

Laboratory Viscometer

Process Measurement Technology

Service/Consulting

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Rheomat **R 140**

The well-established viscometer for fast and reliable determination of viscosity

The **proRheo R 140** is a rotational viscometer for the measurement of viscosity with any commercially available measuring system. The Rheomat R 140 combines the attributes of ease of handling with the quality of measurement necessary for the exact determination of viscosity. The measurement principle of the Rheomat R 140 is similar to that of the well-established Rheomat R 180, yet optimizing the functionality to only the essential parameters.

Use. The proRheo R140 has been engineered for rapid and reliable viscosity measurement in both the laboratory and production environments, being ideally suited for input & output quality control functions. Possible applications include the measurement & control of coatings, food, pharmaceutical products, cosmetics and many more. For further information please contact proRheo.

Measurement principle. The proRheo R140 is a classical rotation-type viscometer which uses a motor driven bob rotating in a fixed measuring tube. The sample is sheared in the gap between the bob the tube and the measured shear stress is used with the shear rate to calculate the viscosity. As a result of the versatility of the R140 a viscosity measurement can be made by immersing the measuring bob in an open vessel or in a closed measuring tube.



Measuring. Because the R 140 is a portable viscometer, the instrument can be directly immersed into a sample requiring measurement – typically near to the sample taking point. This has the advantage of giving immediate and exact determination of the viscosity without having the problems of sample handling & transfer incurred when taking the sample to a laboratory. Alternatively, when laboratory environments are required, a measuring tube with the appropriate sealing cap can be used to transport a small quantity of sample that can be temperature controlled at a later stage.



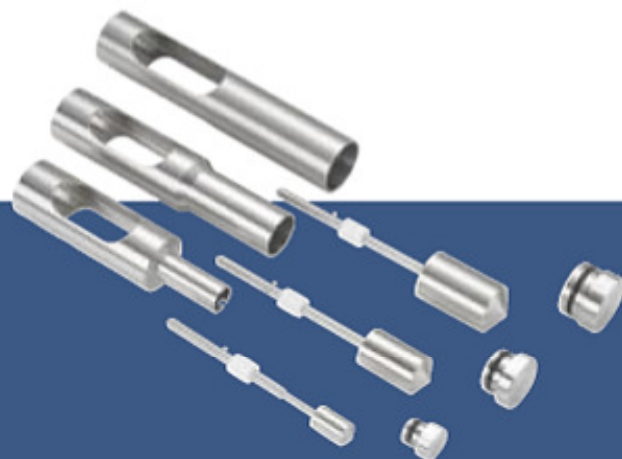
Standards Three of the available measuring systems conform to DIN 53019. These systems consist of a measuring bob, tube and cap. These systems allow for absolute measurement values, which can be compared to other DIN values.

Relative measuring systems. Using the DIN-conforming measurement bobs with larger measuring tubes (or without any tube) considerably increases the measuring range (see table). The values produced in these cases are those of relative viscosity and should only be compared with results achieved under similar conditions.

Special measuring systems. Some samples require the use of special measuring systems, for example samples with high solids content or special dispersions. Special measuring systems are available for these types of samples.

Flexibility. Special accessories are available to allow the proRheo R140 to be customised to your specific needs.

ISO Spindles. Spindles Measurements according ISO 2555 are very common. ISO Spindles are rotational bobs with either a plate or a bell shape with measurements being carried out in a commercial beaker or container.



Measurement systems. A wide range of measurement systems allows the accurate determination of viscosity over an extensive range of products. The measuring systems are manufactured according to DIN 53019 for standardized determination of absolute viscosity – this creating the conditions for optimal comparability of viscosity. Measuring systems designed according to ISO 2555 and Cone & Plate systems are available.

Measurement Procedure. The Rheomat R 140 determines viscosity according to the Searle-Principle: the measuring bob rotates in a measuring cup filled with the sample. The force with which the sample resists to the rotation is measured and transferred by a microprocessor into viscosity. These measurements respond to DIN 53019 or ISO 2555 depending on the measuring system used.

Calibration. Regular calibrations are recommended to guarantee the reliability of the measurement results. Measurement accuracy is expected to be better than 1% of the measured value. According to DIN 53019 calibrations by the manufacturer are gravimetric and should be renewed once a year. Additional control can be achieved by an additional calibration using standardized oils - producing a confirmation of the gravimetric calibration.

User oriented. Reduction on the essential without renouncement of quality or flexibility. These were the premises for developing the Rheomat R 140. This guideline was completely achieved. The enormous precision in viscosity measurement at this unusually favorable price offers a never achieved price-performance ratio.

The premise for developing the Rheomat R140 was to achieve an excellent value for money solution, without compromising performance or flexibility. This goal has been achieved in this unit, with all the major customer requirements being fulfilled, yet at an attractive price.

Durable. The Rheomat R140 is protected inside a rugged instrument housing that stands up to the demands of everyday usage. In addition to this, the proRheo R 140 uses an integrated grip built right into the housing for ease of use.

Well Thought-out. The special stand allows for easy set up for good temperature control of your samples.

Upgrade. The Rheomat R 140 can be upgraded to a complete Viscosity measuring system by incorporating a number of standard accessories. Those available are:

- Temperature control in the sample using a thermostating unit
- RS 232 interface
- Process/Evaluation software
- Printer Interface
- Coaxial measurement stand
- Cone-plate measurement stand
- Battery for net independent measurements
- Rugged transportation case

Practical. The Rheomat R 140 can be delivered as a package with all required accessories mounted inside a hard-cased package. This allows easy handling and transportation for this integrally mobile instrument.

R 140 Display. The following values are displayed and continuously updated:

- Measurement System Number
- Torque and shear rate
- Rotational speed and shear stress
- Viscosity

Measurement. Taking a measurement starts by entering the measuring system, the desired rotational speed and simply pressing the "point" key. The bob rotational speed can also be changed during measurement thus allowing the detection of changing of viscosity with time as well as change due to different rotational speeds.

Easy Operation. A clear dialog guides you through the necessary input options. This dialog is available in six languages: English, German, French, Spanish, Italian and Dutch.

Memory. The integrated memory has a separate lithium battery that stores your preset/last used configurations, i.e. the last used measuring system, rotational speed and language. As a result, repeated routine measurements without new settings becomes simple.

- Measuring Head R 140
- Power Supply



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proRheo R 140 includes

Measuring Head R 140
Power Supply
Measuring tube 1
Measuring bob 2
Operation instructions

proRheo R140 with measuring system No. 12

Weight: 2,9Kg
Dimensions: 90x450x105 mm

Storage Between -20 and +60 °C

Display Torque mNm
Shear rate s⁻¹
Shear Stress Pa
Viscosity Pas
Number of measuring systems

Torque 0,25 to 10 mNm +/- 0,01 mNm

Rotational Speed 5 to 1000 rpm +/- 1 rpm

Voltage

With power supply 100 to 250V AC at 50/60Hz
Without power supply NiMH batteries
Minimum 4h continuous power supply
Charging of batteries by power supply

Instrument operational information

The equipment may be operated in an environment from -20 to 60 °C

Measuring systems 11 predefined measuring systems
99 programmable measuring systems

Measurement Range Viscosity: 0,002 to 10.000 Pas
according measurement system
Shear Rate: 0,8 to 3.000 s⁻¹

	Measurement systems	Measurement tube d mm	Measurement bob d mm	Viscosity [Pas] min.	Viscosity [Pas] max.	Filling volume [ml]
DIN 53018/ DIN 53019	11	32,54	30	0,005	19	ca. 24
	22	26,03	24	0,010	38	ca. 16
	33	15,18	14	0,050	191	ca. 9
Relative Systems	19	32,54	31,5	0,002	7	ca. 20
	12	32,54	24	0,027	104	ca. 18
	13	32,54	14	0,210	800	ca. 26
	23	26,03	14	0,240	906	ca. 18
	14	32,54	14	0,545	2.080	ca. 26

	Measurement systems	Viscosity [Pas] min.	Viscosity [Pas] max.
Special relative Systems	71	0,003	10
	72	0,027	104
	73	0,160	605
	74	0,665	2.530
	75	2,580	9.800
ISO 2555	61	0,007	26
	62	0,028	106
	63	0,070	264
	64	0,139	529
	65	0,278	1.057
	66	0,696	2.643
	67	2,783	10.574



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