Rotational Rheometer for Quality Control

Anton Paar

RheolabQC

RheolabQC
The Powerful QC Instrument

Viscosity measurement and rheological checks for quality control are made routine and easy

From a quick single-point check to complex rheological investigations: RheolabQC sets new standards for carrying out routine rheological tests.

RheolabQC is based on the newest and most innovative technologies used in R&D rheometers. It provides unrivaled performance combined with very easy operation and robust design.

This powerful QC rheometer is an excellent example of a modern measuring instrument which uses all the technical possibilities available to ensure flexible, reliable and simple operation.

Measuring method

RheolabQC is a rotational rheometer which works according to the Searle principle. It consists of a high-precision encoder and a highly dynamic EC motor, which is also used in the MCR rheometer series.

You can select between controlled shear rate (CR) and controlled shear stress (CS) test settings, options which are usually only available with high-end research rheometers. These options, together with the wide speed and torque ranges and very short motor response times, bring innumerable benefits for the application. As well as conventional flow and viscosity curves, RheolabQC is also ideal for investigations into the mixing and stirring behavior of emulsions and dispersions, for testing the sagging and leveling behavior of coatings, and for determining the yield point of gels and pastes.

Operation – choose between simple and demanding

Manual operation

RheolabQC can be operated either via the robust keypad or via an external keyboard which is connected to the PS/2 interface. There is an illuminated, easy-to-read display for selecting the measuring parameters and showing the relevant properties. The internal memory has storage capacity for over 100 predefined measuring profiles and over 50 000 measuring points in more than 100 measurement series. The data can be read out by a software program immediately, stored for reading out later, or sent to a connected printer.

Software

The reliable rheometer software from Anton Paar is available for operating the instrument from a computer. RheolabQC can be connected via the conventional RS232 interface or via a LAN-Ethernet interface directly to the company or laboratory network. It is then controlled using the software. There are numerous analysis models and automation routines available, including a special quality control module. Modules for well-known LIM systems and conformity with 21 CFR Part 11 are standard.

Measuring geometries and accessories - simple and comprehensive

Concentric cylinder systems, double gap systems and different vane geometries and spindles can be used. A quick coupling allows the measuring system to be inserted into the system with a simple hand movement.

- Concentric cylinder measuring systems according to ISO 3219 and DIN 53019
- Double gap measuring systems according to DIN 54453
- Disposable measuring systems
- Vane geometries and spindles
- Krebs spindles according to ASTM D562

The **unique Peltier temperature device** available for RheolabQC enables quick and accurate temperature control for measurements in a range from 0 °C to 180 °C. Due to the special integrated air counter-cooling, no external fluid circulator is required.

An easy to adapt, flexible cup holder enables quick exchange of individual sample containers in diverse shapes and sizes.

Quality Control - Completely Reliable

The Toolmaster™

RheolabQC includes Toolmaster™, the first automatic component recognition and configuration system. All measuring geometries are automatically recognized by the instrument. This information is taken into consideration when carrying out manual measurements. With computer-controlled measurements, the information is read into the software as soon as the geometry is connected to the instrument. This rules out errors which occur when using an incorrect geometry or selecting the wrong geometry in the software.

Quality assurance made easy

The use of the same technologies, same geometries and same software as the MCR rheometer series makes it easy to transfer measuring routines developed in the R&D laboratory to RheolabQC for quality control and production monitoring.

The excellent features and benefits combined with reduced work required from the user makes RheolabQC outstanding value for money. It is the ideal entry level instrument and completes the renowned MCR rheometer series.

The following features make it possible to investigate the quality of products from a wide variety of applications, to the required standards and under conditions which simulate the actual process:

- Toolmaster™
- Password-protected user management for setting up different user rights
- Application manager for selecting the most suitable test profile
- One-page result report with table and graphics
- Bar code option for sample identification
- Analysis and checking the measuring results according to defined tolerance limits (passed check: yes/no)
- Software with 21 CFR Part 11 function (electronic signature, audit trail and data archive)
- Pharma qualification packages available
- LIMS/SAP interface

Applications - Simple or Complex?

RheolabQC can be used for a wide variety of applications: The measuring results can be used to assess the quality of raw materials as part of the incoming inspection or for the design of pumps in plant manufacturing. They can also be used during product manufacturing or processing to check the individual steps such as mixing, dispersing, etc.

The wide measuring range, the highly dynamic measuring motor and the broad spectrum of test profiles are useful for numerous applications.

Typical applications	Recommended tests
Paints, coatings	Flow curve, yield point, 3-interval test (structural decomposition and regeneration)
Building materials	Yield point, 3-interval test (structural decomposition and regeneration)
Slurry	Flow curve, yield point, 3-interval test (structural decomposition and regeneration)
Adhesives	Flow curve, 3-interval test (structural decomposition and regeneration)
Food	Flow curve, temperature test, 3-interval test (structural decomposition and regeneration)
Cosmetics/ Pharmaceuticals	Flow curve, yield point, temperature test, temperature swing test
Soft gels	Yield point, shearing, 3-interval test (structural decomposition and regeneration)
Lubricants, oils	Flow curve, temperature test
Asphalt	Flow curve, temperature test

Technical Specifications

RheolabQC is available in two basic configurations:

1. RheolabQC plus Peltier temperature device (C-PTD 180/AIR/QC) or liquid temperature device (C-LTD 80/QC) with a water bath thermostat for exact temperature control of the measuring cup and the sample. This configuration consists of:
   - Rheometer RheolabQC
   - Stand
   - Temperature device C-PTD 180/AIR/QC or C-LTD 80/QC incl. temperature sensor (Pt100)
   - Measuring system as required (e.g. CC39/QC-LTD)
2. RheolabQC „immersion model“ for measurements under ambient conditions without a temperature control system or for immersing the measuring cup in an external water bath. This configuration consists of:
   - Rheometer RheolabQC
   - Immersion stand
   - Immersion measuring system (e.g. CC39/QC-IM)

Specifications

Speed	0.01 to 1200***) 1/min
Torque	0.20 to 75 mNm
Shear stress*)	0.5 to 30000 Pa
Shear rate*)	10^{-2} to 4000 1/s
Viscosity measuring range*)	1 to 10^9 mPas
Temperature range**)	-20 to 180 °C
Internal angle resolution	2 µrad
LAN-Ethernet interface	PC
Serial interface RS232	PC, printer
PS/2 interface	Keyboard, bar code reader
Dimensions W x H x D	300 x 720 x 350 mm
Weight	14 kg

Properties which can be measured or analyzed

Dynamic viscosity	η
Shear rate	$\dot{\gamma}$
Shear stress	τ
Speed	n
Torque	M
Temperature	T
Time	t
Kinematic viscosity	ν
Yield point	τ_o
Deformation	γ
Compliance	J

*) depends on the measuring system used

**) depends on the temperature control device used

***) max. speed with torque derating

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