser with an adequate quantity of component materials (See 3.2.1 and 3.2.2) for quality control checks.

#### 3.3 Condition

As blended.

#### 3.4 Properties

Powder shall conform to the following requirements:

##### 3.4.1 Particle Size Distribution

Each component powder shall have the particle size distribution shown in Table 3, determined before blending. Sieve analysis shall be conducted in accordance with ASTM B 214; sub-sieve analysis shall be in accordance with ASTM C 1070 or other optical method agreed upon by purchaser and vendor.

TABLE 3 - PARTICLE SIZE DISTRIBUTION

Chromium Carbide % by Wt min	Chromium Carbide % by Wt max	Mesh or Micron <sup>Size(1)</sup>	Nickel-Chromium Alloy % by Wt min	Nickel-Chromium Alloy % by Wt max
100	--	-270 mesh (46 μm)	100	--
--	1	+325 mesh (45 μm)	--	1
50	70	-22 μm	45	75
--	10	-5.5 μm	--	5

(1) +indicates retained on sieve  
- indicates passing through sieve

### 3.4.2 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.

### 3.5 Quality

The component powders shall be thoroughly blended. The blend, 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 the product 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 product conforms to specified requirements.

### 4.2 Classification of Tests

All technical requirements of this specification 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 material, processing, or both 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 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. A lot may be packaged and delivered in small quantities under the basic lot approval provided lot identification is maintained.

4.3.2 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 and the report of 4.5 shall state that such plan was used.

### 4.4 Approval

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

4.4.2 Vendor shall use materials, processing techniques, and methods of inspection on production powder that are essentially the same as those used on the approved sample powder. If necessary to make any change in ingredients, processing techniques, or methods of inspection, 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

The vendor of powder shall furnish with each shipment a report showing the results of tests for composition and the particle size distribution of each lot and stating that the powder conforms to the other technical requirements of this specification. This report shall include the purchase order number, AMS7875E, vendor's product designation, lot number, and quantity.

#### 4.6 Resampling and Retesting

If any sample used in the above tests fails to meet the specified requirements, disposition of the product 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 product represented. Results of all tests shall be reported.

### 5. PREPARATION FOR DELIVERY

#### 5.1 Packaging and Identification

Powder shall be packaged in 5-pound (2.3-kg) sealed containers to protect it from contamination during shipment and under normal dry storage conditions. Seals used on containers shall be so designed that they must be destroyed in order for the container to be opened.

5.1.1 Each individual container shall be identified with not less than the following information, using characters of such size as to be legible and that will not be obliterated by normal handling:

CHROMIUM CARBIDE-NICKEL-CHROMIUM ALLOY POWDER

AMS7875E

MANUFACTURER'S IDENTIFICATION \_\_\_\_\_

PURCHASE ORDER NUMBER \_\_\_\_\_

QUANTITY \_\_\_\_\_

LOT NUMBER \_\_\_\_\_

5.1.2 Containers of powder shall be prepared for shipment in accordance with commercial practice and in compliance with applicable rules and regulations pertaining to the handling, packaging, and transportation of the powder to ensure carrier acceptance and safe delivery.

### 6. ACKNOWLEDGMENT

A vendor shall include this specification number and its revision letter in all quotations and when acknowledging purchase orders.

### 7. REJECTIONS

Powder not conforming to this specification, or to modifications authorized by purchaser, will be subject to rejection.