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Reologija - 3. del: Preskusni postopki in primeri za vrednotenje rezultatov, dobljenih z rotacijsko in oscilacijsko reometrijo (ISO 3219-3:2026)

Rheology - Part 3: Test procedure and examples for the evaluation of results when using rotational and oscillatory rheometry (ISO 3219-3:2026)

Rheologie - Teil 3: Versuchsdurchführung und beispielhafte Auswertungen der Rotations- und Oszillationsrheometrie (ISO 3219-3:2026)

Rhéologie - Partie 3: Mode opératoire d'essai et exemples d'évaluation des résultats en cas d'utilisation de la rhéométrie rotative et oscillatoire (ISO 3219-3:2026)

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NORME EUROPÉENNE

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EN ISO 3219-3

October 2026

ICS 83.080.01

English Version

Rheology - Part 3: Test procedure and examples for the evaluation of results when using rotational and oscillatory rheometry (ISO 3219-3:2026)

Rhéologie - Partie 3: Mode opératoire d'essai et exemples d'évaluation des résultats en cas d'utilisation de la rhéométrie rotative et oscillatoire (ISO 3219-3:2026)

Rheologie - Teil 3: Versuchsdurchführung und beispielhafte Auswertungen der Rotations- und Oszillationsrheometrie (ISO 3219-3:2026)

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European foreword

This document (EN ISO 3219-3:2026) has been prepared by Technical Committee ISO/TC 35 "Paints and varnishes" in collaboration with Technical Committee CEN/TC 139 “Paints and varnishes” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by April 2027, and conflicting national standards shall be withdrawn at the latest by April 2027.

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International Standard

ISO 3219-3

First edition
2026-10

Rheology —

Part 3: Test procedure and examples for the evaluation of results when using rotational and oscillatory rheometry

Rhéologie —

Partie 3: Mode opératoire d'essai et exemples d'évaluation des résultats en cas d'utilisation de la rhéométrie rotative et oscillatoire

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Rheology —

Part 3: Test procedure and examples for the evaluation of results when using rotational and oscillatory rheometry

1 Scope

This document provides requirements and guidelines for selecting the measuring device, measuring geometry and temperature control unit for tests involving rotational and oscillatory rheometry. The general principles of test performance are described and example evaluations of rotational and oscillatory rheometry are provided.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3219-1:2021, *Rheology — Part 1: Vocabulary and symbols for rotational and oscillatory rheometry*

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3 Terms and definitions

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For the purposes of this document, the terms and definitions given in ISO 3219-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
crystallization temperature
T_c
temperature at which crystallization starts and partial order is established when the melt solidifies

Note 1 to entry: The unit of the crystallization temperature, T_c, is degrees Celsius (°C).

3.2
gel point
transition point from sol to gel in oscillation in the linear-viscoelastic range, where the loss angle, δ, is independent of frequency

Note 1 to entry: The gel point can be a time or a temperature.

Note 2 to entry: Contrary to this definition, the gel point is usually measured in practice at one frequency and determined on the basis of the loss angle $\delta = 45°$ or on the basis of the loss factor $\tan \delta = 1$.

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3.3
gel time
pot life
period of time for which a crosslinking material remains processable while a user-specified criterion is satisfied

Note 1 to entry: The gel time can be determined in oscillation in the nonlinear range or in rotation.

Note 2 to entry: In practice, relative measuring geometries or alternative methods are also used, such as flow cups.

Note 3 to entry: Limiting values for the viscosity or moduli can be used as user-defined criteria.

3.4
glass transition temperature
T_g
characteristic temperature of the temperature range in which the glass transformation takes place

Note 1 to entry: The glass transition temperature depends on the test procedure and the measuring conditions.

3.5
sample preparation
handling, conditioning and load applied to the sample prior to measurement

3.6
shear relaxation modulus
G
ratio of shear stress τ to shear strain γ during the relaxation test

Note 1 to entry: The unit for the shear relaxation modulus G is Pascal (Pa).

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3.7
sol/gel transition
transition range from viscoelastic liquid (sol) to viscoelastic solid (gel)

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3.8
trimming
removal of excess sample volume

Note 1 to entry: With plate-plate and cone-plate measuring geometries, a trimming position is often selected being larger than the gap width and at which the excess volume is removed so that the sample is flushed to the edge of the measuring geometry. When the measuring position is subsequently approached, this ensures optimum filling of the gap.

4 Guidelines and requirements for selection

4.1 General

The choice of measuring device, measuring geometry, temperature control unit, measuring method and further accessories depends on the properties of the sample and the resulting rheological requirements.

4.2 Selection of the measuring device

In ISO 3219-2, the differences between the different measuring devices for the determination of rheological properties and their setups are described. A rotational viscometer can be used to determine the shear viscosity. With a rotational rheometer, it is in addition possible to carry out all basic rotational and oscillatory tests (see Clause 7). For this reason, in addition to the viscosity function, this can be used to determine the viscoelastic properties, e.g. shear storage modulus and shear loss modulus.

For viscometric measurements, all viscometers are principally suitable, regardless of the type of bearing. For oscillatory measurements, creep tests and relaxation tests, devices with low internal friction should be used, e.g. devices with air bearings or magnetic bearings. Some devices with ball bearings also offer the

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