MonTech FT 3000 C-H
Fatigue Tester

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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 wave-form 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

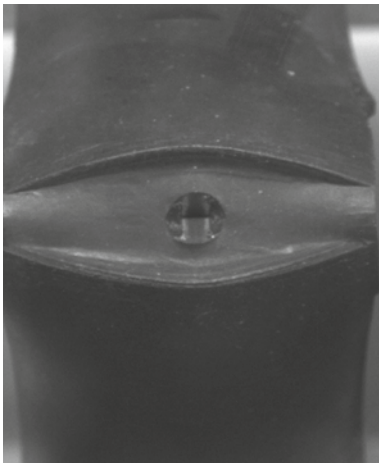
The sample holding system is located in a thermal chamber. This 120 liter heating and cooling chamber permits temperatures between -40 °C and +180°C, covering almost all possible application environments.
Due to the unique triple stage closed loop chiller and compressor design, a superior temperature uniformity of +/-1°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.

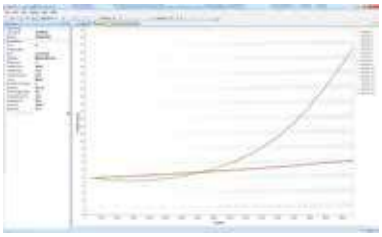
Camera and recording system:

The optional CCD camera system makes the FT 3000 CH the easiest to use and quickest Fatigue testing system for "De-Mattia" crack growth measurements



Automatic image recording by CCD Camera
Initial, pierced sample acc. ISO 132

Crack growth after 100.000 samples at 60°C



MonFT Software – crack growth graph

MonFT Software – specimen identification

Touch PLC control:

The instrument can controlled by a front mounted 5.7" color touch screen display for simple tests according to standards.
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

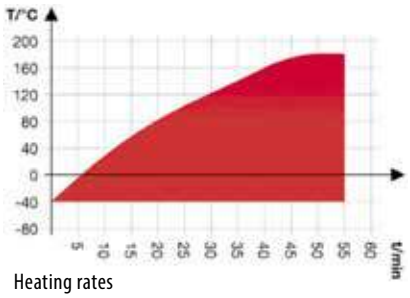
Readings:
- → Number of cycles done
- → Current chamber temperature
- → Actual motor speed / position
- → Cycles to next pause
- → Cycles since last pause

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.
More advanced test scenarios can be programmed using the MonFT software allowing full data and cycle recording and documentation.

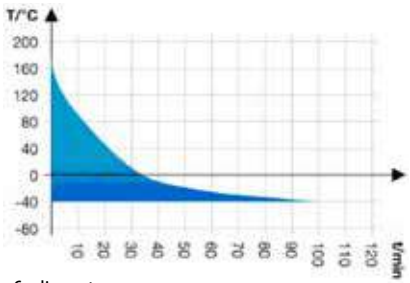
CCD Camera system
for crack-growth measurement

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

MonTech FT 3000 C-H
Advanced Fatigue and Wear life testing

Tailored lifecycle simulation and predictive testing systems

The FT 3000 series of electromechanical Fatigue Testing Systems allows the adaptation to almost any product, shape or environmental condition for determining the durability of materials and components in tension, compression or flexure. The instrument features efficient brushless linear motors with high accelerations, exceptional accuracy, and repeatability. The device can be tailored to specific application requirements with the various 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)

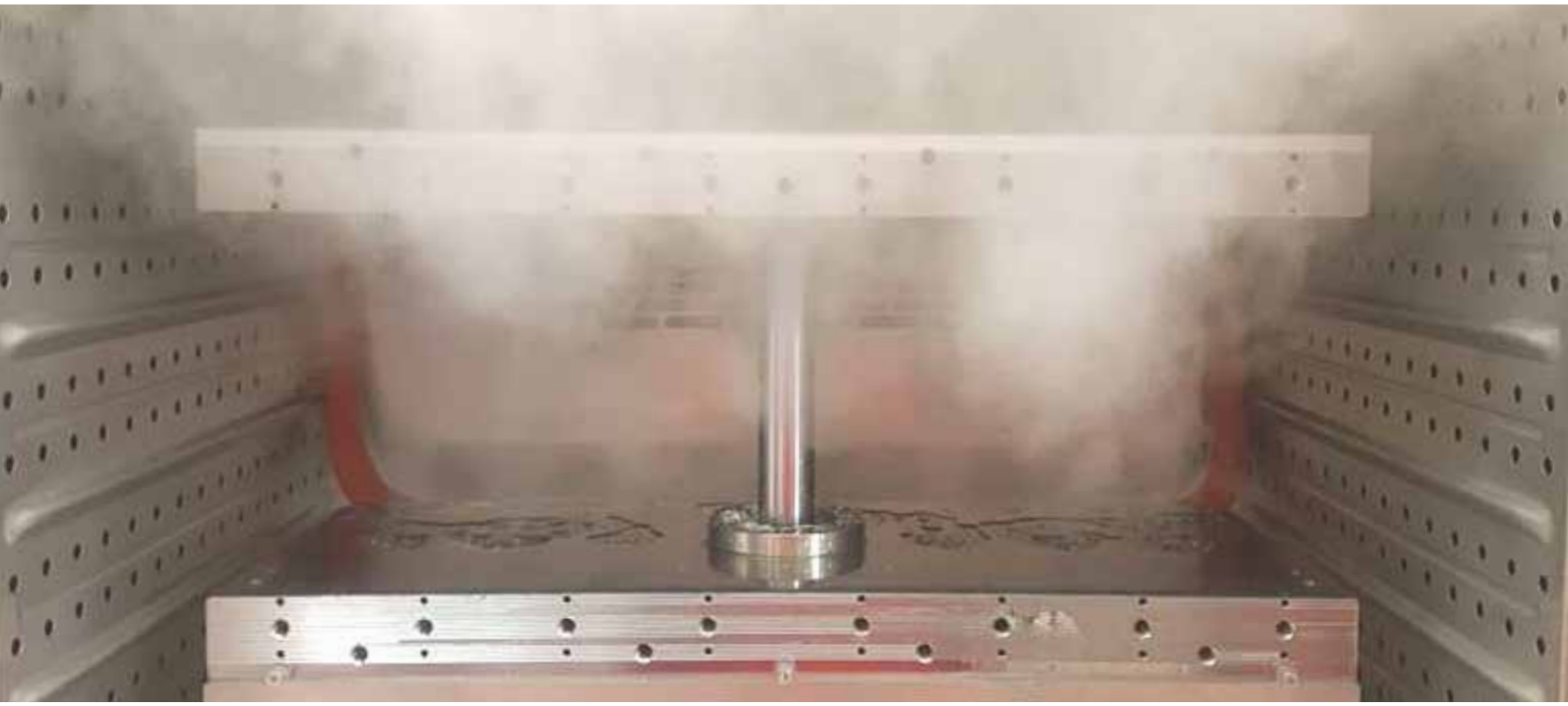
- **Arbitrary waveform programming for electric linear drive**
  Allows to define, program and execute arbitrary waveform fatigue tests including rupture, tear, creep, ... to replicate specific application conditions and perform true process and product load scenraio simulations. Waveforms itself with 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



Beyond standards - advanced materials, product and component testing

Fatigue testing allows manufacturers and researchers to get a critical understanding of how a material or component will perform in real-world conditions. For accurate measurements the FT 3000 CH series has therefore been expanded - besides its thermal control which comes as standard - with specific application packages tailored to various industries and test requirements:

Special sample and product clamps and grips

The standard sample holding system located in the thermal chamber can already accommodate a variety of standard and typical product and component samples in the standard configuration. Integrated centering and attachment possibilities allow to easily add specialized fixtures to the base grips easily accommodating to any shape of product or component that needs to be tested.

All gripping solutions are entirely made of steel and can be tailored to specific customer requirements.

Readily available solutions include fixtures for component testing of Seals, Valve Membranes, Bushings and Anti-vibrations mounts, Vacuum suction cups (against a variety of surfaces) as well as materials testing of e.g. textile and steelcord to rubber adhesion and pullout.

Humidity control

The humidity control options allows precise setting and regulation of the air humidity in the test chamber. This allows testing of materials sensitive to humidity The steam humidifier is connected to a drift-free capacitive humidity sensor. This ensures rapid reaction times, precise measurements, short recovery times after opening the doors, and FDA-compliant test results thanks to the microprocessor-controlled humidification and dehumidification system. The steam humidifier is connected to the water supply system which is easy to use (plug-and-play) and offers the option of connecting the system to a domestic water line as well as providing flexible solutions regardless of the water supply and installation site.

Gas purging and Inert gas supply

Optional inert gas inlets allows customer to create special atmospheres in the test chamber - whether testing under Nitrogen, Oxygen, Carbon Dioxide is required, customized systems for safely creating the required test atmospheres are available.

Test scenarios realized include e.g. fatigue testing of rubber components, seals and membranes for exhaust system of car and truck combustion engines precisely controlled the test environment to 72 % Nitrogen, 20 % Carbon dioxide and 8% Steam

Steam

The available steam generation systems create critical environment for medical and food applications. Controlled steam environments of either unsatured steam, saturated steam or superheated steam can be created into the test chamber or routed directly onto or into test samples.

For the first time this revolutionary integration of steam environment into Fatigue testing allows producers of medical devices to reliable test component life for parts that undergo sterilization. The FT 3000 CHS has further proven itself e.g. for the fatigue life testing of vaccine vials, durability studies for tire curing bladders and for components underground high pressure drilling operations.