SURFACE VEHICLE RECOMMENDED PRACTICE

J441 OCT2013

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Superseding J441 NOV2009

Cut Wire Shot

RATIONALE

J441 has been reaffirmed to comply with the SAE five year review policy.

1. SCOPE

This SAE Recommended Practice is considered to be tentative and is subject to modification to meet new developments or requirements. It is offered as a guide in the selection and use of cut wire shot.

2. REFERENCES

2.1 Applicable Publications

The following publications form a part of this specification to the extent specified herein.

2.1.1 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 A 370 Test Methods and Definitions for Mechanical Testing of Steel Products

ASTM E 384 Test Method for Microhardness of Materials

3. DESCRIPTION

Cut wire shot shall be the product of carbon steel wire or stainless wire Type 302, 304, Condition B, Spring Temper, cut into the form of cylinders with lengths approximately equal to the wire diameter. Conditioned cut wire shot with edges prerounded shall be required for shot peening applications.

4. CLASSIFICATION

All cut wire shot shall be identified according to the wire size from which it is obtained. It shall be identified by the prefix letters CW meaning cut steel wire or SCW meaning stainless cut wire. This designation shall be followed by a two-digit suffix number equivalent to the mean diameter, in inches, of the wire from which the shot is produced times 1000 Table 1.

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5. CHEMICAL COMPOSITION

The chemical composition shall conform to the following specifications:

5.1 Carbon Steel

Carbon: 0.45 to 0.85
Manganese: 0.30 to 1.30
Phosphorus: 0.040 max
Sulphur: 0.050 max
Silicon: 0.15 to 0.35

TABLE 1 - WIRE DIAMETER USED FOR CUT WIRE SHOT

Shot Size	Mean Wire Diameter (mm)	Mean Wire Diameter (in)
SCW/CW-125	3.2	0.125
SCW/CW-116	3.0	0.116
SCW/CW-96	2.4	0.096
SCW/CW-80	2.0	0.080
SCW/CW-62	1.6	0.062
SCW/CW-54	1.4	0.054
SCW/CW-47	1.2	0.047
SCW/CW-41	1.0	0.041
SCW/CW-35	0.9	0.035
SCW/CW-32	0.8	0.032
SCW/CW-28	0.7	0.028
SCW/CW-23	0.6	0.023
SCW/CW-20	0.5	0.020
SCW/CW-17	0.45	0.017
SCW/CW-14	0.35	0.014
SCW/CW-12	0.30	0.012

5.2 Stainless Steel

Carbon: 0.15 max
Manganese: 2.00 max
Phosphorus: 0.045 max
Sulphur: 0.030 max
Silicon: 1.00 max
Chromium: 17.00 to 20.00
Nickel: 8.00 to 10.50

6. HARDNESS

Carbon steel cut wire particles shall have a minimum hardness of 42 HRC (KHN 426 or HV 412). Stainless cut wire shot shall have a minimum hardness of 45 HRC (466 KHN or HV 445). The hardness shall be determined per ASTM E 384 and using a 500 gf load for sizes CW-28 and finer or a 1000 gf load for sizes larger than CW-28. Other microhardness test methods may be used as long as a reliable hardness conversion can be obtained by calibrating various machines against known standards. Approximate conversions to Rockwell C Hardness Numbers (HRC) from Knoop Hardness Numbers (KHN) and Vickers Hardness Numbers (HV) are obtained from ASTM A 370. Other hardness values can be specified by the purchaser.

7. SIZE CLASSIFICATION

Cut wire shot shall be made from wire of the diameters shown in Table 1. The weight of random as-cut particles shall be within the limits of Table 2. The weight of random conditioned particles shall be within the limits of Table 3. Shot sizes varying from those shown are available and may be obtained by arrangement between shot manufacturer and purchaser.

TABLE 2 - WEIGHT LIMITS FOR AS-CUT PARTICLES

Shot Size (mm)	Shot Size (in)	Weight of 50 Random Pieces (grams)
3.2	SCW/CW-125	8.870 – 10.830
3.0	SCW/CW-116	7.080– 8.660
2.4	SCW/CW-96	4.000 – 4.900
2.0	SCW/CW-80	2.340 – 2.860
1.6	SCW/CW-62	1.090 – 1.330
1.4	SCW/CW-54	0.720 – 0.880
1.2	SCW/CW-47	0.480 – 0.580
1.0	SCW/CW-41	0.310 – 0.390
0.9	SCW/CW-35	0.200 – 0.240
0.8	SCW/CW-32	0.140 – 0.180
0.7	SCW/CW-28	0.100 – 0.120
0.6	SCW/CW-23	0.050 – 0.070
0.5	SCW/CW-20	0.040 – 0.050
		Weight of 100 Random Pieces (grams)
0.45	SCW/CW-17	0.040 – 0.060
0.35	SCW/CW-14	0.020 – 0.040
0.30	SCW/CW-12	0.010 – 0.025