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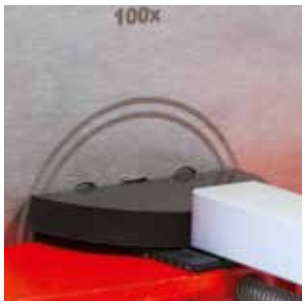
MonTech®
Rubber Testing Solutions

Dispersion















INNOVATIONS IN RUBBER TESTING

MonTech Disper Tester 3000
Carbon black dispersion tester

Computer aided, advanced digital reflected light microscopy brought to the next level

The DisperTester 3000

is the most easy to use instrument for filler dispersion analysis; providing superior compliance, reproducibility and repeatability.
The DisperTester provides accurate, repeatable results in seconds for both vulcanized and uncured rubber compounds that are applicable to the process, allowing quick and easy testing of dispersion compared to other optical techniques which often take hours to perform (less than 2 minutes with sample preparation).

The DisperTester 3000 is equipped with cutting edge digital image processing to automatically determine dispersion ratings, filler distributions and agglomerate sizes. Up to 5 individual readings can be taken in order to precisely evaluate the dispersion and detect possible variations along the surface of the sample.
To increase testing possibilities even further, the MonDispersion software features variable brightness, contrast and exposure, as well as focus control for every type of test material, allowing colored or even white samples to be tested.

The DisperTester 3000 system includes built-in reference scales and can be used for all filler types including Carbon Black, Silica and natural inorganic materials with fully automatic calculation of X value, Y value, Z %, Dispersion %, White area %, ... in accordance with international standards. All data is processed automatically by the MonDispersion software. Agglomerates are automatically highlighted and can even be manually measured by their diameter and normalized area. Test results are stored in an SQL database. PDF reports along with distribution spreadsheets and histograms are created and images are stored into an image database in a high-resolution JPEG format. Of course custom reference scales can be easily added by the user at any time.

The determination of filler dispersion in technical rubber goods and tire compounds is of great importance to the industry.

Dispersion quality has a direct impact on final product properties and is therefore widely used as a quality control parameter.

Many important properties of the cured compound are directly affected by filler dispersion including:

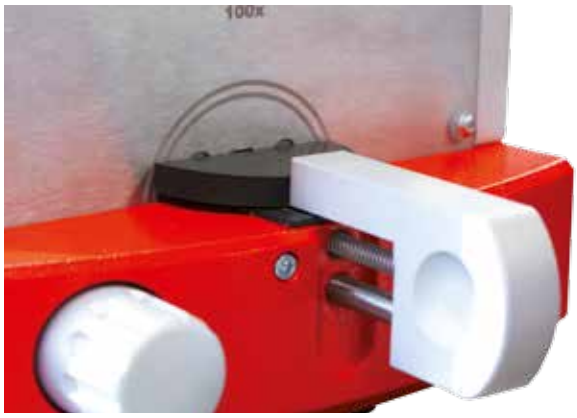
- → Tensile strength
- → Tear strength
- → Fatigue resistance
- → Abrasion resistance

The DisperTester 3000 is the only instrument that gives a direct measurement of dispersion in a fast and simple test, without requiring subjective assessment. The instrument is available in three models with different magnification levels:

- → **30x** with an optical range of **10 to 191 µm** (up to 2mm possible)
- → **100x** for particles from **1 to 58 µm** (up to 250µm possible)
- → **1000x** is specially designed for micro agglomeration measurement of silica compounds for particles from **100nm to 3µm**

Sample Preparation

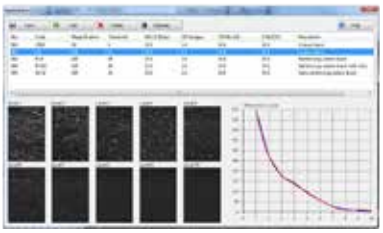
Sample preparation simply involves cutting the sample to generate a "fresh face / gloss cut" for analysis. A simple cutter utilizing ultra-sharp razor blades is supplied to optimize sample preparation for cured samples. For further simplifying sample preparation, the DisperCut automatic sample cutter is optionally available.

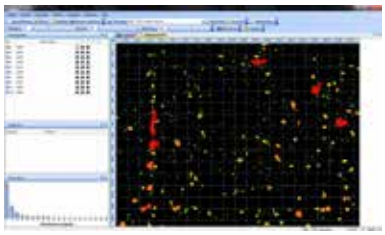


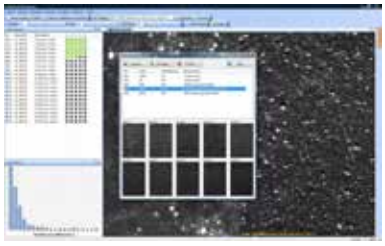
Technical specification

International standards	ISO 11345, ASTM D 7723
Magnification	DisperTester 3000 - 1000x = 1000 times magnification DisperTester 3000 - 100x = 100 times magnification DisperTester 3000 - 30x = 30 times magnification
Aperture Size	DisperTester 3000 - 1000x = 4 mm x 3.5 mm DisperTester 3000 - 100x = 4 mm x 3.5 mm DisperTester 3000 - 30x = 9 mm x 5 mm
Focus	Manual
Image resolution	5 Megapixel with Carl Zeiss telecentric optics
Data Interface	USB 2.0
Data format	PDF, JPEG, ASCII
Sample preparation	Manual sample cutter with 100 Spare blades included
Dimensions (H x W x D)	190 mm x 160 mm x 460 mm
Weight	approx. 17.5 kg net
Electrical	90-250 V, 1 Amp, 47-63 Hz, Single phase
Optional	- DisperCool 3000 - DisperCut 3000

MonDispersion software







MonTech DisperTester 3000 Plus
Carbon black and filler dispersion tester

The MonTech DisperTester 3000 Plus

is the newest model of carbon black dispersion tester - computer aided, advanced digital reflected light microscopy brought to the next level. The DisperTester 3000 Plus is the most advanced instrument for reliable filler dispersion analysis based on the superior compliance, reproducibility and repeatability well known from the DisperTester 3000 series.

In addition, the DisperTester 3000 Plus has been upgraded with a set of extensive new features for reliable, subjective and operator independent analysis of the mix quality of your rubber compounds:

- → Rugged housing machined from a single block of high-strength aluminium
- → 10 Megapixel camera with USB 3.0 connectivity
- → Multi-direction variably controlled LED light sources
- → Precisely guided, horizontally moving camera system to obtain multiple test points from a single sample placement
- → Fully automated or manual focusing, scanning and evaluation
- → Black and White and Color camera systems available for black, white and colored rubber compounds
- → Integrated data acquisition and analysis featuring PDF reports, histograms and high resolution result images
- → Optional autosampling system for 50 samples

The DisperTester 3000 Plus features a totally new precision optical system paired with latest digital image processing technology. These enhanced capabilities now allow Dispersion analyses for particles from 1 µm to 250 µm - in full compliance with latest ISO 11345 and ASTM D 7725. Imaging capabilities are further extended with variable image thresholds and settings for advanced image and particle analyses.

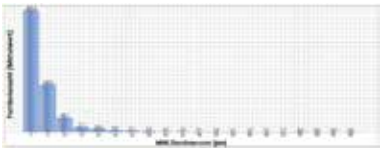
The DisperTester 3000 plus features a precision double stage linear drive system to precisely evaluate variations along the surface of the sample. This totally eliminates the need for manual sample placement by allowing up to 5 individual readings for each sample placement.
To increase testing possibilities even further, the MonDispersion software now features additional imaging techniques such as variable focus control, freely definable shutters and image filters. This ensures an even clearer, superior quality sample image; providing higher test result precision and improved reproducibility.

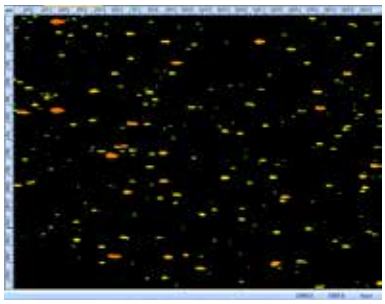
The DisperTester 3000 plus system includes additional built-in reference scales and can of course be used for all filler types including Carbon Black, Silica and natural inorganic materials with fully automatic calculation of X value, Y value, Z %, Dispersion %, White area %, ... for the most precise filler dispersion analysis.

Technical specification

International standards	ISO 11345 : 2006, ASTM D 7723
Magnification	100 times magnification
Aperture Size	12 mm x 3.5 mm
Agglomerate range	1 µm to 250 µm
Focus	Fully automatic or manual
Image resolution	10 Megapixel with Carl Zeiss telecentric optics
Data Interface	USB 3.0
Data format	PDF, JPEG, ASCII
Sample preparation	Manual sample cutter with 100 Spare blades included
Dimensions (H x W x D)	180 mm x 220 mm x 375 mm
Weight	approx. 24 kg net
Electrical	90-250 V, 1 Amp, 47-63 Hz, Single phase
Optional	- Automated sample holder - DisperCool 3000 - DisperCut 3000 - Automation system

MonDispersion software





DisperTester 3000 Plus with optional 50 sample automation system

MonTech DisperCut 3000
Stretched sample cutter for Dispersion testing

DisperCut 3000

The DisperCut 3000 is a small and easy to use tabletop sample cutter that produces fine cuts of cured and uncured rubber samples especially for Dispersion testing samples.

The cutter is equipped with a high-speed close and cut system with simultaneous sample pre-stretching to avoid smearing of the sample and guaranteeing the best straight and clean cutting results.

Test samples can be cut and prepared within a single second!
This makes the patented DisperCut 3000 sample cutter the most reliable tool for producing repeatable samples for Dispersion testing by excluding all kinds of operator influences.
Integrated endstops make sample positioning fast, reliable and easy, ensuring similar test sample dimensions.
The precision-ground blade guides, combined with ultra sharp, heavy-duty single edge blades, ensure straight and precise cuts.

In combination with the DisperCool 3000 chiller unit, the DisperCut 3000 cannot only be used for cured rubber samples, but is also the ideal combination for preparing uncured rubber samples by first cooling them down to glass transition temperature in the DisperCool 3000 and then cutting the samples with the DisperCut 3000.

The cutter is equipped with a two-hand safety control system for simple operation and the highest possible operator safety, eliminating the risks associated with manually operated sample cutters. The cutting knife is always covered and protected to avoid any accidental cutting or touching of the blade.

Technical specification

International standards	ISO 11345 : 2006, ASTM D 7723
Cutting blades	Ultra-sharp heavy duty single edge blades, easily replaceable
Sample dimensions	Max. Ø 45 mm or 40 x 40 mm
Pre-stretching	adjustable by different cutting plates from 5 to 10%
Operation	2-hand safety control with anti-tiedown
Cutting speed	Up to 20 cuts per minute
Dimensions (H x W x D)	430 mm x 295 mm x 205 mm
Weight	approx. 12.0 kg net
Pneumatics	min. 5 Bar

DisperCut - Step by Step

1 - Empty cutting area

2 - Place sample

3 - Active cutting by pressing the 2 control buttons

4 - Release control buttons - blade will return

5 - Cut sample

MonTech DisperCool 3000
Test sample deep freezing unit

The DisperCool 3000

is used for the preparation and sample conditioning of uncured as well as cured rubber samples prior to the cutting process - especially designed for Dispersion Testing.

The sample preparation process is very simple and convenient:
First the sample is pre-cut (if needed) and then easily placed in the quick-open sample holder and then inserted into the tabletop DisperCool unit. Inside the DisperCool chamber, silicon oil is pre-chilled to a low temperature from minus 20 to minus 40°C. The sample holder is placed into the chamber which can hold up to two sample holders. Once the safety lid of the chamber is closed, the cooling process and integrated timer are immediately started.

During the cooling process, the sample is cooled to glass transition temperature. This means that a totally solid sample is produced.

The cooling / preparation time - usually between 5 and 12 minutes depending on the sample type and shape - can easily be set by the operator and can be monitored during the process on a count-down timer display. Once the cooling time is over, the operator is notified by an acoustic signal allowing the operator to open the chamber lid and take out the sample holder along with the sample.

Now the sample at glass transition temperature can be cut and processed like a normal solid hard rubber sample without smearing, distortion or modification of the sample surface. The DisperCool 3000 provides perfect samples for conventional cutters or automatic cutters like the DisperCut 3000.

The whole DisperCool 3000 process is closed, sustainable and environmentally friendly as no consumables like liquid nitrogen or other cooling gases are required.

Technical specification

Temperature range	-40 to 200°C (depending on cooling / heating liquid)
Cooling liquid	Silicone oil, approximately 3 liters
Chamber size	Approx. 170 mm x 90 mm x 170 mm (H x W x D)
Sample capacity	Two independent sample holders
Sample size	Max. 25 x 20 x 20 mm
Display	6-digit timer display with acoustic signal 3,5" color-touch temperature display
Additional Inputs (optional)	PT 100 temperature port for immersion probes to measure temperature directly in the sample
Chiller capacity	Max. 420 Watts, air cooled
Output Interfaces	USB, RS232
Protection levels	Configurable user input modes and levels Integrated temperature and level protection switches
Dimensions (H x W x D)	500 mm x 425 mm x 450 mm
Weight	approx. 40.5 kg net
Electrical	230-250 V, 10 Amps, 47-63 Hz, Single phase

Sample Preparation

Sample holder in chamber (lid open)

External Input and Output ports

Temperature control touchscreen and timer display

Sample temperature recording
by optional immersion probe

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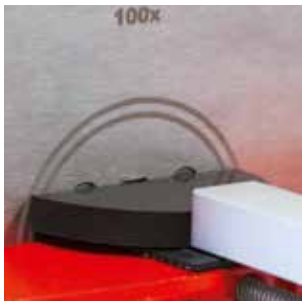
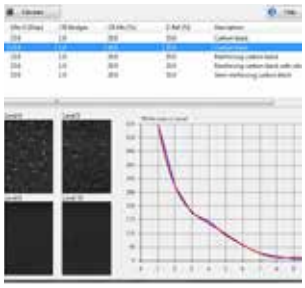
Dispersion

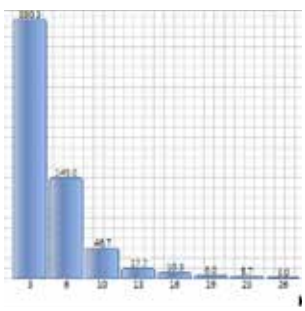
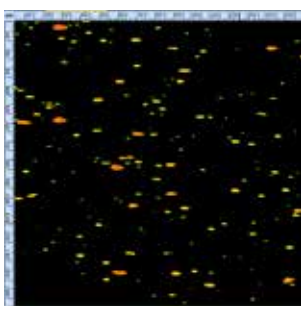











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