



AEROSPACE MATERIAL SPECIFICATION

AMS2431™/9**REV. A**Issued 2020-11
Revised 2025-08

Superseding AMS2431/9

Peening Media
Ceramic Shot, Ceria-Zirconia (ACZ)

RATIONALE

AMS2431/9A is the result of a Five-Year Review and update of this specification with changes to the Title, Purpose (see 1.1), Application (see 1.2), Authority (see 1.3), Aspect Ratio definition (see 2.3), Shape (see 3.8), ceramic shot for peening (see Table 2), Sampling and Testing (see 4.1), Composition (see 4.1.1), Hardness (see 4.1.2), Density (see 4.1.3), Surface Color Homogeneity (see 4.1.4), Shape (see 4.1.5), minimum magnification and resolution for aspect ratio determination (see Table 3), Size and Distribution (see 4.1.6), and dimensions and properties (see 8.2).

1. SCOPE

1.1 Purpose

This specification, in conjunction with the general requirements for peening media covered in AMS2431, establishes the requirements for the procurement of ceria-zirconia ceramic shot.

1.2 Application

Ceria-zirconia ceramic shot conforming to this specification is typically intended for use in peening metal surfaces to impart compressive stresses to these surfaces, thereby increasing resistance to fatigue and stress-corrosion cracking. Generally, ceramic shot is used where ferrous contamination of the part is undesirable or where high-hardness parts are to be peened for maximum residual compressive stress. Ceria-zirconia ceramic shot can also be used for peen forming applications. The high toughness of ceria-zirconia ceramic shot make them particularly suitable when very high impact energy is needed compared to other ceramic shot grades.

1.3 Authority

The cognizant engineering organization (CEO) may impose requirements or approve allowances that supersede the requirements in this AMS.

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Documents

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2. APPLICABLE DOCUMENTS

Shall be in accordance with AMS2431 and as follows:

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2431 Peening Media, General Requirements

2.2 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.

ASTM C1327 Vickers Indentation Hardness of Advanced Ceramics

2.3 ISO Publications

Copies of these documents are available online at <https://webstore.ansi.org/>.

ISO 9276-6 Representation of results of particle size analysis - Part 6: Descriptive and quantitative representation of particle shape and morphology

ISO 13322-1 Particle size analysis - Image analysis methods - Part 1: Static image analysis methods

ISO 13322-2 Particle size analysis - Image analysis methods - Part 2: Dynamic image analysis methods

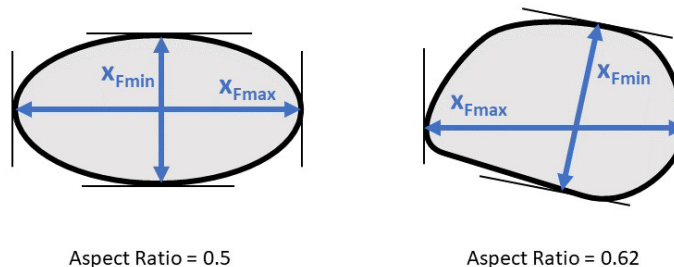
2.4 Definitions

ASPECT RATIO: This refers to the ratio of minimum to maximum Feret diameters of the ceramic shot (refer to ISO 9276-6).

$$\text{Aspect Ratio} = x_{Fmin} / x_{Fmax}$$

The Feret diameters x_F correspond to the distance between parallel tangent lines around the shot.

An example of the particles with different aspect ratio is presented below:



3. TECHNICAL REQUIREMENTS

3.1 Ceramic shot shall be in accordance with AMS2431 and the requirements specified herein.