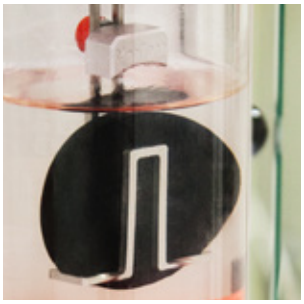
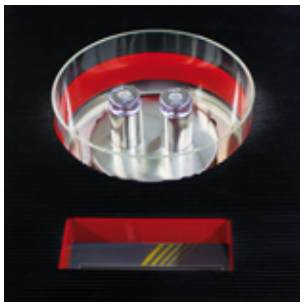
MonTech®
Rubber Testing Solutions

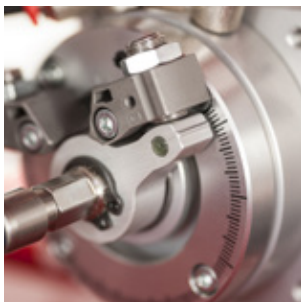
Hardness, Compression set & Density

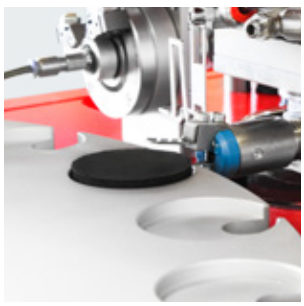
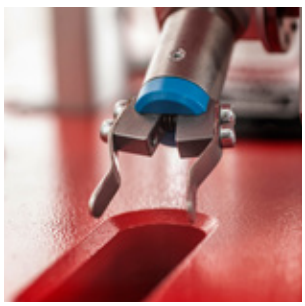










...Innovative testing solutions made in Germany!

MonTech HT 3000
Hardness testers Series

Rubber Hardness Tester Series HT 3000

Hardness (resistance to indentation) is one of the most important properties of rubber products and parts.

MonTech therefore offers a full range of handheld and benchtop precision hardness testers according to various scales and standards.

This includes devices according to

Shore: A, A0, B, C, D, D0, E, 00, 000, 000S,
IRHD: M, H, N, L, VLRH
Asker: C, CS.

Most popular products from the HT3000 family include:

→ **HT 3000 - A**
Digital Handheld Shore A precision hardness tester

→ **HT 3000 - D**
Digital Handheld Shore D precision hardness tester

→ **HT 3000 - S**
Test stand with pickup arm and integrated loadweights

→ **HT 3000 - SA**
Automated test stand with automated indentation movement

→ **Accessories such as**
- Auto-samplers
- Centering and positioning devices
- Verification and control rings
- Reference rubber blocks
- Additional loadweights
- Software systems
- …

MonTech CS 3000
Compression Set test fixtures

Compression set fixtures CS 3000

according to ISO 815, DIN 53517, ASTM D395 and other International Standards.
Compression set testing measures the ability of rubber to return to its original thickness after prolonged compressive stresses.
As a rubber sample is compressed over time between 2 flat parallel plates with a predefined percentage and kept for a specific time at a certain temperature, it loses its ability to return to its original thickness. This loss of resiliency, also called memory or permanent set, characterizes the capability of an elastomeric product to perform over a long period of time.
MonTech Compression set fixtures are entirely made of precision ground stainless steel and feature stiff compression plates as well as sets of spacers according to customer choice.
Optionally suitable tempering oven and height gages are available.

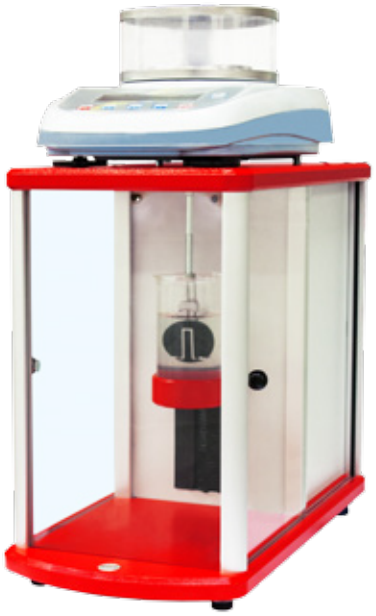
MonTech
Densimeter DM 3000

Densimeter for testing of individual samples with automated test sequence and internal self-calibration

The MonTech DM 3000 is a semi automated Densimeter. The compact instruments is designed for rapid and accurate determination of specific gravity - with a simplified, software guided operation up to 4 tests per minute can be performed.

The Densimeter utilizes the hydro-static method by comparing the weight of the sample in air as well as in an immersion liquid.

The operator simply hangs the sample from the balance and pushes the start button.
A micro-processor then weighs the sample in air, automatically raises a beaker with the immersion liquid, takes the weight of the sample in the immersion liquid and lowers the beaker.
This whole process is software guided and once the procedure is completed the density is displayed.
Additionally the sample weight in air, weight in water, and the weight difference are also recorded and reported.



Technical specification

Measurement method	Hydro-static weighing method
Measured data	Density, Volume change
Weighing range	0.010 to 400.000 grams
Sample weight	1.000 to 50.000 grams
Density range	0.50 – 10.00 g/cm^3 (lower density range possible with anti-float or needle holder)
Complies with	ASTM D 297, ISO 2781, BS903
Resolution / Accuracy	1 Milligram / Better than ± 0.020%
Output languages	English, French, German, Russian (others on request)
Output interfaces	Serial (RS232), USB 2.0 optional
Electrical	100 - 260 VAC +/- 10%, 50/60 Hz +/- 5 Hz, 2 amp single phase
Options	- Needle type sample holder - Anti float bracket - Set of calibration weight - USB 2.0 interface adaptor

LED Workroom lights

Features:

Ease of Maintenance
- → Snap-in Components
- → Simple and rugged mechanics

Ease of Use
- → Single Button Operation
- → Fully automated calibration

Applicable Data Measurement
- → Density
- → Volume change

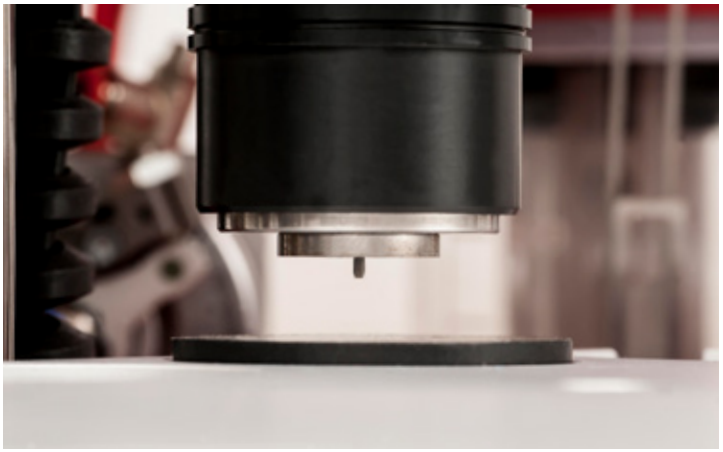
Scope of delivery:

- → Safety shield, mounted inside the instrument
- → DM3000 Software for Density measurement
- → Instruction Manual
- → Standard accessories, cables

MonTech H&D 3000 Automated Hardness & Density Testing Instrument

2 INSTRUMENTS IN 1: With the MonTech H&D 3000, hardness AND density testing of cured rubber samples is made simple, fast and reliable. Arbitrary test sequences are easily pre-programmed, samples are sequentially processed and test data is automatically collected, without the need for operator involvement. Due to the unique rotary tray design, no manual magazine handling is needed; the instrument can be continuously loaded and operated.

- → Hardness and Density testing is combined together into a single tabletop machine requiring minimal bench space in the lab. The system is designed for unattended operation with a fully automated test sequence, totally eliminating any operator influence.
- → Test samples can be continuously loaded into an endless rotary tray at the front of the machine and are identified directly on the computer by a host system or by a barcode.
- → Fully synchronized parallel operation of hardness and density measurement permits total cycle times of less than 35 Seconds! (3 points Shore A + Density)
- → During each test, the environmental and immersion fluid temperatures are accurately measured and recorded for a fully automated compensation of the specific gravity test results.
- → All test results are recorded online by the MonDevice software system featuring extensive test specification management, more than 60 different datapoints specially for the H&D 3000, automated Pass / Fail evaluation and data export to host systems and databases.
- → A standard analytical balance with integrated calibration is used for density testing, providing the most accurate results and full traceability.



Hardness measuring head

The motorized and weight loaded hardness measuring unit featuring an integrated alignment and a digital measurement of the indentor displacement guarantees the highest precision hardness readings on up to 5 different test points per sample.
Various types of hardness heads in accordance to different international standards such as Shore A, Shore D and IRHD are available.

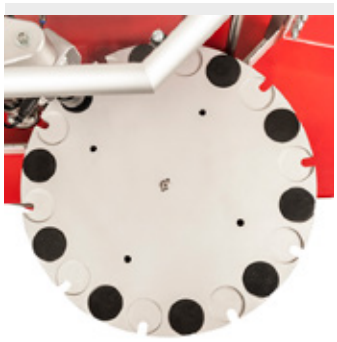
(multiple or interchangeable configurations available)

Precise sample handling

Stainless steel linear, rotational and multiposition electronic / pneumatic actuators provide safe and reliable handling of test samples.
Actuators are mechanically separated into two groups: one for dry and one for wet samples to avoid any cross-contamination of the samples prior to weighing in the immersion liquid.

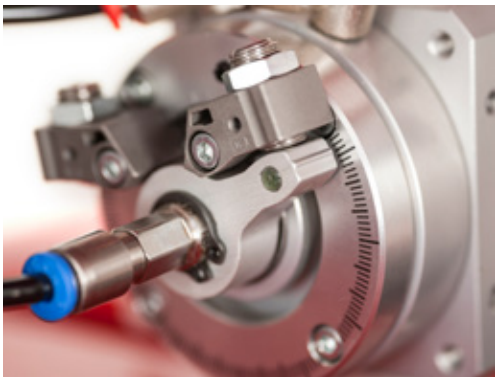
Integrated pump circuits

ensure that the level of the density liquid in the dip tank is carefully controlled. After each density test, an adjustable amount of liquid is automatically renewed, keeping the density liquid fresh and in good condition.
Also the pumps can be used to automatically fill, empty and change the density liquid in less than 20 seconds.



Endless rotary tray magazine

The rotary sample tray allows continuous operation of the machine, totally avoiding any unproductive time.
The testing area is separated by a supervised transparent safety door and covers all around the machine.



Hydrostatic weighing

Density / Specific gravity is determined by using the "weight in air" and "weight in water" methods.
The H&D 3000 features two integrated weighing stations.
After weighing the sample in air on the first weighing station, and placing the sample on the second weighing station, a user-defined number of wetting cycles can be programmed to remove any air bubbles around the sample. Afterwards the weight is taken.
Simultaneously, the temperature of the density liquid is measured and used as a correction for density calculation.
All readings are rapidly taken by a precise weighing system based on a standard analytical precision scale, minimizing the possibility of water absorption by the sample.

Sample removal

All test samples are automatically removed after being tested and put into a separate container on the lower left side of the instrument.
This ensures that rotary tray for fresh samples never gets contaminated with the liquid used for density testing. This ensures the highest accuracy and precision.
Optionally, samples can be separated into 2 containers for passed and failed specimens.

Technical specification - General

Samples	Cured rubber discs
Sample diameter	30 - 45 mm
Sample thickness	5 - 8 mm
Sample capacity	Continuous rotary sample tray with 20 sample capacity (Optional sample trays up to 2000 samples are available)
Data Interface	Ethernet (10/100 MBit), USB (int.), CF card (int.), RS232 (opt.)
Power supply	100 - 230V, 50/60 Hz + N + PE, Single phase, about 1 Amps
Dimensions (H x W x D)	600 mm x 650 mm x 680 mm
Weight	about 80 kg
Instrument options	- Sample magazines for up to 2000 samples - Barcode scanner for Compound and Batch identification - Additional Hardness testing heads: Shore B, C, D, DO, O, OO, OOO, Micro A, Micro D, IRHD N, M, H, L, VLRH - Sample separation in different containers

Technical specification - Density

Test method	Hydrostatic weighing according ISO 2781, ASTM D1817
Measurement range	< 1.0 g/cm³ to 2.8 g/cm³
Immersion Fluid Temperature Measurements	Standard

Technical specification - Hardness	**Shore A**	**IRHD N**
Test method	Shore A in accordance with: ISO 868, DIN 53505, ASTM D2240, ISO 7619, NFT 51-174, BS 903-A26	IRHD N in accordance with: DIN ISO 48, ASTM D1415, NFT 46-003, BS 903-A26
Indenter	Hardened steel rod Truncated 35° cone 0.79 mm diameter	Spherical Ball 2.50 mm diameter
Measurement range	0 - 100 Shore A	0 - 100 IRHD
Pressing force / load	Contact pressure: 12.5 N Spring Force: 8.065 N	Preload: 0.29 N for 2 Seconds Main load: 5.4 N for 1-99 Seconds
Resolution	0.1 Shore	0.1 IRHD

MonTech RD 3000
Density Tester for uncured rubber compounds

Automatic compression density tester for uncured rubber compounds and polymers

The RD 3000

is the simplest way to measure density and specific gravity of raw polymers, masterbatches and uncured rubber compound specimens of any geometry. Due to the extremely rugged instrument design, the RD 3000 is suited for laboratory and production environments.

The true innovation of the RD 3000 is the way it measures density. Typically, a strip of rubber is cut directly from the mill, identified at the control panel of the instrument and weighed. All air is compressed out of the sample in a compression cylinder and the volume of the material is taken. Once the density is automatically calculated, it is checked against tolerance limits and displayed along with Pass / Fail status.

For automatic acquisition and processing of all test related data, the RD 3000 is equipped with:

- → an integrated precision scale
- → an electronic piston measurement device
- → a PLC color 5.7" touchscreen control panel system
- → MonDevice PC-Software for data acquisition and storage (optional)
- → an integrated printer (optional)
- → a barcode scanner (optional)

A single test only takes about 20 seconds comprising the following steps

① Weighing

The sample is placed on the electronic balance which is integrated into the machine table. Therefore only stable weight readings will be accepted.

② Compression of the sample

The sample material is filled into the compression cylinder barrel and the compression of the material is started. Once the piston finally reaches a stable position in the compression process, all air is removed from the sample which means that the test sample is compressed to its specific volume.

③ Volume determination

The sample volume is determined by calculating the difference between the piston stroke at an empty cylinder, and the piston position with the specific test material.

④ Density calculation

The density of the sample is calculated automatically from the weight and the determined volume.

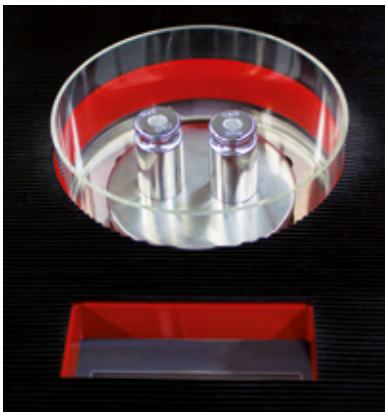
⑤ Displaying of test results

The calculated sample density is displayed on the control panel or in the MonDevice software along with all other results in the test sequence.
Single tests and test series results can also be directly printed by an optional built in printer.

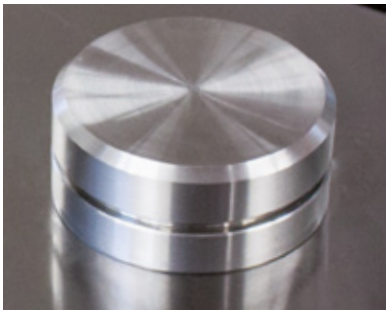
Technical specification

Density	Density range:	0.8 - 2.6 g/cm³
	Accuracy:	0.1 %
	Reproducibility:	0.03 %
Sample volume	Required sample volume:	40 - 120 cm³
	Recommended sample volume:	approx. 100 cm³
Integrated scale	Sample weight range:	0 - 420 g
	Resolution:	1 mg
Compression cylinder	Diameter:	60 mm
	max. stroke:	80 mm
Pneumatics	Supply:	5.5 - 10 bar
	Pressure range for compression:	4.5 - 5.5 bar
	Compression force:	40.0 kN (at 5 bar)
	Volume of air / cycle:	64 l (= 64 dm³)
Data Interface	Ethernet Network (10/100 MBit), Serial RS232 (optional)	
Power supply	100 - 230 V, 50/60 Hz + N + PE, Single phase, about 1 Amps	
Dimensions	Height:	1085 mm
	Width:	525 mm
	Depth:	720 mm
Weight	about 190 kg	
Environmental conditions	**Storage:**	
	Temperature	- 25°C - + 55°C
	relative humidity	5 - 95 %
	Operation:	
	Temperature	+ 5°C - + 45°C
	relative humidity	5 - 95 %
Instrument options	- Barcode scanner for Compound and Batch identification - Integrated test result and test series result printer - Serial (RS232) Output Interface - MonDevice control and data acquisition software	

RD 3000 Operating workspace
Panel, Barcode Scanner (Opt), Weighing and Compression cylinder



Fully Integrated weighing system
with automatic, guided calibration sequence



Compression cylinder
made from stainless steel, precision ground

Stainless steel crosshead
with integrated safety and limit switches for safe operation

MonTech Worldwide Support, Maintenance and Calibration

Global customer support

Customer orientation is our top priority. That is why we are active on your behalf worldwide with one aim: to provide first-class service and support throughout the entire life-cycle of your instrument.

MonTech's customer support services include consulting, demonstration, pre-testing, successful and trouble-free commissioning, preliminary acceptance and installation, initial calibration, instruction on hardware and software, safety briefings, application seminars, workshops and of course, a continuous on-site hotline and remote support. We also supply testing film, consumables, spare parts and instrument upgrades or repairs.

Whenever our customers need help of any kind, we are at their service! Therefore, we are available 24 hours a day, 365 days a year worldwide.

Single source ISO 17025 calibration services

MonTech's on-site calibration service provides ISO 9001 certified and ISO 17025 accredited field calibrations to any brand, type or model of rubber testing machinery or lab equipment.
These on-site service visits and calibrations are designed to be fast and reliable with minimum down time.
MonTech employs a global team of the most qualified field service engineers, strategically positioned for cost-effective service wherever calibration services or assistance may be needed.

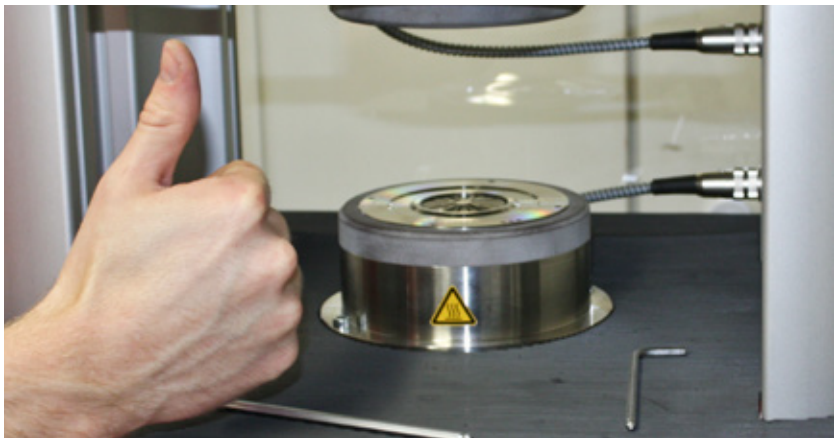
Our KWP preventive calibration, maintenance and service program can be tailored to the customer's environments and specific demands for test data traceability with the highest instrument precision. On-site service intervals can be scheduled to minimize the risk of any unplanned downtime.

DAkkS
Deutsche Akkreditierungsstelle
D-PL-11292-01-00
ISO 17025:2005

ISO 9001:2008 DEKRA Certification DEKRA Zertifiziert
Quality Management
We are certified
Regular voluntary monitoring according to **ISO 9001:2008**

Service, maintenance, calibration

MonTech provides fully traceable calibration services using the latest equipment and methodology by highly skilled field service engineers keeping your instrument in a perfect shape. All work and calibration procedures are fully in compliance with ISO, ASTM, DIN and other applicable standards, proven by our ISO 9001 certification and ISO 17025 accreditation. This allows us to offer a huge scope of mechanical, dimensional, thermal and many other calibrations wherever your laboratories might be located.
Our services ensure that your testing instrumentation is reliably providing you with consistent and accurate data, instrument-to-instrument correlations and site-to-site crosschecks.
Preventive maintenance is essential to guaranteeing instrument performance in tough environments, producing accurate and reliable data and minimizing the risk of instrument breakdowns or unplanned downtime.



Remote and emergency support

Our remote and hotline provides help and support whenever it might be needed.
Whether you might have questions on specific instrument applications, test setups, test executions, results, calibrations, correlations or diagnostics and troubleshooting, our superb team of technical and application specialists is only a quick phone call away.

Dedicated MonTech remote assistance software allows us to connect directly with the instrument in your lab, helping you with full instrument diagnostics, data transfer and immediate software and firmware updates.
Our qualified team of software specialists is available for any kind of IT assistance that might be needed for your laboratory operations including software coaching, configuration, re-installation, upgrades, data export and database setup.

Training and application support

MonTech's unique range of training covers everything from basic rubber rheology and testing courses, software classes for data management and Laboratory Information Management System trainings, advanced polymer and rubber rheology seminars in different operator levels to high-end scientist courses.
MonTech helps you to ensure that you get the most benefits out of any investment in MonTech instruments or software, making these products a truly safe investment that you can rely on.

Training courses are offered at any MonTech facility or on-site in the customers laboratory with a tailored focus on their specific environment and challenges, including QA as well as R&D, consulting services for recipe development, raw materials, production and machinery including compounding and downstream processes.
With these services we assist our customers to quickly increase efficiency and quality at reduced costs for an overall improved customer satisfaction and business performance requiring less internal resources.

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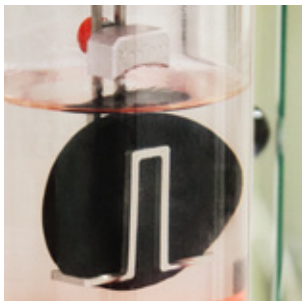

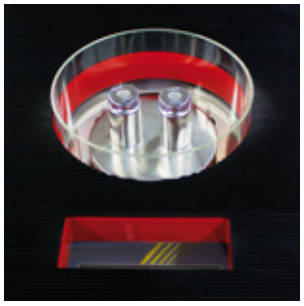


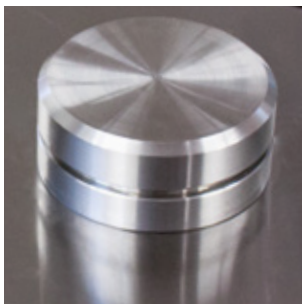




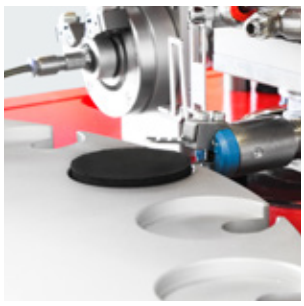


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