

JJF

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**Calibration Specification for Rotational Rheometers
(English Translation)**

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Introduction

JJF 1001-2011 "General metrological terms and definitions", JJF 1071-2010 "National metrological calibration specifications" the JJF 1059.1-2012 "Evaluation and Expression of Uncertainty in Measurement" together constitute the basis for the formulation of this specification.

Series specifications.

This specification is a metrological technical specification for the calibration of rotational rheometers, mainly referring to GB/T 25278-2010 "Determination of the Flowability of Plastics Using Capillary and Slot Die Rheometers" and ASTM E2509-2014 this specification is published for the first time.

Rotational Rheometer Calibration Specifications

1 Scope

This specification is applicable to the calibration of rotational rheometers with a viscosity measurement range of (0~1000) Pa·s.

2 References

This specification references the following documents.

GB/T 25278-2010 Determination of the fluidity of plastics by capillary and slot die rheometers ASTM E2509-2014 Standard Test Method for Temperature Calibration of Isothermal Model Rheometers for any referenced document with a date, only the version with the date is applicable to this specification; for any referenced document without a date, the latest version (including all amendments) shall apply to this specification.

3 Terminology and units of measurement the terms and definitions defined in GB/T 25278-2010 and the following terms and definitions apply to this specification.

3.1 Non-Newtonian fluid A fluid whose viscosity varies with shear rate.

[Source. GB/T 25278-2010, 3.2, modified]

3.2 Shear stress

When an object is deformed due to changes in external loads, the interaction between the two sides of any shear surface inside it Force, unit is Pa.

[Source. GB/T 25278-2010, 3.5, modified]

3.3 Shear rate

The rate of change of the fluid flow velocity relative to the radius of the circular flow channel, measured in s⁻¹.

[Source. GB/T 25278-2010, 3.6, modified]

3.4 Shear viscosity

The ratio of shear stress to shear rate in steady-state shear flow, expressed in Pa·s.

[Source. GB/T 25278-2010, 3.7, modified]

4 Overview

The working principle of the rotational rheometer is to rotate the test fixture driven by the motor to subject the sample to shear force.

The optical decoder will then receive the torque and other information fed back by the sample, and the data analysis software will analyze the collected information.

The information is analyzed to obtain the shear stress and shear rate of the sample, thereby obtaining rheological parameters such as sample viscosity.

The rotational rheometer is mainly composed of five parts. motor, optical decoder, rotor, air bearing and test fixture.

The structure of the instrument is shown in Figure 1.