

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

SAE J90

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Superseding J90b

(R) STANDARD CLASSIFICATION SYSTEM FOR NONMETALLIC AUTOMOTIVE GASKET MATERIALS

1. SCOPE:

- 1.1 The classification system provides a means for specifying or describing pertinent properties of commercial nonmetallic gasket materials. Materials composed of asbestos, cork cellulose, and other organic or inorganic materials in combination with various binders or impregnants are included. Materials normally classified as rubber compounds are not included, since they are covered in SAE J200 - ASTM D 2000. Gasket coatings are not covered, since details thereof are intended to be given on engineering drawings or in separate specifications.
- 1.2 Since all of the properties that contribute to gasket performance are not included, use of the classification system as a basis for selecting materials is limited.
- 1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.
- 1.4 This SAE Recommended Practice may involve hazardous materials, operations, and equipment. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. REFERENCE:

2.1 Applicable Documents:

SAE J200, Classification System for Rubber Products in Automotive Applications

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2.1 (Continued):

ASTM D 2000, Classification System for Rubber Products in Automotive Applications

ASTM E 11, Specification for Wire-Cloth Sieves for Testing Purposes

ASTM F 36, Test Method for Compressibility and Recovery of Gasket Materials

ASTM F 37, Test Methods for Sealability of Gasket Materials

ASTM F 38, Test Methods for Creep Relaxation of a Gasket Material

ASTM F 146, Test Methods for Fluid Resistance of Gasket Materials

ASTM F 147, Test Method for Flexibility of Non-Metallic Gasket Materials

ASTM F 148, Test Method for Binder Durability of Cork Composition Gasket Materials

ASTM F 152, Test Methods for Tension Testing of Nonmetallic Gasket Materials

ASTM F 433, Practice for Evaluating Thermal Conductivity of Gasket Materials

ASTM F 607, Test Method for Adhesion of Gasket Materials to Metal Surfaces

3. SIGNIFICANCE AND USE:

3.1 This classification is intended to encourage uniformity in reporting properties; to provide a common language for communications between suppliers and consumers; to guide engineers and designers in the test methods commonly used for commercially available materials; and to be versatile enough to cover new materials and test methods as they are introduced.

3.2 It is based on the principle that nonmetallic gasket materials should be described, insofar as is possible, in terms of specific physical and mechanical characteristics, and that an infinite number of such descriptions can be formulated by use of one or more standard statements based on standard tests. Therefore, users of gasket materials can, by selecting different combinations of statements, specify different combinations of properties desired in various parts. Suppliers, likewise, can report properties available in their respective products.

4. BASIS OF CLASSIFICATION

4.1 To permit "line call-out" of the descriptions mentioned in 3.2, this classification system establishes letter or number symbols or both for various performance levels of each property or characteristic (See Table 1).

TABLE 1 - Basic Physical and Mechanical Characteristics

Basic Six-Digit Number	Basic Characteristic
First Numeral	<p>"Type" of material (the principal fibrous or particulate reinforcement material from which the gasket is made) shall conform to the first numeral of the basic six-digit number, as follows:</p> <ul style="list-style-type: none"> 0 = not specified 1 = asbestos 2 = cork 3 = cellulose 4 = fluorocarbon polymer 5 = flexible graphite 7 = nonasbestos, tested as Type 1 9 = as specified^a
Second Numeral	<p>Class of material (method of manufacture or common trade designation) shall conform to the second numeral of the basic six-digit number, as follows:</p> <p>When first numeral is "1" or "7," second numeral:</p> <ul style="list-style-type: none"> 0 = not specified 1 = compressed sheeter process 2 = beater process 3 = paper and millboard 9 = as specified^a <p>When first numeral is "2," second numeral:</p> <ul style="list-style-type: none"> 0 = not specified 1 = cork composition (Class 1) 2 = cork and elastomeric (Class 2) 3 = cork and cellular rubber (Class 3) 9 = as specified^a <p>When first numeral is "3," second numeral:</p> <ul style="list-style-type: none"> 0 = not specified 1 = untreated fiber -- tag, chipboard, vulcanized fiber, etc. (Class 1) 2 = protein treated (Class 2) 3 = elastomeric treated (Class 3) 4 = thermosetting resin treated (Class 4) 9 = as specified^a <p>When first numeral is "4," second numeral:</p> <ul style="list-style-type: none"> 0 = not specified 1 = sheet PTFE 2 = PTFE of expanded structure 3 = PTFE filaments, braided, or woven 4 = PTFE felts 5 = filled PTFE 9 = as specified <p>When first numeral is "5," second numeral:</p> <ul style="list-style-type: none"> 0 = not specified 1 = homogeneous sheet 2 = laminated sheet 9 = as specified^a

TABLE 1
(Continued)

Basic Six-Digit Number	Basic Characteristic
Third Numeral	Compressibility characteristics, determined in accordance with 9.2, shall conform to the percent indicated by the third numeral of the basic six-digit number. (Example: 4 = 15 to 25%) 0 = not specified 1 = 0 to 10% 2 = 5 to 15% 3 = 10 to 20% 4 = 15 to 25% 5 = 20 to 30% 6 = 25 to 40% 7 = 30 to 50% 8 = 40 to 60% 9 = as specified ^a *7 to 17% for compressed sheeter process
Fourth Numeral	Thickness increase when immersed in ASTM No. 3 Oil: determined in accordance with 9.3, shall conform to the percent indicated by the fourth numeral of the basic six-digit number. (Example: 4 = 15 to 30%) 0 = not specified 1 = 0 to 15% 2 = 5 to 20% 3 = 10 to 25% 4 = 15 to 30% 5 = 20 to 40% 6 = 30 to 50% 7 = 40 to 60% 8 = 50 to 70% 9 = as specified ^a
Fifth Numeral	Weight increase when immersed in ASTM No. 3 Oil: determined in accordance with 9.3, shall conform to the percent indicated by the fifth numeral of the basic six-digit number. (Example: 4 = 30% max) 0 = not specified 1 = 10%, max 2 = 15%, max 3 = 20%, max 4 = 30%, max 5 = 40%, max 6 = 60%, max 7 = 80%, max 8 = 100%, max 9 = as specified ^a
Sixth Numeral	Weight increase when immersed in water: determined in accordance with 9.3, shall conform to the percent indicated by the sixth numeral of the basic six-digit number. See left and below. (Example: 4 = 30%, max) 0 = not specified 1 = 10%, max 2 = 15%, max 3 = 20%, max 4 = 30%, max 5 = 40%, max 6 = 60%, max 7 = 80%, max 8 = 100%, max 9 = as specified ^a

^aOn engineering drawings or other supplement to this classification system.

TABLE 2
(Continued)

Suffix Symbol	Supplementary Characteristics																						
E00 through E99	<p>Weight and thickness change after immersion in ASTM Fuel B shall be determined in accordance with 9.3. Weight increase shall not exceed the standard rating number indicated by the first numeral of the two-digit number of the E-symbol. Thickness increase shall not exceed the standard rating number indicated by the second numeral of the E-symbol.</p> <table border="0"> <thead> <tr> <th>Weight Increase, % (first numeral)</th> <th>Thickness Increase, % (second numeral)</th> </tr> </thead> <tbody> <tr> <td>E0_ = not specified</td> <td>E_0 = not specified</td> </tr> <tr> <td>E1_ = 10</td> <td>E_1 = 0 to 5</td> </tr> <tr> <td>E2_ = 15</td> <td>E_2 = 0 to 10</td> </tr> <tr> <td>E3_ = 20</td> <td>E_3 = 0 to 15</td> </tr> <tr> <td>E4_ = 30</td> <td>E_4 = 5 to 20</td> </tr> <tr> <td>E5_ = 40</td> <td>E_5 = 10 to 25</td> </tr> <tr> <td>E6_ = 60</td> <td>E_6 = 15 to 35</td> </tr> <tr> <td>E7_ = 80</td> <td>E_7 = 25 to 45</td> </tr> <tr> <td>E8_ = 100</td> <td>E_8 = 30 to 60</td> </tr> <tr> <td>E9_ = as specified^a</td> <td>E_9 = as specified^a</td> </tr> </tbody> </table>	Weight Increase, % (first numeral)	Thickness Increase, % (second numeral)	E0_ = not specified	E_0 = not specified	E1_ = 10	E_1 = 0 to 5	E2_ = 15	E_2 = 0 to 10	E3_ = 20	E_3 = 0 to 15	E4_ = 30	E_4 = 5 to 20	E5_ = 40	E_5 = 10 to 25	E6_ = 60	E_6 = 15 to 35	E7_ = 80	E_7 = 25 to 45	E8_ = 100	E_8 = 30 to 60	E9_ = as specified ^a	E_9 = as specified ^a
Weight Increase, % (first numeral)	Thickness Increase, % (second numeral)																						
E0_ = not specified	E_0 = not specified																						
E1_ = 10	E_1 = 0 to 5																						
E2_ = 15	E_2 = 0 to 10																						
E3_ = 20	E_3 = 0 to 15																						
E4_ = 30	E_4 = 5 to 20																						
E5_ = 40	E_5 = 10 to 25																						
E6_ = 60	E_6 = 15 to 35																						
E7_ = 80	E_7 = 25 to 45																						
E8_ = 100	E_8 = 30 to 60																						
E9_ = as specified ^a	E_9 = as specified ^a																						
H	Adhesion characteristics shall be determined in accordance with 9.6. Results shall be as specified on engineering drawing or other supplement to this classification.																						
K1 through K9	<p>Thermal conductivity characteristics shall be determined in accordance with 9.10. The k-factor obtained in $W/(m \cdot K)(Btu \cdot in/h \cdot ft^2 \cdot ^\circ F)$ shall fall within the ranges indicated by the numeral of a K symbol.</p> <table border="0"> <tbody> <tr> <td>K1 = 0.00 to 0.09 (0.00 to 0.65)</td> <td>K5 = 0.29 to 0.38 (2.00 to 2.65)</td> </tr> <tr> <td>K2 = 0.07 to 0.17 (0.50 to 1.15)</td> <td>K6 = 0.36 to 0.45 (2.50 to 3.15)</td> </tr> <tr> <td>K3 = 0.14 to 0.24 (1.00 to 1.65)</td> <td>K7 = 0.43 to 0.53 (3.00 to 3.65)</td> </tr> <tr> <td>K4 = 0.22 to 0.31 (1.50 to 2.15)</td> <td>K8 = 0.50 to 0.60 (3.50 to 4.15)</td> </tr> <tr> <td></td> <td>K9 = as specified^a</td> </tr> </tbody> </table>	K1 = 0.00 to 0.09 (0.00 to 0.65)	K5 = 0.29 to 0.38 (2.00 to 2.65)	K2 = 0.07 to 0.17 (0.50 to 1.15)	K6 = 0.36 to 0.45 (2.50 to 3.15)	K3 = 0.14 to 0.24 (1.00 to 1.65)	K7 = 0.43 to 0.53 (3.00 to 3.65)	K4 = 0.22 to 0.31 (1.50 to 2.15)	K8 = 0.50 to 0.60 (3.50 to 4.15)		K9 = as specified ^a												
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	K9 = as specified ^a																						
M1 through M9	<p>Tensile strength characteristics shall be determined in accordance with 9.7. Results in MPa (psi) shall be no less than the value indicated by the numeral of the M- symbol.</p> <table border="0"> <tbody> <tr> <td>M1 = 0.689 (100)</td> <td>M5 = 10.342 (1500)</td> </tr> <tr> <td>M2 = 1.724 (250)</td> <td>M6 = 13.790 (2000)</td> </tr> <tr> <td>M3 = 3.447 (500)</td> <td>M7 = 20.684 (3000)</td> </tr> <tr> <td>M4 = 6.895 (1000)</td> <td>M8 = 27.579 (4000)</td> </tr> <tr> <td></td> <td>M9 = as specified^a</td> </tr> </tbody> </table>	M1 = 0.689 (100)	M5 = 10.342 (1500)	M2 = 1.724 (250)	M6 = 13.790 (2000)	M3 = 3.447 (500)	M7 = 20.684 (3000)	M4 = 6.895 (1000)	M8 = 27.579 (4000)		M9 = as specified ^a												
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	M9 = as specified ^a																						
R	Binder Durability characteristics shall be determined in accordance with 9.8. There shall be no evidence of disintegration at conclusion of test.																						

TABLE 2
(Continued)

Suffix Symbol	Supplementary Characteristics
S9	Volume change characteristics, when immersed in ASTM No. 1 Oil, ASTM No. 3 Oil, and ASTM Reference Fuel A, shall be determined in accordance with 9.3. Results shall be as specified on engineering drawing or other supplement to this classification.
T	Flexibility characteristics shall be determined in accordance with 9.9. There shall be no evidence of cracks, breaks, or separation at conclusion of test.
Z	Other characteristics shall be as specified on engineering drawing or other supplement to this classification.

^aOn engineering drawing or other supplement to this classification system.

4.4 For convenience, gasket materials are referred to by Type according to the principal fibrous or particulate reinforcement or other material from which the gasket is made and by Class according to the manufacturing method, or the common trade designation. Type numbers correspond with the first numeral, and class numbers correspond with the second numeral of the basic six-digit line call-out, as shown in Table 1.

NOTE 1: While this "cell-type" format provides the means for close characterization and specification of each property and combinations of properties for a broad range of materials, it is subject to possible misapplications, since impossible property combinations can be coded if the user is not familiar with available commercial materials. Table A1 of this classification indicates properties, characteristics, and test methods that are normally considered applicable to each type of material.

5. PHYSICAL AND MECHANICAL REQUIREMENTS:

5.1 Gasket materials identified by this classification shall have the characteristics or properties indicated by the first six numerals of the line call-out, within the limits shown in Table 1, and by additional letter-numeral symbols shown in Table 2.

6. THICKNESS REQUIREMENTS:

6.1 Gasket materials identified by this classification system shall conform to the thickness tolerances specified in Table 3.

TABLE 3 - Thickness Tolerances

Type and Class of Material (First Two Numerals of Basic Six-Digit Number)	Thickness Specified, mm (in)	Applicable Tolerance, ^a mm (in)
11 and 12	0.41 (0.016) and under	+0.13 (+0.005) -0.05 (-0.002)
	over 0.41 (0.016) and under 1.57 (0.062) 1.57 (0.062) and over	± 0.13 (± 0.005) ± 0.20 (± 0.008)
13	up to 3.18 (0.125)	± 0.13 (± 0.005)
	3.18 (0.125) to 12.70 (0.500)	± 0.25 (± 0.010)
21	all thicknesses	$\pm 10\%$, or ± 0.25 (± 0.010) whichever is the greater
22	under 1.57 (0.062)	± 0.25 (± 0.010)
	1.57 (0.062) and over	± 0.38 (± 0.015)
23	1.57 (0.062) and over	± 0.38 (± 0.015)
31, 32, and 33 (also 00 and 99) ^b	0.41 (0.016) and under	± 0.089 (± 0.0035)
	over 0.41 (0.016) to 1.57 (0.062)	± 0.13 (± 0.005)
	over 1.57 (0.062) to 2.39 (0.094)	± 0.20 (± 0.008)
	over 2.39 (0.094)	± 0.41 (± 0.016)
51	1.6 (0.062) and under	± 0.051 (± 0.002)
52	12.7 (0.5) and under	$\pm 10\%$

^aTolerances listed are permissible variations applicable to a given lot of sheets or gaskets. Where other thickness tolerances are necessary due to the gasket application, tolerances applicable to individual sheet or gasket may be agreed to in writing between the purchaser and the supplier.

^bUnless otherwise specified on engineering drawing or other supplement to this classification system.

7. SAMPLING:

- 7.1 Specimens shall be selected from finished gaskets or sheets of suitable size, whichever is the more practicable. If sheets are used, they shall, where applicable, be cut squarely with the grain of the stock, and the grain direction shall be noted by an arrow. If finished gaskets are used, the dimensions of sample and any variations from method must be reported.
- 7.2 For qualification purposes, thickness shall be 0.8 mm (0.03 in), except for Type 2, where the qualification thickness is to be 1.5 to 6.4 mm (0.06 to 0.25 in), and Type 5 Class 1, where the qualification thickness is to be 0.4 mm (0.015 in). When thicknesses other than those shown above are to be tested, the specification limits shall be agreed to in writing between the purchaser and the supplier.

7.3 Sufficient specimens shall be selected to provide a minimum of three determinations for each test specified. The average of the determinations shall be considered as the result.

8. CONDITIONING:

8.1 Prior to all applicable tests, specimens shall be conditioned as follows:

8.1.1 When the first numeral of line callout is "1" (Type 1 materials), specimens shall be conditioned in an oven at $100^{\circ}\text{C} \pm 2$ ($212^{\circ}\text{F} \pm 3.6$) for 1 h and allowed to cool to 21°C to 30 (70°F to 85) in a desiccator containing anhydrous calcium chloride; except when second numeral of line call-out is "3" (Class 3 materials), the specimens shall be conditioned in an oven for 4 h $100^{\circ}\text{C} \pm 2$ ($212^{\circ}\text{F} \pm 3.6$).

8.1.2 When the first numeral of line callout is "2" (Type 2 materials), specimens shall be conditioned at least 46 h in a controlled-humidity room or in a closed chamber with gentle mechanical circulation of the air at 21 to 30°C (70 to 85°F) and 50 to 55% relative humidity.

NOTE 2: If a mechanical means of maintaining 50 to 55% relative humidity is not available, a tray containing a saturated solution of reagent grade magnesium nitrate, $\text{Mg}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$; shall be placed in the chamber to provide the required relative humidity.

8.1.3 When the first numeral of line callout is "3" (Type 3 materials), specimens shall be preconditioned for 4 h at 21 to 30°C (70 to 85°F) in a closed chamber containing anhydrous calcium chloride as a desiccant. The air in the chamber shall be circulated by gentle mechanical agitation. Specimens shall then be transferred immediately to a controlled-humidity room or closed chamber with gentle mechanical circulation of the air and conditioned for at least 20 h at 21 to 30°C (70 to 85°F) and 50 to 55% relative humidity.

8.1.4 When the first numeral of a line callout is "4," no conditioning of specimens is necessary.

8.1.5 When the first numeral of a line callout is "5," test specimens shall be conditioned in accordance with 8.1.1 (Type 1 materials).

8.1.6 When the first numeral of a line callout is "0" or "9," specimens shall be conditioned as in 8.1.3, unless otherwise specified in supplements to this classification.

8.2 In all cases where testing is conducted outside the area of specified humidity, specimens shall be removed from the chamber one at a time just prior to testing.

9. TEST METHODS:

9.1 Thickness:

9.1.1 Measure the specimens with a device actuated by a dead-weight load. The device shall be capable of reading in 0.02 mm (0.001 in) or smaller units, and readings shall be estimated to the nearest 0.002 mm (0.0001 in). The presser foot shall be 6.40 mm \pm 0.13 (0.252 in \pm 0.005) in diameter. The anvil shall have a diameter not less than that of the presser foot. The pressure on the sample shall be as specified in Table 4.

TABLE 4 - Thickness Measurement Stresses and Forces

Type of Material of First Numeral of Six-Digit Number	Pressure on Sample, kPa (psi)	Total Force on Presser Foot, N (oz) (reference)
1	80.3 \pm 6.9 (11.5 \pm 1.0)	2.50 (9.0)
2	35 \pm 6.9 (5.1 \pm 1.0)	1.11 (4.0)
3	55 \pm 6.9 (8.0 \pm 1.0)	1.75 (6.3)
0 and 9 ^a	55 \pm 6.9 (8.0 \pm 1.0)	1.75 (6.3)
5	80.3 \pm 6.9 (11.5 \pm 1.0)	2.50 (9.0)

^aUnless otherwise specified on engineering drawing or other supplement to this classification system.

9.1.2 Take the reading by lowering the presser foot gently until it is in contact with the specimen. Take a sufficient number of readings, depending on the size of the specimen, to provide a reliable average value.

9.2 Compressibility and Recovery:

Test specimens in accordance with Test Method ASTM F 36 using the procedure which is applicable to the material described by the first two numerals of the basic six-digit number, as given in Table 5.

TABLE 5 - Compressibility Test Methods

First Two Numerals of Six-Digit Number	Procedure, Test Method ASTM F 36	Pressure, MPa (psi)
11 and 12	A	34.474 (5000)
13	H	6.895 (1000)
21 and 23	F	0.689 (100)
22	B	2.758 (400)
31,32, 33, and 34	G	6.895 (1000)
00 and 99	G ^a	6.895 (1000)
51 and 52	A	34.474 (5000)
71 and 72	J	34.474 (5000)
73	K	6.895 (1000)

^aUnless otherwise specified on engineering drawing or other supplement to this classification system.

9.3 Fluid Resistance:

Test specimens in accordance with Test Method ASTM F 146.

9.3.1 Other Types of Materials (as indicated by 0 or 9 first numeral of basic six-digit number): Use the same apparatus and general procedure outlined for Type 3 materials, unless otherwise specified in the engineering drawing or other supplement to this classification.

9.4 Sealability:

Test specimens in accordance with Test Method ASTM F 37.

9.5 Creep Relaxation:

Test specimens in accordance with Test Method ASTM F 38.

9.6 Adhesion:

Test specimens in accordance with Test Method ASTM F 607.

9.7 Tensile Strength:

Test specimens in accordance with Test Method ASTM F 152.

9.7.1 Other Type of Materials (as indicated by 0 or 9 first numeral of basic six-digit number):

Use the same apparatus and general procedure outlined for Type 3 materials, unless otherwise specified on engineering drawing or other supplement to this classification.

9.8 Binder Durability:

Test specimens in accordance with appropriate procedures in Test Method ASTM F 148.

9.9 Flexibility:

Test specimens in accordance with appropriate procedures in Test Method ASTM F 147.

9.10 Thermal Conductivity:

Test specimens in accordance with Practice ASTM F 433, using a temperature of $100^{\circ}\text{C} \pm 2$ ($212^{\circ}\text{F} \pm 3.6$)

The (R) is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

APPENDIX A

(Nonmandatory Information)

A.1 Applicable Test Methods

- A.1.1 Table A1 indicates properties, characteristics, and test methods that are normally considered applicable to each type of material. It is not intended to limit the use of numeral-symbols as provided in Classification System SAE J90 where experience indicates that the related properties, characteristics, or test methods, or both, are applicable.
- A.1.2 Table A2 is being provided to offer an explanation of the system of identification of gasket materials previously used in SAE J90a which has been superseded by Classification System SAE J90.
- A.1.3 Tables A3, A4, and A5 are also retained in this appendix to provide a reference for transforming formerly used P-number identification into the present SAE J90.

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The (R) is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

TABLE A1 - Typical Types of Materials

NOTE: "X" indicates that the test conditions shown in first column have been used to characterize the type of material named in column heading. "Dash" (-) indicates that the test method is either "not applicable" to the material named or has not been commonly used in characterizing the material.

Properties, Characteristics, and Test Methods	Type 1, Asbestos or Other Inorganic Fibers	Type 2, Cork	Type 2, Cork	Type 2, Cork and Elasto-meric	Type 2, Cork and Cellular Rubber	Type 3, Cellulose or Other Organic Fibers	Type 5, Flexible Graphite	Type 5, Flexible Graphite	Lami-nated Sheet							
Compressibility:																
5000-psi load (Test Method F 36, Procedure A)	X	X												X	X	X
5000-psi load (Test Method F 36, Procedure J) ^a	X	X												X	X	X
1000-psi load (Test Method F 36, Procedure H)			X													
1000-psi load (Test Method F 36, Procedure I) ^a			X													
1000-psi load (Test Method F 36, Procedure K) ^a																
1000-psi load (Test Method F 36, Procedure G)					X				X							
100-psi load (Test Method F 36, Procedure F)					X											
400-psi load (Test Method F 36, Procedure B)																
Tensile strength																
Resistance to exposure in ASTM No. 3 Oil:																
Volume change, 70 h at 212°F																
Weight increase, 22 h at 70 to 85°F																
Thickness increase: 5 h at 70 to 85°F																
Thickness increase: 5 h at 300°F	X	X														
Resistance to exposure in ASTM Fuel B:																
Weight increase: 22 h at 70 to 85°F																
Weight increase: 5 h at 70 to 85°F	X	X														
Thickness change: 22 h at 70 to 85°F	X	X														
Thickness change: 5 h at 70 to 85°F	X	X														
Resistance to exposure in ASTM No. 1 Oil:																
Volume change, 70 h at 212°F																
Resistance to exposure in ASTM Fuel A:																
Volume change, 22 h at 70 to 85°F																
Resistance to exposure in distilled water:																
Weight increase, 22 h at 70 to 85°F																
Thickness change, 22 h at 70 to 85°F																
Sealability	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Creep relaxation	X	X														
Adhesion	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Binder Durability																
Flexibility																
Thermal Conductivity	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

^aType 7, Nonasbestos

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TABLE A2 - System of Identification

Digit	Type 1	Type 2	Type 3
First Digit (principal fibrous or particulate material)	1. Asbestos or other inorganic fibers	2. Cork	3. Cellulose or other organic fibers
Second Digit (trade designation)	1. Compressed asbestos sheet 2. Asbestos beater sheet 3. Asbestos paper and mill-board	1. Cork composition 2. Cork and rubber 3. Cork and cellular rubber	0. Tag 1. Chipboard 2. Vulcanized fiber 3. Cellulose fiber 4. Fiber and filler compositions
Third Digit (binder or treatment other than sizing)	0. None 1. Protein (glue-glycerin or equivalent) 2. Resin 3. Rubber, Type S, Class A (polysulfide or equivalent) 4. Rubber, Type S, Class SB (acrylonitrile or equivalent) 5. Rubber, Type S, Class SC (chloroprene or equivalent) 6. Rubber, Type R, (natural, reclaim, styrene, or equivalent)	(Same for all three types)	
Fourth Digit (compressibility index, Test Method ASTM F 36, Procedure G, total load - 1000 psi). For identification purposes only. May not agree with compressibility in tables where other loads are employed.	0. 0 to 5% 1. 6 to 15% 2. 16 to 25% 3. 26 to 35% 4. 36 to 45% 5. 46 to 55% 6. 56 to 65% 7. 66 to 75% 8. 76 to 85% 9. 86 to 95%	(Same for all three types)	
Suffix Letter	Used to distinguish grades of material within one 4-digit category which differ sufficiently to justify separate tabular values. If only one grade of material is listed in the table, the letter "A" is used.		

Example: Letter indicating a gasket material included in ASTM D 1170
 Cellulose or other organic fibers
 Rope or chemical wood, or both
 Binder or treatment, rubber; Type S, Class SC
 Compressibility index is 26 to 35%
 Grade

P 3 3 5 3 A

TABLE A3 - Type 1 - Asbestos or Other Inorganic Fibers

Identification No. ^a	Former "G" No. (for reference only)	Original Properties		Original Properties after Immersion in Liquids		Original Properties after Immersion in Liquids		Original Properties after Immersion in Liquids		Original Properties after Immersion in Liquids	
		Compressibility	Tensile Strength, min, psi	Ignition Loss, max, %	After Aging 5 h at 150°C ± 2 (300°F ± 3.6) in ASTM Oil No. 3	After Aging 5 h at 150°C ± 2 (300°F ± 3.6) in ASTM Oil No. 3	After Aging 5 h at 21 to 30°C (70 to 85°F) in ASTM Reference Fuel B	After Aging 5 h at 21 to 30°C (70 to 85°F) in ASTM Reference Fuel B	After Aging 5 h at 21 to 30°C (70 to 85°F) in ASTM Reference Fuel B	After Aging 5 h at 21 to 30°C (70 to 85°F) in ASTM Reference Fuel B	After Aging 5 h at 21 to 30°C (70 to 85°F) in ASTM Reference Fuel B
P1141A	1122-1	5000	2000	—	20	30	0 to 13	20	0 to 15	0 to 15	
P1151A	1123-1	5000	2000	—	30	50	15 to 30	30	10 to 25	10 to 25	
P1161A	1111-1	5000	2000	—	—	70	20 to 50	40	15 to 35	15 to 35	
P1161B	—	5000	2000	—	—	80	40 to 70	50	25 to 45	25 to 45	
P1162A	1111-2	5000	1600	—	—	70	20 to 50	40	15 to 35	15 to 35	
P1241C	—	5000	1000	—	30	35	5 to 20	30	0 to 15	0 to 15	
P1242C	—	5000	1700	—	45	15	0 to 20	50	0 to 15	0 to 15	
P1242D	—	5000	2000	—	25	20	0 to 20	40	0 to 15	0 to 15	
P1243C	1422-2	5000	500	—	35	25	0 to 5	50	0 to 5	0 to 5	
P1251A	1423-1	5000	2000	—	55	40	10 to 20	35	0 to 15	0 to 15	
P1252A	1423-2	5000	1000	—	35	60	20 to 35	50	5 to 20	5 to 20	
P1252D	—	5000	1200	—	45	30	10 to 25	50	5 to 20	5 to 20	
P1252E	—	5000	1200	—	40	40	10 to 25	45	5 to 20	5 to 20	
P1253A	1423-3	5000	1000	—	—	50	0 to 15	55	0 to 10	0 to 10	
P1261A	—	5000	1000	—	—	60	10 to 25	60	5 to 20	5 to 20	
P1262B	—	5000	200	20	—	80	10 to 40	70	0 to 30	0 to 30	
P1301A	4131	1000	200	20	—	—	—	—	—	—	
P1302A	4111	1000	175	20	—	—	—	—	—	—	

^aThickness tolerances:

P1100 and P1200 Series	Thickness	Tolerance
1/64 in and under		+0.005 in
Over 1/64 in and under 1/16 in		-0.002 in
1/16 in and over		±0.005 in
		±0.008 in
		±10%
Up to 1/8 in		±0.005 in
1/8 to 1/2 in		±0.010 in

The above thickness tolerances are permissible variations applicable to a given lot of sheets or gaskets. Where special thickness tolerances are necessary due to application, the tolerance on the individual sheet or gasket shall be agreed to in writing between the purchaser and the supplier.

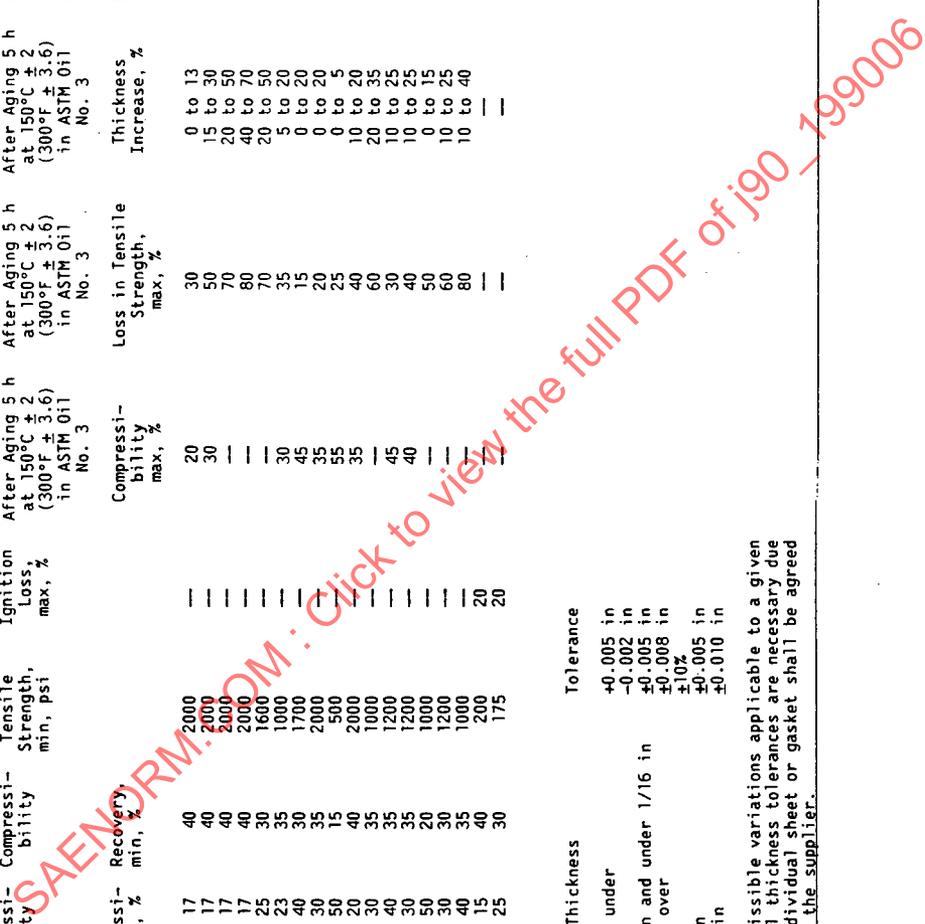


TABLE A1 - Type 2-Cork

Identifica- tion No. 6 (for refer- ence only)	Original Properties		Original Properties		Original Properties		Original Properties		Original Properties		Original Properties		Original Properties		Original Properties	
	Compressi- bility	Compressi- bility	Compressi- bility	Recovery, min. %	Tensile Strength, min. psi	Density, min. lb./ft. ³	Flotation Test ^c	Flotation Test ^c	Flotation Test ^c	Flexibility Factor, F	After 70 h Aging, 2 (212°F ± 3.6)					
P2116A	100	10 to 25	60	75	175	24	N	N	N	5	5	5	5	5	5	5
P2117A	100	15 to 30	65	75	150	20	N	N	N	5	5	5	5	5	5	5
P2117B	100	20 to 40	75	100	100	17	N	N	N	5	5	5	5	5	5	5
P2118A	100	30 to 50	80	175	75	14	N	N	N	5	5	5	5	5	5	5
P2126A	100	10 to 25	60	75	175	24	N	N	N	5	5	5	5	5	5	5
P2127A	100	15 to 30	65	150	150	20	N	N	N	5	5	5	5	5	5	5
P2127B	100	20 to 40	75	100	100	17	N	N	N	5	5	5	5	5	5	5
P2128A	100	30 to 50	80	75	75	14	N	N	N	5	5	5	5	5	5	5
P2236A	400	25 to 45	75	200	200	---	---	---	---	16	16	16	16	16	16	16
P2243A	400	15 to 25	75	250	250	---	---	---	---	16	16	16	16	16	16	16
P2245A	400	25 to 35	75	250	250	---	---	---	---	16	16	16	16	16	16	16
P2246A	400	35 to 45	70	200	200	---	---	---	---	16	16	16	16	16	16	16
P2254A	400	15 to 25	75	250	250	---	---	---	---	16	16	16	16	16	16	16
P2255A	400	25 to 35	75	250	250	---	---	---	---	16	16	16	16	16	16	16
P2255B	400	40 to 55	75	125	125	---	---	---	---	16	16	16	16	16	16	16
P2265A	400	35 to 45	75	220	220	---	---	---	---	16	16	16	16	16	16	16
P2265B	400	25 to 45	75	150	150	---	---	---	---	16	16	16	16	16	16	16
P2268A	400	40 to 60	75	75	75	---	---	---	---	16	16	16	16	16	16	16
P2347A	100	35 to 50	75	100	100	---	---	---	---	16	16	16	16	16	16	16
P2357A	100	35 to 50	75	75	75	---	---	---	---	16	16	16	16	16	16	16
P2367A	100	35 to 50	75	100	100	---	---	---	---	16	16	16	16	16	16	16

^aGrain size may be specified for certain applications. If so, the following will usually apply: Fine—will pass a No. 20 sieve; Medium—will pass a No. 40 sieve; Coarse—will pass a No. 10 sieve. Medium will be retained on a No. 20 sieve; Coarse—will pass a No. 5 sieve and will be retained on a No. 10 sieve. Sieve sizes are as specified in Table 1 of Specifications E 11.

^bThickness tolerances:
P2100 series—±10% or ±0.010 in., whichever is the greater; P2200 series—under 1/16 in. ±0.010 in. 1/16 in. and over, ±0.015 in.
P2300 series—1/16 in. (minimum thickness) and over ±0.015 in.
CN = No. disk integration.