

Fatigue Testing



***INNOVATIONS IN
RUBBER TESTING***



MonTech FT 3000 C-H Fatigue Tester



Key Features

- Tension and bending fatigue (De-Mattia) in a single machine
- Stainless steel grips holding a total of 16 samples
- Frequency, Grip distance and dynamic stroke can freely be set
- the number of total cycles and cycles before automatic stop can be set
- optional image recording by CCD camera and MonFT evaluation software

State of the art fatigue testing and lifecycle simulation

The FT 3000 is a high-end, direct linear drive fatigue tester of advanced design; providing a full test which indicates material properties such flex cracking/crack growth test and tension fatigue test in accordance with: ISO 132, ISO 6943, ASTM D 430-B, ASTM D 813, ASTM D 4482, DIN 53 522 -1/2/3.

The instrument is designed for continuous operation in compound / material research & development laboratories as well as industrial applications like in-process quality control in rubber plants requiring repetitive testing of rubber samples to assess dynamic material performance properties.

Especially due to the unique advanced linear motor design, optional arbitrary waveform programming and CCD camera data acquisition system, the machine can easily be set-up and adapted to individual customer testing needs.

Precisely controlled thermal environment

The sample holding system is located in a thermal chamber. This 120 liter heating and cooling chamber permits temperatures between -40 °C and +180°C, covering almost all possible application environments.

Due to the unique triple stage closed loop chiller and compressor design, a superior temperature uniformity of $\pm 1^{\circ}\text{C}$ is achieved with no gases or external media required for the cooling process.

Highest accuracy, rigidity and durability - guaranteed!

The direct drive, linear motor drive system with digital control and inline position measurement ensures extremely precise movements, low levels of noise and vibration, high durability and long lifetime. The instrument is fitted with a massive, deflection free stainless steel sample holder system. Optionally, samples can be inspected with a motorized camera CCD system for crack and crack-growth measurement - this system also includes the MonFT data acquisition software.



FT 3000 CH - Instrument options:

- Camera CCD System (incl. MonFT software)

For automated crack growth measurement and recording (De-Mattia) with variable camera setup for through hole or surface measurement, automated lateral camera travel as well as integrated LED light system.

- Sensor grip system for FT 3000 CH with single clip or clamp holders (replaces standard grips)

For exact measurement of completed cycles to failure of each sample - total 16 sample position available. Each position in the sample holder has a variable clamp for individual sample mounting; with an integrated, non-contact tension, precision sample sensor for exact detection of the cycle at sample failure. The time of failure (in cycles, minutes or seconds) is automatically transferred to the software and stored. (Max. temperature limited to +100°C)

- Arbitrary waveform programming for electric linear drive

Allows to define, program and execute arbitrary waveform fatigue tests including rupture, tear, creep, ... to replicate specific application conditions and perform true process simulation.

Waveforms itself with strain and frequency can be freely defined and altered.

- Arbitrary test sequence programming

Allows to combine standard sine-wave test steps with variable temperature cycles and conditioning times along with arbitrary waveform substeps (with option "Arbitrary waveform programming" into complex test programs and sequences.

- Special grips for tailored, application specific fatigue tests

- Piercing tool for sample preparation and piercing according to ISO 132 and ASTM D 813

- Curing moulds and sample preparations tools e.g. P-VS 3000 Sliding table for ASTM D 4482 sampling

Touch PLC control:

The instrument is controlled by a front mounted 5.7" color touch screen display.

The following functions are incorporated in the display:

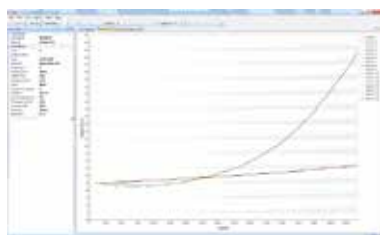
Inputs:

- Input number of set cycles
- Input set temperature in °C / °F
- Set motor speed in strokes per minute

Readings:

- Number of cycles done
- Current chamber temperature
- Actual motor speed / position
- Cycles to next pause
- Cycles since last pause

The display unit can be used to configure tests and display status alerts. It can also be used start, stop or pause testing at any time.



MonFT Software – crack growth graph



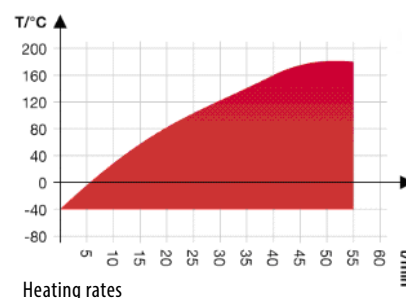
MonFT Software – specimen identification



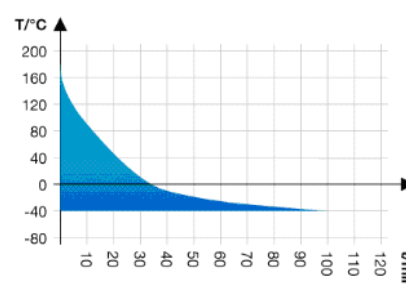
CCD Camera system for crack-growth measurement

Technical specification

International Standards	ISO 132, ISO 6943, ASTM D 430-B, D 813, D4482; DIN 53 522 -1/2/3
Speed adjustment	DIRECT LINEAR DRIVE from 0,05 to 5 Hz (higher frequencies possible at reduced stroke)
Dynamic stroke	from 0 to 60 mm (up to 150mm with reduced frequency)
Static grip distance	0 to 160 mm
Maximum force in traction	600 N (at 1 Hz oscillation frequency)
Sample holder	16 samples can be tested at the same time.
Thermal chamber temperature	From -40°C to 180°C with +/-1°C accuracy
Dimensions (H x W x D)	1880 x 1200 x 900 mm
Weight	approx. 870 kg net
Electrical Requirements	400 V, 50Hz, 16 Amps, Triple phase (480V / 60Hz version available upon request)

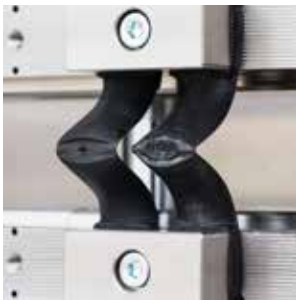


Heating rates



Cooling rates

Fatigue Testing



MonTech

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