



# Testequipment of Cotesa Materials Laboratory





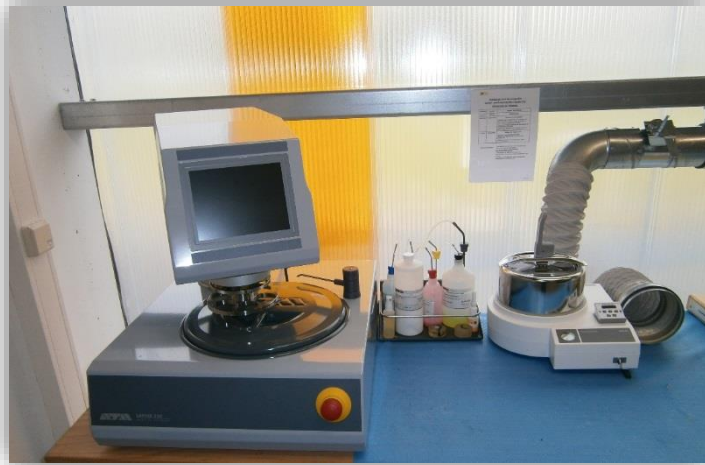
## Autoclave

- 10,5 bar maximum pressure
- 1500 x Ø 900 mm capacity/content
- 250 °C maximum temperature
- Heating rate 0,5 – 5 K/min
- Heating system 5,5 – 33 kW



## Press - Rucks KV 241.06

- 130 kN nominal pressing force
- 1,27 N/mm<sup>2</sup> surface pressure
- 260 bar maximum pressure
- 320 x 320 mm pressing zone measurement
- 200 mm maximum travel
- Electrical heating with a peak temperature of 400 °C for 3h



## Grinding machine Saphir 550 with Rubin 520

- Single spindle grinding and polishing machine
- Grinding disk with  $\varnothing$  250 – 300 mm
- Continuous speed control (50 – 450 rpm)
- Separate revolution speed control (30 – 150 rpm)
- Material removal with an accuracy up to 0,01 mm
- Local pressure application of 5 - 100 N (1-6 specimen  $\varnothing$  50mm)
- Global pressure application of 20 – 400 N



## Cutting machine Brilliant 265

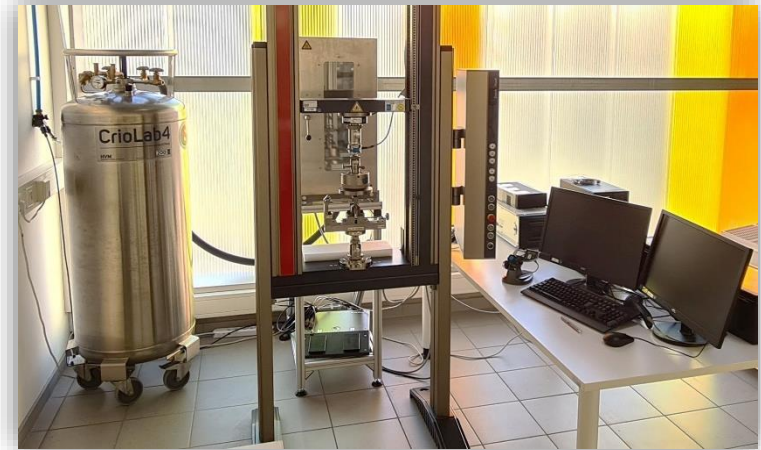
- Automatic chop and traverse cut
- Automatic incremental launch
- Electronic cutting force and distance measurement
- Cutting force depended feed control
- Electronical control





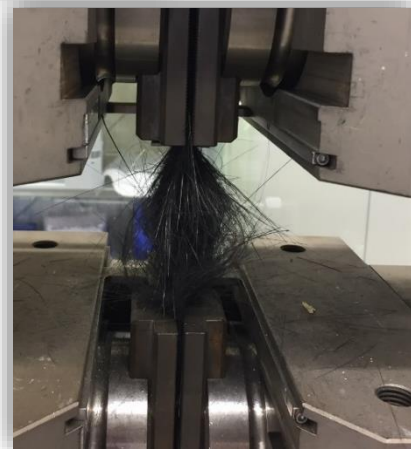
Tensile/compression testing machine  
**Shimadzu AG-250 kNG**

- $\pm 250$  kN load cell
- $\pm 5$  kN load cell
- Different test equipment (hydraulic and mechanical clamping devices)
- Testing software Labmaster
- Testing speed 0,05 – 500 mm/s
- Extensometer MFA 2

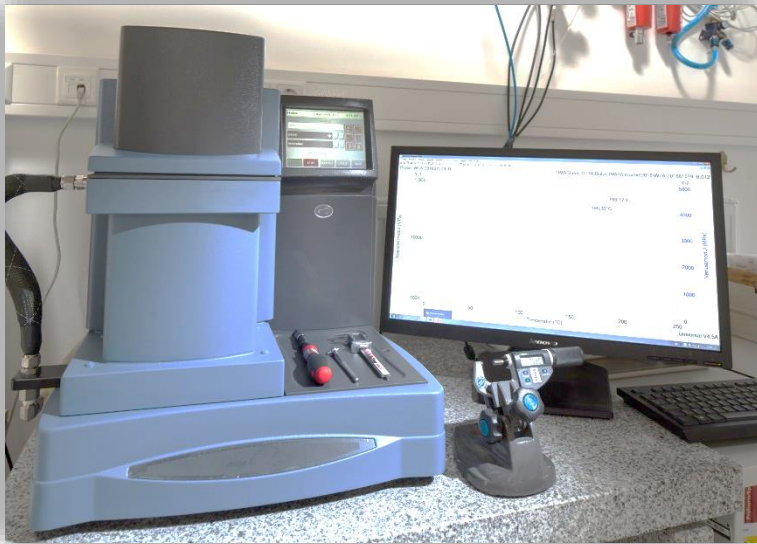


Universal testing machine  
**Zwick Retroline**

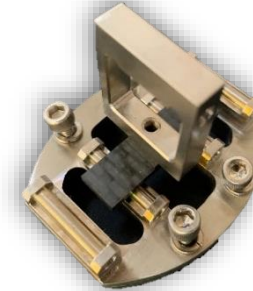
- $\pm 20$  kN load cell
- $\pm 10$  kN load cell
- $\pm 0,5$  kN load cell
- Different test equipment (Pneumatic and mechanical clamping devices; bending bench; Roll-peel test equipment)
- Testing software TestXpert
- Integral heat chamber
- Testing temperature from  $-70^{\circ}\text{C}$  up to  $260^{\circ}\text{C}$
- Heat-up rate 2 – 10 K/min
- Internal measurements  
200 x 300 x 600 mm



## Testing devices



Dualcantilever



for 3 point bending test



for tensile test

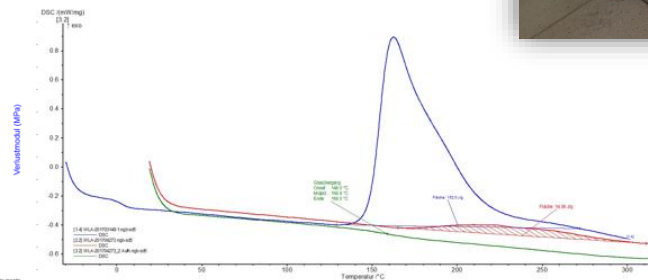
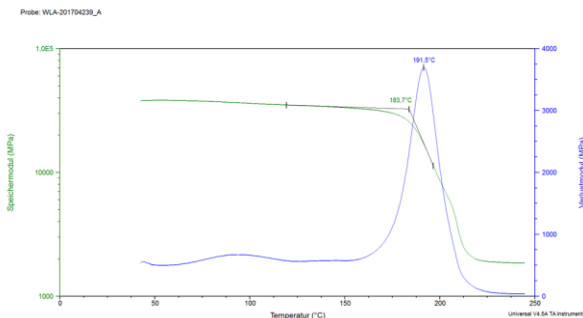
## Dynamic-mechanical analyses (DMA)

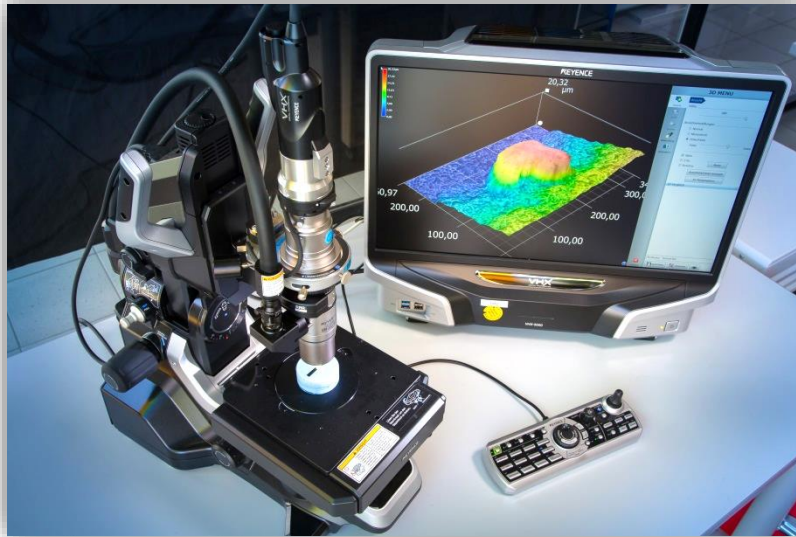
- Temperature range RT up to 600 °C
- Force envelope 0,001 – 18 N
- Heat-up rate 0,1 – 20 K/min
- Cool-down rate 0,1 – 10 K/min



## Differential scanning calorimetry (DSC)

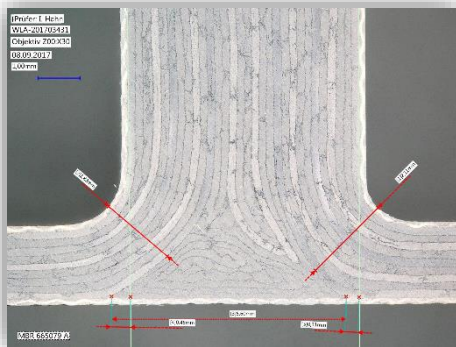
- Temperature range -90°C up to 550°C
- Heat-up rate 0,001 – 100 K/min
- Cool-down rate 20 K/min until -100°C





## **Mikroskope VHX-5000**

- Bright-field and reflected light microscope
- Objektiv VH-Z00R/W/T (magnification 5-50x)
- Objektiv VH-Z100R/W/T (magnification 100-1000x)
- Automatic focus system
- Motorized XY table
- High-resolution camera
- Adjustable height (Z-axis) and angular displacement

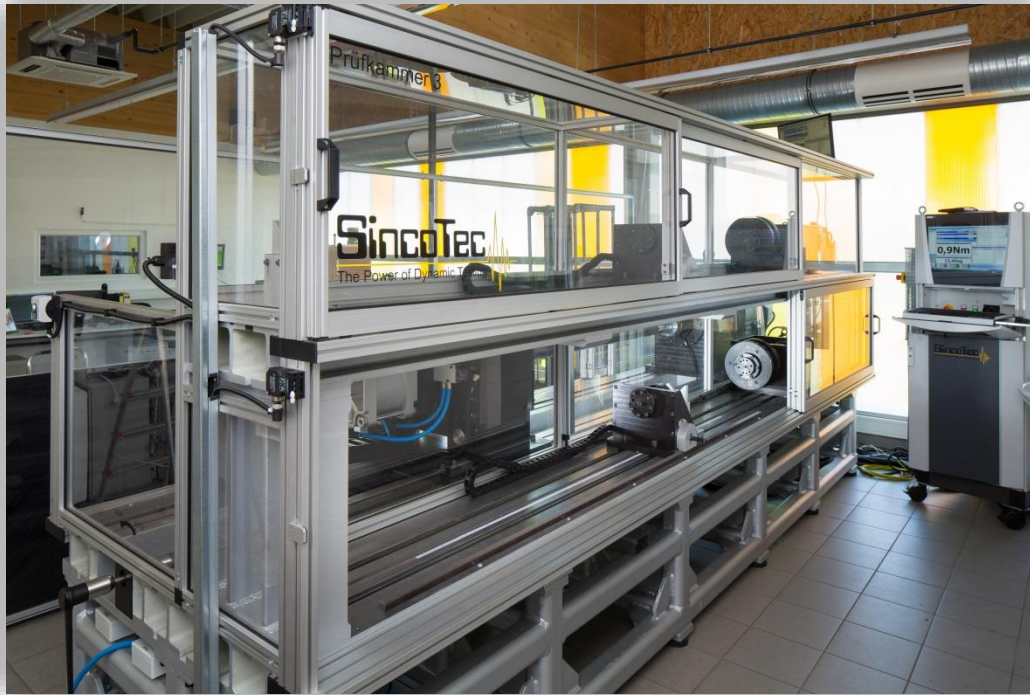


**Microsection of CFK profile**

## **Mikroskope SX45**

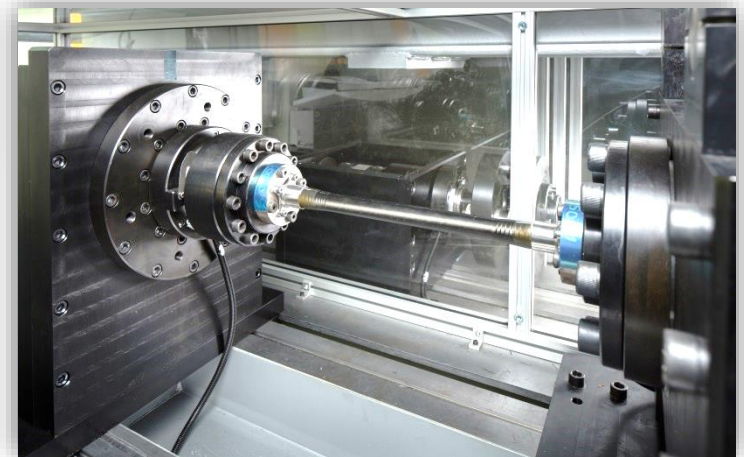
- Reflected light microscope
- Magnification (from 10 until 100times)
- Softwarestem Pixelfox
- Moveable table





## Torsional testing machine Sincotec

- Displacement: 25 up to -25mm
- Angle sensor system:
  - 180° bis -180° (dynamics and statics system)
- Torque transducer:
  - 0 up to 500Nm (dynamics system -SN: TF150159)
  - 0 up to 4000Nm (statics system-SN: TF150158)
- Testing software: Testpilot
- Testing speed: max. 2Hz, 180°
- Strain measurement amplifier (Typ A 106)
- additional option to apply the axial force in the longitudinal direction up to 19.000N





## Universal oven UFE500

- Maximum temperature 1200 °C
- Power 2000 W
- Setting accuracy 0,5 °C
- Programmable heat-up and cool-down rate
- Internal memory for protocols

## Universal oven UNB100

- Maximum temperature 1050 °C
- Power 600 W
- Setting accuracy 0,5 °C



## Fume cupboard and cupboard for hazardous substances type 2-454

- Volume flow of 640-1400 m<sup>3</sup>/h

## Ultrasonic cleaning equipment SONOREX DIGITEC DT 514 BH20

- Internal measurement 18,7 l
- Heating 20 – 80 °C





## recording of temperature evaluation



## autoclaves or hardness ovens



## TUS or SAT protocols

### Protokoll zur TUS-Prüfung

Protocol to the TUS-test

TUS-Übersicht gemäß CAA-16

Datum der letzten TUS	Datum der letzten TUS	Erweitert a TUS	Ausgeführt durch	Ausgeführt durch
01.06.2020	01.06.2020	1	M. Müller	M. Müller

Detaillierte Angaben zur Prüfanlage:

TUS-System	TUS-System	TUS-System	TUS-System	TUS-System
1	1	1	1	1

Ergebnisse der TUS-Prüfung:

Prüfung	Ergebnis	Prüfung	Ergebnis
1	0,2	1	0,2

### Protokoll zur SAT-Prüfung

Protocol to the SAT-test

SAT-Übersicht gemäß CAA-16

Datum der letzten SAT	Datum der letzten SAT	Erweitert a SAT	Ausgeführt durch	Ausgeführt durch
01.06.2020	01.06.2020	1	M. Müller	M. Müller

Detaillierte Angaben zur Prüfanlage:

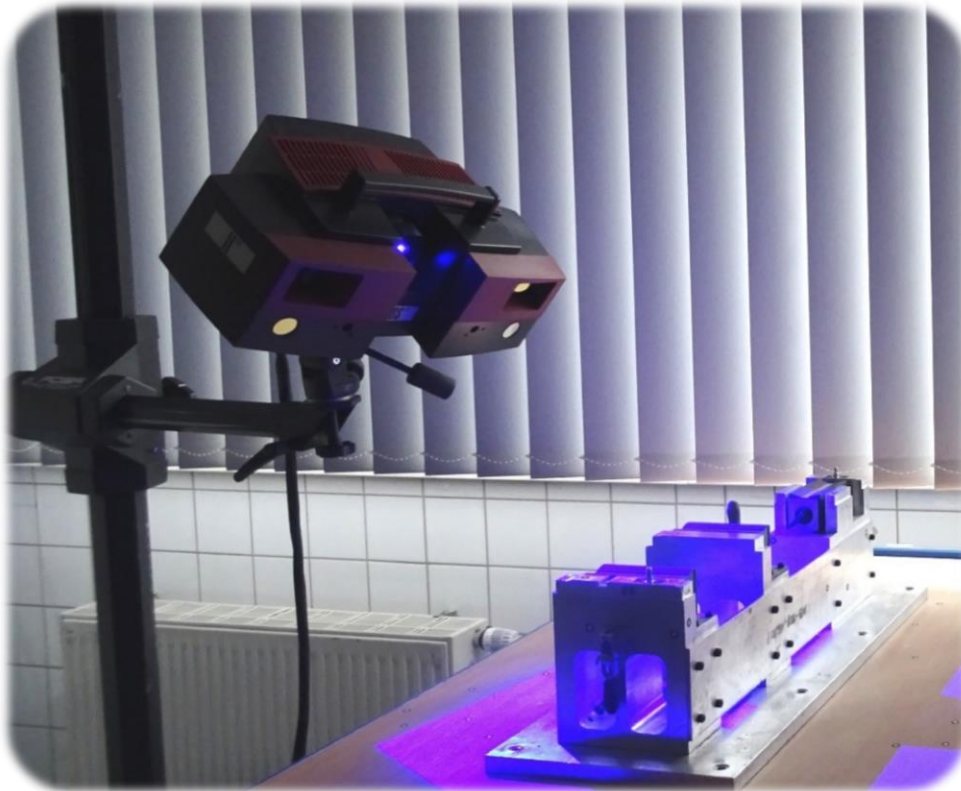
SAT-System	SAT-System	SAT-System	SAT-System	SAT-System
1	1	1	1	1

Ergebnisse der SAT-Prüfung:

Prüfung	Ergebnis	Prüfung	Ergebnis
1	0,2	1	0,2

## TUS - Temperature Uniformity Surveys SAT - System Accuracy Tests

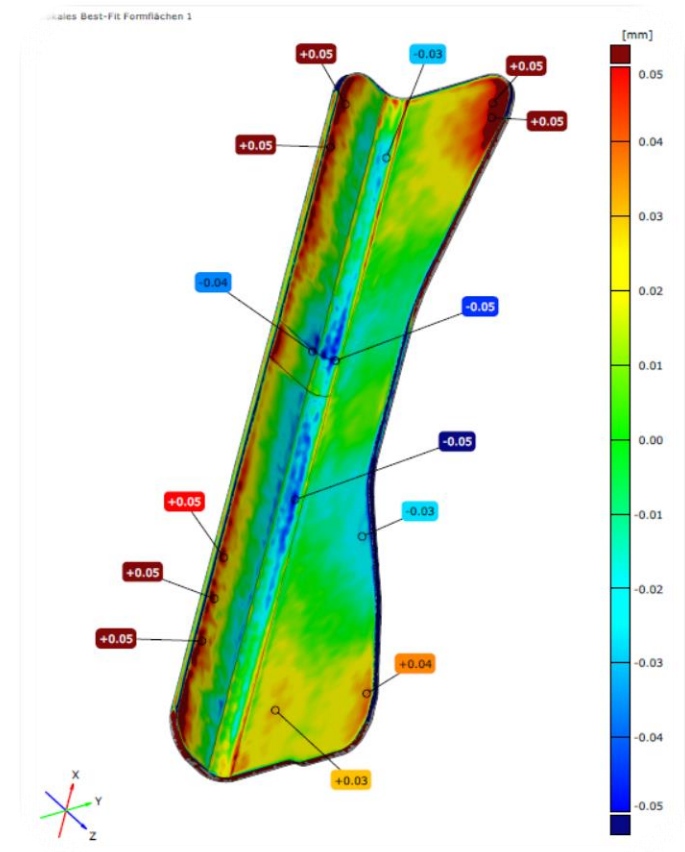
## ATOS – mobil optical measurement system



### ATOS - 3D Scanner

- provide accurate scans with detailed resolution at high speed
- delivers three-dimensional measurement data and analysis for industrial components such as tool, dies and prototypes

## Example of surface comparison scan / CAD model



### ATOS Professional - 3D Scanning and Inspection Software

- process-reliable software that controls ATOS 3D scanners
- produces precise 3D surface data
- offers complete inspection and reporting functionalities



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