INCH-POUND
A-A-59139
25 September 1998

COMMERCIAL ITEM DESCRIPTION

ALUMINUM POWDER, ATOMIZED (FOR USE IN EXPLOSIVES)

The General Services Administration has authorized the use of this commercial item description as a replacement for Military specification MIL-A-82728(OS) for all federal agencies.

1. SCOPE.

1.1 This commercial item description covers one type of atomized aluminum powder for use in explosives.

2. SALIENT CHARACTERISTICS.

2.1 Material. The aluminum powder shall be microfine virgin aluminum particles manufactured by an atomizing process. The shape of the particles shall be spheroidal.

2.2 Aluminum purity. The aluminum purity shall be a minimum of 98.5 percent.

2.2.1 Impurities. The impurities shall not exceed the maximum specified in Table I.

TABLE I. *Maximum allowable impurities.*

Impurity	Maximum Percent Allowable
Silicon	0.3
Iron	0.5
Zinc	0.05
Copper	0.1
Grit	0.05
Oil and grease	0.2
Volatile matter at 105°C	0.1
Alkalinity as magnesium hydroxide	0.07

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Indian Head Division, Naval Surface Warfare Center, Standardization Team (Code 840M), 101 Strauss Avenue, Indian Head, MD 20640-5035.

AMSC N/A FSC 6810

2.3 Screen analysis. The material shall conform to the following requirements for the screen analysis:

a. A minimum of 95.0 percent shall pass through a U.S. Standard 200 sieve
b. A minimum of 80.0 percent shall pass through a U.S. Standard 325 sieve.

2.4 Average particle size. The average particle size of the material shall be 11 to 27 micrometers as determined by a Fisher subsieve sizer.

3. REGULATORY REQUIREMENTS.

3.1 This standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

4. QUALITY ASSURANCE PROVISIONS.

4.1 Product conformance. The product provided shall meet the salient characteristics of this Commercial Item Description, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

4.2 Inspection requirements. Ten percent of each single batch or continuous production run (produced using a single set of operations and operating conditions) shall be randomly selected for acceptance tests. The sample shall be uniformly mixed and an 8-ounce composite sample selected for the tests of 4.3.

4.3 Test methods.

4.3.1 Percent aluminum and elemental impurities. Determine percent aluminum by difference and elemental impurities (silicon, iron, zinc, and copper) by chemical analysis in accordance with ASTM E 34, or by spectrochemical analysis in accordance with ASTM E 101.

4.3.2 Grit. Weigh to the nearest 0.01 gram, 5.0 to 5.1 gram of aluminum powder into a 400 mL beaker. Cover with approximately 10 mL of water. Cautiously and slowly, add 60 mL of concentrated hydrochloric acid. Cover with a ribbed watch glass, heat to effect solution of sample, cool, then transfer sufficient solution to a tared 50-mL centrifuge tube to balance a second centrifuge tube containing approximately 45-mL of water. Centrifuge the two centrifuge tubes, in balanced position, at 600 to 700 relative centrifugal force (rcf, see 6.3) for 15 minutes. Allow the centrifuge to stop without braking and decant the liquid layer from the centrifuge tube containing the solution. Add the rest of the solution to the centrifuge tube. Rinse the beaker with water and add the rinsing to the solution centrifuge tube. Add a sufficient quantity of rinsing water to the specimen tube to balance it with the centrifuge tube containing water. Centrifuge, stop, and decant as above. Add sufficient water to balance the centrifuge tube, shake to mix, and centrifuge as above. Decant the liquid layer and dry the tared centrifuge tube to a constant weight in a drying oven at 105 ± 2°C. Cool in a desiccator and weigh to the nearest 0.1 mg. Calculate percent grit as follows:

$$Percent\ grit = \frac{100(A - B)}{W}$$

Where:

A = Weight of centrifuge tube and dried contents in grams
B = Tare weight of centrifuge tube in grams
W = Weight of specimen in grams.

4.3.3 Oil and grease. Determine the percent of easily extracted fatty and oily matter in accordance with the procedure for aluminum of ASTM D 480.

4.3.4 Volatile matter at 105°C. Determine the percent of volatile matter in accordance with the procedure for aluminum paste of ASTM D 480, except that a 10 gram specimen shall be used.

$$Volatile\ matter\ at\ 105^{o}C\ (percent) = \frac{Weight\ Loss}{Weight\ of\ Sample}\ X\ 100$$

4.3.5 Alkalinity. Weigh to the nearest milligram approximately 2 grams of test sample and transfer to a stoppered Erlenmeyer flask. Add 200 mL of cold water. Stopper and shake the flask every 2 minutes. After 15 minutes, filter sample through a dry, neutral filter paper. Titrate 100 mL of filtrate with 0.05N sulfuric or hydrochloric acid using 5 drops of bromothymol blue as indicator. Run a blank determination. Calculate alkalinity as percent magnesium hydroxide as follows:

$$Percent\ alkalinity = \frac{5.833N\ (A - B)}{W}$$

Where:

A = Milliliters of acid required for sample titer
B = Milliliters of acid required for blank titer
N = Normality of acid
W = Weight of sample in grams.

4.3.6 Particle size distribution. Determine the particle size distribution of aluminum powder in accordance with ASTM B 214 using ASTM Sieves and 50-gram samples. A weighed portion of approximately 50 gram of the sample shall be placed on the top sieve of the nest of sieves assembled as follows, top to bottom: 100, 200, 230, 325, and bottom pan.

4.3.7 Average particle size. The average particle size shall be determined by a Fisher subsieve sizer according to the manufacturer's instructions.

5. PACKAGING. Preservation, packing, and marking shall be as specified in the contract or order.

6. NOTES.

6.1 Intended use. The aluminum powder is intended for use in explosives.

6.2 Acquisition requirements. Acquisition documents must specify the following:

(a) Title, number, and date of this commercial item description.

(b) Packaging and packing requirements.

6.3 Relative centrifugal force(rcf). Relative centrifugal force is defined as follows:

$$rcf = A \times \frac{B^2}{265}$$

Where:

A = Diameter of swing in inches measured between tips of opposite tubes when in rotating position.

B = Speed of centrifuge in revolutions per minute.

6.4 Referenced documents. Application for copies of ASTM standards should be addressed to the American Society for Testing and Materials Customer Service, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

Preparing Activity:
Navy - OS
(Project 6810-N097)