

Steel, Carbon, Laminated Sheet, Surface Bonded

RATIONALE

AMS6387A results from a Five Year Review and update of this specification.

1. SCOPE

1.1 Form

This specification covers steel in the form of laminated sheet.

1.2 Application

This material has been used typically for shims in which thickness is adjusted by removal of laminations as required, but usage is not limited to such applications.

1.3 Classification

Materials are classified as follows:

1.3.1 Type

- Type I - All laminations
- Type II - One half laminations
- Type III - Three quarters laminations

1.3.2 Class

- Class 1 - 0.002 inch (0.05 mm) thick laminations
- Class 2 - 0.003 inch (0.075 mm) thick laminations

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.

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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.

AMS5040	Steel, Sheet and Strip, 0.15 Carbon, Maximum, Deep Forming Grade
AMS5042	Steel, Sheet and Strip, 0.15 Carbon, Maximum Grade
AMS5044	Steel, Sheet and Strip, 0.15 Carbon, Maximum, Half Hard Temper
AMS5047	Steel, Sheet and Strip, 0.08 - 0.13C, Aluminum Killed (SAE 1010), Deep Forming Grade

2.2 American Society for Quality Publications

Available from American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203, Tel: 800-248-1946 (North America) or +1-414-272-8575 (International), www.asq.org.

ANSI/ASQC Z1.4 Sampling Procedures and Tables for Inspection by Attributes

3. TECHNICAL REQUIREMENTS

3.1 Composition

3.1.1 Laminations

Shall conform to AMS5040, AMS5042, AMS5044 or AMS5047.

3.1.2 Adhesive

Shall be of a composition that will meet the fabrication and quality requirements of this specification.

3.2 Fabrication

The laminated shim stock shall consist completely of laminations each 0.002 ± 0.0002 inch (0.05 ± 0.005 mm) thick or 0.003 ± 0.0003 inch (0.08 ± 0.008 mm) thick, or partly of such laminations combined with a single thicker lamination, as ordered, bonded together by an adhesive such that individual laminations may be peeled for adjustment of shim thickness. The thickness of each layer of adhesive shall not exceed 0.0003 inch (0.008 mm).

3.2.1 Sheet shall be of the thicknesses and combinations of laminations and solid base shown in Table 1.

TABLE 1 - THICKNESS COMBINATIONS OF SHIM STOCK

Inch	mm	Type I Class 1 All Laminated, 0.002 in. (0.05 mm) Laminations	Type I Class 2 All Laminated, 0.003 in. (0.08 mm) Laminations	Type II Class 1 Half Solid, Half Laminated, 0.002 in. (0.05 mm) Laminations	Type II Class 2 Half Solid, Half Laminated, 0.003 in. (0.08 mm) Laminations	Type III Class 1 Three Quarters Solid, One Quarter Laminated, 0.002 in. (0.05 mm) Laminations	Type III Class 1 Three Quarters Solid, One Quarter Laminated, 0.003 in. (0.08 mm) Laminations
0.006	0.15	X					
0.008	0.20	X					
0.010	0.25	X					
0.012	0.31	X					
0.015	0.38	X	X				
0.016	0.41	X	X				
0.020	0.51	X	X				
0.021	0.53	X	X				
0.032	0.81	X	X				
0.033	0.84	X	X				
0.047	1.19	X	X				
0.048	1.22	X	X				
0.062	1.58	X	X	X	X		
0.063	1.60	X	X	X	X		
0.078	1.98	X	X	X	X		
0.080	2.03	X	X	X	X		
0.093	2.37	X	X	X	X		
0.094	2.39	X	X	X	X		
0.109	2.77	X	X	X	X		
0.121	3.07	X	X	X	X	X	X
0.125	3.18	X	X	X	X	X	X

3.2.2 Legacy Part Numbers

Legacy part numbers of the form M22499/4 plus dash number shall meet the following Type, Class and dimensions specified in Table 2. Tolerance of Length and Width shall be plus and minus 0.125 inch.

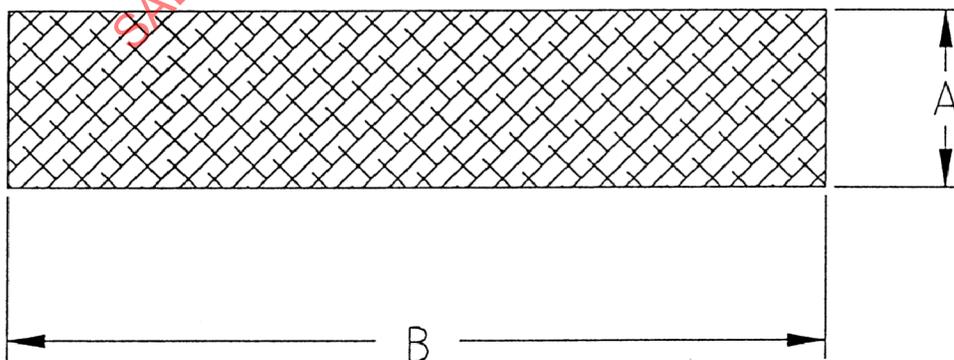


TABLE 2 - REQUIREMENTS FOR LEGACY PART NUMBERS

Dash No	A Thickness	B Width	Length Feet	Type	Class
001	0.010	8.000	4.000	I	1
003	0.016	6.000	3.000	I	1
005	0.024	8.000	2.000	I	1
007	0.032	6.000	3.000	I	1
009	0.062	6.000	3.000	I	1

3.3 Construction

3.3.1 General Requirements

Laminations and solid stock, when applicable, shall be bonded together throughout the whole surface area in a manner that will permit peeling of the laminations without the aid of mechanical devices, for adjustment of shim thickness, without separation of the remaining laminations and solid part. Laminations shall be bonded together in such a manner that any shape can be cut from the material using suitable tools, without separation. Laminations shall remain intact without separation during normal handling. Requirements shall be applicable to laminations not less than eight hours after completion of bonding.

3.3.2 Surface Roughness

Flat surfaces of laminations, and solid stock when applicable, shall have a maximum roughness of 63 RA (microinches) on original surfaces and on metallic surfaces after peeling.

3.3.3 Water Resistance

Sheet shall withstand total immersion in water at $120\text{ }^{\circ}\text{F} \pm 3$ ($49\text{ }^{\circ}\text{C} \pm 2$) for at least three hours without separation of laminations or any evidence of corrosion.

3.3.4 Peel Strength

Each individual lamination shall have a peel strength no less than 1 pound per inch of width (180 gm/cm of width) and no more than 5 pounds per inch of width (900 gm/cm of width), except at the solid/laminate bond line that may be higher.

3.4 Quality

Sheet, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from dents, creases, and other imperfections detrimental to usage of the sheet.

3.5 Thickness Tolerances

Shall be as specified in Table 3.

TABLE 3A - TOTAL THICKNESS TOLERANCES, INCH/POUND UNITS

Nominal Thickness Inches	Tolerance, Inch Plus	Tolerance, Inch Minus
Up to 0.008, incl	0.001	0.0005
Over 0.008 to 0.010, incl	0.0015	0.0005
Over 0.010 to 0.016, incl	0.0015	0.001
Over 0.016 to 0.021, incl	0.002	0.001
Over 0.021 to 0.033, incl	0.003	0.002
Over 0.033 to 0.048, incl	0.005	0.002
Over 0.048 to 0.063, incl	0.006	0.002
Over 0.063 to 0.080, incl	0.007	0.002
Over 0.080 to 0.094, incl	0.009	0.003
Over 0.094 to 0.109, incl	0.010	0.003
Over 0.109 to 0.125, incl	0.012	0.003
Over 0.125 to 0.156, incl	0.015	0.003
Over 0.156 to 0.187, incl	0.018	0.003
Over 0.187 to 0.190, incl	0.018	0.005

TABLE 3B - TOTAL THICKNESS TOLERANCES, SI UNITS

Nominal Thickness Millimeters	Tolerance, Millimeter Plus	Tolerance, Millimeter Minus
Up to 0.20, incl	0.025	0.013
Over 0.20 to 0.25, incl	0.038	0.013
Over 0.25 to 0.41, incl	0.038	0.025
Over 0.41 to 0.53, incl	0.05	0.025
Over 0.53 to 0.84, incl	0.08	0.05
Over 0.84 to 1.22, incl	0.13	0.05
Over 1.22 to 1.60, incl	0.15	0.05
Over 1.60 to 2.03, incl	0.18	0.05
Over 2.03 to 2.39, incl	0.23	0.08
Over 2.39 to 2.77, incl	0.25	0.08
Over 2.77 to 3.18, incl	0.30	0.08
Over 3.18 to 3.96, incl	0.38	0.08
Over 3.96 to 4.75, incl	0.46	0.08
Over 4.75 to 4.83, incl	0.46	0.13

3.6 Quality

The shim stock shall be uniform in quality, clean, and free of defects detrimental to functional performance of the material.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The vendor of sheet shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the sheet conforms to specified requirements.

4.2 Classification of Tests

All technical requirements are acceptance tests and shall be performed on each heat or lot as applicable.