

SURFACE VEHICLE RECOMMENDED PRACTICE

Submitted for recognition as an American National Standard

SAE J1345

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Superseding J1345 FEB1982

AUTOMOTIVE PLASTIC PARTS SPECIFICATION

- 1. Scope**—This recommended practice provides a system for specifying significant requirements of automotive plastic parts or specimens taken from said parts. It should apply to parts only and not to the materials produced for the manufacture of parts used in the automotive and related industries.
 - 1.1** It is based on the principle that plastic parts should be described, insofar as possible, in terms of specific performance characteristics desired in the molded part; and that an infinite number of such descriptions can be formulated by the use of one or more standard statements (based on standard tests), each designating a quality level of a property or characteristics. Thus, users of plastic parts can, by selecting different combinations of performance characteristics, specify different combinations of requirements desired in various parts.
 - 1.2** The system includes a letter numbered symbol for each quality level of each property or characteristic. The user shall include a symbol for specifying the generic material (i.e., SAE J1344, Marking of Plastic Parts).
 - 1.3** The property tables included in this recommended practice are contained in two sections of the document. The tables which appear in the body of the document have been found acceptable and useful for describing finished plastic parts. The property tables contained in the Appendix have, likewise, been found useful for describing finished plastic parts, but have not yet been fully accepted. In some cases, more development work is required in test methods or to complete the table. These tables have been included in the document to minimize the use of the Z suffix for those properties which have been partially defined. The use of the tables in the Appendix require that agreement as to their interpretation be reached between the supplier and user. As these property tables are fully developed and more experience is gained with them, they will be moved into the main body of the document.
- 2. Guidelines for the Use of This Standard**—Items which must be considered when using the line call-out system of SAE J1345 are as follows:
 - 2.1** It is not intended that all property tables be used to describe every part. Tables are to be selected according to the application and need.
 - 2.2** The first letter given designates the property table and type of requirement to be considered. These letters may be appended by additional letters and are always appended by an additional number of symbols to fully define the characteristic specified for the designated property.

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- 2.3 The system is not to be used to invent properties of materials used, but must adapt to the part in question, using commercially available materials.
- 2.4 Knowledge of plastic materials and plastic part requirements is necessary for effective use of this system.
- 2.5 Properties determined on test specimens cut from parts, in most cases, will not be the same as on standard specimens molded from the same resin and may differ significantly.
- 2.6 Appropriate testing of specimens cut from parts must be conducted to establish specification limits.
- 2.7 Plastic resin specifications or resin manufacturer data sheet values should not be used to specify plastic part requirements.

3. Requirements

- 3.1 **General Characteristics**—The general type of material used to manufacture the part shall be identified by a symbol following the SAE J1345 specification number. The symbol used shall be as defined in J1344, Standard Symbols. Parts shall be uniform in density, color, texture, finish, electrical and mechanical properties; and free of porosity, warpage, checks or cracks, chipped edges, and blisters. Appearance and finish of parts shall conform to good commercial practice (reasonably free of gates, flash, ridges, roughness, and tool marks; and of mold lubricants and other contamination).
- 3.2 **Other Characteristics**—Parts described by basic number appended by suffix letter-number symbols¹
—Example: SAE J1345 ABS (C20, DF1060, M230, AAC83)—shall conform to additional requirements outlined in tables. (See Section 5.)
- 4. **Tests**—The requirements designated by the specification call-out shall be determined by the latest issue of the test methods indicated and apply only to parts as molded and not to parts that have been subjected to service. Tests shall be conducted 40 h, minimum, after sample preparation and immediately following a conditioning period of 24 h, minimum, in standard laboratory atmosphere ($23 \pm 2^{\circ}\text{C}$ and $50 \pm 5\%$ relative humidity), unless otherwise specified. (The two time periods may run concurrently.) The maximum time between production and testing shall be as agreed upon between supplier and user.
- 4.1 Specimens for the ASTM tests specified herein shall be taken from parts where size and configuration permit. User shall indicate on the part drawing the areas where physical specimens are to be taken along with instructions of when and how the specimens are to be taken. It may be necessary to specify alternate functional tests for parts which do not allow for the specified ASTM sample sizes.
- 4.2 All tests of parts molded of moisture-sensitive materials shall be conducted on “dry as molded” test specimens which have been sealed in water vapor impermeable containers immediately after molding. Individual specimens shall not be removed from closed containers until immediately before testing.

¹ Numerals shown for each symbol represent the range of values which are expected to be available to, and most commonly used by, the automotive and related industries. They represent, also, what are felt to be reasonable and workable increments of values for each property. Use of numbers (or increments) shown will keep to a minimum the variety of values which must be considered in communications between purchaser, supplier, etc. However, where a property of any plastic part cannot be defined adequately by one of the numerals, the user may substitute any numeral which correlates with the published numerals, the test conditions given, etc. F350 is an understandable expansion of the symbols shown for melting point.

5. Property Tables—Index

5.1 Main Suffixes

<u>SAE J1345</u>	<u>Characteristic</u>	<u>Test Method</u> (ASTM, Unless Otherwise Specified)
B	Reinforcement and/or filler	As agreed
C	Regrind	None, See property table
D	Specific gravity	D792, D1505, D1622
E	Viscosity	D1238, D789
H	Oxidative stability	D2445, D3012
M	Flexural modulus	D790
T	Cold flex temperature	See property table
Z	Other characteristics	As agreed
AA	Dimensional stability	See property table
AD	Surface finish	See property table

5.2 Appendix Suffixes

<u>SAE J1345</u>	<u>Characteristic</u>	<u>Test Method</u> (ASTM, Unless Otherwise Specified)
F	Melting point	D789, D3418
G	Water absorption, volatile loss	D570, D1203, as agreed
J	Hardening	D2240, D785, D2583
K	Tensile strength	D638
L	Ultimate elongation	D638
N	Flexural strength	D790
Q	Compressive strength	D695
R	Impact resistance	As agreed
U	Flammability	SAE J369
W	Heat resistance	D638, D573
X	Humidity aging	D638, See property table
Y	Accelerated weather resistance	See property table
AB	Surface texture	See property table
AC	Thermal cycle resistance	B117, D2246

TABLE 1—PLASTIC PART REQUIREMENTS—PROPERTY TABLE

Suffix Symbol B	Property Description and Test Method																												
BA11—BA675 thru BM11—BM675	REINFORCEMENT AND/OR FILLER. Shall be described by amending the suffix B symbol using the following letter designations: <table><tr><td>A = Glass fibers</td><td>G = Sisal</td></tr><tr><td>B = Glass spheres</td><td>H = Dimethyl polysiloxane (Polymeric silicone)</td></tr><tr><td>C = Carbon fibers</td><td>J = PTFE fibers</td></tr><tr><td>D = Wood flour</td><td>K = PTFE granules</td></tr><tr><td>E = Mineral fillers, for example, flour, calcium, carbon-ate, talc, mica, clay, etc.</td><td>L = Graphite</td></tr><tr><td>F = Cotton flock</td><td>M = Molybdenum disulfide</td></tr></table> The reinforcement, expressed as mass percent, shall be specified by the second, or second and third numeral(s) following the amended suffix B symbol with a tolerance as indicated by the first numeral following the amended suffix B symbol (see table below). <table><tr><th>Numeral Designation</th><th>Tolerance</th><th>Numeral Designation</th><th>Tolerance</th></tr><tr><td>BA1—BM1</td><td>min value</td><td>BA4—BM4</td><td>±1.0</td></tr><tr><td>BA2—BM2</td><td>max value</td><td>BA5—BM5</td><td>±2.0</td></tr><tr><td>BA3—BM3</td><td>±0.5</td><td>BA6—BM6</td><td>±3.0</td></tr></table> Examples: (Single filler) BA630 = 30 ± 3% (27-33%) glass fibers (Mixed filler) BA625, BM35 = 25 ± 3% (22-28%) glass fibers with 5 ± 0.5% (4.5-5.5%) molybdenum disulfide Note: The test method shall be as agreed upon between supplier and user.	A = Glass fibers	G = Sisal	B = Glass spheres	H = Dimethyl polysiloxane (Polymeric silicone)	C = Carbon fibers	J = PTFE fibers	D = Wood flour	K = PTFE granules	E = Mineral fillers, for example, flour, calcium, carbon-ate, talc, mica, clay, etc.	L = Graphite	F = Cotton flock	M = Molybdenum disulfide	Numeral Designation	Tolerance	Numeral Designation	Tolerance	BA1—BM1	min value	BA4—BM4	±1.0	BA2—BM2	max value	BA5—BM5	±2.0	BA3—BM3	±0.5	BA6—BM6	±3.0
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Suffix Symbol C	Property Description and Test Method																												
CO—C100	REGRIND. Salvage material generated during the molding process when uniformly blended may be used to a percent not exceeding the value following the C suffix. The use of regrind does not preclude the part from meeting the other specified characteristics of part performance. Example: C25 = 25% max																												
Suffix Symbol D	Property Description and Test Method																												
DA800—DA2000 thru DF800—DF2000	SPECIFIC GRAVITY. As determined by ASTM D792 (Method A), shall be within the tolerance indicated by the letter following the D suffix (see below) and the value shall be as indicated by the numerals following the D suffix times the factor 0.001. ASTM D1505 may be used in place of ASTM D792 providing density is converted to specific gravity. Apparent density of rigid cellular plastic parts—structural foams—may be determined by ASTM D1622. <table><tr><th>Numeral Designation</th><th>Tolerance</th><th>Numeral Designation</th><th>Tolerance</th></tr><tr><td>DA</td><td>min value</td><td>DD</td><td>±0.03</td></tr><tr><td>DB</td><td>max value</td><td>DE</td><td>±0.05</td></tr><tr><td>DC</td><td>±0.02</td><td>DF</td><td>±0.005</td></tr></table> Example: DF895 = 0.895 ± 0.005	Numeral Designation	Tolerance	Numeral Designation	Tolerance	DA	min value	DD	±0.03	DB	max value	DE	±0.05	DC	±0.02	DF	±0.005												
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DB	max value	DE	±0.05																										
DC	±0.02	DF	±0.005																										

(Table continued on next page)

TABLE 1—PROPERTY TABLE (CONTINUED)

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Suffix Symbol E	Property Description and Test Method
E20—E2500	VISCOSITY. Either one of the following two methods shall apply dependent upon the presence or absence of an amending letter to the E suffix symbol. When the suffix E symbol is not amended by a letter, then the following method shall apply: RELATIVE VISCOSITY. As determined by the test method for relative viscosity described in ASTM D789, shall be no less than the numeral(s) of the E symbol. Example: E80 = 80 min
EA2—EA250 thru ET2—ET250	When the suffix E symbol is amended by a letter, the following method shall apply: FLOW RATE. As determined by the test method for flow rate listed in ASTM D1238, shall be within $\pm 30\%$ of the value indicated by the numeral of the E suffix symbol times the factor 0.1 g/10 min. The standard test conditions for the test shall be given by the letter following the suffix E symbol as described in the table of ASTM D1238. Example: EL8 = $0.8 \pm 30\%$ g/10 min (Condition L)
Suffix Symbol H	Property Description and Test Method
H1, H3, H7, H14	OXIDATIVE STABILITY. Specimens taken from molded part and exposed to Test for Thermal Oxidative Stability, ASTM D2445, for the period of time indicated by the numeral at the suffix H symbol, shall be determined by removing specimens from test apparatus, placing on a flat surface, and subjecting to a light compressive force. H1 = 1 day (24 h), H3 = 3 days, H7 = 7 days, H14 = 14 days
HA1, HA3, HA7, HA14	When the suffix H symbol is amended by the letter A, then ASTM D3012, Test for Thermal Oxidative Stability Characteristics of Plastics, shall be used. Note: Specimen size shall approximate the form of pellets or granules from which the material was supplied for molding.
Suffix Symbol M	Property Description and Test Method
M10—M2500	FLEXURAL MODULUS. Secand modulus of elasticity shall be determined as specified by ASTM D790 at 2.5 mm deflection. The value so determined shall be no less than the numerical value following the suffix times the factor 10 MPa. Example: M200 = 2000 MPa min
MA10—MA2500	When the suffix M symbol is amended by the addition of the letter A, then the tangent modulus of elasticity shall be determined by ASTM D790 instead of secant modulus.

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