



Designation: D7191 – 24

Standard Test Method for Determination of Moisture in Plastics by Relative Humidity Sensor¹

This standard is issued under the fixed designation D7191; 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 covers the quantitative determination of water down to 20 ppm in plastics using a relative humidity sensor.

1.2 Values stated in SI units are to be regarded as standard.

1.3 Specimens tested in this test method can reach or exceed 250°C, use caution when handling them after testing has completed.

1.4 *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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

NOTE 1—There is no known ISO equivalent to this standard.

1.5 *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.*

2. Referenced Documents

2.1 *ASTM Standards:*²

D1193 Specification for Reagent Water

D883 Terminology Relating to Plastics

D1600 Terminology for Abbreviated Terms Relating to Plastics (Withdrawn 2024)³

D6869 Test Method for Coulometric and Volumetric Determination of Moisture in Plastics Using the Karl Fischer Reaction (the Reaction of Iodine with Water)

¹ This test method is under the jurisdiction of ASTM Committee D20 on Plastics and is the direct responsibility of Subcommittee D20.70 on Analytical Methods.

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

E177 Practice for Use of the Terms Precision and Bias in ASTM Test Methods

E456 Terminology Relating to Quality and Statistics

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

E2935 Practice for Evaluating Equivalence of Two Testing Processes

3. Terminology

3.1 Terms used in this standard are defined in accordance with Terminology D883, unless otherwise specified. For terms relating to precision and bias and associated issues, the terms used in this standard are defined in accordance with Terminology E456.

4. Summary of Test Method

4.1 A sample is loaded into a septum-capped glass vial that is moved into a heater to evolve the volatiles from the sample into the headspace. A coaxial needle, or two needle set, pierces the septum of the vial as it enters the heater. A dry carrier gas then flows into the vial and carries the evolved volatiles in the headspace into the sensor manifold. In the sensor manifold, the carrier gas is cooled to allow high-boiling volatiles to condense on a hydrophobic filter. The filter's hydrophobic properties allow the moisture in the carrier gas to pass through and then be measured as an increase in potential at the relative humidity sensor. This sensor signal is integrated over time to provide a measurement of the total mass of water in the sample. The total moisture is then divided by sample mass to yield moisture content.

4.2 This test method utilizes a sealed, airtight flow system that prevents contamination of the analyzer from water present in the atmosphere.

5. Significance and Use

5.1 This test method is intended for use as a control, acceptance, and assessment test.

5.2 Moisture can seriously affect the processability of plastics. It is possible that high moisture content will cause surface imperfections (that is, splay or bubbling) or degradation by hydrolysis. Low moisture (with high temperature) has been known to cause solid phase polymerization.