

 <i>An SAE International Group</i>	AEROSPACE MATERIAL SPECIFICATION	SAE AMS2585	REV. A
		Issued 2010-05 Revised 2013-07	
		Superseding AMS2585	
Shot Peening Media, Ultrasonically Activated			

RATIONALE

This revision includes ceramic media and additional media sizes to address user requirements.

1. SCOPE

The complete requirements for procuring the product shall consist of this document and the latest Issue of the basic specification, AMS2431.

1.1 Application

Peening balls conforming to this specification are typically intended for use in ultrasonically activated shot peening of metal surfaces to impart compressive stresses to these surfaces thereby increasing resistance to fatigue and stress-corrosion cracking. These balls can also be used in the peen forming process.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

AMS2431 Peening Media, General Requirements

2.2 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 751 Standard Test Methods, Practices, and Terminology for Chemical Analysis of Steel Products

ASTM E 384 Standard Test Method for Knoop and Vickers Hardness of Materials

ASTM E140 Standard Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Knoop Hardness, and Scleroscope Hardness

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2.3 ANSI Publications

Available from American National Standards Institute (ANSI), 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

ANSI/ABMA/ISO 3290 Rolling bearings - Balls - Dimensions and Tolerances

2.4 DIN Publications

Available from DIN Deutsches Institut für Normung e. V., Burggrafenstraße, 6, 10787, Berlin, Germany or www.DIN.de.

DIN 5401 Rolling bearings - Balls for rolling bearings and general industrial use

2.5 BNAE Publications

Available from BNAE, Technopolis 54, 199, rue Jean Jacques ROUSSEAU, 92138 Issy les Moulineaux cedex, France or www.BNAE.asso.fr.

BNAE NFL 06-834 Metallic parts – Inducement Compressive Surface Stresses – Tungsten Carbide Spherical Beads

2.6 ISO Publications

Available from International Organization for Standardization, 1, rue de Varembe, Case postale 56, CH-1211 Geneva 20, Switzerland, Tel: +41-22-749-01-11, www.iso.org.

ISO 3290 Rolling Bearings - Balls - Dimensions and Tolerances

3. TECHNICAL REQUIREMENTS

3.1 Peening balls shall conform to AMS2431 and the requirements specified herein.

3.2 Composition and properties

3.2.1 Chemical composition of peening balls shall conform to Table 1 or an alternative composition approved by the cognizant engineering organization.

TABLE 1 – COMMON PEENING BALL MATERIALS

Material	Alloy	AFNOR / ISO / DIN equivalent	Hardness
Steel	52100	100C6	60-67 HRC
	M50		60-66 HRC
	1010/1015	XC10/XC15	60-66 HRC
	1055/1065/1085		60-66 HRC
Stainless Steel			
	440C	Z100CD17	58-65 HRC
	304	Z7CN18-09	25-39 HRC
	304L	Z2CN18-10	25-39 HRC
	316	Z6CND17-12	25-39 HRC
	316L	Z2CND17-12	25-39 HRC
Tungsten Carbide	n/a	BNAE NFL 06-834	1400-1800 HV
Ceramic High Density	$ZrO_2 + HfO_2 + Y_2O_3$		1100-1300 HV

- 3.2.2 The percentage variation by weight ranges of the main constituents of ceramic ball shall conform to requirements in Table 2:

TABLE 2 – CERAMIC BALLS COMPOSITION

Constituent	min	max
Zirconium Oxide + Hafnium Oxide	90	95
Yttrium Oxide	3	7
Others		3

Note: Approved alternative shall conform to an AISI, SAE, ASTM, DIN, or ISO standard.

- 3.2.3 The surface finish, the shape and tolerances for steel, stainless steel and tungsten carbide media shall conform to grade of ANSI/ABMA/ISO 3290 or ISO 3290 or DIN 5401 defined in Table 3.

TABLE 3 – REQUIRED GRADES OF PEENING BALLS

Standard	Grade
AISI/ABMA/ISO 3290	up to 200
ISO 3290	up to 200
DIN 5401	up to class III

- 3.2.4 Ceramic media shall be predominantly spherical in shape. 90% of media shall have sphericity higher than 0.8. Balls with sharp angle, twins, tear drop or with satellite are classified as defective media.

- 3.2.5 Hardness of peening balls shall conform to Table 1, unless otherwise agreed upon by user and manufacturer.

- 3.2.6 Density of ceramic media shall be not less than 5.90 g/cc.

- 3.2.7 Contamination

- 3.2.7.1 Balls shall be clean and free of dust, grit, oil and grease.

- 3.2.7.2 Surface Discolorations shall be determined microscopically using magnification per 4.1.5. Not more than 5% of ceramic media shall show foreign discolorations. A particle shall be considered objectionable for foreign discoloration when more than 25% of its surface area is discolored.

- 3.3 Size

For metal alloy or carbide media, peening balls shall conform to the size requirements in Table 4. Ceramic media shall conform to the size requirements of Table 5.

TABLE 4 - USABLE SIZES. MOST COMMONLY USED ARE SHOWN IN GREY.

Nominal diameter (mm)	Nominal diameter (inch)	Nominal diameter (mm)	Nominal diameter (inch)	Nominal diameter (mm)	Nominal diameter (inch)
0.3	0.01181	1.98438	5/64	4.5	0.17717
0.39688	1/64	2.1	0.08268	5.15938	13/64
0.4	0.01575	2.2	0.08661	5.5	0.21654
0.5	0.01969	2.3	0.09055	5.55625	7/32
0.508	0.02	2.38125	3/32	5.95312	15/64
0.6	0.02362	2.4	0.09448	6	0.23622
0.635	0.025	2.5	0.09843	6.35	1/4
0.68	0.02677	2.6	0.10236	6.5	0.25591
0.7	0.02756	2.7	0.10629	6.74688	17/64
0.79375	1/32	2.77812	7/64	7	0.27559
0.8	0.03150	2.8	0.11023	7.14375	9/32
0.9	0.03543	2.9	0.11417	7.5	0.29528
1	0.03937	3	0.11811	7.54062	19/64
1.1	0.04330	3.1	0.12204	7.9375	5/16
1.19062	3/64	3.175	1/8	8	0.31496
1.2	0.04724	3.2	0.12598	8.33438	21/64
1.3	0.05118	3.3	0.12992	8.5	0.33465
1.4	0.05511	3.4	0.13385	8.73125	11/32
1.5	0.05906	3.5	0.13780	9	0.35433
1.5875	1/16	3.57188	9/64	9.12812	23/64
1.6	0.06299	3.96875	5/32	9.5	0.37402
1.7	0.06692	4	0.15748	9.525	3/8
1.8	0.07086	4.36562	11/64	9.92188	25/64
1.9	0.07480				

TABLE 5 - CERAMIC MEDIA FOR SHOT PEENING – SIZES AND SPHERICITY

Designation	Nominal Sizes, Millimeters	Nominal Sizes, Inch	Sieve Size, Millimeters Maximum 0.5% Retained	Sieve Size, Millimeters Maximum 5% Retained	Sieve Size, Millimeters Maximum 5% Passing	Sieve Size, Millimeters Maximum 0.5% Passing
CB 1.1	1.0/1.2	0.039/0.047	1.40	1.18	1.00	0.9
CB 1.5	1.4/1.6	0.055/0.062	1.70	1.60	1.40	1.18
CB 1.9	1.8/2.0	0.070/0.078	2.24	2.00	1.80	1.70
CB 2.2	2.0/2.5	0.078/0.098	2.80	2.50	2.00	1.80
CB 3.0	2.6/3.3	0.102/0.129	3.55	3.35	2.80	2.36

4. QUALITY ASSURANCE PROVISIONS

In accordance with AMS2431 and the following:

4.1 Sampling

One sample of not less than 100 balls shall be randomly selected from the batch and shall be suitably split to perform controls. The batches shall be packed in containers not exceeding 50 pounds (~22 kg) and issued of the same production.