



CERAMIC POWDER, ALUMINUM OXIDE, PLASMA SPRAYED

ESF-M3L88-A2

1. SCOPE

The material defined by this specification is an aluminum oxide ceramic powder (Al_2O_3). It is also referred to as alumina.

2. APPLICATION

This specification was released to define a material to be used in an arc plasma spray application of an alumina coating on the aluminum control plate of the 3rd generation alternator series.

3. REQUIREMENTS

3.0 STANDARD REQUIREMENTS FOR PRODUCTION MATERIALS

Material suppliers and part producers must conform to the Company's Standard Requirements For Production Materials (WSS-M99P1111-A).

3.4 COMPOSITION (ASTM E 1097)

Shall conform to the following weight percents, determined by methods agreed upon by purchaser and supplier.

Compound	Min	Max
Al_2O_3	93.0	
Na_2O		0.1
Fe_2O_3		1.0
SiO_2		1.5
TiO_2		1.80-4.20
CaO		0.40
MgO		0.60

3.5 MOISTURE CONTENT, max 0.20%

Test Method: A sample of the powder shall be weighed and heated in an oven for 2 h at 110 °C. After heating weigh the sample again. The difference in the weight of the sample before and after heating times 100 shall be the moisture content.

3.6 SPECIFIC GRAVITY 3.70 – 3.95 (ASTM C 135)

Date	Action	Revisions
2003 07 23	Revised	Para 3.0 inserted; Para 3.1, 3.2, 3.3, 3.18, 4 deleted
1992 03 19	DF00E00107002134	Released A. Vallabhanath

**3.7 PHASE COMPOSITION OF ALUMINA (AL₂O₃)
DETERMINED BY X-RAY DIFFRACTION**

Alpha Alumina, approx.	100%
Na Beta Alumina	Trace

3.8 MICROEXAMINATION

At a 20X magnification the particle morphology shall be blocky in nature.

**3.9 PARTICLE SIZE DISTRIBUTION
(ASTM C 690)**

Powder shall conform to the following particle size requirements, as measured with a coulter multisizer.

D3 Max	D50	D94 Min	Ratio D3/D50 Max	Ratio D50/D94 Max	U.S. Sieve #170 % Retained
49	28.0 – 29.0	19	1.7	1.45	0.1 max

Explanation:

D3 The particle size at the 3% point will be a maximum of 49 microns. 97% of the material will be smaller than 49 microns.

D50 The size at the 50% point will be between 28.0 and 29.0 microns.

D94 The size at the 94% point will be a minimum of 19 microns, or 94% of the material will be larger than 19 microns.

Ratio D50/D94 Controls the slope of the curve on the fine side.

Ratio D3/D50 Controls the slope of the curve on the coarse side.

170 Sieve Picks up any large particles that the particle sizer cannot.

3.10 PLASMA SPRAYING

Powder shall be capable of producing acceptable plasma spray coatings to standards agreed upon by purchaser and supplier using the plasma spray parameters defined by purchaser.