SAE International™

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J827

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Superseding J827 SEP1996

High-Carbon Cast-Steel Shot

1. Scope—This SAE Recommended Practice describes chemical composition and physical characteristic requirements for high-carbon cast-steel shot to be used for shot peening or blast cleaning operations.

1.1 Rationale—This document has been reaffirmed to comply with the SAE 5-Year Review policy.

2. References

2.1 Applicable Publications—The following publications form a part of this specification to the extent specified herein. The latest issue of SAE, ASTM, and ISO publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J444—Cast Shot and Grit Size Specifications for Peening and Cleaning
SAE J445—Metallic Shot and Grit Mechanical Testing

2.1.2 ASTM PUBLICATIONS—Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM B 215, Method B—Methods of Sampling Finished Lots of Metal Powders
ASTM E 140—Hardness Conversion Tables for Metals (Relationship Between Brinell Hardness, Vickers Hardness, Rockwell Hardness, Rockwell Superficial Hardness, and Knoop Hardness)
ASTM E 384—Test Method for Microhardness of Materials

2.2 Related Publications—The following publications are provided for information purposes only and are not a required part of this document.

2.2.1 ISO PUBLICATIONS—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 11124 Part 3—High-carbon cast-sheet steel shot and grit
ISO 11125 Part 1—Preparation of steel substrates before application of paints and related products—Test methods for metallic abrasives—Part 1: Sampling
ISO 11125 Part 2—Preparation of steel substrates before application of paints and related products—Test methods for metallic abrasives—Part 2: Determination of particle size distribution
ISO 11125 Part 3—Preparation of steel substrates before application of paints and related products—Test methods for metallic abrasives—Part 3: Determination of hardness

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ISO 11125 Part 4—Preparation of steel substrates before application of paints and related products—Test methods for metallic abrasives—Part 4: Determination of apparent density
ISO 11125 Part 5—Preparation of steel substrates before application of paints and related products—Test methods for metallic abrasives—Part 5: Determination of percentage defective particles and microstructure
ISO 11125 Part 6—Preparation of steel substrates before application of paints and related products—Test methods for metallic abrasives—Part 6: Determination of foreign matter
ISO 11125 Part 7—Preparation of steel substrates before application of paints and related products—Test methods for metallic abrasives—Part 7: Determination of moisture

3. Description—High-carbon cast-steel shot is obtained by atomizing molten steel. The shot is heat treated and screened to produce a range of sizes from HCS S70 to HCS S1320 or larger as described in SAE J444. Other sizes are available.

4. Size Classification—Cast-steel shot shall be identified by HCS S for shot, followed by three numbers representing the size in ten thousandths of inches, in accordance with SAE J444.

EXAMPLE—HCS330 indicates a cast-steel shot identified by a nominal sieve opening of 050 mm (0.0331 in).

5. Chemical Composition—The finished shot shall have the chemical composition shown in Table 1:

TABLE 1—CHEMICAL COMPOSITION

Element	Weight Percent
Carbon	0.80 – 1.2%
Manganese	
HCS S70 to HCS S110	0.35 – 1.2%
HCS S170	0.5 – 1.2%
HCS S230 and up	0.6 – 1.2%
Silicon	0.4% minimum
Sulfur	0.050% maximum
Phosphorous	0.050% maximum

6. Hardness

6.1 Standard Hardness—The hardness of 90% of all shot particles shall be within the range of 40 to 51 HRC.

6.2 Special Hardnesses—Shot for peening and blast cleaning is manufactured from 40 to 65 HRC. The user may specify a range to suit the application. The minimum hardness range that can be specified is 7 points HRC.

7. Microstructure—The microstructure of high-carbon cast-steel shot shall be uniform martensite, tempered to a degree consistent with the hardness range, with fine, well distributed carbides, if any.

8. General Appearance—High-carbon cast-steel shot is generally spherical and shall have no more than 20% of the particles with objectionable characteristics. Any one particle tested that has more than one different defect, shall only be counted once.

8.1 Objectionable Characteristics

8.1.1 PARTICLE SHAPE—No more than 5% of the particles in a shot sample shall be elongated. An elongated particle is one whose length is in excess of twice the maximum particle width.