



Standard Test Method for Determination of Xylene Solubles in Propylene Plastics¹

This standard is issued under the fixed designation D5492; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This test method is to be used for determining the 25°C xylene-soluble fraction of polypropylene homopolymers and copolymers.

1.2 *This standard 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 standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—This test method is technically equivalent to ISO 16152.

2. Referenced Documents

2.1 ASTM Standards:²

D883 Terminology Relating to Plastics

D1600 Terminology for Abbreviated Terms Relating to Plastics

E691 Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method

2.2 ISO Standard:

ISO 16152 Plastics—Determination of Xylene Solubles of Polypropylene³

3. Terminology

3.1 Definitions:

3.1.1 For definitions of plastic terms see Terminology D883 and for abbreviations see Terminology D1600.

3.2 Definitions of Terms Specific to This Standard:

3.2.1 *soluble-fraction* (S_s)—the percentage of the polymer mass that does not precipitate out when the polymer solution is cooled from reflux temperature to $+25 \pm 0.5^\circ\text{C}$ and held at that temperature for a specified period of time.

¹ This test method 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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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 Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036.

4. Summary of Test Method

4.1 A weighed amount of sample is dissolved in xylene under reflux conditions. The solution is cooled under controlled conditions and maintained at a $+25^\circ\text{C}$ equilibrium temperature so that the crystallization of the insoluble fraction takes place. When the solution is cooled the insoluble portion precipitates and is isolated by filtration. The xylene is evaporated from the filtrate, leaving the soluble fraction in the residue. The percentage of this fraction in the plastic is determined gravimetrically.

5. Significance and Use

5.1 The results of this test provide a relative measure of the total soluble fraction of polypropylene homopolymers and copolymers. The soluble fraction approximately correlates to the amorphous fraction in the polypropylene. Xylene is widely used for determining the soluble fraction in polypropylene as it is more specific to the atactic fraction than other solvents. The concentration of a soluble fraction obtained with a specific solvent has been found to relate closely to the performance characteristics of a product in certain applications, for example film and fiber. Data obtained by one solvent and at one precipitation time cannot be compared with data obtained by another solvent or precipitation time, respectively.

6. Interferences

6.1 It is possible that materials with solubilities similar to the soluble fraction, such as additives, can interfere with the measurement of solubles. When present in concentrations that are judged to impart a significant error to the soluble-fraction data, the level of interference must be determined and corrections made.

6.2 It is possible that small-particle fillers and pigments and insoluble gels present in the polymer can pass through the filter and cause errors in the measurement.

6.3 The polymer flakes and spheres must be dried before testing to eliminate moisture that can influence the initial weight of sample added to the flask.

7. Apparatus

7.1 *Reflux-Condenser Apparatus*, 400 mm, with 24/40 glass joint.

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