



Designation: D2493/D2493M – 24

Standard Practice for Viscosity-Temperature Chart for Asphalt Binders¹

This standard is issued under the fixed designation D2493/D2493M; 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 The viscosity-temperature chart covered by this standard is a convenient means of plotting data for estimating the viscosity of asphalt binders at any temperature within a limited range. Conversely, the chart may be used to ascertain the temperature at which a desired viscosity is attained.

1.2 The chart is suitable for asphalt binders and for asphalts recovered from laboratory aging tests or extracted from pavements.

1.3 The chart is based on a viscosity-temperature relationship that can be plotted using any appropriate set of units. For convenience, charts based on both conventional and SI units are provided.

1.4 The range of the chart is sufficient for roofing asphalts.

1.5 The range of the chart is sufficient for asphalt binders whose viscosity exceeds 0.01 Pa·s (10 centipoise).

1.6 The values stated in either SI units or inch-pound units are to be regarded separately as standard. The values stated in each system may not be exact equivalents; therefore, each system shall be used independently of the other. Combining values from the two systems may result in nonconformance with the standard.

NOTE 1—Modified asphalt binders may not give a linear plot.

1.7 *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

¹ This practice is under the jurisdiction of ASTM Committee D04 on Road and Paving Materials and is the direct responsibility of Subcommittee D04.44 on Rheological Tests.

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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.

D341 Practice for Viscosity-Temperature Equations and Charts for Liquid Petroleum or Hydrocarbon Products
D2170/D2170M Test Method for Kinematic Viscosity of Asphalts
D2171/D2171M Test Method for Viscosity of Asphalts by Vacuum Capillary Viscometer
D4402/D4402M Test Method for Viscosity Determination of Asphalt at Elevated Temperatures Using a Rotational Viscometer
D4957 Test Method for Apparent Viscosity of Asphalt Emulsion Residues and Non-Newtonian Asphalts by Vacuum Capillary Viscometer
D7175 Test Method for Determining the Rheological Properties of Asphalt Binder Using a Dynamic Shear Rheometer

3. Significance and Use

3.1 The viscosity-temperature chart is a convenient means of plotting the viscosity data for estimating the viscosity of asphalt binders, recovered asphalts, and roofing asphalts at any temperature within a limited range. It is also a convenient means to estimate the temperature at which a desired viscosity is attained. Charts may be constructed manually or using computer graphing software.

3.2 Kinematic viscosity-temperature charts are described in Practice D341.

4. Description

4.1 Fig. 1 shows an example viscosity-temperature chart. For Fig. 1, the chart coordinates are logarithm of the logarithm of the viscosity in centipoise as the ordinate, and logarithm of the absolute temperature in degrees Rankine (degrees F + 459.67) as the abscissa. However, the viscosity in poise and the temperature in degrees Fahrenheit are shown in the chart for convenience.

4.2 Fig. 2 shows an example viscosity-temperature chart. For Fig. 2, the chart coordinates are logarithm of the logarithm of the viscosity in mPa·s as the ordinate, and logarithm of the absolute temperature in Kelvin (degrees C + 273.15) as the abscissa. However, viscosity in Pa·s and the temperature in degrees Celsius are shown in the chart for convenience.

4.3 The temperature range of the charts may be extended or abbreviated as necessary.