



**NATIONAL STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

GB/T 2794-2022

Determination for viscosity of adhesives

胶黏剂黏度的测定

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Table of Contents

Foreword	3
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Sampling	5
5 Apparatus	5
6 Sample conditioning	7
7 Test methods	7
8 Result representation	9
9 Test report	9

Foreword

This document was issued on 12 October 2022 by the State Administration for Market Regulation; Standardization Administration of the PRC and takes effect on 1 May 2023.

It is a GB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

1 Scope

GB/T 2794-2022 covers the measurement of the viscosity of adhesives by single cylinder rotational viscometer, by cone-plate rotational viscometer and by rotational rheometer - the sampling, the apparatus, the conditioning of the sample, the three test methods, the representation of the result, and the test report. Viscosity decides whether an adhesive can be pumped, sprayed, rolled or trowelled at all, and how much of it stays where it was put before it sets, which is why it is the first number a converter checks on a drum that has just arrived. It is also a number that moves: the same adhesive reads one way warm and another way cold, and differently again depending on how fast it is sheared. So the sample is taken in accordance with GB/T 20740 and conditioned in the standard environment of GB/T 2918 before anything is measured, and the instruments are pinned down in their own clause, the single cylinder viscometer to a measurement accuracy of $\pm 5\%$. In that first method a cylindrical or disc-shaped rotor is turned at a constant rate through the sample under test. Written for adhesive manufacturers, for the users who check incoming batches, and for laboratories asked to settle an argument between the two.

This document describes methods for determination for the viscosity of adhesives using

single cylinder rotational viscometer, cone-plate rotational viscometer, and rotational rheometer.

This document applies to the determination for viscosity of adhesives.

2 Normative references

The contents of the following documents, through normative references in this text, constitute indispensable provisions of this document. Among them, for dated references, only the edition corresponding to that date applies to this document. For undated references, the latest edition (including all amendments) applies to this document.

GB/T 2918 Plastics - Standard atmospheres for conditioning and testing

GB/T 8170 Rules of rounding off for numerical values and expression and judgement of limiting values

GB/T 20740 Adhesive - Sampling

3 Terms and definitions

This document does not have terms and definitions that need to be defined.

4 Sampling

Sample sampling shall be carried out in accordance with the provisions of GB/T 20740.

5 Apparatus

5.1 Single cylinder rotational viscometer

Measurement accuracy: $\pm 5\%$.

5.2 Cone-plate rotational viscometer

Measurement accuracy: $\pm 5\%$.

6 Sample conditioning

The samples shall be conditioned and tested in the standard conditioning environment specified in GB/T 2918.

7 Test methods

7.1 Method 1: Single cylinder rotational viscometer method

7.1.1 Principle

A cylindrical or disc-shaped rotor rotates at a constant rate through the sample to be tested. Measure the torque caused by the viscous drag; combine with the selected speed and rotor type; obtain the viscosity value of the sample.

7.1.2 Test procedure

7.1.2.1 Add an appropriate amount of the sample to be tested into the sample holder as needed, to ensure that no air bubbles are introduced. If necessary, use vacuum or other suitable methods to eliminate air bubbles. If the sample is volatile or hygroscopic, during the constant-temperature process, it shall seal the sample holder.

7.1.2.2 Select the appropriate rotor and speed, so that the meter reading is within 20%~90% of the maximum range.

7.1.2.3 Make sure that the sample temperature reaches the specified temperature.

Unless otherwise specified, the temperature of the test sample shall be kept at $(23.0 \pm 0.5)^{\circ}\text{C}$. When conducting arbitration, the thermometer shall be immersed in the sample, to test the actual temperature of the sample.

7.1.2.4 Start the motor; the rotor rotates in the test sample. After the reading is stable, record the data. When measuring the viscosity of some adhesives, if the reading displayed by the instrument is unstable, the viscosity value should be read at a specified time, such as 15 min. The time can also be determined through negotiation between the two parties.

7.1.2.5 After each test, remove the rotor from the instrument. Use a solvent, which can completely dissolve the sample, to carefully clean the rotor and cylinder.

7.1.2.6 Take two samples for parallel test, until the difference between the readings of two consecutive sample tests is less than 3%. The result is the average of two measurements.

7.2 Method 2: Cone-plate rotational viscometer method

7.2.1 Principle

Place the sample to be tested between the rotor and the plate. When the rotor rotates,

measure the torque caused by the viscous drag; combine with related parameters such as the selected rotational speed and the diameter and angle of the rotor; obtain the viscosity value of the sample.

7.2.2 Test procedure

7.2.2.1 According to the sample, select the appropriate instrument model, rotor and speed; so that the instrument reading is within 10%~90% of the maximum range.

7.2.2.2 Make sure the viscometer is at the temperature required for the determination.

7.2.2.3 Zero the instrument.

7.2.2.4 Set the cone-plate gap.

7.2.2.5 According to the viscosity and thixotropy of the adhesive and the requirements of the rotor, take an appropriate amount of the sample to be tested; place it in the center of the plate; to ensure that the space between the rotor and the plate is filled with adhesive. There shall be no excessive adhesive overflow. At the same time, ensure that no air bubbles are introduced.

7.2.2.6 Wait for a period of time for the sample temperature to reach thermal equilibrium, to ensure that the sample temperature is within the specified range. Unless otherwise specified, the temperature of the test sample shall be kept at $(23.0 \pm 0.5)^\circ\text{C}$.

7.2.2.7 Start the rotor. After the reading is stable, record the data.

7.2.2.8 After each test, use a solvent, which can completely dissolve the sample, to carefully clean the rotor and plate.

7.2.2.9 Take two samples for parallel test, until the difference between the readings of two consecutive sample tests is less than 3%. The result is the average of two measurements.

7.3 Method 3: Rotational rheometer method

7.3.1 Principle

Apply strain (stress) to the rotor to test. According to the shear rate and shear stress, measure the viscosity of the sample under the corresponding temperature conditions.

7.3.2 Test procedure