

AEROSPACE MATERIAL SPECIFICATION

Submitted for recognition as an American National Standard

Peening Media Glass Shot

1. SCOPE:

This specification, in conjunction with the general requirements covered in AMS 2431 establishes the requirements for glass shot to be used for peening of metal parts.

2. APPLICABLE DOCUMENTS:

See AMS 2431.

3. TECHNICAL REQUIREMENTS:

3.1 Glass shot shall conform to AMS 2431 and the requirements specified herein.

3.2 Composition:

Shall be high quality glass of the soda-lime type. Silica content shall not be less than 67% by weight.

3.2.1 Hardness: Not less than 90% of the readings shall fall within the range of:

500 to 550 HV, or
515 to 575 HK
(48 to 52 HRC, or reference only)

3.2.2 Density: Shall not be less than 2.3 g/cc.

3.2.3 Magnetic Particles: Shall not exceed 0.1% by weight of the original sample.

3.2.4 Inclusions: Not more than 10% of the glass shot shall contain inclusions (including air bubbles) covering more than 20% of their projected area.

3.2.5 Coatings: Silicone or any other coating material are not permitted.

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3.3 Workmanship:

3.3.1 Shape: Glass shot shall be spherical to ellipsoid in shape. Minimum percentage of true spheres shall conform to Table 1.

3.4 Size:

Shall conform to the requirements of Table 1.

3.5 Test Methods and Procedures:

3.5.1 Size Classification: The sieve analysis shall be determined in accordance with ASTM D 1214. The screens shall be in accordance with U.S. Standard Series described in ASTM E 11.

3.5.2 Silica Content: Shall be determined in accordance with ASTM C 169.

3.5.3 Hardness: Shall be determined by a Knoop penetrator using 100 gram load, or Vickers Diamond Pyramid penetrator using 50 gram load.

3.5.4 Contamination:

3.5.4.1 Magnetic Particle Content: Shall be determined by slowing sprinkling 1500 grams of the sample glass shot on an inclined aluminum tray, 0.062 inch (1.6 mm) deep by 6 inches (152 mm) wide by 12 inches (305 mm long). The tray shall be 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 shall be positioned against the under surface and crosswise of the inclined tray about the middle of its length. Thickness of tray at the magnet locations shall not exceed 0.062 inch (1.6 mm). Magnets shall be not less than 10,000 Gauss each and arranged so that the magnetic north and south poles alternate. The magnetic particles (iron) that accumulate on the tray as the beads roll down shall be brushed into a preweighed dish. The procedure shall be repeated with the same 1500 gram sample until all visible magnetic particles are collected. The dish shall be reweighed and the magnetic particle content calculated as a percentage of the total original sample.

3.5.5 Inclusions: Shall be determined microscopically, using substage lighting, while glass shot is immersed in a fluid having refractive index of 1.5.

3.5.6 Silicone coating: The following test shall be performed to determine the presence of silicone. Slowly pour 50 grams of the sample glass shot into a 250 mL beaker containing 200 mL of distilled water. A small amount of shot floating separately on the water is permissible but a agglomeration indicates presence of silicone.

3.5.7 Shape: A visual count shall be made of three fields of approximately 100 beads each, on the sample prepared as in 4.1.6, using a microscope with 20X magnification and substage lighting, or an optical projector. The three results shall be averaged and compared to Table 1.

3.5.8 Density: Sixty grams of shot, carefully weighed, and previously dried, shall be placed in a 100 mL graduated cylinder containing 50 mL of distilled water. The total volume minus 50 mL represents the volume of the shot. Calculate density using equation 1.

$$\text{Density} = \frac{60 \text{ grams}}{\text{Shot Volume}} \quad (\text{Eq. 1})$$

4. QUALITY ASSURANCE PROVISIONS:

See AMS 2431 and the following:

4.1 Sampling:

Two samples of 200 grams each shall be selected from separate containers chosen at random. Each sample shall be split to the following test quantities:

4.1.1 Composition: Not less than two samples from each shipment.

4.1.2 Hardness: Twenty microhardness readings shall be made from each sample with no more than 1 impression from any single shot.

4.1.3 Inclusions: The samples used in 4.1.5 may be used to determine inclusions.

4.1.4 Density: Two 60 grams samples for density determination.

4.1.5 Size: Two representative samples of 60 grams each.

4.1.6 Shape: Shot shall be poured into a piece of transparent adhesive tape so that beads adhere to the tape.

4.1.6.1 A mechanical method of inspection for shape is permitted provided that it can be correlated to the optical method and is acceptable to purchaser.

5. PREPARATION FOR DELIVERY:

See AMS 2431 and the following:

5.1 Packaging and Identification:

Shot shall be packaged in 50 pound (23 kg) units in multi-wall bags, with a reinforced scrim conforming to MIL-G-9954 "Level A." An inner plastic bag shall be used having a vapor transmission rate of less than 0.5 grams of water per 100 square inches (645 cm²) per 24 hours.

5.1.2 Desiccants: All glass shot passing U.S. Screen #100 shall have eight units of MIL-D-3464 desiccant included in each bag.

6. ACKNOWLEDGMENT:

See AMS 2431.

7. REJECTIONS:

See AMS 2431.

8. NOTES:

See AMS 2431 and the following:

8.1 Intended Use:

Glass shot conforming to this specification is intended for use in peening of metal surfaces to impart compressive stresses, thereby increasing resistance to fatigue and stress-corrosion cracking. Generally, glass shot may be used where:

8.1.1 Very low intensities are required because glass shot is available in smaller sizes than other media.

8.1.2 Very small, under 0.015 inch (0.38 mm) radii or narrow slots are to be peened.

8.1.3 Ferrous contamination of part is undesirable.

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