

Fatigue crack growth module

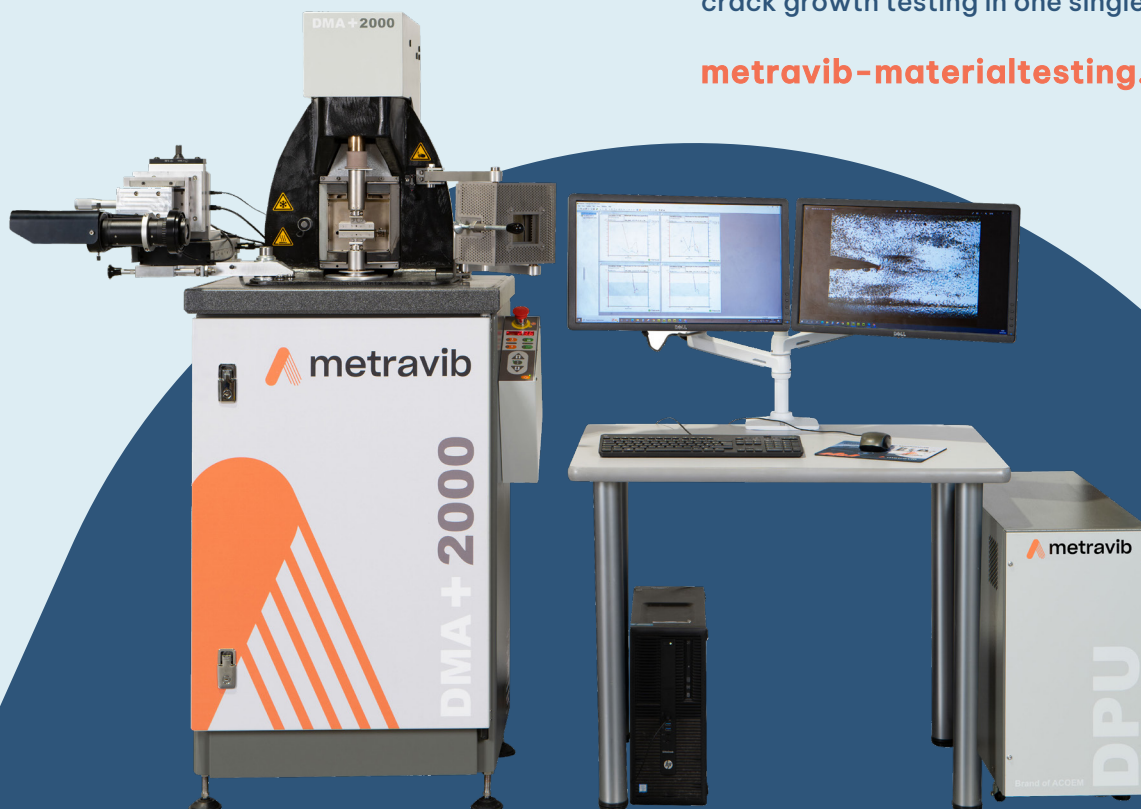
MAKES DMA+ AN ACCURATE FATIGUE CRACK GROWTH TESTING MACHINE!

Resistance to fatigue, ageing & crack growth are major issues for rubber based materials. Current commercial methods for crack growth testing have been restricted to time to failure test.

Since 1999, cooperation with leaders of the Tire industry led METRAVIB to market an advanced crack growth testing method to bring to research & rubber industry a quantitative & productive testing solution.

Taking advantage of the DMA+ series advanced performances, it extends dramatically their testing capabilities in combining DMA, fatigue & crack growth testing in one single instrument.

metravib-materialtesting.com



BENEFITS

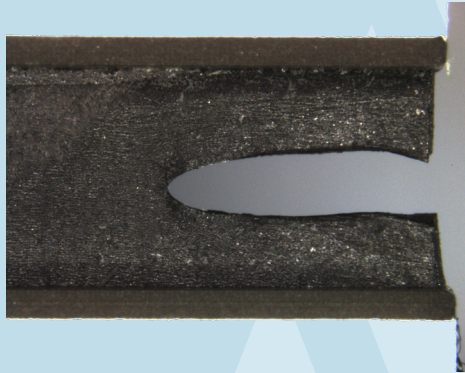
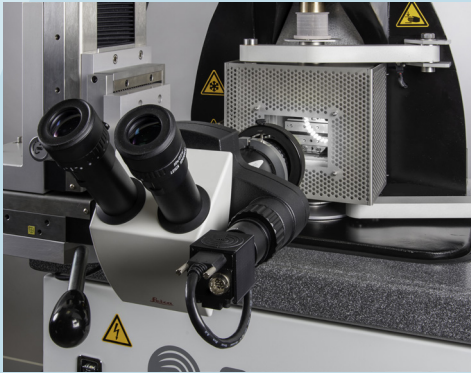
- Accurate
- Productive
- Non operator-dependent
- Cost effective

SPECIMEN

The test is performed on a pure shear specimen 40, 60 or 80 mm wide.

The specimen is preferably molded & designed with beads, then clamped into stainless steel jaws.

Rubber strips can be as well tested by using dedicated jaws.



SOFTWARE & TESTING METHOD

The MULTITEST crack growth testing software module performs 3 consecutive test sequences:

A preliminary accommodation test is applied to the un-cracked specimen at a given strain amplitude, frequency & cycles number up to stabilization, in order to limit the Mullins effect.

A preliminary characterization test is applied to the un-cracked specimen to determine the relationship between the applied energy & the strain amplitude.

The crack growth test is performed automatically without operator's intervention, at given energy. From the successive crack images & detected crack tip positions, it determines crack growth rate and related data.

CRACK GROWTH RATE MEASUREMENT BY VIDEO CAMERA

A CCD video camera is mounted on a motorized microscope to focus in the crack & to measure accurately the crack tip position.

The crack image is captured periodically during a short excitation stop.

Digital crack length measurement is performed in real time by computing each image, in determining the crack contour & localizing the crack's tip position.

The camera scans the entire specimen width, & follows up to 4 cracks in one single test.





THERMAL & GAS ENVIRONMENT

The thermal chamber includes a large window making possible to perform the crack growth test under controlled temperatures & specific atmosphere. The optional gas cabinet makes possible to control a specific oxygen rate.

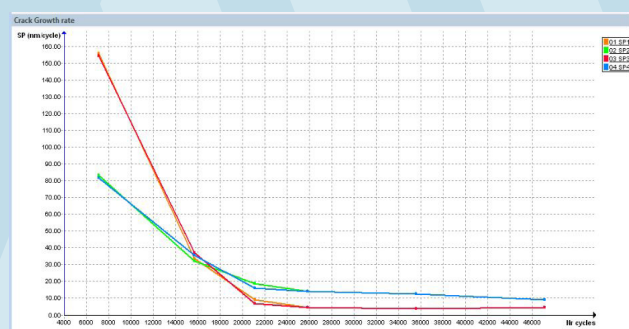
COMPOSITION

- Motorized microscope
- CCD video camera
- Specimen holders for strips & specimens with beads
- Multitest software crack growth testing module
- Gas distribution cabinet (option)
- Specimen mold
- Specimen mounting bench



DATA ACQUISITION & ANALYSIS

- Controlled excitation waveform (sine, haversine, pulse, ...)
- Cycles count
- Force/stress amplitude
- Displacement/strain amplitude
- Image of crack
- Video of crack growth
- Temperature
- Oxygen rate (option)
- Energies
- Crack tip position
- Crack growth rate
- Crack length
- Data exportation (.csv) for customized users analysis



MAIN SPECIFICATIONS

Specimen width	40, 60, 80 mm
Specimen height	6 mm (advised between beads)
Specimen type	strip or molded with beads

Number of cracks	upto 4
Crack length resolution	better than 2 μ m
Temperature	0 °C to 300 °C
Frequency	1Hz to 200Hz (main) and 1kHz (harmonics)