SAE International™ SURFACE VEHICLE STANDARD

SAE J1323 REV. DEC2003

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Standard Classification System for Fiberboards

1. ***Scope—***This SAE Standard provides a means for specifying or describing the pertinent properties of fiberboards for automotive applications. The materials normally specified by this standard are defined in SAE J947. The test methods commonly used for fiberboards are defined in SAE J315.

1.1 **Purpose—**The purpose of this classification system is to provide guidance to the engineer in the selection of commercially available fiberboards and further provide a method for specifying the fiberboard and its critical properties by use of a standard line call-out.

2. References

2.1 **Applicable Publications—**The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the lastest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, Pa 15096-0001.

SAE J315—Fiberboard Test Procedure
SAE J947—Glossary of Fiberboard Terminology

2.1.2 AATCC PUBLICATION

AATCC Evaluation Form 2 (Gray Scale for Staining)

3. Numbering System

3.1 **The Basic Five Characters—**This classification establishes alpha-numeric characters for various performance levels of each fiberboard property or characteristic. In specifying or describing fiberboard materials, each line call-out shall include the number SAE J1323, followed by a sequence of alpha-numerics to describe the fiberboard and its properties. The first five alpha-numeric characters of the call-out after SAE J1323 are mandatory, since they identify the material and specify the critical fiberboard properties, thickness, fiberboard type, and dimensional stability.

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3.2 Suffix Letters—To further specify or describe the fiberboard, each line call-out may include one or more suffix - alpha-numeric symbols as listed in Section 5. These suffix letters, when appended to the basic number, specify additional physical or mechanical property requirements. Suffix symbols may be used singly or in combination to describe the properties desired in the fiberboard.

3.3 Special Numbers—The numeral 0 is used when the description of any characteristic is not desired. The numeral 9 is used when the description of any characteristic (or test related thereto) is specified by some supplement to this classification system, such as notes on engineering drawings.

3.4 Special Letter—To identify other characteristics not covered by the existing suffix symbols, the letter Z shall be used. The Z characteristics shall be specified in detail on the engineering drawing or other supplement to this classification. If more than one Z characteristic is specified, they should be identified by subnumeral, for example, Z_1, Z_2, Z_3, etc.

3.5 Example—The line call-out SAE J1323 B2A23A1B7C3D9Z would be broken down to indicate the type of fiberboard and properties as in Figure 1:

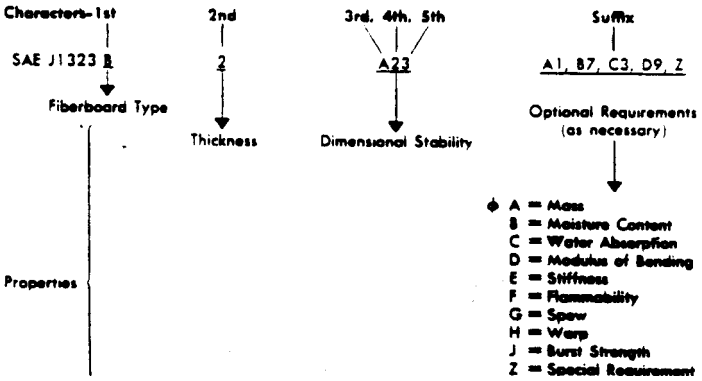

FIGURE 1—

By using the breakdown in Figure 1 and Tables 1 to 4, the example line call-out specifies a hardboard, 2.03 mm thick, with a 0.5% maximum expansion and a 0.75% maximum contraction after humidity exposure. The optional requirements include a weight of 1 kg/m^2 ± 0.05, a moisture content of 5 to 9%, water absorption of 30% maximum, and a special modulus bending requirement.

4. Basic Fiberboard Characteristics—Fiberboards identified by this classification system shall have the following three basic characteristics indicated by the first five alpha-numeric symbols.

4.1 Fiberboard Type—The first character of the line call-out specifies the type of fiberboard as defined in SAE J947, and listed in Table 1:

TABLE 1—

First Character	Fiberboard Type
A	None Specified
B	Hardboard
C	Paperboard - Laminated
D	Paperboard - Single Ply
E	Paperboard - Wet Machine Board
F	Molded Cellulosic Fiber Pulp Product
G	Kraft Paper
H	Paperboard - Corrugated
Z	Special Requirements, as Necessary

4.2 Thickness—The second character of the line call-out specifies the fiberboard thickness in millimeters as determined in SAE J315, and listed in Table 2. The thickness tolerance for paperboard is ±5% from the average panel thickness; however, the thickness variation within a hardboard panel (in the range of 1.65 to 3.18 mm thick) is ±0.25 mm from the average panel thickness.

TABLE 2—

Second Character	G (Paper) mm	D and E (Single Ply Paperboard) mm	C (Laminated Paperboard) mm	B and F (Hardboard or Molded Fiberboard) mm	H (Corrugated Fiberboard(1)) mm
1	0.025	0.25	1.02	1.65	2.26 (E flute)
2	0.051	0.64	1.65	2.03	3.00 (B flute)
3	0.076	0.76	1.78	2.54	4.19 (C flute)
4	0.102	1.02	2.03	3.18	5.13 (A flute)
5	0.127		2.54		
6	0.152		3.05		
7	0.178		3.18		
8	0.203				
9	Special Requirements, as Necessary				

1. The corrugated fiberboard thickness values are based upon the use of 42/1000 ft^2 (195 g/m^2) kraft paper. The flute designations indicate the following construction:

A flute = 118 ± 10 flutes/m
B flute = 164 ± 10 flutes/m
C flute - 138 ± 10 flutes/m
E flute = 308 ± 13 flutes/m

4.3 Dimensional Stability—The third, fourth, and fifth characters of the line call-out specify the maximum[1] percent expansion and contraction of the fiberboard for both the machine and across-machine direction, as determined in SAE J315, and listed in Tables 3 and 4. The third character denotes the method of test in SAE J315, the fourth character specifies the maximum expansion, and, the fifth character specifies the maximum contraction.

1. The maximum dimensional movement on fiberboards will occur in the across-machine direction. Paper and paperboards will usually have only half the dimensional movement in the machine direction, due to linear fiber orientation during manufacture.

TABLE 3—

Third Character	Test Method
A	Method A (humidity)
B	Method B (water immersion)

TABLE 4—

Fourth and Fifth Characters	Expansion or Contraction % max
0	None specified
1	0.25
2	0.50
3	0.75
4	1.0
5	1.5
6	2.0
7	3.0
8	4.0
9	Special Requirement, as Necessary

5. Supplementary Characteristics—Additional fiberboard requirements can be included by adding one or more of the following suffixes:

5.1 Suffix Letter A—Mass determined in accordance with SAE J315. Specify the mass in kg/m^2. (See Table 5.) The tolerance unless otherwise specified shall be ±5%.

TABLE 5—

Suffix Number	kg/m^2
A1	1 ± 0.05 kg/m^2
A1.5	1.5 ± 0.075 kg/m^2
A9	Special Requirement

5.2 Suffix Letter B—Moisture Content determined in accordance with SAE J315. Specify the moisture content in percent with a range of ±2%. (See Table 6.)

TABLE 6—

Suffix Number	% Moisture Content
B1	0–3
B2	0–4
B3	1–5
B4	2–6
B5	3–7
B6	4–8
B7	5–9
B8	6–10
B9	Special Requirement

5.3 Suffix Letter C—Water Absorption determined in accordance with SAE J315. (See Table 7.)

TABLE 7—

Suffix Number	Water Absorption % max
C1	10 for 2.5 h immersion
C2	20 for 2.5 h immersion
C3	30 for 2.5 h immersion
C4	60 for 2.5 h immersion
C5	10 for 24 h immersion
C6	20 for 24 h immersion
C7	30 for 24 h immersion
C8	60 for 24 h immersion
C9	Special Requirement

5.4 Suffix Letter D—Stiffness (modulus of bending) determined in accordance with SAE J949a. (See Table 8.)

a. First Suffix Number - machine direction stiffness min
b. Second Suffix Number - across-machine direction stiffness min

TABLE 8—

Suffix Number	Stiffness
D1	350 kPa
D2	700 kPa
D3	2000 kPa
D4	3500 kPa
D5	6000 kPa
D9	Special Requirement

Example: D21 = 700 kPa M.D. min and 350 kPa A.M.D. min

5.5 Suffix Letter E—Stiffness (cantilever beam) determined in accordance with ASTM D 747. (See Table 9.)

a. First Suffix Number - M.D. stiffness min
b. Second Suffix Number - A.M.D. stiffness min

TABLE 9—

Suffix Number	Stiffness
E1	500 kPa
E2	1000 kPa
E3	1500 kPa
E4	2000 kPa
E9	Special Requirement

5.6 Suffix Letter F—Flammability determined in accordance with SAE J369. (See Table 10.)

TABLE 10—

Suffix Number	Burn Rate max
F1	Does Not Ignite
F2	Self-Extinguishing
F3	Burn Rate - 25 mm/min
F4	Burn Rate - 51 mm/min
F5	Burn Rate - 76 mm/min
F6	Burn Rate - 101 mm/min
F9	Special Requirement

5.7 Suffix Letter G—Spew determined in accordance with SAE J315 and AATCC Evaluation Procedure 2 (Gray Scale for Staining). (See Table 11.)

TABLE 11—

Suffix Number	Gray Scale Rating
G1	No. 1 Very Heavy Stain
G2	No. 2 Heavy Stain
G3	No. 3 Moderate Stain
G4	No. 4 Slight Stain
G5	No. 5 Unstained
G9	Special Requirement

5.8 Suffix Letter H—Warp determined in accordance with SAE J315. The maximum allowable warp should be directly expressed as a percent. (See Table 12.)

TABLE 12—

Suffix Number	Warp % max
H1	1
H2	2
H3	3
H4	4
H5	5
H6	6
H7	7
H8	8
H9	Special Requirement

5.9 Suffix Letter J—The Minimum Bursting Strength as determined in accordance with SAE J315. (See Table 13.)

TABLE 13—

Suffix Number	Minimum kPa/mm Thickness
J1	250
J2	500
J3	750
J4	1000
J5	1250
J6	1500
J7	1750
J8	2000
J9	Special Requirement, as Necessary

6. Conclusion—A word of caution is extended in utilizing this classification system. It could be possible for a consumer to call out a product that cannot be manufactured. Close cooperation will be necessary between the consumers and suppliers to assure feasibility of the line call-out.

7. Notes

7.1 Marginal Indicia—The change bar (l) located in the left margin is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. An (R) symbol to the left of the document title indicates a complete revision of the report.

PREPARED BY THE SAE TEXTILES AND FLEXIBLE PLASTICS COMMITTEE

SAE J1323 Revised DEC2003

Rationale—The Foreword was removed as part of the committee's 5-Year Review.

Relationship of SAE Standard to ISO Standard—Not applicable.

Application—This SAE Standard provides a means for specifying or describing the pertinent properties of fiberboards for automotive applications. The materials normally specified by this standard are defined in SAE J947. The test methods commonly used for fiberboards are defined in SAE J315.

Reference Section

SAE J315—Fiberboard Test Procedure

SAE J947—Glossary of Fiberboard Terminology

AATCC Evaluation Procedure (Gray Scale for Staining)

Developed by the SAE Textiles and Flexible Plastics Committee