



Designation: D6579 – 11 (Reapproved 2024)

Standard Practice for Molecular Weight Averages and Molecular Weight Distribution of Hydrocarbon, Rosin and Terpene Resins by Size-Exclusion Chromatography¹

This standard is issued under the fixed designation D6579; 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 practice covers the determination of apparent molecular weight (MW) averages and molecular weight distributions (MWD) for THF-soluble hydrocarbon, rosin and terpene resins by size-exclusion chromatography (SEC). This technique is not absolute; it requires calibration with standards of known molecular weight. This practice is applicable to resins containing molecular-weight components that have elution volumes falling within the elution volume range defined by polystyrene standards.

NOTE 1—SEC is also known as gel permeation chromatography (GPC).

1.2 SEC systems employ low-volume liquid chromatography components and columns packed with relatively small (generally 3 μm to 20 μm) microporous particles. High-performance liquid chromatography instrumentation and automated data handling systems for data acquisition and processing are also required.

1.3 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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.*

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.*

¹ This practice is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.34 on Pine Chemicals and Hydrocarbon Resins.

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2. Referenced Documents

2.1 *ASTM Standards:*²

D804 Terminology Relating to Pine Chemicals, Including Tall Oil and Related Products

D3016 Practice for Use of Liquid Exclusion Chromatography Terms and Relationships

D6440 Terminology Relating to Hydrocarbon Resins

3. Terminology

3.1 For definitions of size-exclusion chromatography terms, see Practice D3016.

3.2 For definition of terpene resin, see Terminology D804.

3.3 For definitions of resin terms, see Terminology D6440.

4. Summary of Practice

4.1 In this practice, a dilute solution of a hydrocarbon, rosin or terpene resin sample is injected into a liquid mobile phase containing the same solvent used to prepare the resin solution. The mobile phase transports the resin into and through a chromatography column (or set of columns connected in series) packed with a rigid or semirigid, porous substrate that separates the molecules according to their size in solution. A detector monitors the eluate as a function of elution volume (or time). Upon emerging from the column(s), the fractions of size-separated molecules are detected and their elution volumes (or times) and (usually) concentrations recorded. Through calibration, the elution volumes (or times) are converted to apparent molecular weights, and various molecular weight parameters for the sample resin are calculated from the molecular weight/concentration data.

5. Significance and Use

5.1 The MW averages and the MWD are important characteristics of a resin. They may be used for a variety of correlations for fundamental studies, processing, or product

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