

MonTech MDR 3000 Advanced Moving Die Rheometer

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The MDR 3000

is the industry standard for measuring the viscoelastic properties of polymers and elastomeric compounds before, during and after cure.

The acquired data is gives advanced information about processability, cure characteristics, cure rate as well as the behavior of the compound after-cure at fixed, user selectable strain rates.

The instrument comes in the unique MonTech Series 3000 loadframe - industrial proof, fanless and ultra-rugged even for toughest production environments.

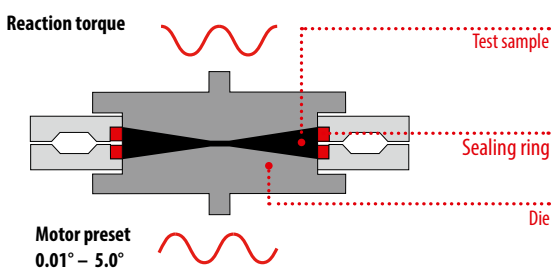
The reaction torque is measured by a high resolution, digital strain gauge assembly with integrated temperature compensation, making the MDR 3000 the most accurate and precise Moving Die Rheometer for static testing. Optionally, the instrument can be equipped with a combined torque / normal force sensor to assess blowing or sponging reactions of the tested material. For increased productivity and throughput, various types of highly reliable automation systems are also available.

Of course the MDR 3000 can be easily upgraded at a later stage to an MDR 3000 Professional to not only be able to run static but also dynamic test sequences.

Unique direct drive system

The instrument utilizes a direct, high-precision, gearless torque drive system mounted directly to the lower die assembly. Therefore, the oscillation angle can be directly changed in the MonControl software, making the instrument capable of always measuring materials in the optimal strain range. This feature significantly reduces signal noise, improving the accuracy of testing results. With this fully digital drive system, no mechanical strain adjustments are needed and the motor positioning is monitored and recorded throughout the test.

For less demanding applications the MDR 3000 is also available in a economy "M" version equipped with a mechanical stainless steel drive system with BLDC motor.

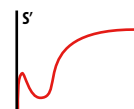


The heart of the instrument is the directly heated and precisely regulated biconical die assembly. The lower die oscillates with a predefined angle and frequency whereas the reaction torque is recorded on the upper die.

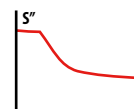
Technical specification

International standards	ISO 6502, ASTM D 5289, DIN 53529, ...
Die configuration	Biconical, closed die system, sealed
Die gap	0.45 mm nominal
Sample volume	approx. 4.5 cm ³
Drive system	Direct, wearless servo drive system
Closing system	Soft closing to prevent foil rips and damage of test sample
Oscillation frequency	1.667 Hz (100 cpm)
Oscillation strain	+/- 0.01° to 5° (+/- 0.14% to 70%), Programmable via Software Optional "M" version with mechanically fixed oscillation angle
Torque range	0.01 to 250 dNm
Normal force / Pressure (opt.)	0 to 10.000 kPa (1.450 lbin), Auto tare
Temperature control system	Ambient to 232 °C, precision +/- 0.03 °C, Max. heating rate: 85°C/min digital, microprocessor controlled
Temperature check system	Recordings of the temperature gradient on the screen, microprocessor monitored
Measured Data	Torque (dNm, lbf.in, kgf.cm), Temperature (°C, °F), Pressure (bar, kg per cm ²), Time (min - min / min - sec / sec), Shear rate (1/s, rad/s), Cure rate (1/min, 1/sec)
Calculated Data	S', S'', S''', tan δ, phase angle, cure rate, ...
Data Interface	Ethernet (10/100 MBit), USB (int.), CF card (int.), RS232 (opt.)
Data points	Over 3500 data points available for each test Including: S' Min, S' Max, TS 1, TS 2, TC 10, TC 30, TC 50, TC 90
Pneumatics	min. 4.5 Bar / 60 psi
Electrical	200-240 V, 6 Amps, 47-63 Hz, Single phase
Instrument options	- "M" version with mechanical drive system - Instrument control panel with 5" touchscreen display and printer - Adapted transducers for high or low-viscosity torque range - Normal force / Pressure measurement - Double channel forced air cooling system - Extended thermal range to +300°C - Autoloader 5 or 10 sample linear - Autoloader with 24, 48 or 100 sample tray or tray changers - R-VS 3000 constant volume sample cutter - Label Printer - Signal tower ...

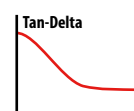
Calculated results



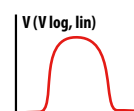
Elastic Modulus



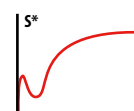
Viscous Modulus



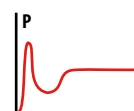
Tan - Delta



Vulcanization speed



Complex Modulus

Normal force / Pressure
(optional available)