SAE International™

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J1993

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High-Carbon Cast-Steel Grit

1. ***Scope***—This SAE Recommended Practice describes the chemical composition, and physical characteristic requirements for high-carbon cast-steel grit, to be used for blast cleaning and etching 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. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE PUBLICATION—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 Methods for Microhardness of Materials

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

ISO 11124 Part 3—High-carbon cast-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
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

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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 grit is the product obtained by crushing heat-treated high-carbon cast-steel shot. The resulting angular particles are screened to a range of sizes from G10 to G325 as described in SAE J444.

4. Size Classification and Hardness Identification

4.1 High-carbon cast-steel grit will be identified by HCS G, followed by a number which represents the sieve designation, in accordance with SAE J444, followed by a letter designating the grit hardness range. See the example following 6.3 for the full grit designation.

5. Chemical Composition

a. Carbon—0.80 to 1.20%
b. Manganese—0.60 to 1.20%
c. Silicon—0.40% minimum
d. Sulphur—0.05% maximum
e. Phosphorus—0.05% maximum

6. Hardness

6.1 The four standard hardness ranges for high-carbon cast-steel grit are as follows:

a. HCS G([1])S—The hardness range shall be 40 to 51 HRC
b. HCS G([1])M—The hardness range shall be 47 to 56 HRC
c. HCS G([1])L—The hardness range shall be 54 to 61 HRC
d. HCS G([1])H—The hardness shall be 60 HRC minimum

6.2 90% of the hardness readings shall be within the specified range. For HCS G([1])H, 90% of the readings shall be 60 HRC or higher.

6.3 Special Hardness—Other hardnesses may be specified by the user. The minimum hardness range that can be specified is 7 points HRC.

EXAMPLE—HCS G25S indicates a high-carbon cast-steel grit meeting the G25 requirements in SAE J444, with a hardness designation of S (40 to 51 HRC).

7. Microstructure—The microstructure of high-carbon cast-steel grit shall consist of martensite, tempered to a degree consistent with the hardness, with fine, well distributed carbides, if any. Some retained austenite may be observed in H hardness grit.

8. General Appearance—The cast-steel grit shall be as angular as commercially possible. A total of no more than 40% of the grit particles shall have objectionable characteristics or contain more than 1% by weight of nonmetallic material. Any one particle tested that has more than one objectionable characteristic will only be counted once in the total. Notwithstanding the allowable percentages listed as follows, no more than a total of 40% objectionable particles are allowed.

1. Grit size designation from SAE J444.