

Peening Media (AWCR)
Conditioned Carbon Steel Cut Wire Shot, Regular Hardness (45 to 52 HRC)

RATIONALE

AMS 2431/3C is a Five Year Review and update of this specification.

1. SCOPE

1.1 Purpose

The complete requirements for procuring the product shall consist of this document and the latest issue of the basic specification, AMS 2431.

1.2 Usage

Conditioned carbon steel cut wire shot, regular hardness, conforming to this specification is intended for use in peening metal surfaces to impart compressive stresses to these surfaces thereby increasing resistance to fatigue and stress-corrosion cracking. Generally, regular hardness conditioned carbon steel cut wire shot is used on parts of hardness less than 50 HRC.

2. APPLICABLE DOCUMENTS

See AMS 2431.

3. TECHNICAL REQUIREMENTS

3.1 Conditioned carbon steel cut wire shot, regular hardness, shall conform to AMS 2431 and the requirements specified herein.

3.2 Composition shall conform to the percentages by weight shown in paragraph 5.1 of SAE J441 (For reference only, see Table 1), determined in accordance with ASTM E 350.

TABLE 1 - COMPOSITION

Element	min	max
Carbon	0.45	0.85
Manganese	0.30	1.30
Silicon	0.15	0.35
Phosphorus	--	0.040
Sulfur	--	0.05

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3.3 Hardness

Not less than 90% of the readings, using a microhardness tester with a minimum 500 gram load, shall fall within the range of 45 to 52 HRC, or equivalent, determined in accordance with ASTM E 384. Hardness testing shall be performed after the shot has been conditioned for shape.

3.4 Wire Quality

Shot shall be manufactured from wire that is free from shear cracks and laps and shall not contain excessive seams or burrs.

3.5 Weight shall conform to Table 3 or Table 4 as determined in accordance with 4.1.3.2.

3.6 Contamination

Shot shall be clean and free of dirt, grit, oil, or grease.

3.7 Quality Requirements

Shot shall conform to 3.7.1, 3.7.2, 3.7.3, and 3.7.4 determined in accordance with 3.9.2.

3.7.1 Shape shall be predominantly spherical as a result of conditioning or rounding.

3.7.2 Acceptable Shapes

Shapes conforming to Figure 1 shall be in accordance with Table 2.

3.7.3 Marginal Shapes

Shapes conforming to Figure 2 are permissible to the extent specified in Table 2.

3.7.4 Unacceptable Shapes

Shapes conforming to Figure 3 are permissible to the extent specified in Table 2.

3.7.5 Conditioning is accomplished by impacting the as-cut wire cylinders against a hardened target until a predominantly round shape (See Figure 1) has been obtained.

3.8 Size shall conform to the requirements of Table 3 or Table 4 determined in accordance with 4.1.3.2.

TABLE 2 - SHAPE REQUIREMENTS

Shot Size	Area per Field Square Inch (mm ²)	Number of Fields Viewed	Number of Marginal Particles All Fields max(1)	Number of Unacceptable Particles All Fields max(2)
AWCR 62	1 (645)	9	63	2
AWCR 54	1 (645)	7	66	2
AWCR 47	1 (645)	5	68	2
AWCR 41	1 (645)	4	70	2
AWCR 35	0.25 (161)	14	67	2
AWCR 32	0.25 (161)	12	60	2
AWCR 28	0.25 (161)	7	67	2
AWCR 23	0.25 (161)	5	70	2
AWCR 20	0.25 (161)	4	76	2
AWCR 17	0.0625 (40)	11	70	2
AWCR 14	0.0625 (40)	6	60	2
AWCR 12	0.0625 (40)	5	68	2

Notes: (1) Maximum number of marginal shapes is approximately 3% of the total number of particles viewed.

(2) Maximum number of unacceptable shapes is approximately 0.1% of the total number of particles viewed.

TABLE 3 - SIZE REQUIREMENTS

Shot Size	Wire Diameter Inch	Wire Diameter Millimeters	Weight of 50 pieces Gram
AWCR 62	0.0625 $\pm$ 0.002	1.588 $\pm$ 0.05	0.98 to 1.20
AWCR 54	0.054 $\pm$ 0.002	1.37 $\pm$ 0.05	0.65 to 0.79
AWCR 47	0.047 $\pm$ 0.002	1.19 $\pm$ 0.05	0.43 to 0.52
AWCR 41	0.041 $\pm$ 0.002	1.04 $\pm$ 0.05	0.28 to 0.35
AWCR 35	0.035 $\pm$ 0.001	0.89 $\pm$ 0.025	0.18 to 0.22
AWCR 32	0.032 $\pm$ 0.001	0.81 $\pm$ 0.025	0.12 to 0.16
AWCR 28	0.028 $\pm$ 0.001	0.71 $\pm$ 0.025	0.09 to 0.11
AWCR 23	0.023 $\pm$ 0.001	0.58 $\pm$ 0.025	0.045 to 0.060
AWCR 20	0.020 $\pm$ 0.001	0.51 $\pm$ 0.025	0.035 to 0.045

TABLE 4 - SIZE REQUIREMENTS

Shot Size	Wire Diameter Inch	Wire Diameter Millimeter	Weight of 100 pieces Gram
AWCR 17	0.017 $\pm$ 0.001	0.43 $\pm$ 0.025	0.040 to 0.055
AWCR 14	0.014 $\pm$ 0.001	0.36 $\pm$ 0.025	0.015 to 0.030
AWCR 12	0.012 $\pm$ 0.001	0.30 $\pm$ 0.025	0.010 to 0.020

3.9 Test Methods and Procedures

3.9.1 Size

The size of shot shall be determined in accordance with 4.1.3.2.

3.9.2 Shape

Visual evaluation, at a minimum magnification of 10X for sizes CW 23 and larger and a minimum magnification of 30X for sizes finer than CW 23, shall be performed using the areas and number of fields specified in Table 2 for each respective shot size.

4. QUALITY ASSURANCE PROVISIONS

See AMS 2431 and the following:

4.1 Sampling and Testing for Composition, Hardness, Size, and Shape

Two samples of approximately 800 grams each shall be selected from separate containers chosen at random from each lot. Each sample shall be split to test quantities as follows:

4.1.1 Composition

Not less than two samples from each lot shall be evaluated.

4.1.2 Hardness

Not less than 20 microhardness readings shall be made from each sample with no more than one impression on any one shot.

4.1.2.1 Samples for microhardness testing shall be prepared by encapsulating a representative sample of each lot in a plastic mount and polishing down to nominal half spheres.

4.1.3 Size

Two representative samples of not less than 100 grams each shall be used for size evaluation.

4.1.3.1 Alternative methods for size evaluation may be used provided that they can be correlated to the weight method and are acceptable to purchaser.

4.1.3.2 Fifty pieces of the conditioned media shall meet the weight requirements of Table 3. One hundred pieces of the conditioned media shall meet the weight requirements of Table 4.

4.1.4 Shape

A representative sample shall consist of a number of shot, in one layer, which completely fills the areas specified in Table 2. The number of areas, or fields, viewed at 10X or 30X (See 3.9.2) evaluated for each shot size shall be as indicated in Table 2.

4.1.4.1 Alternative methods of inspection for shape are permitted provided that they can be correlated to the optical method and are acceptable to purchaser.

5. PREPARATION FOR DELIVERY

See AMS 2431 and the following:

5.1 Packaging and Identification

Steel shot shall be packaged in 40 to 55 pound (18 to 25 kg) units in plastic coated bags or pails.

6. ACKNOWLEDGMENT

See AMS 2431.

7. REJECTIONS

See AMS 2431.

8. NOTES

See AMS 2431.