

Rheometers

Dynamic shear rheometer (DSR) for bitumen and asphalt tests

HAAKE MARS iQ Air Rheometer

Application

The requirements for bitumen and asphalt have increased considerably in recent years. In order to meet the constantly increasing traffic volume and climatic changes, new bitumen and asphalt formulations are continuously being developed especially for use in road construction. Rheological measurements have become an established method for the analysis of unmodified as well as modified bitumen and asphalt. These measurements are written down in detail in numerous standards (AASHTO, ASTM, DIN EN and FGSV). Internationally accepted standards guarantee the same quality worldwide.

The modular Thermo Scientific™ HAAKE™ MARS™ iQ Air Rheometer is ideal for routine measurements in test laboratories. Depending on the standard, it can be equipped with plate-plate or coaxial cylinder measuring geometries and an appropriate temperature control. Changing between different configurations is easy, fast and failure-free.

The “Connect Assist” technology for measuring geometry and temperature control unit ensures simple connection thanks to a quick coupling mechanism with automatic recognition.

The Thermo Scientific™ HAAKE™ RheoWin™ Software—available in 15 languages—is an individually configurable software. The user decides: working with predefined standard methods and minimal settings required or complete flexibility for individual test procedures with as much information as possible (e.g., raw data). With the optional module “Bitumen and Asphalt” the rheometer software is expanded by measurement and evaluation procedures that comply with established standards specifically for this application. If required, the measuring procedures can be extended with individual information and instructions (such as videos or text messages). The procedure created can be started either using the rheometer control software or directly from the rheometer’s touch screen. A fully automatic temperature calibration tool is available to meet the requirements for temperature accuracy.



Figure 1: HAAKE MARS iQ Air Rheometer.

Available measuring routines, standards

- AASHTO TP123 (BYET)
- AASHTO T315 (SHRP-Test)
- AASHTO M320 (Standard Specification for Performance Grading—SHRP)
- AASHTO T316 (Rotational viscosity with cylinder)
- AASHTO T350 (MSCR-Test)
- AASHTO M332 (Standard Specification for Performance Grading—MSCR)
- ASTM D4402 (Rotational viscosity with cylinder up to 200 °C)
- ASTM D7175 (SHRP-Test)
- ASTM D7405 (MSCR-Test)
- DIN EN 13302 (Rotational viscosity with cylinder)
- DIN EN 13702 (Rotational viscosity with cone & plate)
- DIN EN 14770 (Complex modulus and phase angle)
- DIN EN 16659 (MSCR-Test)
- FGSV AL 720 (BTSV-Test)
- FGSV AL 721 (Constant Shear Rate)
- FGSV AL 722 (Temperature Sweep)
- FGSV AL 723 (MSCR-Test)

Features

- Modular Dynamic Shear Rheometer (DSR) for individual demands
- Easy-to-operate, multilingual HAAKE RheoWin Software for beginners and experts with optional “Bitumen & Asphalt” module
- State-of-the-art user interface with multifunctional 7” touchscreen for instrument operation and execution of Standard Operating Procedure (SOP) with a fingertip
- “Connect Assist” functionality with quick coupling and automatic recognition of measuring geometries and temperature control modules

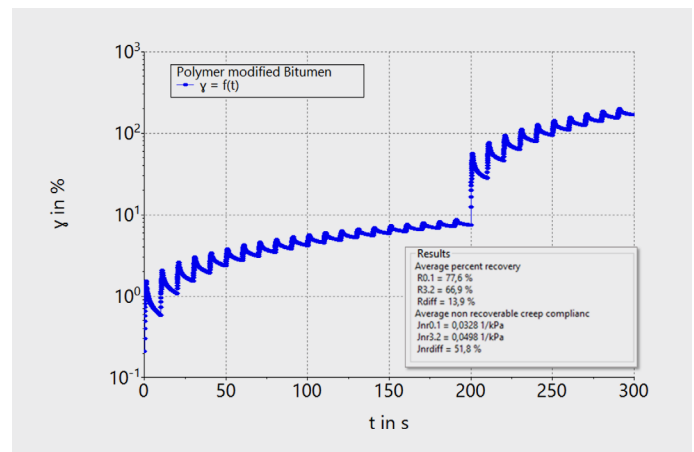


Figure 2: Measurement data and evaluation for Multiple Stress Creep and Recovery (MSCR).

Product	Order no.
HAAKE MARS iQ Air Modular Rheometer	379-0700
HAAKE RheoWin Software for HAAKE MARS iQ Air	098-5077
HAAKE RheoWin Software Extension Module for Bitumen	098-5566
Configuration 1 for plate-plate-measuring geometries	
Peltier temperature module TM-PE-P for cone and plate measuring geometries	222-1861
Holder for Guide Bar	222-2384
Upper Electrical Temperature Module TM-EL-H	222-2353
Metal ring for TM-EL-H for use with external temperature sensor	222-2416
Lower plate TMP25 (D = 25.0 mm)	222-2475
Rotor P25/Ti with “Connect Assist” and ceramic shaft	222-2105
Lower plate TMP08 (D = 8.0 mm)	222-2473
Rotor P8/Ti with “Connect Assist” and ceramic shaft	222-2106
Lower plate TMP04 (D = 4.0 mm)	222-2472
Rotor P4/Ti with “Connect Assist” and ceramic shaft	603-2172
Sample preparation tool made of silicone (for 8 mm and 25 mm test specimen, 5 pcs. each) acc. to ASTM D7175	603-2300

Product	Order no.
Configuration 2 for coaxial cylinder geometries	
Peltier temperature module TM-PE-C for coaxial cylinders	222-1955
Sample hood PEEK	222-2163
Rotor CC25 DIN (additional sizes available)	222-2125
Cup CCB25 DIN (additional sizes available)	222-1956
Insert for disposable cups	222-1969
Disposable cups (100 pcs.)	222-0631
Smaller rotors for testing rubber modified asphalts (larger gaps) are available upon request.	
Necessary accessories	
Compressed air	Filter unit (222-1211) or compressor (222-2288 – 230 V or 222-2289 – 115 V)
Temperature calibration tool	Device (222-2206) with temperature sensor for parallel plate measuring geometries (222-2530), calibrated, acc. to AASHTO T315
Counter cooling:	
<ul style="list-style-type: none"> • TM-PE-C 	Heat exchanger (e.g., HX R 222-2339)
<ul style="list-style-type: none"> • TM-PE-P / EL-H 	Circulator (e.g., SC100-A10: 222-1937 in 230V / 50 Hz or 222-1939 in 115 V / 60 Hz)