



AEROSPACE MATERIAL SPECIFICATION

AMS2431™/7**REV. C**

Issued 1988-04
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Revised 2021-12

Superseding AMS2431/7B

Peening Media
Ceramic Shot

RATIONALE

AMS2431/7C is the result of a Five-Year review and update of this specification with changes to Shape (3.4.6) that allows image analysis and its resolution, allows dispersion of shot prior imaging, adds a preferred number of shot to be analyzed, changes Table 2 and Table 3 from shot per area to percentage which is more explicit, and changes to the definitions of Sphericity (8.2.2), Angularity (8.2.3), and Satellites (8.2.4) with new figures for each.

1. SCOPE

1.1 Purpose

The complete requirements for procuring the product shall consist of this document and the latest issue of the basic specification, AMS2431.

1.2 Application

Ceramic shot conforming to this specification is typically intended for use in peening of metal surfaces to impart compressive stresses to these surfaces thereby increasing resistance to fatigue and stress-corrosion cracking. Generally, ceramic shot may be used where ferrous contamination of the part is undesirable or very hard parts (over 60 HRC) are to be peened for maximum residual compressive stress.

2. APPLICABLE DOCUMENTS

Shall be in accordance with AMS2431.

3. TECHNICAL REQUIREMENTS

3.1 Ceramic shot shall conform to AMS2431, and the requirements specified herein.

3.2 Composition

Composition shall be high quality zirconium oxide and silica. The percentage variation by weight ranges of the main constituents of ceramic shot shall be as stated in Table 1:

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Documents

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Table 1 - Composition

Constituent	Min	Max
Zirconium Oxide	60	70
Silica	28	33
Alumina	--	10
Other Constituents, total	--	3

3.3 Properties

3.3.1 Hardness

3.3.1.1 Hardness shall be measured by the manufacturer at least on mother production batches. User should measure hardness at their discretion or when a counter analysis is required.

3.3.1.2 For AZB850 to AZB150, at least 90% of the readings shall fall within the range of 643 to 785 HV (58 to 63 HRC, for reference only).

3.3.1.3 For AZB100, the mean value of the readings shall fall within the same range of 643 to 785 HV.

3.3.2 Density

Density shall be between 3.60 and 3.95 g/cc, measured at 70 °F (21 °C) by a pycnometric method.

3.3.3 Contamination

3.3.3.1 Magnetic particles shall not exceed 0.1% by weight of the original sample.

3.3.4 Surface Discolorations

Not more than 15% of the shot shall show foreign discolorations. A particle shall be considered objectionable for foreign discoloration when more than 25% of its surface area is discolored.

3.3.5 Coatings

Coating of any kind are not permitted.

3.3.6 Shape

3.3.6.1 Ceramic shot shall be spherical to ellipsoid in shape. Table 2 shows the maximum percentage of ceramic shot having a sphericity lower than 0.5 and the minimum percentage of ceramic shot having a sphericity of 0.8 and above (true spheres). See Section 8 for definition of sphericity.

3.3.6.2 Maximum number of permissible broken or angular shots is shown on column 11 of Table 2. This number shall never exceed 3% of the actual count. See Section 8 for definition of roundness.

Table 2 - Ceramic shot for peening – sizes and sphericity

Designation	Nominal Sizes, Millimeters	Nominal Sizes, Inches	Nominal Sizes, Mesh	Sieve Size, Millimeters Maximum 0.5% Retained	Sieve Size, Millimeters Maximum 5% Retained	Sieve Size, Millimeters Maximum 10% Passing	Sieve Size, Millimeters Maximum 3% Passing	Minimum % of Shot W/Sphericity 0.8 and Above (True Spheres)	Maximum %of Shot with Sphericity Below 0.5	Maximum % Broken or Angular Shots Acceptable
AZB850	0.85/1.18	0.033/0.047	16/20	1.400	1.180	0.850	0.710	65	4.6%	2.3%
AZB600	0.6/0.85	0.024/0.033	20/30	1.000	0.850	0.600	0.425	65	5.3%	2.7%
AZB425	0.425/0.6	0.017/0.024	30/40	0.710	0.600	0.425	0.300	70	4.8%	2.7%
AZB300	0.300/0.425	0.012/0.017	40/50	0.500	0.425	0.300	0.250	70	3.9%	2.2%
AZB210	0.212/0.300	0.008/0.012	50/70	0.355	0.300	0.212	0.180	80	4.0%	1.5%
AZB150	0.150/0.212	0.006/0.008	70/100	0.250	0.212	0.150	0.125	80	11.0%	2.4%
AZB100	0.100/0.150	0.004/0.006	100/140	0.180	0.150	0.106	0.063	80	10.0%	1.5%

3.3.7 Satellites

Maximum allowable number of shot with satellites shall be Table 3. See Section 8 for definition of satellites.

Table 3 - Ceramic shot with satellites

Designation	Maximum % of Shot with Satellites	Maximum % of Shot with 3 or More Satellites
AZB850	9.3%	3.5%
AZB600	8.7%	4.0%
AZB425	12.9%	4.1%
AZB300	9.5%	3.0%
AZB210	9.2%	2.9%
AZB150	6.4%	1.8%
AZB100	5.8%	1.7%

3.3.8 Size

Size shall conform to the requirements of Table 2.

3.4 Test Methods and Procedures

3.4.1 Size Classification

Sieve analysis shall be determined in accordance with ASTM D1214. Screens shall be in accordance with U.S. Standard Series described in ASTM E11.

3.4.2 Composition

Composition shall be measured by the manufacturer at least on mother production batches by x-ray fluorescence or by other method acceptable to purchaser. User should measure composition at his discretion or when a counter analysis is required.

3.4.3 Hardness

Hardness shall be determined by a Vickers diamond pyramid penetrator using 1000-gram load in accordance with ASTM E384 or ASTM C1327. To avoid fracture of shots, the loads shall be as follows: 200-gram load for AZB100, 500-gram load for AZB150, AZB210, and AZB300 and 1000-gram load for AZB425, AZB600, and AZB850.