SAE INTERNATIONAL

SURFACE VEHICLE RECOMMENDED PRACTICE

J1830™ OCT2023

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Superseding J1830 OCT2013

Size Classification and Characteristics of Ceramic Shot for Peening

RATIONALE

SAE J1830 is updated and adjusted to count particle defects as a percentage.

1. SCOPE

This specification covers characteristics for chemistry, microstructure, density, hardness, size, shape, and appearance of zirconium oxide-based ceramic shot, suitable for peening surfaces of parts by impingement.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 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.

AMS2431/7 Peening Media Ceramic Shot

2.1.2 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 E11 Standard Specification for Woven Wire Test Sieve Cloth and Test Sieves

ASTM D1214 Standard Test Method for Sieve Analysis of Glass Spheres

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/J1830_202310/

3. CHEMISTRY

This specification includes the nominal chemistry of zirconium oxide-based ceramic shot and the amount of free iron particles.

3.1 Oxide Analysis

Ceramic shot shall be manufactured from zirconium oxide and silica. The main constituents shall be:

- Zirconium oxide 60 to 70 weight percent
- Silica 28 to 33 weight percent
- Alumina less than 10 weight percent

The total of other constituent contents shall not exceed 3 weight percent. Analysis method is x-ray fluorescence or any other method acceptable to purchaser.

3.2 Free Iron Content

The free iron content of the ceramic shot sample shall not exceed 0.10 weight percent. It is determined by slowly sprinkling 500 g of the sample ceramic shot on an inclined aluminum tray that is 0.062 inch (1.6 mm) deep by 6 inches (152 mm) wide by 12 inches (305 mm) long. The tray is supported by a nonmagnetic frame so that it is inclined with a 6-inch (152-mm) rise from end to end (30 degrees from horizontal). Four 1 x 1 x 6 inches (25 x 25 x 152 mm) bar magnets are positioned against the under surface and crosswise to the inclined tray about the middle of its length. Magnets shall be not less than 10000 Gauss magnetic field each and arranged so that the magnetic north and south poles alternate. The magnetic particles (iron) that accumulate on the tray as the shots roll down are carefully brushed into a preweighed dish. The procedure is repeated with the same 500 g sample until all visible magnetic particles are collected. The dish is then reweighed and the magnetic particle content is calculated as a percentage of the total original sample.

4. MICROSTRUCTURE

Ceramic shots are manufactured by electric fusion of oxides to form a closely bonded internal structure of a crystalline zirconia phase within an amorphous silica phase.

5. SPECIFIC GRAVITY

Specific gravity shall be from 3.60 to 3.95 g/cm^3 measured at temperature at 70 °F ± 20 °F (21 °C ± 11 °C) by pycnometric method.

6. HARDNESS

Unless otherwise specified, the ceramic shot shall have the following hardness:

623-785 DPH (1 Kgf)
or 660-812 KHN (500 gf)
(for reference, only approximately 57 to -63 HRC)

7. SIZE

Unless otherwise specified, the ceramic shot shall conform to Table 1. Sieve analysis shall be determined in accordance with ASTM D1214. Screens shall be in accordance with U.S. Standard Series, described in ASTM E11.

7.1 Testing

This is conducted by screening a 250 g sample with sieves conforming to ASTM E11.