

## MATERIAL TESTING PLASTICS AND COMPOSITES MATERIALS

We are the partner you can contact when it comes to national and international testing requirements, whether you are dealing with materials, components or entire structures.

Our engineers look forward to help to you run your testing programs and to standardise and certify materials.

In the case of fibre-reinforced plastics, we test materials and prepare samples and laminates for you. In addition to this, Applus+ IMA Dresden has extensive experience in the fields of adhesive technology, laminate design and material approval. Benefit from our comprehensive knowledge on preparing and running material tests, including not only static, cyclic and dynamic testing but also creep testing. Furthermore, we are at your service to answer any questions you may have about choosing and planning a test method and, of course, evaluating the results.

## LAMINATE & SPECIMEN MANUFACTURING

Our labs offers a variety of ways to manufacture laminates for testing using rovings, semi-finished textile products and resin systems. Make the most of our experience with producing laminates using vacuum infusion, RTM, thermoplastic processing and filament winding.

We use the test laminates to prepare high-quality test samples in line with national and international testing standards.



### LAMINATE MANUFACTURING

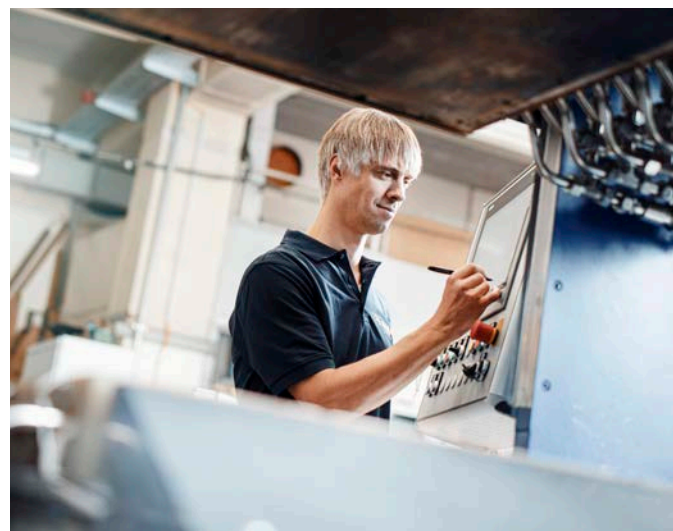
- Vacuum Infusion
- Resin Transfer Moulding (RTM)
- Prepreg
- Thermoplastics
- Filament Winding
- Yarn Impregnation

### SPECIMEN MANUFACTURING

- High Speed Cutting
- Drilling
- CNC Milling
- Tabbings
- Waterjet Cutting

### INSTRUMENTATION & QUALITY ASSURANCE

- 3D-Coordinate Measurement of Specimen Tolerances
- Strain Gauge Application
- Crack Gauge Application



## PHYSICAL AND THERMAL TESTING

Our testing laboratories determine the test materials' specific physical and thermal properties. Our services cover a wide range, starting with fibre content testing and extending as far as determining the glass transition temperature or performing sample conditioning.

### THERMAL ANALYSIS

- DSC (Differential Scanning Calorimetry)
- DMA (Dynamic Mechanical Analysis)
- Dilatometry

### PHYSICAL TESTING

- Density
- Fibre Content
- Polished Section Analysis
- Fibre Distribution

### ENVIRONMENTAL TESTING

- Conditioning of Materials and Specimens
- Liquid Immersion
- Aggressive Fluids
- Fibre Distribution

## STATIC MATERIAL TESTING

We carry out a wide variety of standard tests to characterise fibre-reinforced materials. We look forward to advise you on testing standards which apply to your material and the parameters which need to be determined.

In principle, we are able to carry out accredited tests in line with all national and international standards, either in a standard atmosphere or at higher or lower temperatures.

### STANDARD TESTING

- Standard Climate Conditions: 23 °C ± 2 °C, 50 % ± 5 %
- Load Range: 0,5 N – 4 MN
- Tension, Compression, Bending, Shear, Joints
- Various Strain Measurement Devices
- Bolted Joints
- Special Fixtures (IMA-Compression Fixture, IMA-Rail Shear Fixture)

### FRACTURE TOUGHNESS DETERMINATION

- G1c Testing
- G2c Testing (3ENF, 4ENF)
- Mixed Mode Testing

### TESTING OF PLASTICS AND COMPOSITES UNDER TEMPERATURE CONDITIONS

- Temperature Range: -55 °C to 200 °C
- Tension Testing
- Compression Testing
- Shear Testing
- Flexural Testing

### IMPACT TESTING

- CAI (Compression After Impact)
- Impact Depth Measurement
- Impact of Stringer
- Fatigue Loading of Impact Damaged Components
- Determination of Damage Area



# FATIGUE MATERIAL TESTING

The cyclic testing methods require a high degree of expertise, as the varied properties of this group of materials need to be taken into account during testing.

Moreover, there is still a lack of recognised standards in this field of testing. Our experts will be glad to carry out various types of tests for you.

## FATIGUE TESTING ON PLASTICS AND COMPOSITES

- Pulsating and Alternating Loading
- Load Range: 0,5 N – 2 MN
- Load, Deflection or Strain Control
- Strain and Temperature Measurement
- In-situ Crack Documentation (optical)
- Evaluation of S-N-curves

## FATIGUE TESTING ON PLASTICS AND COMPOSITES UNDER TEMPERATURE AND CLIMATE CONDITIONS

- Low Temperature: -60 °C
- High Temperature: +180 °C
- Hot-Wet Conditions: max. 85 °C and 85 % RH

## FATIGUE SPECIMEN GEOMETRIES AND METHODS

- Special Double Side Waisted Geometry for UD Testing (IMA-UDFA, IMA-up-UDFA)
- G1c, G2c Testing
- Anti-Buckling Devices for Compression Loading
- Geometries accepted by DNV GL
- Components and Sub-Structures (i.e. Rotor Blade Root Joints)

# MATERIAL CREEP TESTING

Components made of fibre-reinforced plastics need to withstand loads safely over the long term. To achieve this, information is needed about the material to determine how the component behaves when exposed to a static load over a long period. We carry out these long-term creep tests for various types of stress, taking into account the effect of different in temperature and media conditions.

## CREEP TESTING ON PLASTICS AND COMPOSITES

- Creep Tests (Tension, Compression, Shear)
- Long-Term Rupture Test
- Load range: 0,1 N – 20 kN
- Extrapolation

## CREEP TESTING ON PLASTICS AND COMPOSITES UNDER TEMPERATURE AND MEDIA CONDITIONS

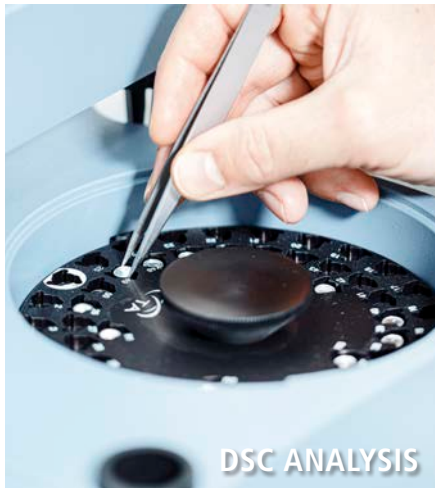
- Creep Testing under Temperature (-30 °C to 150 °C)
- Creep Testing in Aggressive Fluids or under Liquid Immersion
- Combined Creep Loading (Temperature and Fluids)



LAMINATE AND SPECIMEN MANUFACTURING



WATERJET CUTTER



DSC ANALYSIS



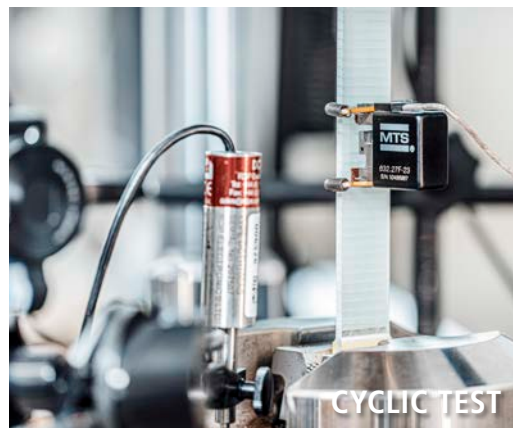
MATERIAL TESTS  
ON CORE MATERIAL



STATIC MATERIAL TESTING



PHYSICAL TESTING



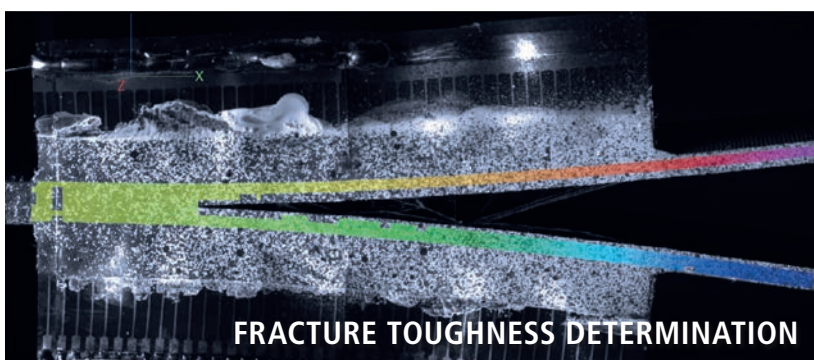
CYCLIC TEST



3D-COORDINATE  
MEASUREMENT



MATERIAL CREEP TESTING



FRACTURE TOUGHNESS DETERMINATION



ASSEMBLY MONITORING

## BENEFIT FROM THE COMPETENCE OF APPLUS+ IMA DRESDEN FOR YOUR MATERIAL TESTING.

As an independent test provider we guarantee reliable results and strict confidentiality. Our credo of thinking and acting like our customers was not carelessly formulated. It contains an earnest pursuit of engineering perfection, which merges intelligent solutions with sustainable usable

result at fair prices. This, of course, also includes the flexibility to respond to all kinds of request and, in doing so, to provide peak performances which are not possible elsewhere. Each of our employees bears a portion of this responsibility.

Since May 2021, IMA Dresden is part of Applus Laboratories.

Please do not hesitate to contact us for any questions or inquiries at [sales@ima-dresden.de](mailto:sales@ima-dresden.de)



According to accreditation certificate



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