

Classification System for Automotive Acrylonitrile/Butadiene/Styrene (ABS) and ABS + Polycarbonate Blends (ABS+PC) Based Plastics

- 1. Scope**—This SAE Recommended Practice provides a system for classification and specification for limited number of acrylonitrile/butadiene/styrene (ABS) and blends with polycarbonate (ABS+PC) plastics used in the Automotive Industry. Based upon ASTM D 4673, Classification System for (ABS) Molding Materials, it calls for additional descriptive characteristics and properties commonly used in the Automotive Industry.

This practice applies to natural, non-color matched black, and plating gray compounds only. Color matched compounds shall be defined by the proprietary OEM standards.

This practice allows for the use of recycled, reconstituted, and regrind materials provided that the requirements as stated in this document are met, the material has not been altered or modified to change its suitability for safe processing and use, and the material shall be identified as such.

- 1.1 Purpose**—The purpose of this document is to:

- Standardize the grades of unreinforced and reinforced ABS and ABS+PC used for the Automotive Industry
- Standardize the test methods used to characterize the properties of these materials
- Provide a method for specifying these materials by the use of a simple line call-out designation

- 1.2 Rationale**—In the September 2004 SAE Plastics Committee meeting, J1685 was discussed and a recommendation developed that the standard be withdrawn. Reasons for this include: The material has been incorporated into SAE J2642 Recommended Practice for Developing Specifications for Automotive Thermoplastic Materials.

2. References

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

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SAE J1685 Cancelled MAR2005

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

SAE J369—Flammability of Automotive Interior Materials-Horizontal Test Method
SAE J1344—Marking of Plastic Parts
SAE J1756—Test Procedure to determine the Fogging Characteristics of Interior Automotive Materials
SAE J1885—Exposure to Interior Xenon-Arc Weatherometer
SAE J1960—Exposure to Exterior Xenon-Arc Weatherometer
SAE J1976—Outdoor Weathering of Exterior Materials

2.1.2 ASTM PUBLICATIONS—Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM D 2457-90—Specular Gloss of Plastic Film and Solid Plastics
ASTM D 3763-92—High Speed Puncture Properties Plastics Using Load Displacement Sensors
ASTM D 4673-87—Acrylonitrile-Butadiene-Styrene (ABS) Molding and Extrusion Materials
ASTM D 5279-92—Measuring Dynamic Mechanical Properties of Plastics in Torsion
ASTM E 831-86—Linear Thermal Expansion of Solid Materials by Thermomechanical Analysis

2.1.3 ISO PUBLICATIONS—Available from ANSI, 25 West 43rd Street, New York, NY 10036-8002.

ISO 75-1:1993—Plastics—Determination of temperature of deflection under load—Part 1: General test methods
ISO 75-2:1993—Plastics—Determination of temperature of deflection under load—Part 2: Plastic and Ebonite
ISO 105/A02:1993—Textiles—Grey scale for assessing change in color
ISO 178:1993—Plastics—Determination of flexural properties
ISO 180:1993—Plastics—Determination of Izod impact strength
ISO 188:1982—Rubber—Accelerated aging
ISO/DIS 294-1:1995—Plastics—Injection molding of test specimens of thermoplastic materials
ISO/DIS 294-3:1995—Plastics—Injection molding of test specimens of thermoplastic materials—Part 3: Plates (ISO mold type D)
ISO/DIS 294-4:1995—Plastics—Injection molding of test specimens of thermoplastic materials—Part 4: Determination of molding shrinkage
ISO 295:1991—Plastics—Compression moulding of test specimens of thermosetting materials
ISO 306:1994—Plastics—Thermoplastic materials—determination of Vicat softening temperature
ISO 527-1:1993—Plastics—Determination of tensile properties—Part 1: General principles
ISO 527-2:1993—Plastics—Determination of tensile properties—Part 2: Testing conditions
ISO 1133:1991—Plastics—Determination of melt mass-flow rate (MFR) and the melt-volume rate (MVR) of thermoplastics
ISO 1183:1987—Plastics—Methods for determining the density of non-cellular plastics
ISO 2580-2:1995—Plastics—Acrylonitrile/butadiene/styrene (ABS) molding and extrusion materials—Part 2: Preparation of test specimens and determination of properties
ISO 3167:1993—Plastics—Preparation and use of multipurpose test specimen
ISO 3451/1:1981—Plastics—Determination of ash—Part 1: General Methods
ISO 3795:1989—Road vehicles—Determination of burning behavior of interior materials for motor vehicles

2.1.4 AATCC PUBLICATION—Available from AATCC, P.O. Box 12215, Research Triangle Park, North Carolina 27709 and British Standard Institution, 10 Blackfriars Str. Manchester, M3 5TD, England.

AATCC Gray Scale

- 2.1.5 FMVSS PUBLICATION—Available from The Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

FMVSS 302

3. Description

- 3.1 This classification system was developed to permit the addition of descriptive characteristics and values commonly used in Automotive Material Specifications for ABS and ABS+PC based materials. All the requirements listed in Section 7 shall apply for initial qualification of the material. The requirements listed in Section 8 shall be required for initial qualification when the particular suffix is included in the line call-out for the material. The requirements listed in Appendix A, Table A1 for initial product certification shall be met with data representing 3 sigma values per 6.2. Production lots shall meet property control plan as agreed to between material supplier and user of this document.

4. Classification

- 4.1 Acrylonitrile/butadiene/styrene (ABS) and ABS+PC based plastics are classified into "groups" based on the chemical type and processing method. These groups are subdivided into "classes" and "grades" as shown in Appendix A, Table A1.
- 4.2 An example of this classification system is as follows:

The designation ABS0121 would indicate:

ABS = acrylonitrile/butadiene/styrene, generic symbol according to SAE J1344
01 = unreinforced, injection molding ABS
2 = high impact
1 = requirements as given in Appendix A, Table A1

5. Line Call-outs

- 5.1 A line call-out, which is a specification, shall contain this document's identification number and a material designation from Table 1 as illustrated in 4.2.

**TABLE 1—STANDARDIZED AUTOMOTIVE GRADES OF ABS
AND ABS+PC BLENDS BASED PLASTICS^{(1),(2)}**

Group	Description	Designation
01	ABS, Injection Molding, Unreinforced	
	Medium Impact ⁽³⁾	0111
	High Impact	0121
	High Heat	0131
	High Heat	0132
	Plating	0141
04	ABS+PC Blends, Injection Molding, Unreinforced	
	Medium Impact ³	0411
	High Impact	0412
	High Impact	0421
	High Heat, High Impact	0431
	High Heat, High Impact	0432
14	Plating	0441
	ABS+PC, Injection Molding, Reinforced	
	10% Glass Fiber	1411
	10% Mineral	1421

1. Grades commonly used in Automotive Industry. Additional grades may be included in the future as agreed to by the SAE Plastics Committee.
2. Low gloss grades will be defined by use of Suffix Z5 (8.4)
3. Grades commonly described as "general purpose"

5.2 The line call-out specifies material meeting all requirements of this document. Note additional characterization in Section 7 and Section 8 - suffixes.

The following is an example of a line call-out:

SAEJ1685ABS0121

The above specification would indicate:

SAE J1685 Classification System for automotive ABS and ABS+PC Blends Plastics

ABS = acrylonitrile/butadiene/styrene, generic symbol according to SAE J1344
 01 = unreinforced, injection molding ABS
 2 = high impact
 1 = requirements as given in Appendix A, Table A1

5.3 The following definitions for tables in Appendix A, Table A1 of this document apply to ABS and ABS+PC blends.

a. Group 01 Unreinforced, injection molding acrylonitrile/butadiene/styrene (ABS)

Class 1 Medium Impact
 Class 2 High Impact
 Class 3 High Heat
 Class 4 Plating