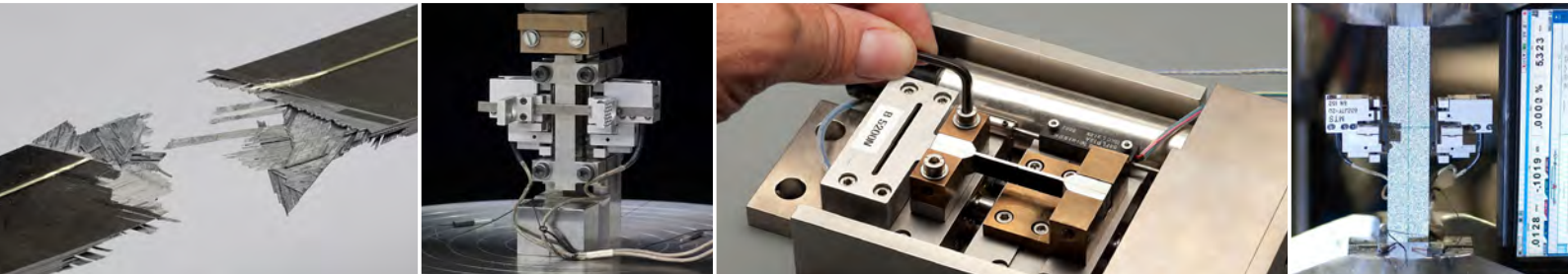





Mechanical Test Laboratory



 Aerospace Vehicles Division
Structures Testing & Evaluation

 testing@nlr.nl

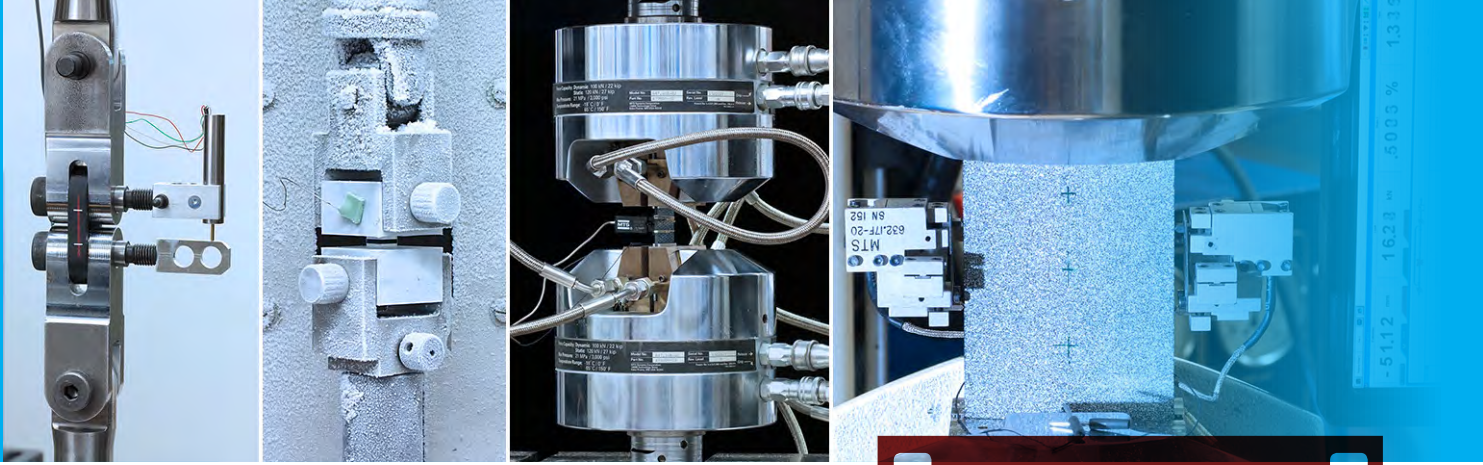
 +31 88 511 46 49

“DETERMINING MECHANICAL MATERIAL PROPERTIES”

NLR's mechanical testing laboratory provides a wide variety equipment and knowledge for testing and certifying metals, composite materials and structures. NLR is a 'one-stop-shop' where our materials, chemical, metallurgical, mechanical testing, NDI and analytical experts will guide you through the entire testing process. The combination of up-to-date equipment together with years of hands-on experience ensures a proper solution for your testing matter.

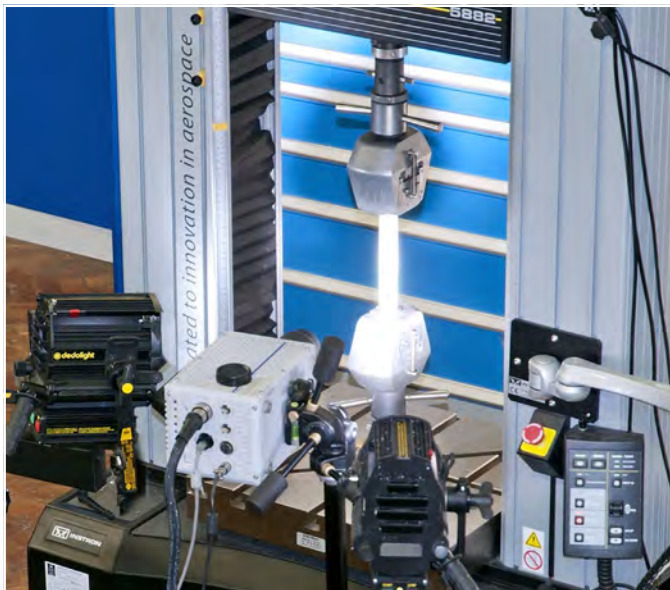
We will work together with you to determine the best testing and certification program for you. Industries such as aerospace, automotive, appliances, building products and more have worked with us to get their problem solved or material structure approved or certified.

NLR's test laboratory has an ISO 17025 approval for several tests to according ASTM and AITM test standards.



Static testing

Our mechanical test laboratory can perform almost every mechanical test according to DIN, ASTM or AITM test standard. Also customer defined tests can be performed with highly flexible test setups with slot tables. By incorporating different fields of in-house expertise ranging from coupon manufacturing, assembly, NDI techniques, testing and evaluating we are a one-stop-shop for allowable and certification tests on coupon and panel level, composite and metals.

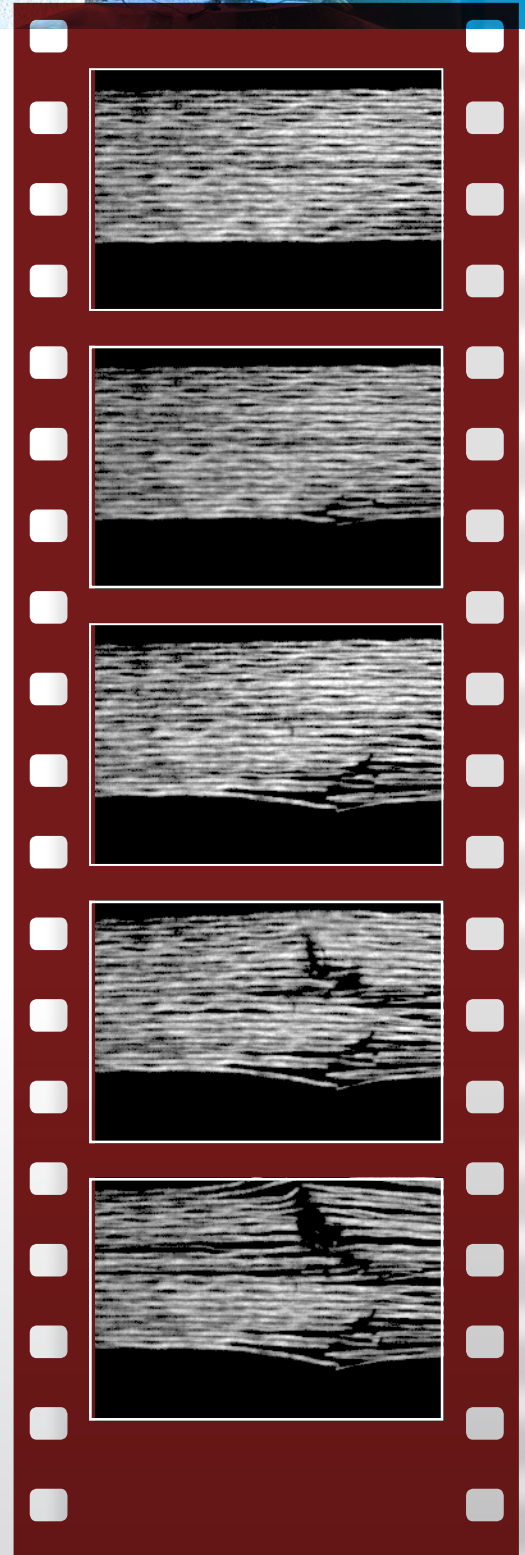


Tensile test using high speed cameras

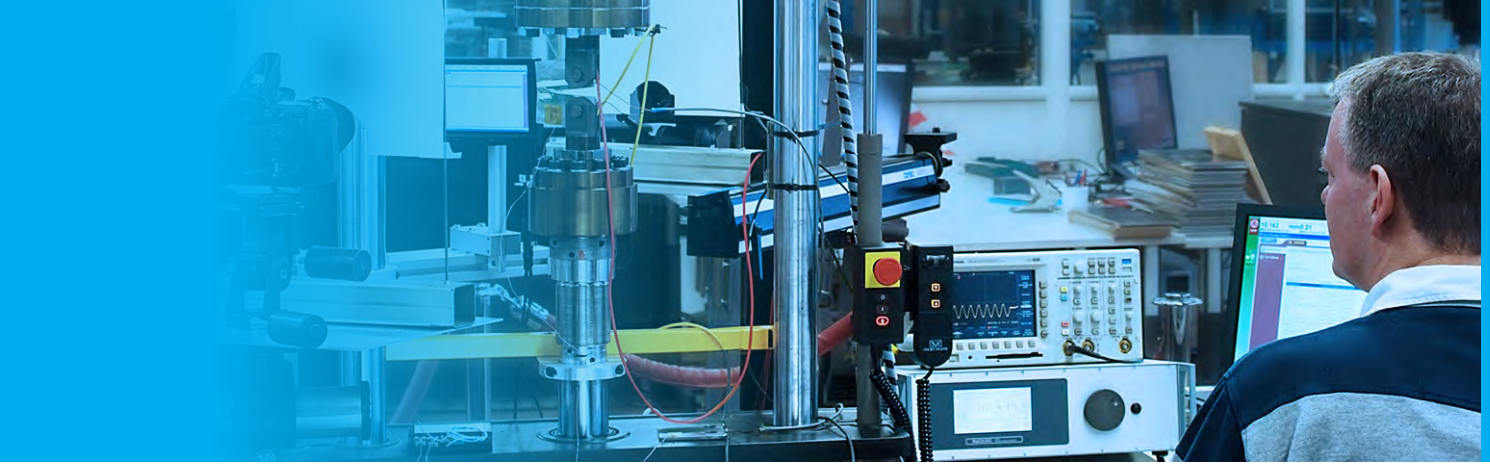
Static test equipment have the following specifications:

- Instron model 5989;** load capacity tensile / compression: 600N – 600kN
 temperature range -196°C to +1200°C
 testing speed 0.00005 to 500 mm/min
 test space 575 x 1235 mm
- Instron model 5882;** load capacity tensile / compression: 100N - 100kN
 temperature range -196°C to +1200°C
 testing speed 0.00005 to 500 mm/min
 test space 575 x 1235 mm

Measurement by 500 channel 100Hz Peekel Autolog system, strain gauge or extenso meters, Aramis 12M. Digital correlation system and/or two high speed camera's up to 100.000 fps each.

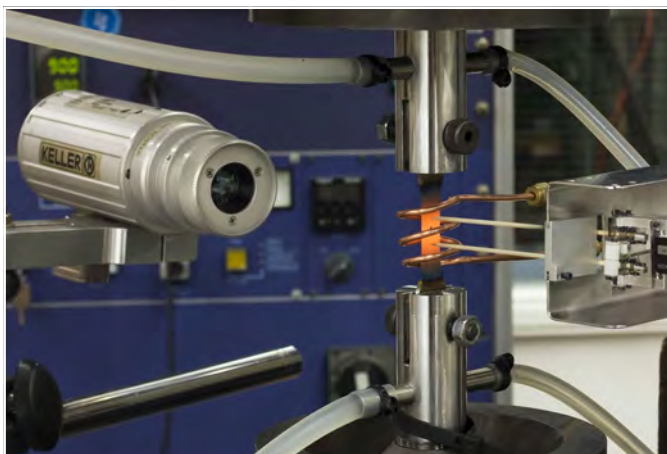
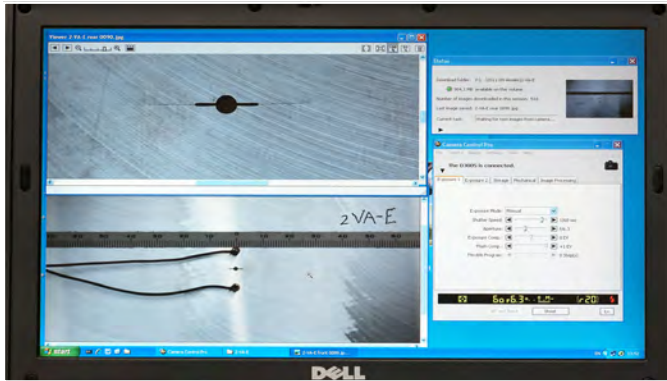


HS registration of fracture in carbon



Dynamic testing

All our dynamic test machines are equipped with force, strain as well as displacement control and complete Instron software package including KIC & CTOD fracture toughness, J-Integral, Flight spectrum loading and Low Cycle Fatigue testing. Several mechanical and hydraulic (plate) grips are available for a wide temperature test range from -180°C till +1300°C. For standard K1c and crack growth testing in metals fully automated photo triggering and visual inspection systems are available for 24/7 testing at room, elevated or low temperature.



High temperature testing

3 x 100 kN (MTS and Schenck)

Max. specimen size : length: 600 mm

2 x 200 kN (Amsler)

Max. specimen size : length: 1350 mm

1 x 900 kN (Wolpert)

Force range : 600 kN tension (100, 250, 500 and 1000 kN)

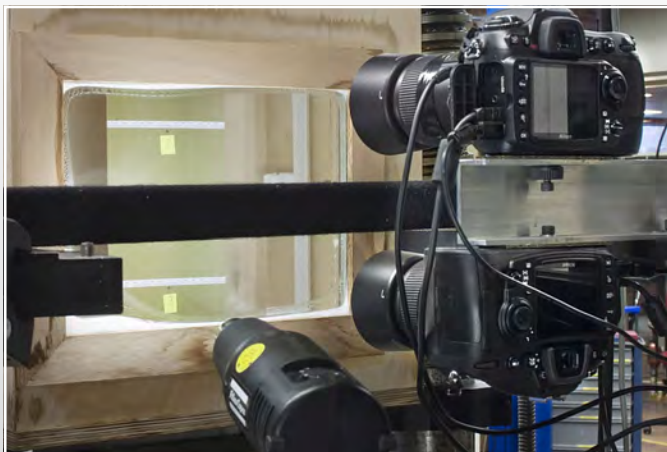
1 x 500 kN (MTS)

Up-side-down configuration with self-aligning Biaxial loads in tension and compression

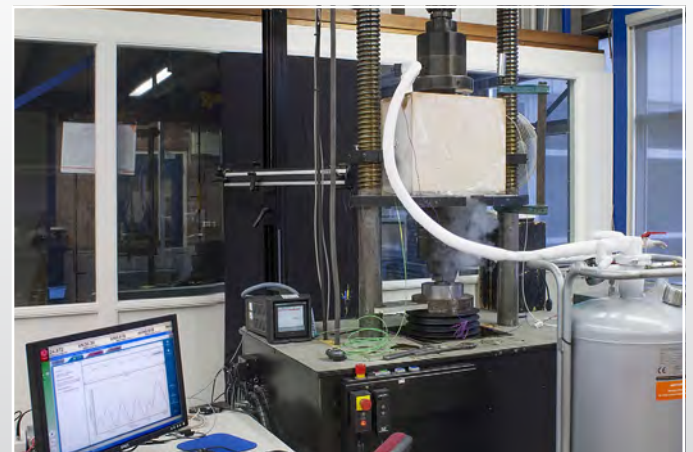
High Frequency pulsator

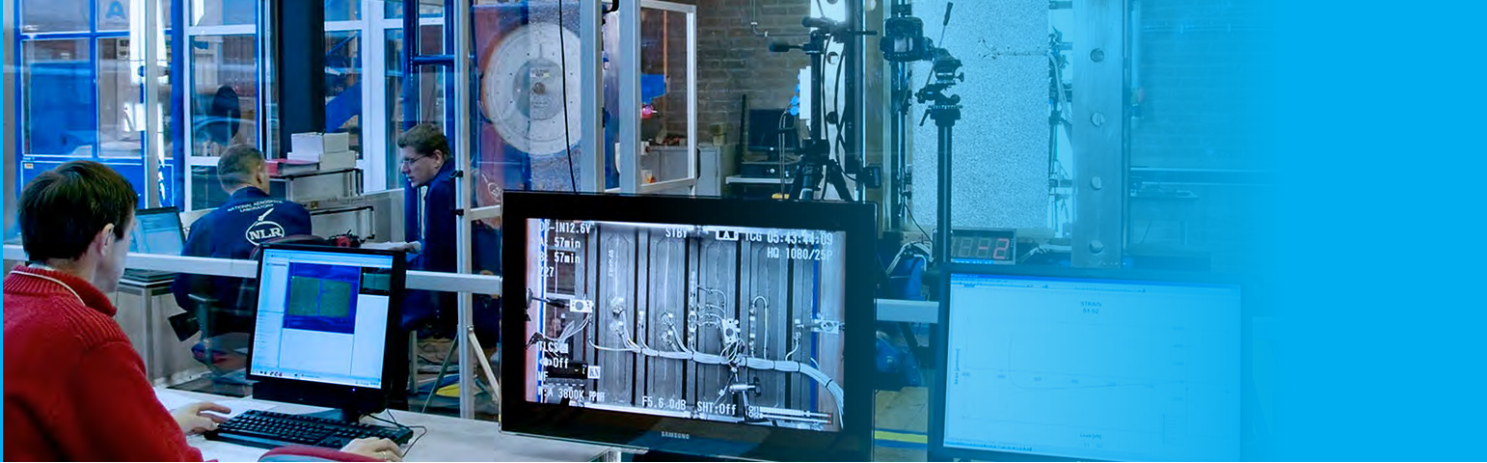
Force range : 100 kN (4 ranges 10, 20, 50 and 100)

Max. frequency 300 Hz



Low temperature fracture toughness





Panel testing

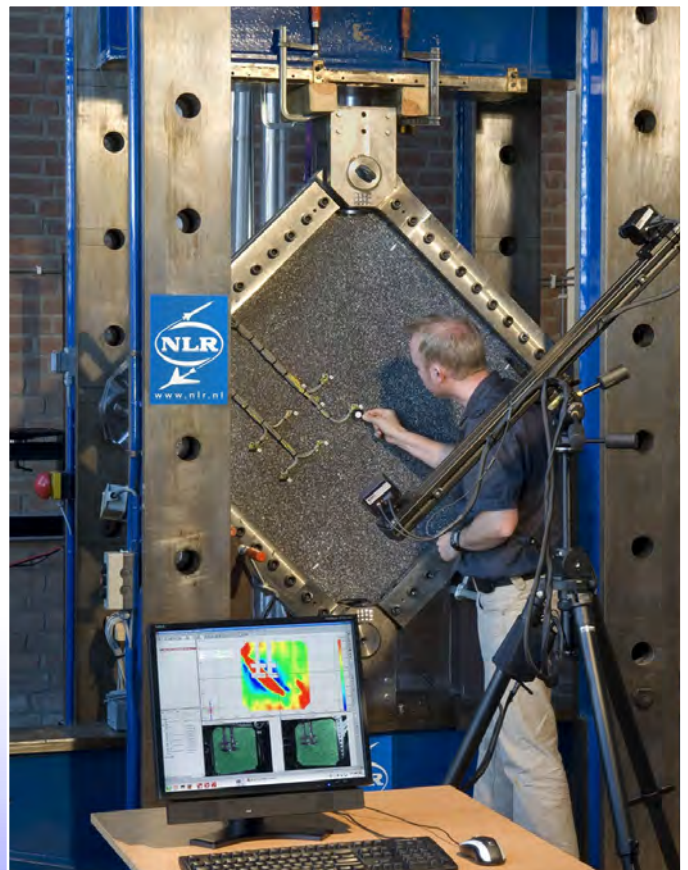
For static testing, the standard equipment has a maximum load capacity of 2MN in compression for its expertise in panel testing. For example to determine buckling behavior in compression panel testing.

Avery panel test machine

load capacity compression: 40kN - 2000kN
 temperature range -120°C to +120°C (specials)
 testing speed 0.00005 to 500 mm/min
 test space 1040 x 3680 mm

Strain/Displacement measurement with Digital Image Correlation (DIC) enables global field retrieval, both in-plane and out-of-plane. Picture-in-Picture (PiP) mesh refinement and data mapping enables local gradient information within global field using Off-the Shelf HD-Cameras and In-house data mapping. The in-house developed T-share software offers real time display and comparison of your predicted values versus real time data.

Impact drop tower up to 7 mtrs and 10 kgs weight
 Impact mobile guns up to 100J in every direction



Features

A wide variety of NLR's specialized laboratories and workshops ensure extensive possibilities for:

- structure (re)design
- computational mechanics
- composite manufacturing
- specimen manufacturing,
- mechanical workshop
- specimen inspection
- environmental laboratory
- NDI techniques
- failure analysis