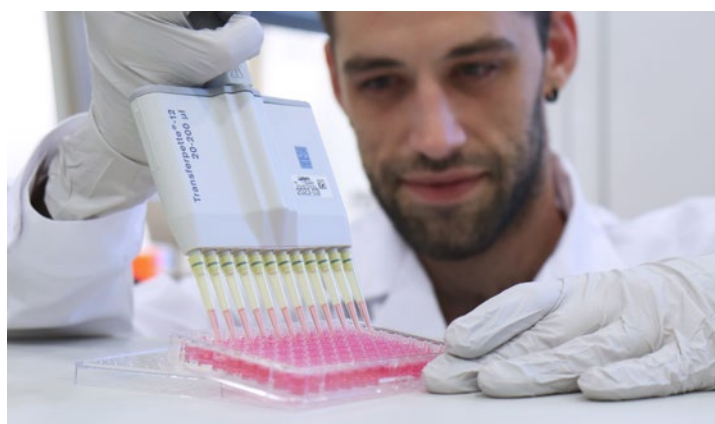
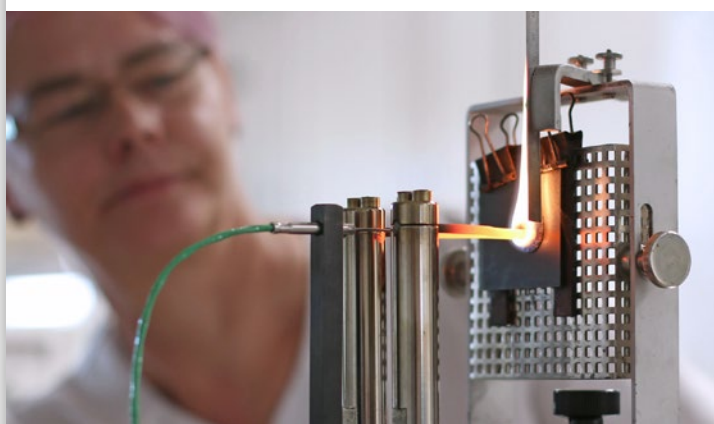




The testing laboratory
for plastics and textiles



Service catalog

*Materials testing for
plastics and textiles*

www.ompg.de

Precise analysis, clear results

Materials Testing of plastics, textiles and more

OMPG – The testing laboratory for plastics and textiles is a full subsidiary of Thuringian Institute for Textile and Plastics Research (TITK). With its establishment in 1992, TITK has concentrated its competences of material characterisation as an institute for industry-related research in the field of polymer materials and expanded these competences continuously.

By following the dynamic development in the field of quality assurance, OMPG developed into a modern analysis, research and development service provider. It meets both the demands of classical traditional analyses and the complex, differentiated and future-oriented demands of its customers.

The high quality of products, materials and technologies is and will be the basis for success on the increasingly globalised market. The connected internal and external supervision and assurance of the quality not only challenges the technical competence of internal quality assurance bodies. It increasingly also demands the assessment and inspection by independent experts.

We offer a wide range of cross-sector services for polymer materials, composites and textiles:

- Chemical and physical/mechanical material characterization
- Biological tests
- Material processing tests
- Analytical method development and process development



With us, you benefit from a wide range of tests in accordance with national and international standards and norms.

We also support you with individually developed test methods for the quality assurance of your products.

OMPG is accredited in accordance with DIN EN ISO / IEC 17025.

Testing is carried out in accordance with national and international standards and norms as well as customer-specific test procedures.

How can we support you?

**Please select a suitable contact person
on the last page of this document!**



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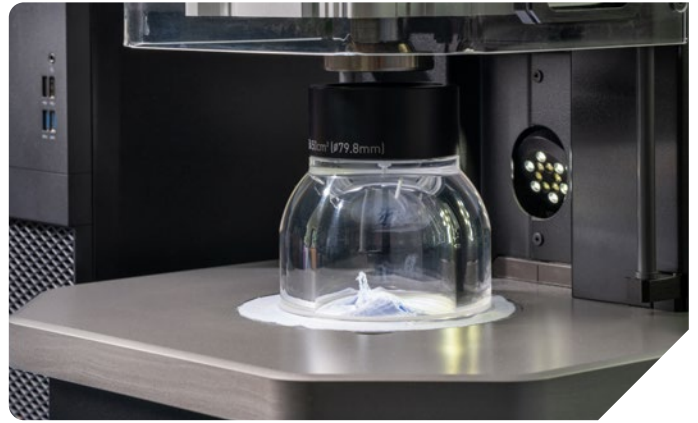
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Material properties - Mechanical testing

Tensile testing, bending testing, compression testing and impact testing - OMPG is your reliable and competent partner for testing plastics and composites. We offer all standard test methods specified in the relevant data sheets.



Plastics

A broad portfolio of test methods for determining the mechanical material properties and many other analysis tasks is available to you for this purpose. Whether thermoplastic, thermoset or elastomer, you will find testing options for the full spectrum with us.

We also support you in producing test specimens from granulates, semi-finished products or finished parts.

Processing tests are possible on spunbond, wetlaid and needled nonwoven systems. There is a long tradition in the processing of natural fiber products.

Composites

In addition to general tests under tensile, compressive, bending or impact loads, OMPG can also carry out tests to characterize fibre-matrix adhesion. We are experienced with both thermoset and thermoplastic matrix systems. We also support you in producing test specimens from semi-finished or finished parts.

Textiles

OMPG's equipment allows the testing of single fibers, yarns and textile fabrics (woven fabrics, knitted fabrics, nonwovens) as well as composite materials (coated textiles, carpets).

Density and bulk density

Density is a physical property that is used to identify plastics.

OMPG has equipment to determine the density using the buoyancy method (DIN EN ISO 1183-1) for test specimens or components or as a gas pycnometer method (also applicable for fibers and regrind).



Thermal Testing

Melting point and glass transition

The melting point or glass transition temperature (often the softening point) of plastics can be determined using various test methods.

In addition to the classic DSC measurement, thermo-mechanical analysis (TMA) and dynamic mechanical thermal analysis (DMTA) are also available.

HDT + Vicat

The heat deflection temperature of plastics is defined by the HDT temperature or the Vicat temperature.

OMPG can carry out tests up to 220°C in a silicone oil bath. For higher Vicat temperatures, a testing device with plate heating is available.



Thermal conductivity

Our method to determine the thermal conductivity on small test specimens 10mm x 10mm x 2mm is the nano-flash method.

Further application-specific tests

- Length expansion
- Shrinkage

in accordance with several national and international standards.

Moisture, conditioning and water content

Moisture determination

OMPG has the following options for determining the moisture content of materials and components:

- Aquatrac
- Drying in an air circulation drying oven
- Drying in a vacuum drying oven
- Karl Fischer titration

The moisture absorption of plastics can be determined on standardized sample panels



60mm x 60mm x 1 or 2mm in accordance with DIN EN ISO 62.

The rapid conditioning of polyamides in accordance with DIN EN ISO 1110 or in accordance with VW regulations.

Composition and identification of polymers

The question of whether the “right” plastic has been processed can often only be clarified with very complex tests. The combination of tests depends on the polymer being searched for or suspected.

Since compounds contain various fillers (glass fibers, talcum, carbon fibers) and additives such as flame retardants, lubricants and/or dyes in addition to the basic plastic, special tests and analyses are also required for these very different materials.

Test procedures

- Melting point determination using DSC
- IR spectroscopy
- Density
- Residue on ignition / thermogravimetry (TGA)
- Glass fiber length distribution
- Fracture analysis (SEM)



Specific chemical analyses can be used to identify organic and inorganic additives.

Chemical analytics

- Spectroscopy (FT-IR, UVVIS, AAS/AEP, ICP, XRF etc.)
- Elemental analysis
- Gas chromatography (MS, pyrolysis, TD etc.)
- Liquid chromatography (HPLC, LC-MS/MS, LC-DAD)
- Thermal analysis (DSC, TGA)
- Molar mass distribution (GPC, SEC)

The sensitivity of the analytical methods increases considerably if the additives required for method development can also be provided.

Viscosity measurements and degradation

The flow behavior of plastics is determined by their viscosity. A distinction is made between melt viscosities (MVR / MFR) and solution viscosities, often expressed in viscosity numbers (VZ, IV or VN). Both measurements depend on the chain lengths of the polymers and the test conditions. It is also used for degradation measurements.



Emission testing

The influence of different materials on the immediate environment is increasingly monitored. Depending on the area of application and type of material, a wide variety of tests and analyses are used to rule out negative influences.

We offer:

- Odor testing (PV 3900, VDA 270 and others)
- Organic emissions (VDA 278, PV 3341, VDA 277 and others)
- Fogging test (DIN 75201, PV 3015 and others)
- Formaldehyde emission (PV 3925, VDA 275 and others)



VOC analytics

Volatile Organic Compounds (VOC) describes a large number of individual substances that are emitted by materials and products. We offer VOC analytics by Headspace GC/MS Measurements.

Chemical testing – REACH

REACH Regulation (EC) 1907/2006 as the European chemicals legislation serves to control chemicals that are harmful to health and environment. The main focus of this regulation is the protection of humans and environment from the risks of chemical substances.

We support you with our testing services to meet the strict legal requirements regarding chemical substances for placing products on the European market.

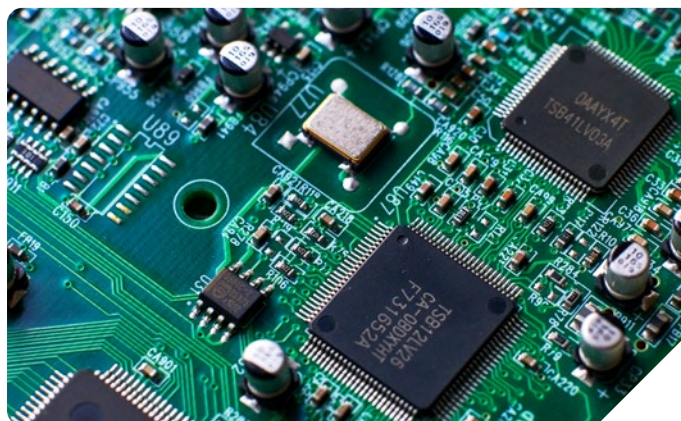
Our testing spectrum includes:

- Individual test concepts for REACH Annex 17 and SVHC substances
- SVHC analysis and other tests for compliance with material and product-specific limit values



Chemical testing – ROHS

EU Directive 2011/65/EU sets limits for residue chemicals in electrical devices for the heavy metals cadmium, lead, mercury or chromium VI, brominated flame retardants or phthalate plasticizers. OMPG offers you customized test concepts and RoHS analyses with accredited test methods for your electrical products.



Chemical testing – Consumer goods and toys

Safety and health protection right from the start.

The requirements for health and product safety are strict and diverse - especially when very different standards come into effect on the international market.

With our accredited range of tests, we can ensure that your products and raw materials meet all the important requirements of the EU Toy Safety Directive (2009/48/EC) as well as the provisions of Annex 17 of the REACH Regulation, the POP Regulation, individual customer-specific specifications and other chemical safety requirements, such as US standards (CPSIA/CPSC/CP65).



Chemical testing – Pharmaceutical products

Main activity of our independent services in the field of pharmaceutical analysis is the determination of inorganic components (elemental impurities) in

- Proprietary medicinal products
- Active ingredients and excipients
- Raw materials

The determination of contents and impurities as well as other pharmaceutical parameters is carried out in accordance



with international and national pharmacopoeias (e.g. Ph. Eur., USP). Customer-specific methods can also be used or developed and validated for the analytical testing of active pharmaceutical ingredients and finished products.

Flammability testing and electrical applications

Fires can have different causes and different conditions for their spread. The possible flammability tests are just as diverse.



Flammability of Interior Materials

Fire properties of materials and components are tested with automotive standards such as FMVSS 302, DIN 75200 or ISO 3795.

Glow wire test (GWEPT / GWFI / GWIT / GWT)

The glow wire test in accordance with DIN EN 60695-2-10 ff. simulates the danger posed by heating electrical conductors.



Tracking resistance (PTI / CTI)

When using electrical appliances and equipment, damage can be caused by the conductive effect of salty water on plastic surfaces. (DIN EN 60112)



Ball pressure hardness in the heat

One requirement for plastic components for electrical applications is sufficient heat resistance. (DIN EN 60695-10-2)

UL 94 (-V / -HB / -HBF / VTM)

UL 94 standard is used to classify the flammability of plastics under identical conditions.



Oxygen index (LOI or OI)

LOI is carried out in accordance with DIN EN ISO 4589-1, -2 at room temperature.

Cone Calorimeter (MAHRE value / HRR / TSR)

The cone calorimeter and a Smoke box are available for tests in accordance with railroad regulations. The aim is to investigate fire development through heat radiation and to determine harmful gases and smoke gas density.

Electrical Resistance

Many plastics are considered dielectrics and have a high electrical resistance. The focus of testing services here is on both volume and surface resistivity. (DIN EN IEC 62631-3-1 and -2) Special additives can make plastics conductive. In this case, the optimum distribution of the additives is important.



Aging and resistance – Color and gloss measurement

Color measurements are carried out to objectively evaluate dyed materials after exposure or in comparison to a standard or reference material. Characterizing the gloss of surfaces and assessing the degree of whiteness or yellowness of materials also play an important role in quality control. We have the necessary measuring equipment for reproducible testing of these characteristics.

Color measurements are performed using a spectrophotometer in accordance with DIN EN ISO 11664-4 (e.g., CIE Lab* and ΔE calculations) or VW 50190 for objective color characterization.



Gloss measurements are performed using a gloss meter in accordance with DIN EN ISO 2813, DIN 67530, VW, Daimler, BMW, etc., with measuring angles of 20° (high gloss), 60° (medium gloss), and 85° (matte gloss), depending on the material.

Aging and resistance – Color fastness

Color fastness refers to the resistance of dyes and prints to the stresses of processing and use. We test this characteristic on textiles, but also on leather, plastics, painted, coated or other surfaces and materials.

To this end, we offer tests using various devices and conditions, such as light fastness (DIN EN ISO 105-B06, DIN EN ISO 4892-2), wash fastness (DIN EN ISO 105-C10), water fastness (DIN EN ISO 105-E01), rub fastness (DIN EN ISO 105-X12, DIN EN ISO 12947-4, DIN EN ISO 17076-1), sweat fastness (DIN EN ISO 105-E04), saliva fastness (DIN 53160-1), cleaning resistance (according to VW, Daimler, BMW, etc.), care product resistance (according to VW, Daimler, BMW, etc.), heat/cold/climate change resistance (according to VW, Daimler, BMW, etc.).



Aging and resistance – Surface, aging and resistance

Surfaces are subject to constant wear and tear during use. It is important to test the resistance to different stresses so that these do not become a case of damage and cause complaints. A variety of reproducible test methods can be used to simulate friction, scratch or abrasion tests with or without media.

In addition to colorimetric assessment, resistance to care and cleaning agents as well as to a wide range of operating materials is of great interest for basic aesthetic perception.



Test procedures

- Taber
- Martindale
- Schopper / round rubbing
- Crockmeter
- Abrex

Hardness and scratch testing

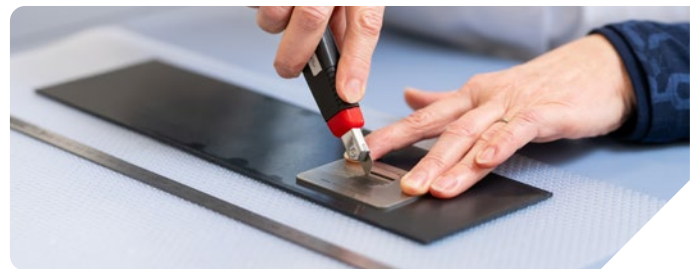
The hardness of plastics is determined differently depending on the type of material. OMPG offers the shore hardness measurement for elastomers. Many surface tests are also associated with hardness.

Scratch tests

Scratch tests are conducted using the Erichsen Model 430P testing machine.

Lacquer tests

Lacquer tests combine climate storage, exposure and chemical tests (cream or cleaning agent resistance) with various adhesion tests. Cross-cut, cross-cut and scratch tests are used to assess paint adhesion.

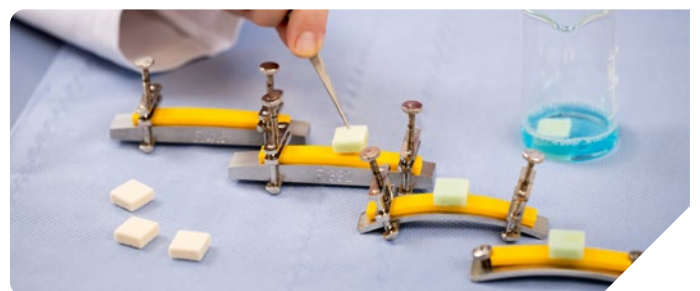


Media resistance (Short-and long term tests)

Testing is always carried out in accordance with the OEM-specifications or DIN EN ISO 175.

Stress cracking test

Testing is carried out with the bending strip method according to DIN EN ISO 22088-3.



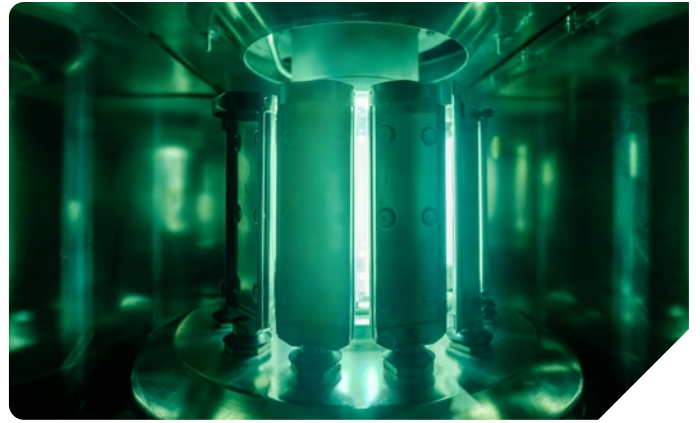
Aging and resistance – Light, weather and climate

Solar radiation, heat, rain and moisture have a permanent effect on materials and influence their serviceability, appearance and, in many cases, their product safety.

With the available equipment (e.g. xenotest, sun simulation chamber and climate chamber), numerous standards and test methods for testing climate, light and weather stability can be implemented reliably.

Environmental simulations

- Air conditioning mounts
- Climate change tests
- Artificial exposures / light fastnesses
- Artificial weathering
- Tackiness
- Florida test
- Kalahari / Arizona test
- Salt spray tests



Vibration and shock testing

Standards

- DIN EN 60068-2-6: Oscillation (sinusoidal)
- DIN EN 60068-2-27: Shock test
- DIN EN 60068-2-38: Composite test
- DIN EN 60068-2-57: Time history method
- DIN EN 60068-2-64: Broadband noise (digitally controlled)
- DIN EN 60721-3-2: Classification of environmental conditions - Section 2: Transportation



Biological testing – Microbiological tests

In our S2 safety laboratory, we test textiles, plastics and other materials against human pathogenic bacteria, bacteriophages and fungi.

An overview of all current microbiological tests can be found below.



Antibacterial activity

DIN EN ISO 20743 – Determination of the antibacterial effectiveness of textiles

ISO 22196 – Measurement of the antibacterial activity of plastics and other non-porous surfaces

DIN EN ISO 20645 – Textile fabrics - Testing the antibacterial effect - Agar plate diffusion test

DIN EN ISO 20776-1 – Susceptibility testing of infectious agents and performance evaluation of antimicrobial susceptibility testing devices

Antiviral activity

ISO 18184 – Textiles - Determination of the antiviral efficacy of textile products (Modification: testing with bacteriophages)

ISO 21702 – Measurement of antiviral activity on plastic and other non-porous surfaces (Modification: testing with bacteriophages)

Resistance against microorganisms

DIN EN ISO 846 – Plastics - Determination of the effect of microorganisms on plastics (methods A, B and C)

DIN EN 14119 – Testing of textiles - Determination of the effect of microscopic fungi (microfungi)

Bioburden of products

DIN EN ISO 11737-1 – Determination of the population of microorganisms on products

Ph. Eur. 5.1.3 – Check for sufficient preservation

Ph. Eur. 2.6.12 – Microbiological examination of non-sterile products: Counting of all germs capable of reproduction

Biological testing – Biocompatibility

In addition to microbiological tests, OMPG also carries out biological assessments of medical devices, cosmetics and other products. We offer exclusively animal-free (in vitro) tests.

The current range of tests for determining the biocompatibility and skin-damaging potential of chemicals and medical devices can be found below.

DIN EN ISO 10993-5 – In vitro cytotoxicity (extraction method)



DIN EN ISO 10993-23 – In vitro irritation (extraction method)

OECD 439 – In vitro skin irritation

OECD 431 – In vitro skin corrosion

OECD 442D – In vitro sensitization (KeratiNoSens™-Assay)

Plastics processing and polymerization

We offer you a wide range of equipment for the production of test specimens. This ranges from injection molding of standard test specimens according to DIN EN ISO 20753 and to plates for fire tests (355mm x 100mm x 1-4mm) to special shapes such as UL test specimens (125mm x 13mm x 0.8, 1.2, 1.6 and 3.2mm) are also possible.

Delivered components are documented and the test specimens are prepared for various tests according to the sampling plan. Saws and milling machines in various sizes are available.

OMPG's range of services in the field of processing plastics and compounds is very comprehensive. The technology for polymerization (PA, PET; PAN) in autoclaves from 2 to 10 liters, compounding and processing of plastics is available to you.

All common plastics (except PVC) can be compounded with twin-screw extruders (ZSK25 or ZSK40). The incorporation of additives, fillers and liquid additives is



possible. Processing temperature up to 350°C possible.

Additional equipment allows the direct extrusion of flat films, sheets and tubes (catheters) in some cases.



Special testing and test method development

Optical microscopy

OMPG performs extensive tasks for the microscopic characterization and visualization of surface morphologies.

This includes, for example, the examination of cuts, thin sections or fracture surfaces using incident light, transmitted light, polarized light, dark field, bright field and differential interference contrast (DIC) for the plastic representation of surfaces. Fluorescence-excited μ -areas can also be displayed, 3D imaging technology is available to increase the depth of field and video technology is available to record moving objects in the micro and macro range. Evaluations are carried out using software for digital image analysis.

In addition, investigations can be carried out to determine contact angles on surfaces and liquids, surface tension, interfacial tension, surface energy, roll-off angle (e.g. lotus effect), wetting envelopes, polar and disperse (non-polar), proportion of surface energy on solids and liquids.

Scanning electron microscopy

High-resolution scanning electron microscopy provides views of surfaces with a high depth of field. Even electrically non-conductive materials such as plastics and other organic materials such as cellulose can be imaged with the highest resolution and contrast thanks to our expertise.



X-ray micro-range analysis

For the material identification of microscopic samples, energy-dispersive X-ray micro-range analysis (EDX) is used in the SEM to detect elements and their distribution. The method allows the characterization and classification of materials and structures and is used for R&D work, quality assurance, damage analysis and environmental analysis in micro areas.

Test method development

In addition to our very broad range of mechanical, physical, chemical and biological material tests, we are also available to our customers for the development of individual test methods.

This includes analytical method development, process development and, last but not least, material processing tests on customer request.



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