



SURFACE VEHICLE RECOMMENDED PRACTICE

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Classification System for Automotive Polyamide (PA) Plastics

RATIONALE

This document is not being utilized by the industry. The materials detailed within this standard are covered within ASTM D6779, which contains a more extensive listing of currently available materials.

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- 1. Scope**—This SAE Recommended Practice provides a system for classification and specification for limited number of polyamides (nylons) used in the Automotive Industry. Based upon ASTM D 4066, Classification System for Nylon Injection and Extrusion Materials (PA), it calls for additional descriptive characteristics and properties commonly used in the Automotive Industry.

This document applies to natural and non-color matched black, heat-stabilized polyamide compounds only. Color matched compounds shall be defined by the proprietary OEM standards.

This document 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:

- a. Standardize the grades of unreinforced and reinforced polyamides (nylons) 66, 6, and 66/6 used for the Automotive Industry
- b. Standardize the test methods used to characterize the properties of these materials
- c. Provide a method for specifying these materials by the use of a simple line call-out designation

2. References

- 2.1 Applicable Publications**—The following publications form a part of this specification to the extent specified herein. The latest issues of ISO, SAE, and ASTM publications shall apply.

- 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 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, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTMD789-92—Determination of Relative Viscosity, Melting Point, and Moisture Content of Polyamide (PA)

ASTM D 3763-93—High Speed Puncture Properties Plastics Using Load Displacement Sensors

ASTM D 4066-92a—Nylon Injection and Extrusion Materials (PA)

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, 11 West 42nd Street, New York, NY 10036-8002.

ISO75-1:1993—Plastics—Determination of temperature of deflection under load—Part 1: General test methods

ISO75-2:1993—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/DIS294-3:1995—Plastics—Injection molding of test specimens of thermoplastic materials—Part 3: Plates (ISO mold type D)

ISO/DIS294-4:1995—Plastics—Injection molding of test specimens of thermoplastic materials—Part 4: Determination of molding shrinkage

ISO 295:1991—Plastics—Compression molding of test specimens of thermosetting materials

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 960:1988—Plastics—Polyamides (PA)—Determination of water content

ISO 1183:1987—Plastics—Methods for determining the density of non-cellular plastics

ISO1874-2:1995—Plastics—Polyamide (PA) molding and extrusion materials—Part 2: Preparation of test specimens and determination of properties

ISO 3146:1985—Plastics—Determination of melting behavior of semi-crystalline polymers

ISO 3167:1993—Plastics—Preparation and use of multipurpose test specimen

ISO 3451/4:1986—Plastics—Determination of ash—Part 4: Polyamides

ISO 3795:1989—Road vehicles—Determination of burning behavior of interior materials for motor vehicles

2.1.4 AATCC GRAY SCALE 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 Evaluation Procedure 1

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

FMVSS 302

2.2 Related Publications—The following publications are provided for information purposes only and are not a required part of this document.

2.2.1 SAE PUBLICATION—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1344—Marking of Plastic Parts

2.2.2 ISO PUBLICATION—Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ISO 62:1980—Plastics—Determination of water absorption

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 polyamides. 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 Polyamide 6, 66, and 66/6 plastics are classified into "groups" based on the chemical composition. These groups are subdivided into "classes" and "grades" as shown in the Appendix A, Table A1.

4.2 An example of this classification system is as follows:

The designation PA1122 would indicate:

PA = polyamide (nylon)
11 = reinforced PA66
2 = glass reinforced, impact modified, heat stabilized
2 = 15% glass

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.

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

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

SAEJ1639PA1122

The previous specification would indicate:

SAE J1639 Classification System for Automotive PA Plastics

PA = polyamide (nylon)
11 = reinforced PA66
2 = glass reinforced, impact modified, heat stabilized
2 = 15% glass