LET’S THE DMA SPECIALIST TAKE CARE OF YOUR MATERIAL DMA TESTING!

Take advantage of the expertise and the long experience of the renowned specialist in Dynamic Mechanical Analysis to get the testing service that you need.

metravib
material testing

Our laboratory with the whole range of Metravib DMA instruments can be yours!

For DMA testing as for fatigue testing including Heat Build Up and Crack growth testing.

It includes :

- Desktop DMA
- High force DMA
- Automated DMA
- High frequency DMA

Take part in the tests campaign definition and launching, even assist to the most interesting part of it, in order to improve your knowledge in DMA technique.

Let's our specialists advise you of the most adapted testing methods regarding your materials and problematic and get the best of the capabilities of Metravib DMA.

What your benefits can be:

- Limited cost
- Assistance for developing industrial DMA testing methods
- Full handling of test campaign definition
- Improvement of your knowledge in DMA technique
- Specifying the most appropriate test methods
- Specimen preparation and dimensioning
- Detailed test report including expertise and comments of DMA experts
- Efficient solution when your lab is overbooked
- Allows for the performance of shear, flexion and tension and compression testing, combining the parameters of time, frequency, stress, strain and temperature (all controllable)

OUR EXPERTISE

- Designer and manufacturer of Dynamic Mechanical Analyzers
- Designer of customized testing solutions
- Characterization of viscoelastic properties
- Rubbers, polymers, composites testing
- Fatigue testing

OUR TESTING SERVICES

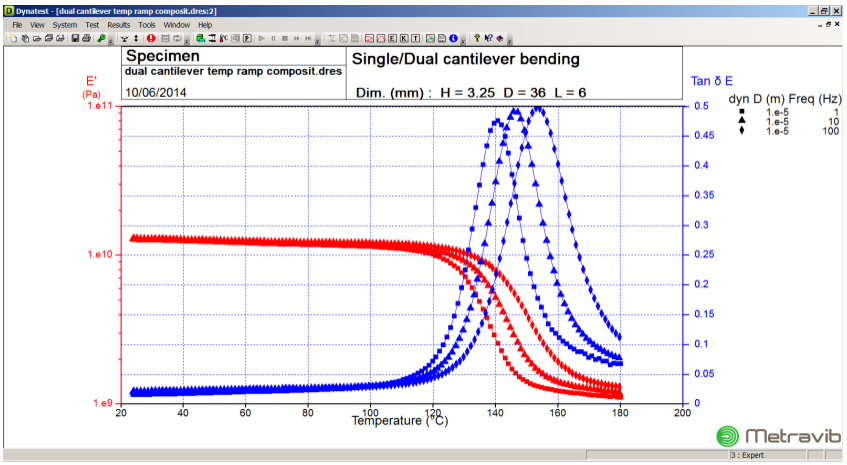
Classical DMA tests

- **Temperature sweep at one or multi frequencies**

  Goal: Glass transition and secondary transitions determination

  Conditions: -50°C to 200°C (2°C/min up to 5°C/min)

  Test duration: 2 to 3 hours



E' modulus and Tan Delta as a function of Temperature

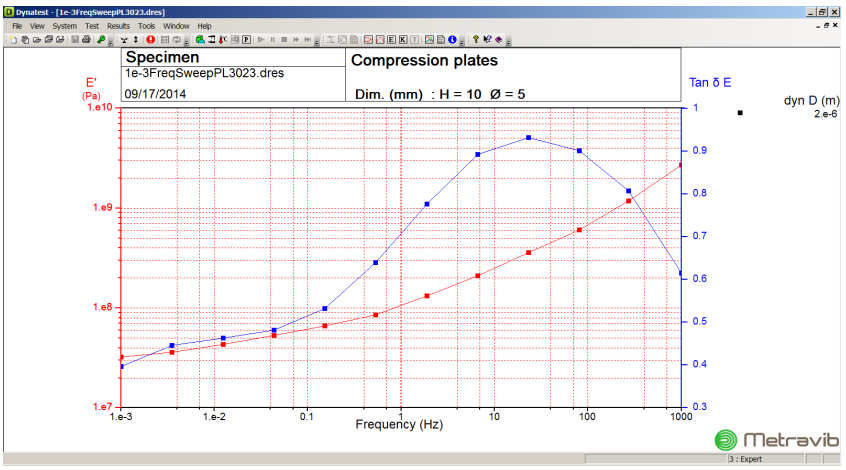
- ## Frequency sweep at one stabilized temperature

  Goal: Frequency dependence

  Conditions:

  - Frequency range : 0.01Hz up to 1000Hz (according to the stiffness of the specimen)
  - Temperature range : -150°C to 200°C

  Test duration: ~1 to 2 hours



E' modulus and Tan Delta as a function of Frequency

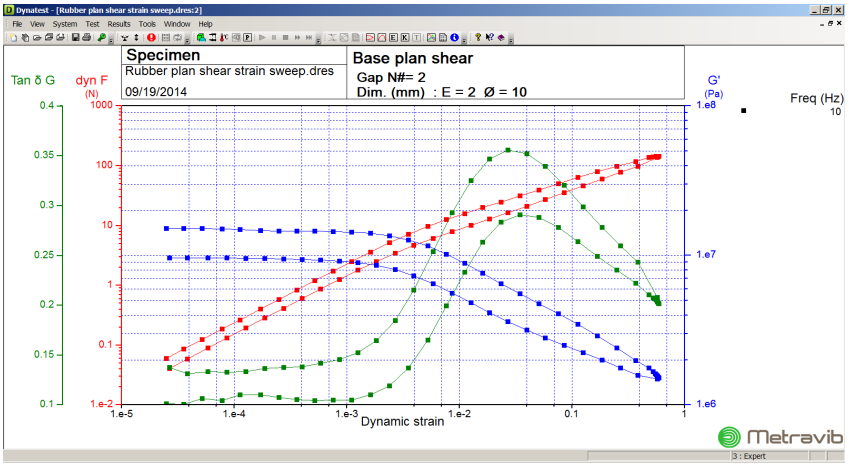
NEW FUNCTIONALITY included:
The exploitation of the temporal signals allows a finer analysis of materials.
For instance, the shape of the hysteresis loop is representative of the viscous nature and provides relevant information on the nature of the damping (viscous behavior, mechanical damping, etc.).

- ## Strain sweep at one stabilized temperature

Goal: Study Payne and Mullins effects (linear and nonlinear behavior)

Conditions: Stabilized temperature between -150°C and 200°C

Test duration: ~1 hour



G' modulus, Tan Delta and Dynamic force as a function Dynamic Strain

NEW FUNCTIONALITY included :

The exploitation of the temporal signals allows a more accurate analysis of nonlinear materials.

For instance, the shape of the hysteresis loop is representative of the viscous nature and provides relevant information on the nature of the damping (viscous behavior, mechanical damping, etc.).

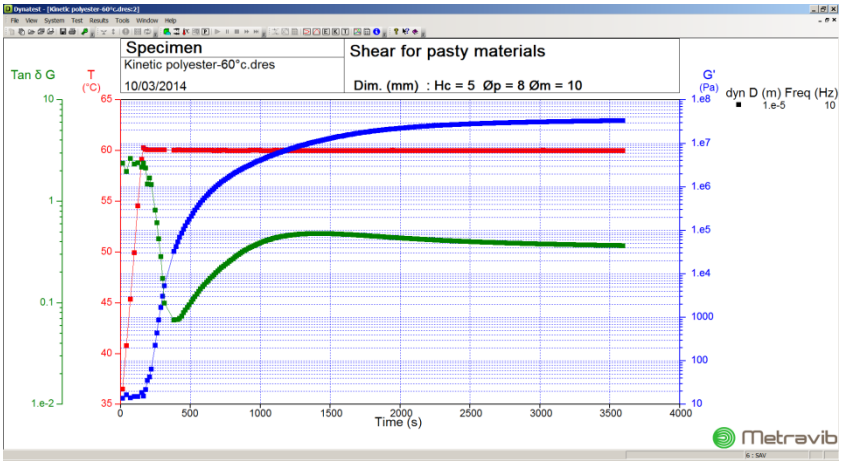
- ## Curing follow-up (polymerization)

Goal: Determination of curing process of resins by reproducing manufacturing process conditions (gel time, vitrification time, …).

Conditions:

- Temperature ramp or/and temperature stage
- Temperature max 200°C

Test duration: ~2 hours



G' modulus, Tan Delta and Temperature as a function of Time

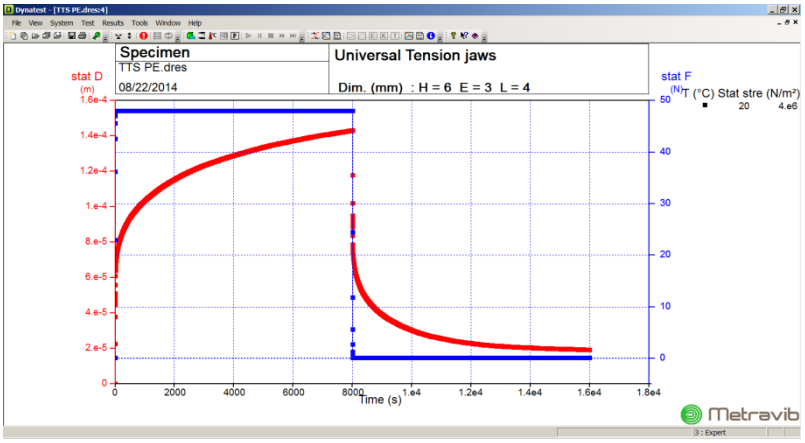
- ## Creep at one stabilized temperature

Goal: Creep and recovery behavior

Conditions:

- Imposed static force
- Stabilized temperature between -50°C and 200°C

Test duration: ~2 hours



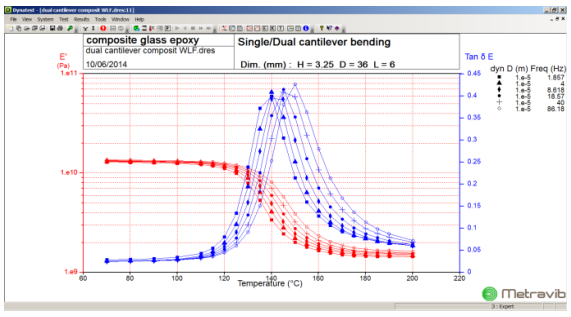
Static Displacement and Static Force as a function of Time

- ## Master curves computation (WLF law)

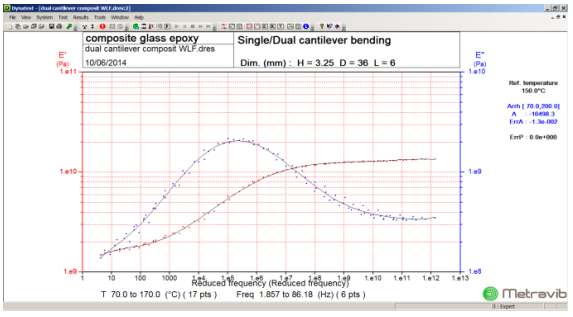
Goal: Prediction of viscoelastic properties in very high frequency area ; FEM data

Conditions: Frequency sweep on a maximum of 17 temperature stages between -80°C and 80°C

Test duration:~9 hours



E' modulus and Tan Delta as a function of Temperature



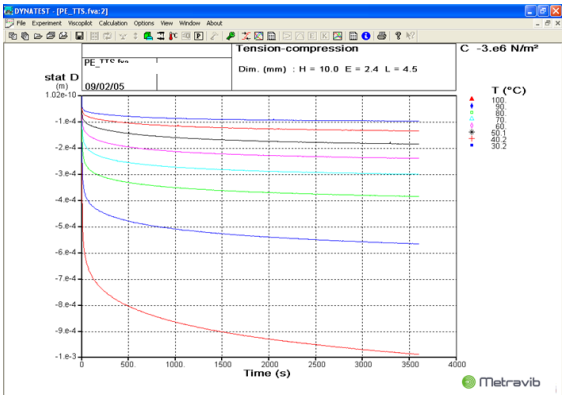
E' and E'' modulus as a function of Reduced Frequency

- ## Creep tests at variable temperature for long term creep prediction

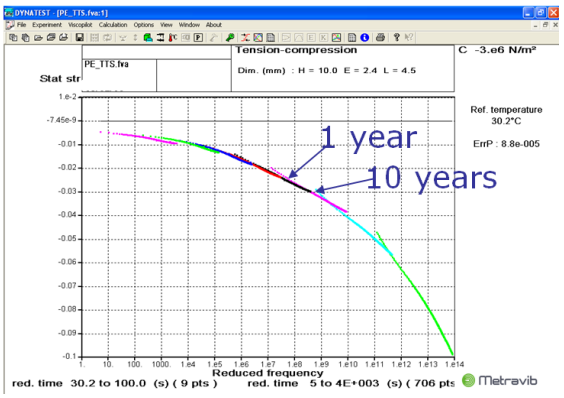
Goal: Prediction of creep behavior for a very long term ; FEM data

Conditions: Creep tests with imposed static force on a maximum of 13 temperature stages between -20°C and 150°C.
Post-processing of the results with the time-temperature equivalence (TTS)

Test duration: ~9 hours



Static Displacement as a function of Time



Static Displacement as a function of Reduced Time

Specific dynamic tests

TO GO FURTHER IN THE ANALYSIS OF YOUR MATERIALS: MULTITEST software makes possible an extended variety of fatigue tests as well for materials specimens as for industrial components.

- ### Fatigue testing

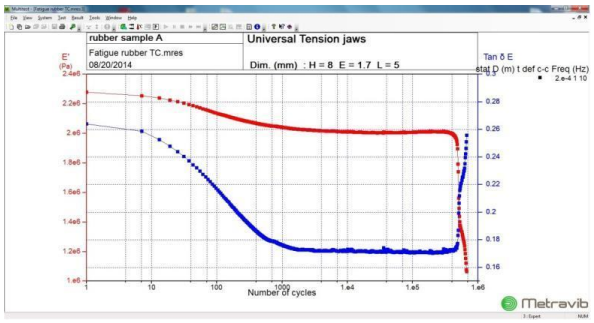
  Goal: Measurement of damping properties evolution during fatigue test under sinusoidal excitation or a customized waveform.

  Conditions:

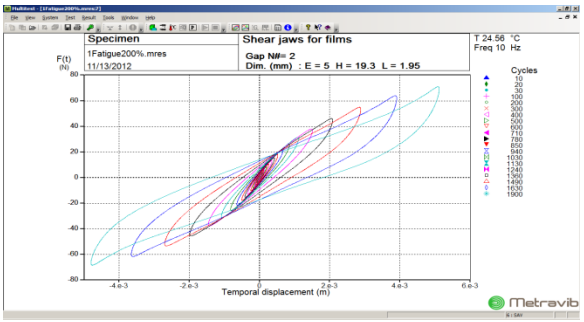
  - Frequency, number of cycles
  - Imposed amplitude and waveform
  - Stabilized temperature between -50°C and 200°C

  Criteria for stopping the test: number of cycles or modulus drop or specimen failure

  Test duration: up to 24 hours



E' modulus and Tan Delta as a function of Number of cycles



Force versus Displacement (lissajous curves)

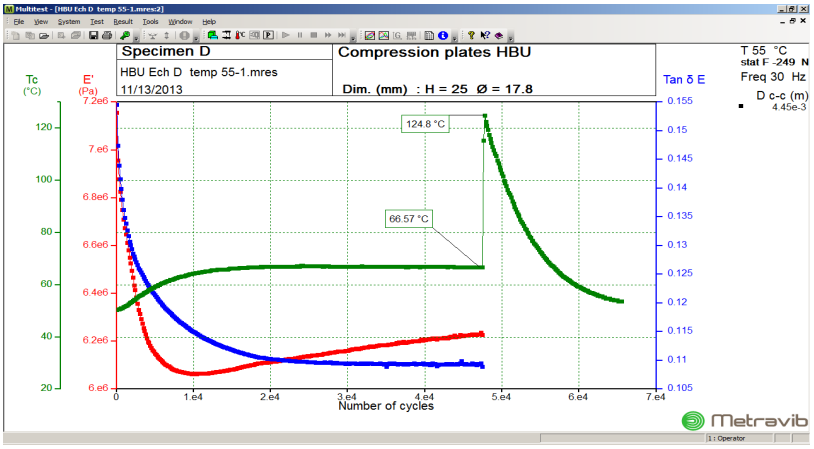
- ## Heat build up

Goal: Measurement of surface specimen temperature during fatigue test and instantaneous temperature measurement in the heart of specimen at the end of test.

Conditions:

- ASTM D 623 (Method A): standard test method for rubber property – heat generation in compression ;
- ISO 4666/3: rubber, vulcanized. Determination of temperature rise in flexometer testing compression ;
- Specimen: Goodrich–Diameter 18 mm –Height 25 mm.
- Maximum temperature: 200 °C.

Test duration: ~2 hours



E' modulus, Tan Delta and as a function of Number of cycles

Specimen holder dedicated to HBU testing

- ## Fatigue crack growth

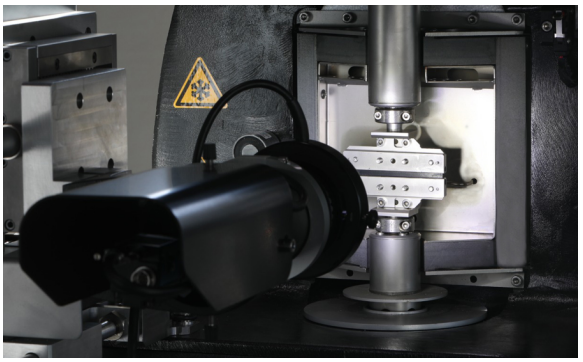
Goal: Analysis of crack propagation in rubber specimen by controlling strain, stress or tearing energy

Description:
A CCD video camera is mounted on a motorized microscope to focus in the crack and to measure accurately the crack tip position (crack length resolution better than 2µm). The camera scans the entire specimen width, and follows up to 4 cracks in one single test.
This test is possible under controlled temperatures and specific atmosphere. The optional gas cabinet makes it possible to control a specific oxygen rate.

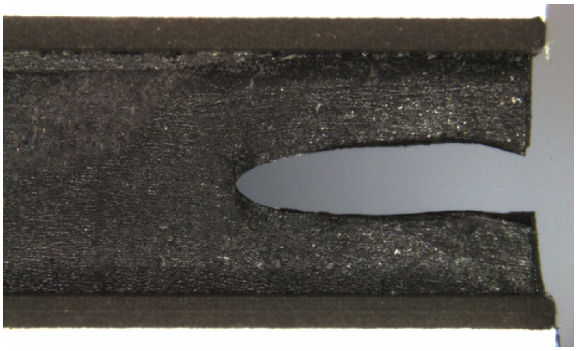
Conditions:

- Pure shear specimen 40, 60 or 80mm wide and 6mm height
- Controlled excitation waveform (sine, haversine, pulse, ...)
- Maximum temperature: 200 °C

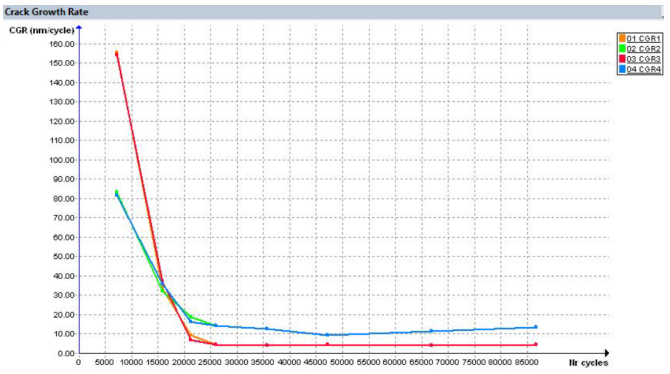
Test duration: ~2 to 6 hours



Crack growth follow up system



Crack of pure shear specimen



Follow up of 4 cracks in one single test

- ## Very high frequency test with VHF104

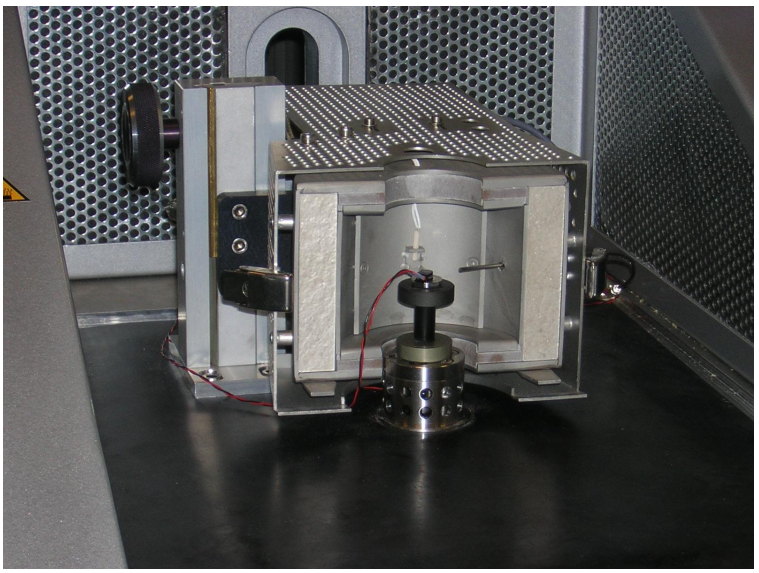
Goal: Direct experimental method to measure the material's viscoelastic properties over a very high frequency range.

Conditions:

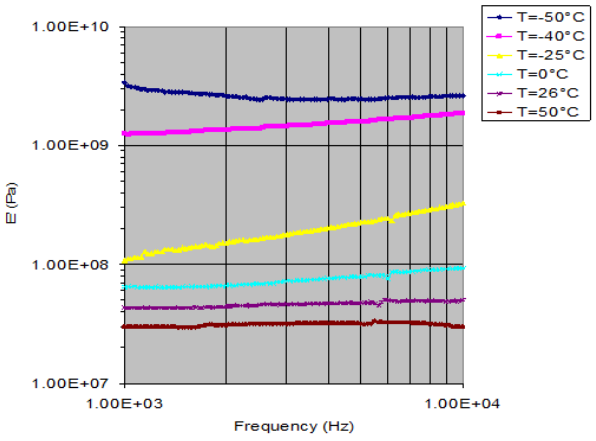
- High frequency range: 100Hz up to 10kHz
- Temperature range: -50°C up to 110°C
- Tension compression mode on cylindrical specimen

Test duration: ~1 hour

VHF104 instrument



Specimen under test with VHF104



E' dependence to frequency at various temperature stages

NEW OFFERS

Recurring need for DMA tests?

- *Choose the testing contract service and benefit from a discount based on your test volume*

Plan to buy your own DMA at short term?

- *Get a credit on your DMA purchase (offer valid for the calendar year of submission of the last test report).*

Please feel free to ask our sales department for further information.

GENERAL CONDITIONS OF TESTING

SPECIMEN

Specimens should preferably be provided with the preconized dimensions or with those recommended by our specialists.
Delicate cutting or special shaping operations may result in higher cost.
Our testing lab is equipped with cutting instruments to prepare the most suitable specimen for the test requested.

TEST PROTOCOLS

The exact test conditions must be fixed in agreement with our specialists at the order.
An evolution of the conditions of the test may result in higher cost.

DELIVERABLE

The test conditions, the results (measured curves) and the comments of our specialists are provided by electronic report in PDF format (or WORD on request).
The temporal evolutions of the instructions and measurements are provided in ASCII format, importable under EXCEL.

SPECIFIC EXPLOITATION OF RESULTS

A DYNA+ software license can be purchased to allow a specific, convenient and comfortable use of the results DYNA+ files on request).

SPECIMEN SIZING: MAXIMUM DIMENSIONS

MODE	DMA25/50	DMA+300/1000/2000	VHF 104	SHAPE FACTOR
COMPRESSION	D40mm ; H60mm	D40mm ; H60mm	Cylindrical shape ; H5-10mm	H > D
TENSION	H60mm; W20mm; T6mm	H60mm; W20mm; T10mm	x	H > 2TW/(T+W)
SHEAR FOR PLAN	D10mm;T3,5mm	D10mm;T4mm	x	D > 4T
SHEAR FOR FILM	H20mm; W50mm ; T2mm	H30mm; W50mm ; T2mm	x	H > 2T
3 POINTS BENDING	Adjustable span 20mm up to 50mm ; max thickness 4mm	Adjustable span 16mm up to 112mm ; max width 26mm	x	*La/T > 8 *La*/W > 3
4 POINTS BENDING	x	Adjustable span 32mm up to 112mm ; max width 26mm	x	
DUAL CANTILEVER	Max specimen length 72mm Max thickness 2mm	Adjustable span 32mm up to 110mm ; max width 26mm	x	*La/T > 16 *La/W > 6
SINGLE CANTILEVER	Max specimen length 26mm Max thickness 2mm or L17mm W5mm H2mm	L17mm W5mm H2mm	x	
HBU	x	Goodrich specimen D18mm –H25mm	x	H > D
CRACK GROWTH MODULE	x	40, 60 or 80mm wide and 6mm height	x	Pure shear specimen

***La:** specimen length between the central jaw or clamp and each extremity