



Designation: D5857 – 17

Standard Specification for Polypropylene Injection and Extrusion Materials Using ISO Protocol and Methodology¹

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INTRODUCTION

This material specification is intended to provide a call out system for polypropylene utilizing specimen preparation procedures and test method based on ISO standards.

This specification is not intended for the determination of the suitability of performance of materials in the final application. Selection of these materials is to be made by personnel with expertise in the plastics field in which the environment, inherent properties of the materials, performance of the parts, part design, manufacturing process, and economics are considered.

1. Scope*

1.1 This specification covers polypropylene materials suitable for injection molding and extrusion. Polymers consist of polypropylene homopolymers, polypropylene copolymers, and polypropylene-elastomer compounds produced with or without the addition of impact modifiers (ethylene-propylene rubber, polyisobutylene rubber, and butyl rubber, and so forth), colorants, stabilizers, lubricants, fillers, or reinforcements.

1.2 This specification allows for the use of those polypropylene materials that can be recycled, reconstituted, and reground, provided that the following conditions are met:

1.2.1 The requirements as stated in this specification and other ISO guidelines pertaining to these types of materials are met, and

1.2.2 The material has not been modified in any way to alter its conformance to food contact regulations or similar requirements.

1.3 The proportions of recycled, reconstituted, and reground material used, as well as the nature and the amount of any contaminant, cannot be practically covered in this specification. It is the responsibility of the supplier and buyer of recycled, reconstituted, and reground materials to ensure compliance.

1.4 The properties included in this classification system are those required to identify the compositions covered. Other requirements necessary to identify particular characteristics

important to specialized applications can be specified by using the suffixes as given in Section 5 and those in Classification System D4000.

1.5 This classification system and specification are intended to provide a means of calling out polypropylene materials used in the fabrication of end items or parts. It is not intended for the selection of materials. Material selection can be made by those having expertise in the plastic field only after careful consideration of the design and the performance required of the part, the environment to which it will be exposed, the fabrication process to be employed, the costs involved, and the inherent properties of the material other than those covered by this specification.

1.6 The values stated in SI units are to be regarded as the standard.

1.7 The following precautionary caveat pertains only to the test methods portion, Section 13, of this specification: *This specification does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this specification to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—This specification is similar to both ISO 1873-1 and ISO 1873-2, but to different degrees. This specification resembles ISO 1873-1 in title only. The content is significantly different. This specification and ISO 1873-2 differ in approach or detail; data obtained using either are technically equivalent.

1.8 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

¹ This specification is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.15 on Thermoplastic Materials.

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*A Summary of Changes section appears at the end of this standard

2. Referenced Documents

2.1 *ASTM Standards*:²

- D618 Practice for Conditioning Plastics for Testing
- D883 Terminology Relating to Plastics
- D1600 Terminology for Abbreviated Terms Relating to Plastics
- D1999 Guide for Selection of Specimens and Test Parameters from ISO/IEC Standards (Withdrawn 2000)³
- D3763 Test Method for High Speed Puncture Properties of Plastics Using Load and Displacement Sensors
- D3892 Practice for Packaging/Packing of Plastics
- D4000 Classification System for Specifying Plastic Materials
- D7209 Guide for Waste Reduction, Resource Recovery, and Use of Recycled Polymeric Materials and Products (Withdrawn 2015)³
- E29 Practice for Using Significant Digits in Test Data to Determine Conformance with Specifications

2.2 *ISO Standards*:⁴

- ISO 62 Plastics—Determination of Water Absorption
- ISO 75-1 Plastics—Determination of Temperature of Deflection Under Load, Part 1: General Test Method
- ISO 75-2 Plastics—Determination of Temperature of Deflection Under Load, Part 2: Plastics and Ebonite
- ISO 105 Textiles—Tests for Color Fastness
- ISO 178 Plastics—Determination of Flexural Properties of Rigid Plastics
- ISO 179 Plastics—Determination of Charpy Impact Strength of Rigid Materials
- ISO 180 Plastics—Determination of Izod Impact Strength of Rigid Materials
- ISO 293 Plastics—Compression Moulding Test Specimens of Thermoplastic Material
- ISO 294 Plastics—Injection Moulding of Test Specimens of Thermoplastic Material
- ISO 306 Plastics—Thermoplastic Materials—Determination of Vicat Softening Temperature
- ISO 527-1 Plastics—Determination of Tensile Properties, Part 1: General Principles
- ISO 527-2 Plastics—Determination of Tensile Properties, Part 2: Test Conditions for Molding and Extrusion Plastics
- ISO 537 Plastics—Testing with Torsional Pendulum
- ISO 604 Plastics—Determination of Compressive Properties
- ISO 868 Plastics and Ebonite—Determination of Indentation Hardness by Means of a Durometer (Shore Hardness)
- ISO 877 Plastics—Methods of Exposure to direct Weathering, to Weathering Using Glass-Filtered Daylight, and to Intensified Weathering by Daylight Using Fresnel Mirrors
- ISO 899 Plastics—Determination of Tensile Creep

- ISO 974 Plastics—Determination of the Brittleness Temperature by Impact
- ISO 1133 Plastics—Determination of Melt Flow Rate of Thermoplastics
- ISO 1183A Plastics—Methods for Determining the Density and Relative Density of Non-Cellular Plastics
- ISO 1191 Plastics—Polyethylene and Polypropylenes in Dilute Solutions—Determination of Viscosity Number and of Limiting Viscosity Number
- ISO 1628-3 Plastics—Determination of Viscosity Number and Limiting Viscosity Number, Part 3: Polyethylene and Polypropylene Resins
- ISO 1873-1 Plastics—Propylene and Propylene-Copolymer Thermoplastics, Part 1: Designation
- ISO 1873-2 Plastics—Polypropylene (PP) and Propylene-Copolymer Thermoplastics, Part 2: Preparation of Test Specimens and Determination of Properties
- ISO 2039-1 Plastics—Determination of Hardness, Part 1: Ball Indentation Method
- ISO 2039-2 Plastics—Determination of Hardness, Part 2: Rockwell Hardness
- ISO 2818 Plastics—Preparation of Test Specimens by Machining
- ISO 3451-1 Plastics—Determination of Ash, Part 1: General Methods
- ISO 3795 Road Vehicles, and Tractors and Machinery for Agriculture and Forestry—Determination of Burning Behavior of Interior Materials
- ISO 4582 Plastics—Determination of Changes in Colour and Variations in Properties after Exposure to Daylight Under Glass, Natural Weathering or Artificial Light
- ISO 4589 Plastics—Determination of Flammability by Oxygen Index
- ISO 4892-1 Methods of Exposure to Laboratory Light Sources, Part 1: General Guidance
- ISO 4892-2 Plastics—Methods of Exposure to Laboratory Light, Part 2: Xenon Arc Exposure
- ISO 4892-3 Plastics—Methods of Exposure to Laboratory Light, Part 3: Fluorescent UV Lamps
- ISO 6427 Plastics—Determination of Matter Extractable by Organic Solvents (Conventional Methods)
- ISO 6602 Plastics—Determination of Flexural Creep by Three-Point Loading
- ISO 6603-1 Plastics—Determination of Multiaxial Impact Behavior of Rigid Plastics, Part 1: Falling Dart Method
- ISO 6603-2 Plastics—Determination of Multiaxial Impact Behavior of Rigid Plastics, Part 2: Instrumented Puncture Test
- ISO 8256 Plastics—Determination of Tensile Impact Properties
- ISO 9113 Plastics—Polypropylene (PP) and Propylene-Copolymer Thermoplastics—Determination of Isotactic Index
- ISO 10350 Plastics—Acquisition and Presentation of Comparable Single-Point Data
- ISO 11357-3 Plastics—Differential Scanning Calorimetry (DSC), Part 3: Determination of Temperature and Enthalpy of Melting and Crystallization

² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ The last approved version of this historical standard is referenced on www.astm.org.

⁴ Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, <http://www.ansi.org>.