WÜRTH

WÜRTH Industrie Service

DE | EN

# ACCREDITED TEST LABORATORY

**Competent. Reliable. Independent.**

ilac-MRA

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-20518-01-00

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# A LABORATORY FOR OUR CUSTOMERS

The extensive expertise of our employees, our premium facilities and our wide range of services offered are what distinguishes the inspection laboratory of Würth Industrie Service GmbH & Co. KG from others. Here, the focus of our specialists lies firmly on connection technology. Our portfolio includes application-oriented inspection of friction coefficient and torsion tests, various hardness testing methods, tensile and impact testing, materials and surface testing, and geometry measurement. In total, the laboratory area of the three-story building covers 800 square meters. Tests are performed using advanced test equipment, a seamless quality management system and rapid reaction times – exactly what our customers want.

## Specialists in connection technology

Industrial customers rely on our expertise in the fields of quality testing, application consulting and product development. As innovative pioneers, we respond to requests from all over the world and in doing so, we will not shy away from exploring new approaches. We train our materials testers year after year, thus ensuring the technical competence of our team. Our laboratory includes the world's largest friction coefficient testing machine for fasteners, which can test screws up to M80 in size, a salt spray chamber which is used for corrosion testing, and complex shape and positional tolerances are measured using 3D multi-sensor technology in a climate controlled measurement room. Within Würth Industrie Service, we inspect connection elements for goods receipt, initial sample testing, application consulting and complaints management.

## Accredited competency - your testing service provider

As an accredited testing service provider, we always have the needs of our customers in mind. Therefore, the continuous improvement of processes and quality is part of our philosophy in every step of the way. The recognition as an accredited test center in accordance with DIN EN ISO / IEC 17025 for more than 50 standardized testing methods confirms our consistent quality management and competence in the laboratory.

**Because our motto is: A laboratory for our customers!**

i.V.

Laboratory Head at Würth Industrie Service GmbH & Co. KG

"Leading screw experts are difficult to find on the market. That's why we train our employees ourselves and continuously strive to develop our expertise. Further training opportunities and apprenticeship for materials testers ensure the specialist expertise of our laboratory employees. The accreditation is more than a certificate on the wall: We provide certainty to our customers, because we know exactly what our laboratory, our people and our technology can provide. We live and breathe quality management and put it into practice on a daily basis."

Jürgen Bauer
Head of Laboratory

# TECHNICAL EXPERTISE

## Technology and expertise perfectly combined

Our technical facility is extensive, modern and of a high quality. It is the prerequisite for our wide range of services, oriented to the current and as well as the future requirements of our customers. Our technology, however, is only one component of our quality. Of equal importance is the specialist expertise of our employees in the laboratory.

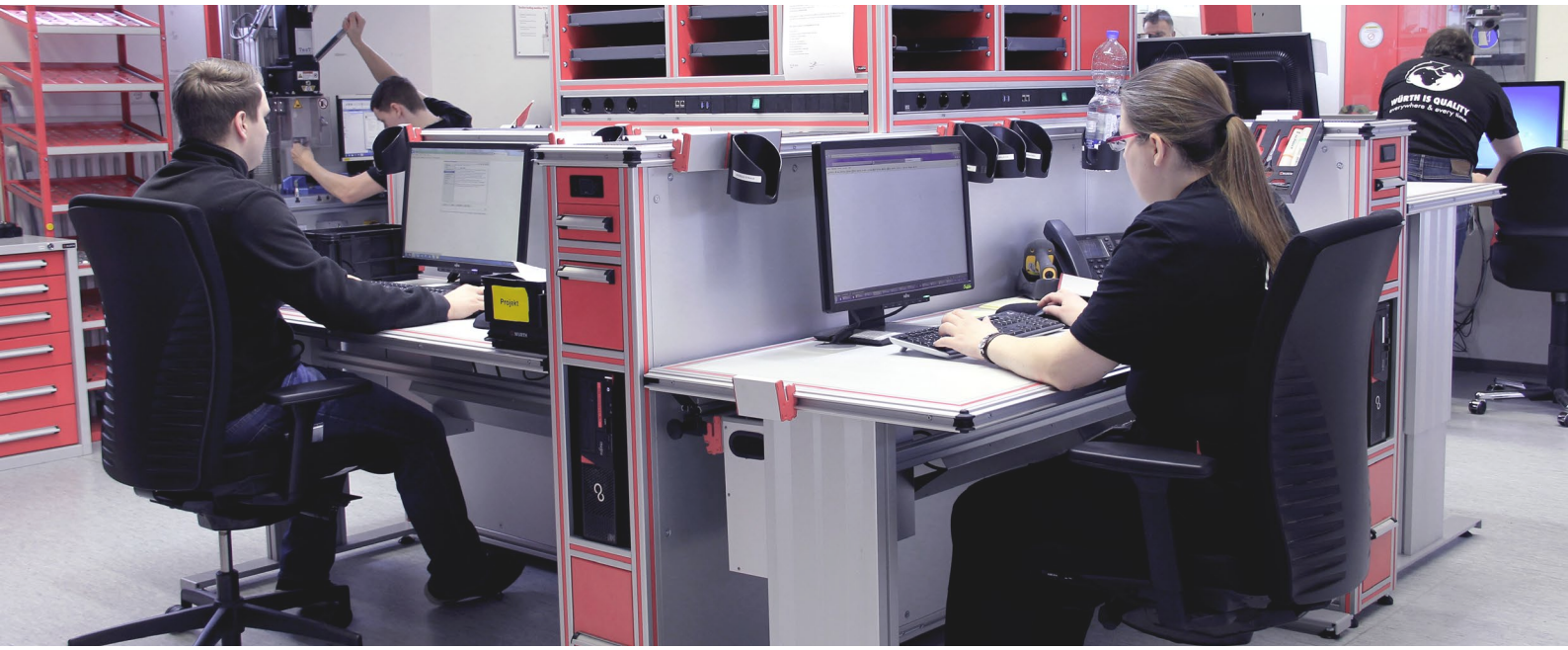
## People make the difference

Our laboratory is characterised by an open communication culture. In addition to individual development through internal and external training of team members, the sharing of knowledge between long-term employees and the next generation is another important point for securing and constantly developing expertise.

## Finding specialists and training materials testers

For us, the search for suitably qualified specialists is an important topic. Therefore, in addition to the recruitment of personnel, we train materials testers in the laboratory ourselves. As part of the traineeship, we provide young trainees with a basic knowledge of materials and their properties, educate trainees in the evaluation of materials and provide them with the necessary expertise to develop an insight into production processes and the individual influencing factors. Our aim is to enhance our laboratory with responsible specialists who consistently strive for quality and customer satisfaction.

**We have confidence in what we do —
and this benefits the entire Würth Industrie Service test laboratory and above all, our customers.**



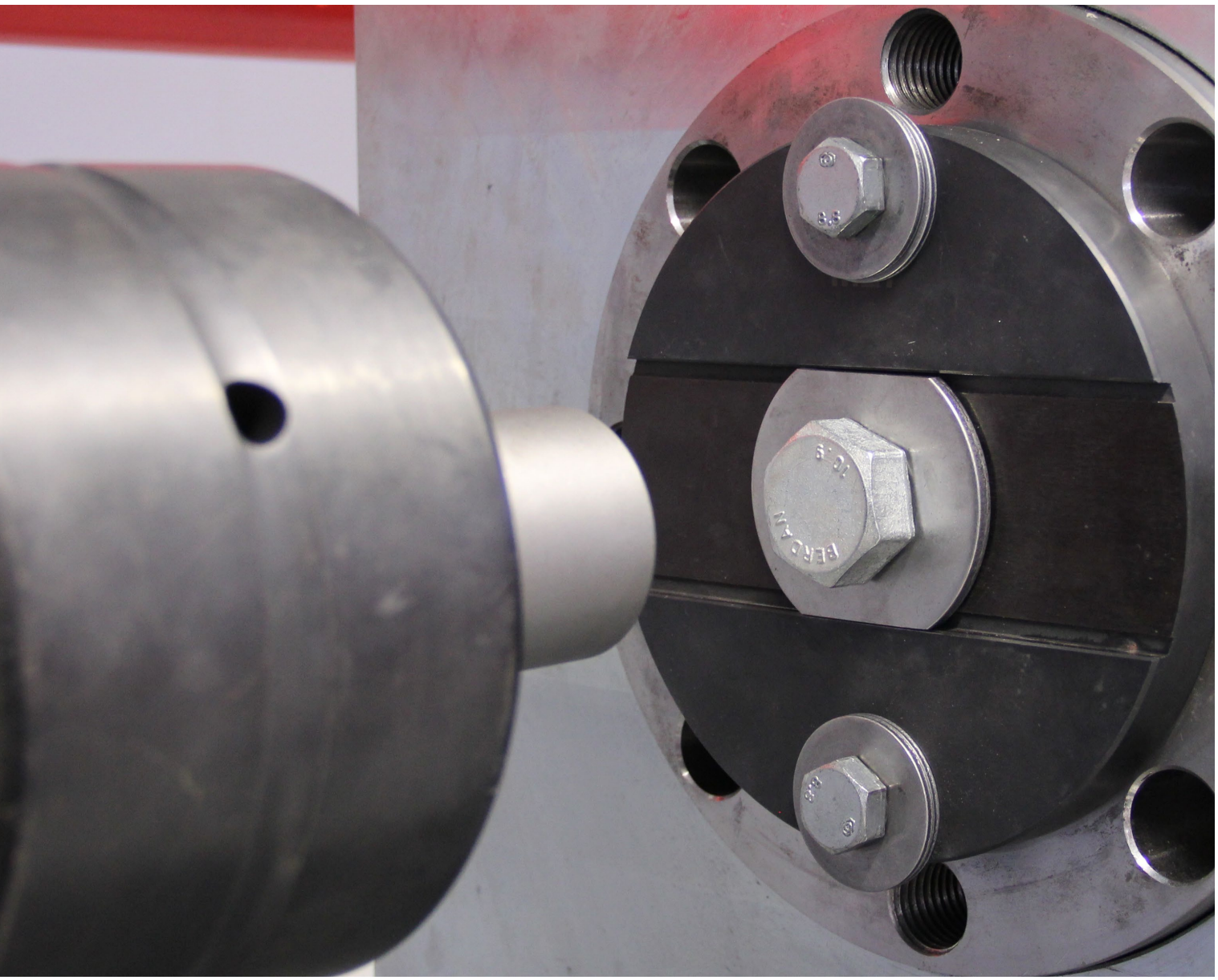
# SCREW CONNECTIONS

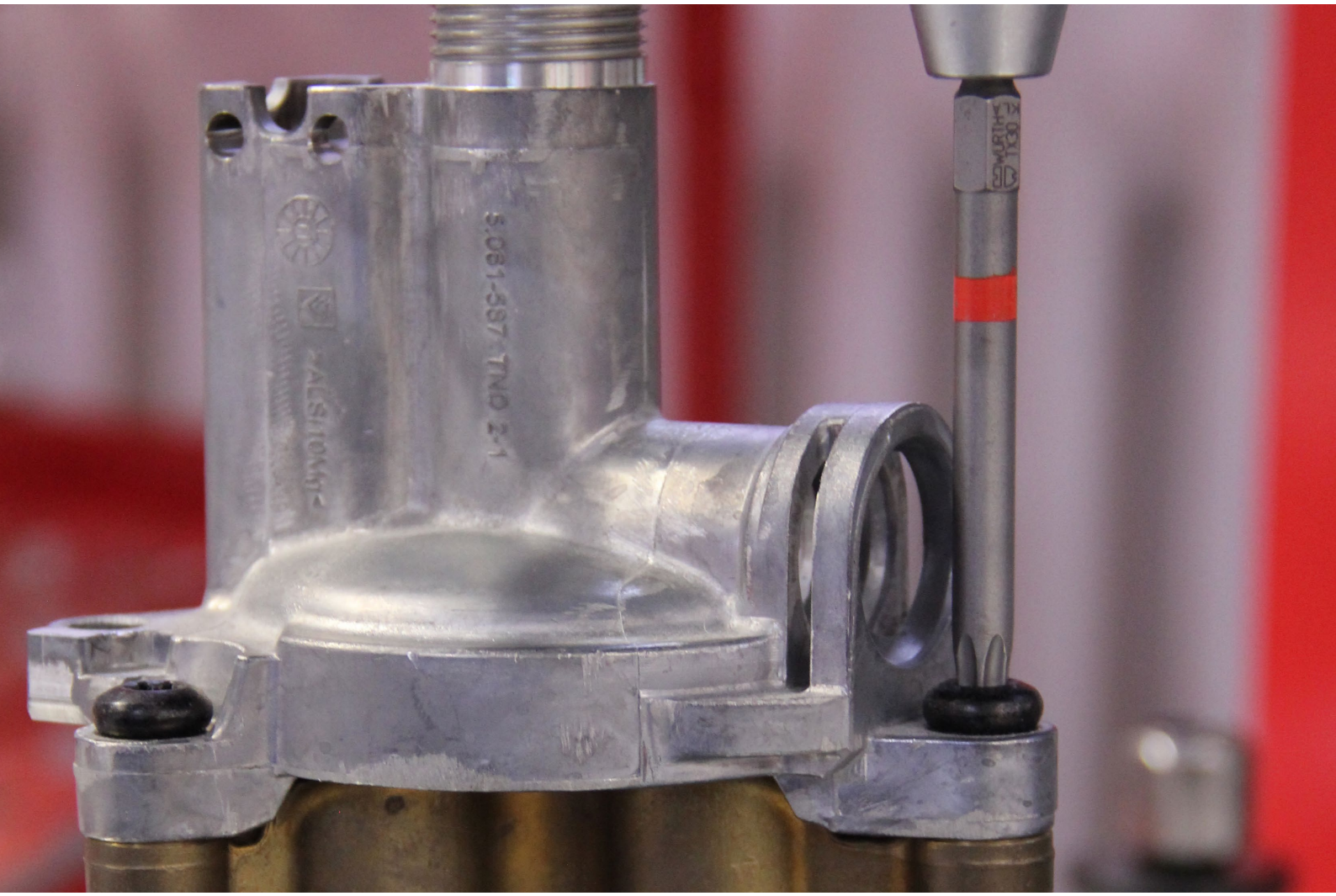
## Friction coefficient testing — from very small to M80

A pre-tensioned screw connection is not possible without friction. At the same time, the friction coefficient must be stable to allow a consistent assembly and maximum load-bearing capacity. We test standard screws from M5 to M80. For the larger screws, we use one of the world's largest friction coefficient testing machines for fasteners. This machine can test screws with a clamp force of up to 5,000 kN with a total torque of up to 60,000 Nm to ensure the load has been obtained.

**Standardised friction coefficient determination e.g. according to**

- DIN EN ISO 16047
- DIN EN 14399
- VDA 235-203





## Torsion testing — testing of special screws

Our test equipment includes two vertical torque test benches. These are used to determine the torque and the rotation angle of connected parts. This includes the functional characteristics of screws in relation to breaking torque, screw-in torque, rolling torque and tightening torque.

This technology is always used if the behavior of a connection element has to be evaluated on a specific customer's component. This makes us the partner of choice when it comes to application consulting and the united development of new products.

## Torsion testing with up to 800 rpm, maximum 150 Nm

**Standardised torsion testing e.g. according to**

- DIN 7500
- DIN 267-27
- DIN 267-28

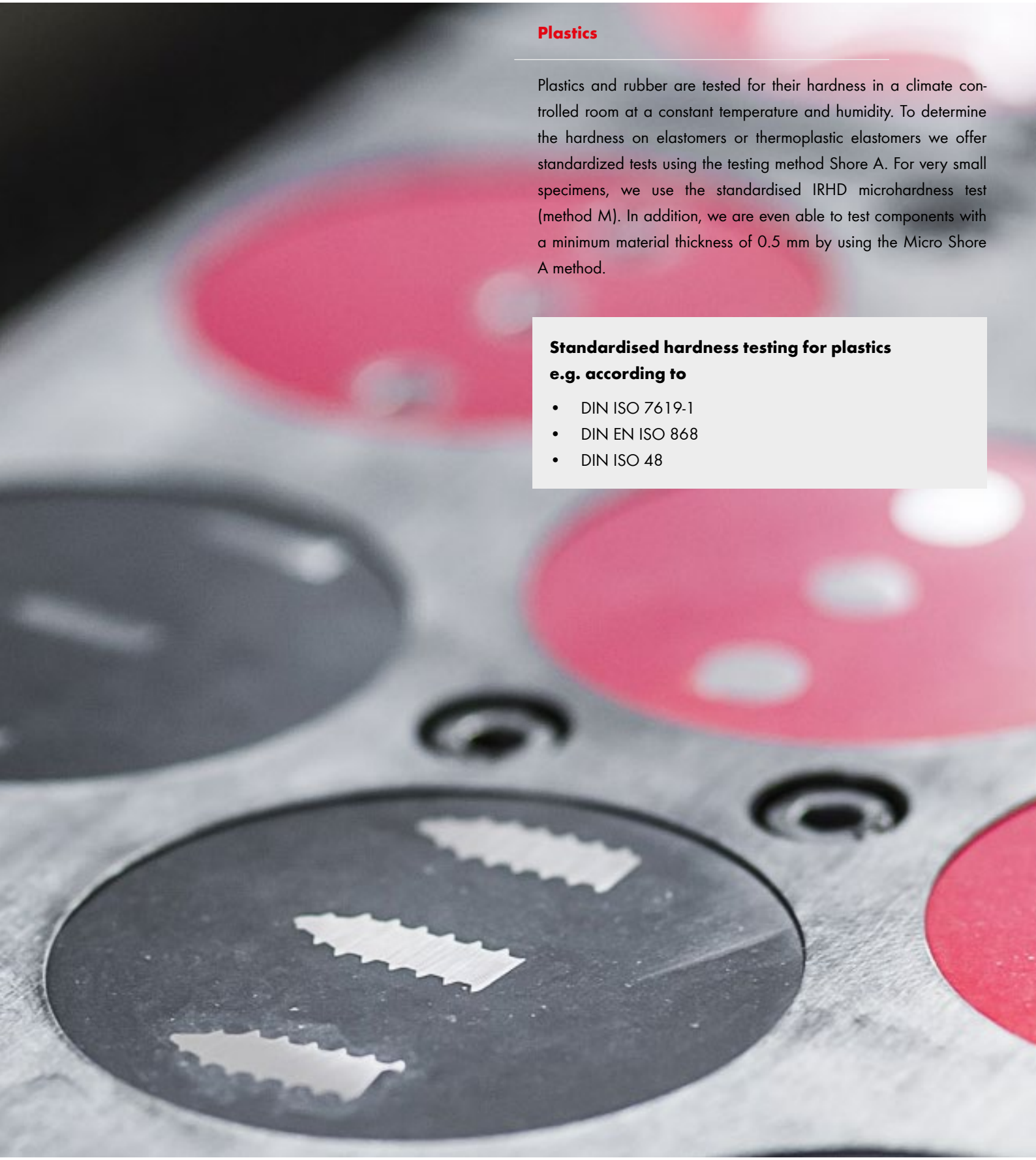
# HARDNESS TESTS

## Metals

Our portfolio includes the Brinell, Vickers and Rockwell testing methods for determining the hardness on metallic connection elements in line with current standards. In addition, the laboratory tests the depth of the case hardness on, among other things, tapping screws and thread rolling screws. Thanks to state-of-the-art laboratory facilities, simultaneous testing is also possible – after all, speed is of the essence in the damage case as well as in product development.

**Standardised hardness testing for metals**
**e.g. according to**

- DIN EN ISO 6506-1
- DIN EN ISO 6507-1
- DIN EN ISO 6508-1
- DIN EN ISO 2639
- DIN EN ISO 2702
- DIN 7500



## Plastics

Plastics and rubber are tested for their hardness in a climate controlled room at a constant temperature and humidity. To determine the hardness on elastomers or thermoplastic elastomers we offer standardized tests using the testing method Shore A. For very small specimens, we use the standardised IRHD microhardness test (method M). In addition, we are even able to test components with a minimum material thickness of 0.5 mm by using the Micro Shore A method.

**Standardised hardness testing for plastics e.g. according to**

- DIN ISO 7619-1
- DIN EN ISO 868
- DIN ISO 48

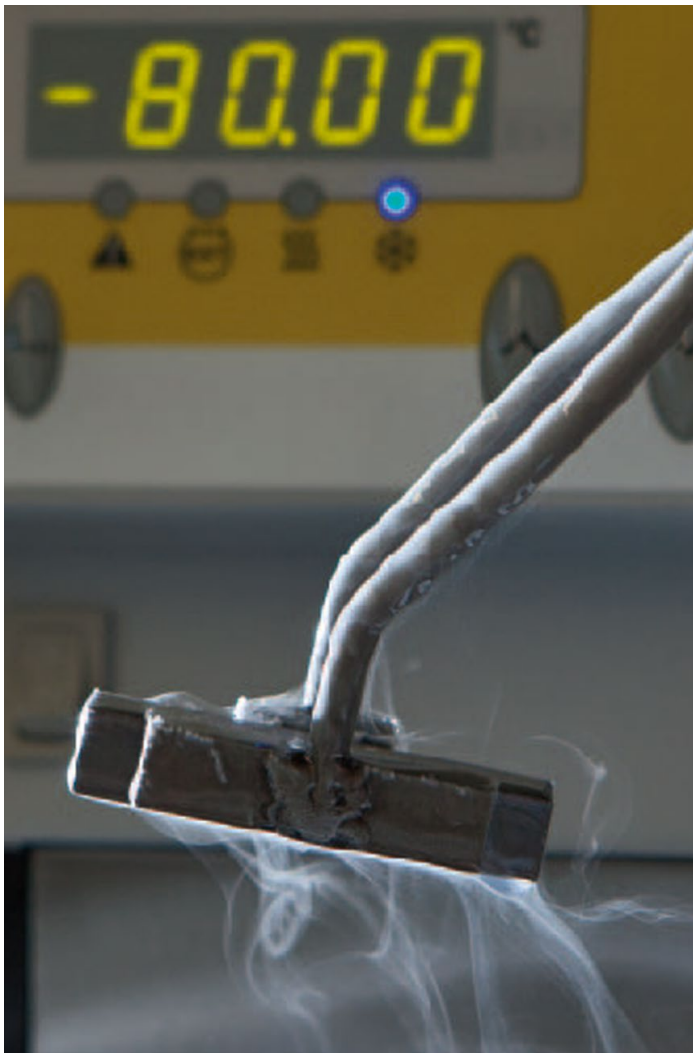
# MATERIAL SCIENCE

## Impact testing — hammering out results

The selection of a specific material also depends on its deformation behavior at varying temperature ranges. To determine the toughness of a metallic material at negative temperatures up to -80 °C, we use the impact test method.

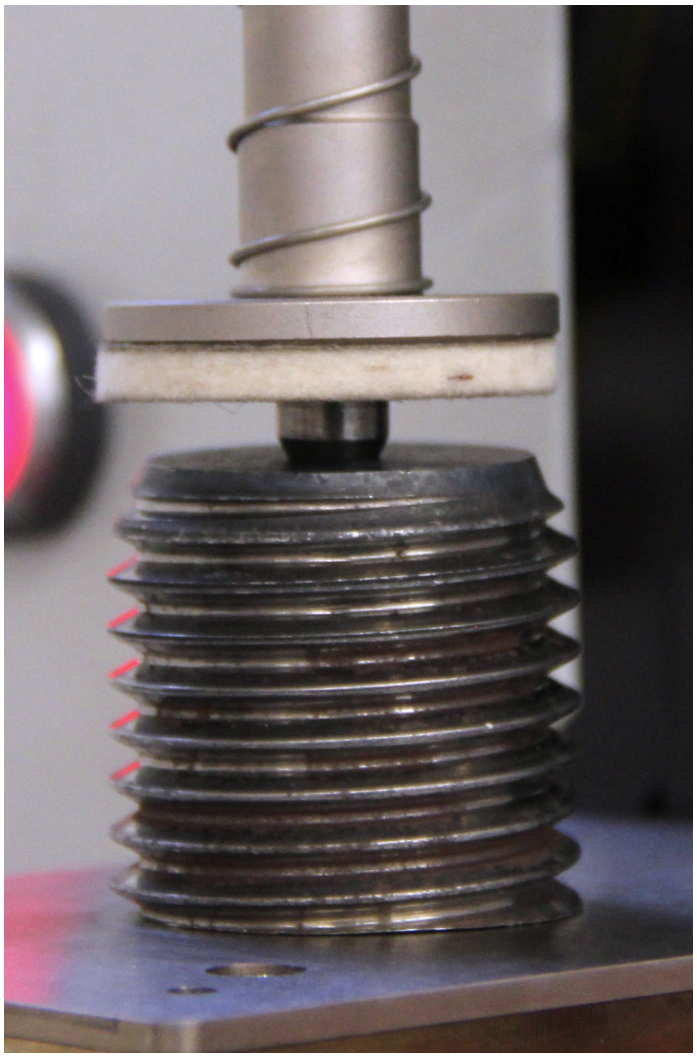
**Standardised impact testing e.g. according to**

- DIN EN ISO 148-1



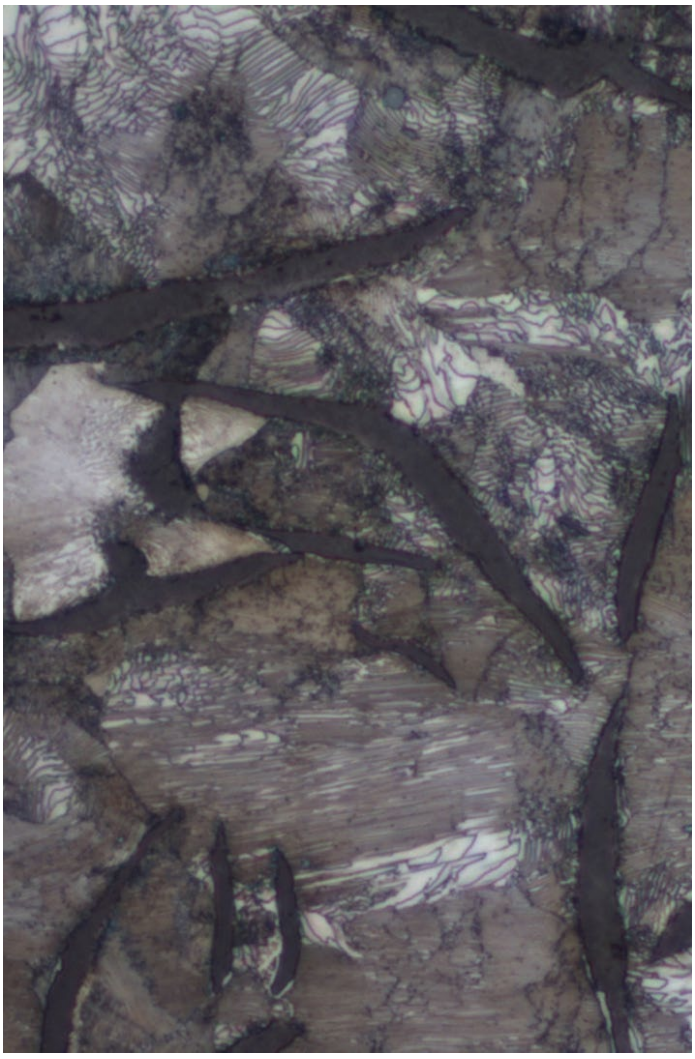

## Material analysis — making sparks fly

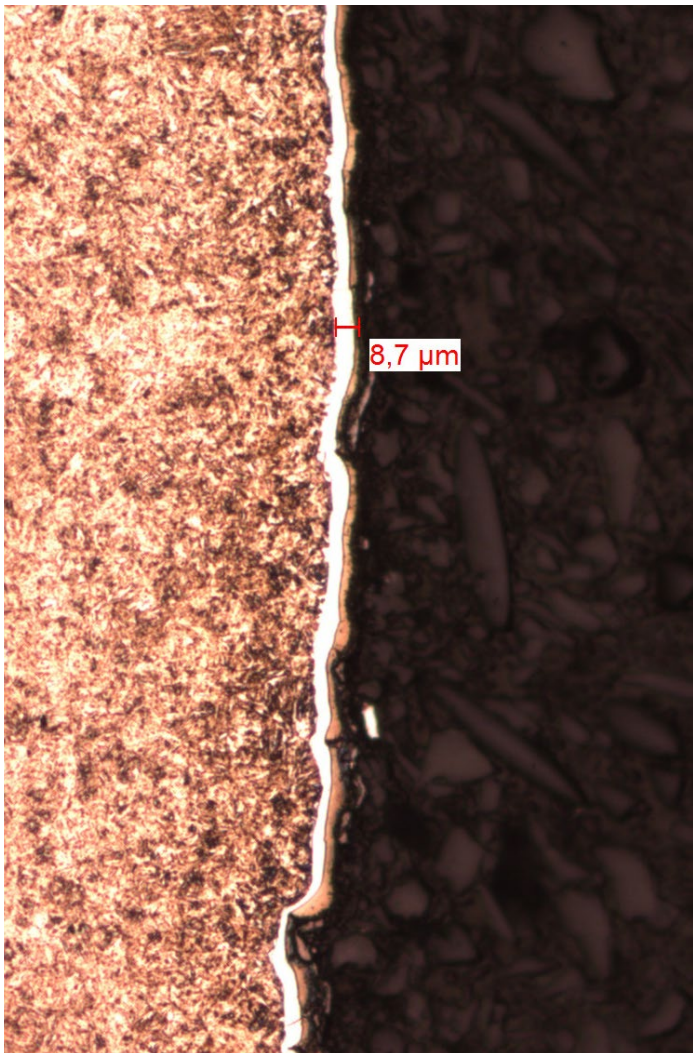
Material analysis using spectral technology is about establishing the elemental composition of metals. In our laboratory, we can flexibly test all current metallic materials that are based on iron, aluminium and copper. The vacuum spark emission spectrometer used for this process sparks off the surface of the specimen and produces a clear result indicating the elements contained and their weighting.



## Metallography — the view deep inside

Microstructure analysis is used to analyze surface discontinuities and heat treatment of products – even in damage cases. In our sample preparation room, we prepare metallographic sections to analyze their components in the next step. Using modern microscopes the analysis of the proportion of constituents, for example martensite or delta ferrite. It is also possible to determine the surface decarburization and carburization of the workpiece.





# TENSILE TESTS

## Tensile testing — it's make it or break it

The categorisation of screws, nuts and metallic components into strength classes forms the basis for a targeted and appropriate application. To determine important parameters, such as tensile strength and yield point, we expose screws, nuts and other metallic components to forces up to 60 tons in our twin-column tensile testing machine. During this process, specimens are loaded until they break or until the specified test force is reached. Using the tensile test under wedge, we can also test finished screws where the transition radius is exposed to additional stresses. In addition to screws up to M30 (8.8) and nuts up to M33 (10), we also offer tensile testing for machined specimens.

**Standardised tensile testing e.g. according to**

- DIN EN ISO 6892-1
- DIN EN ISO 898-1
- DIN EN ISO 898-2

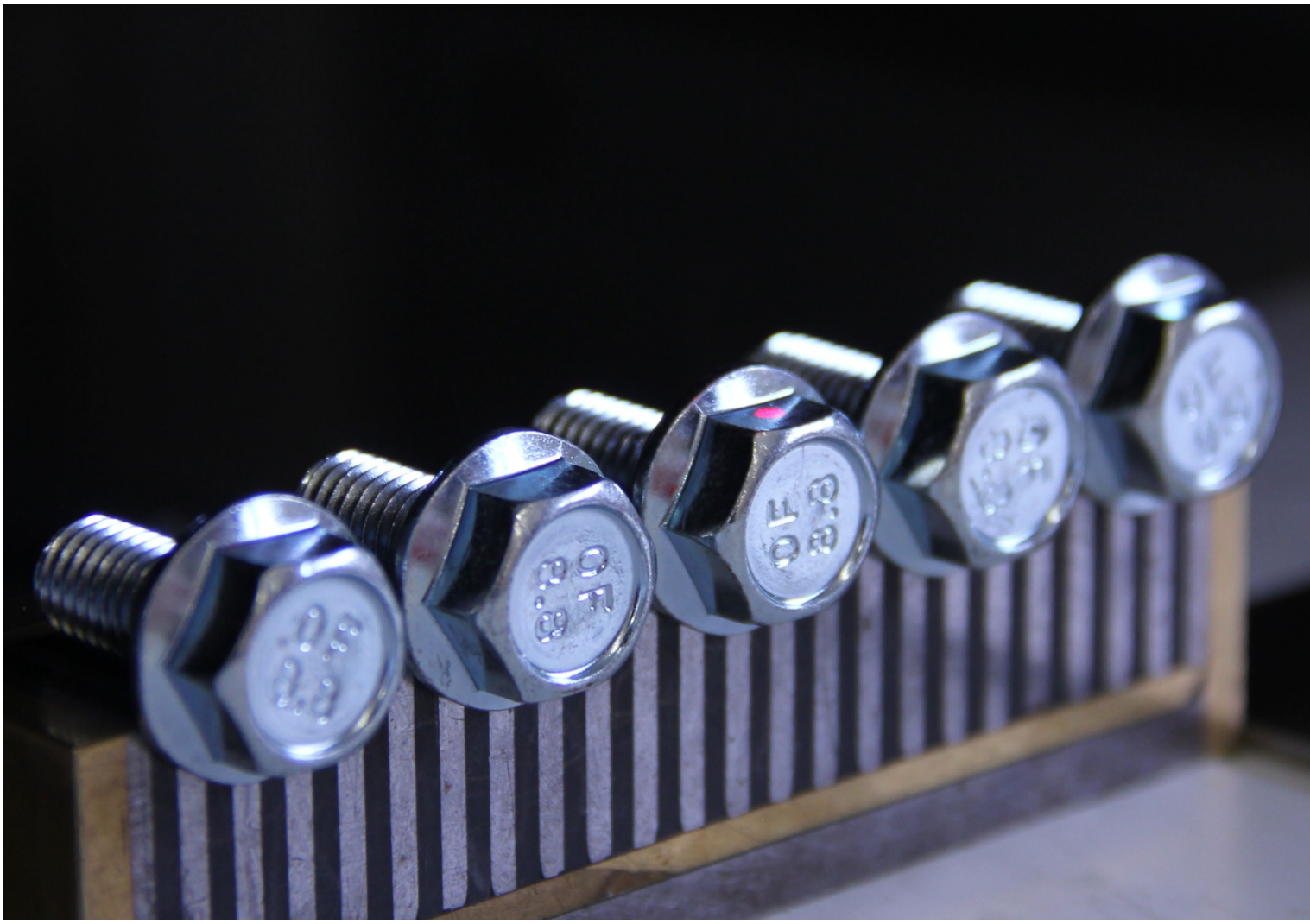
# SURFACES

## Corrosion testing — when mist turns salty

To test the resistance and protection level of coatings, we expose the test specimen to a sodium chloride solution. With a neutral pH value, the solution continuously attacks the surface of the specimen in the 35 degree Celsius salt spray chamber. Depending on the application requirements of the connection technology, the testing time can last from a few hours up to several 1000 hours. Afterwards, typical features such as white rust and red rust can be assessed.

**Neutral salt spray testing e.g. according to**

- DIN EN ISO 9227



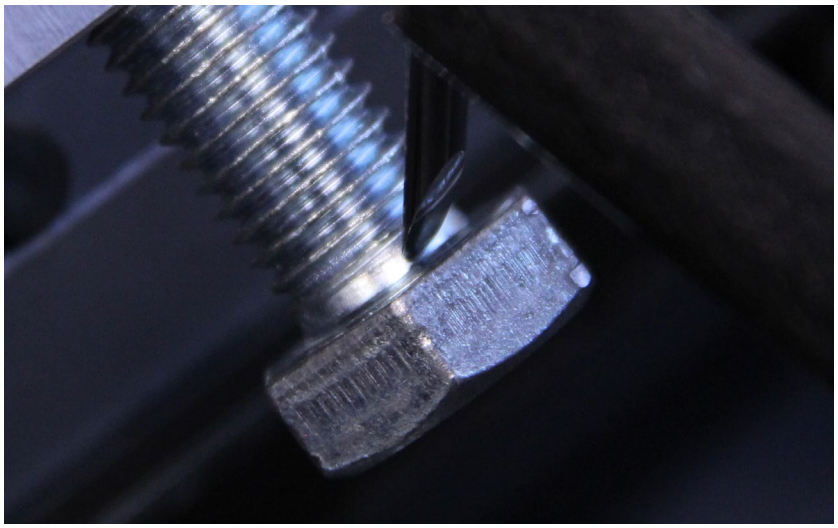
# GEOMETRY

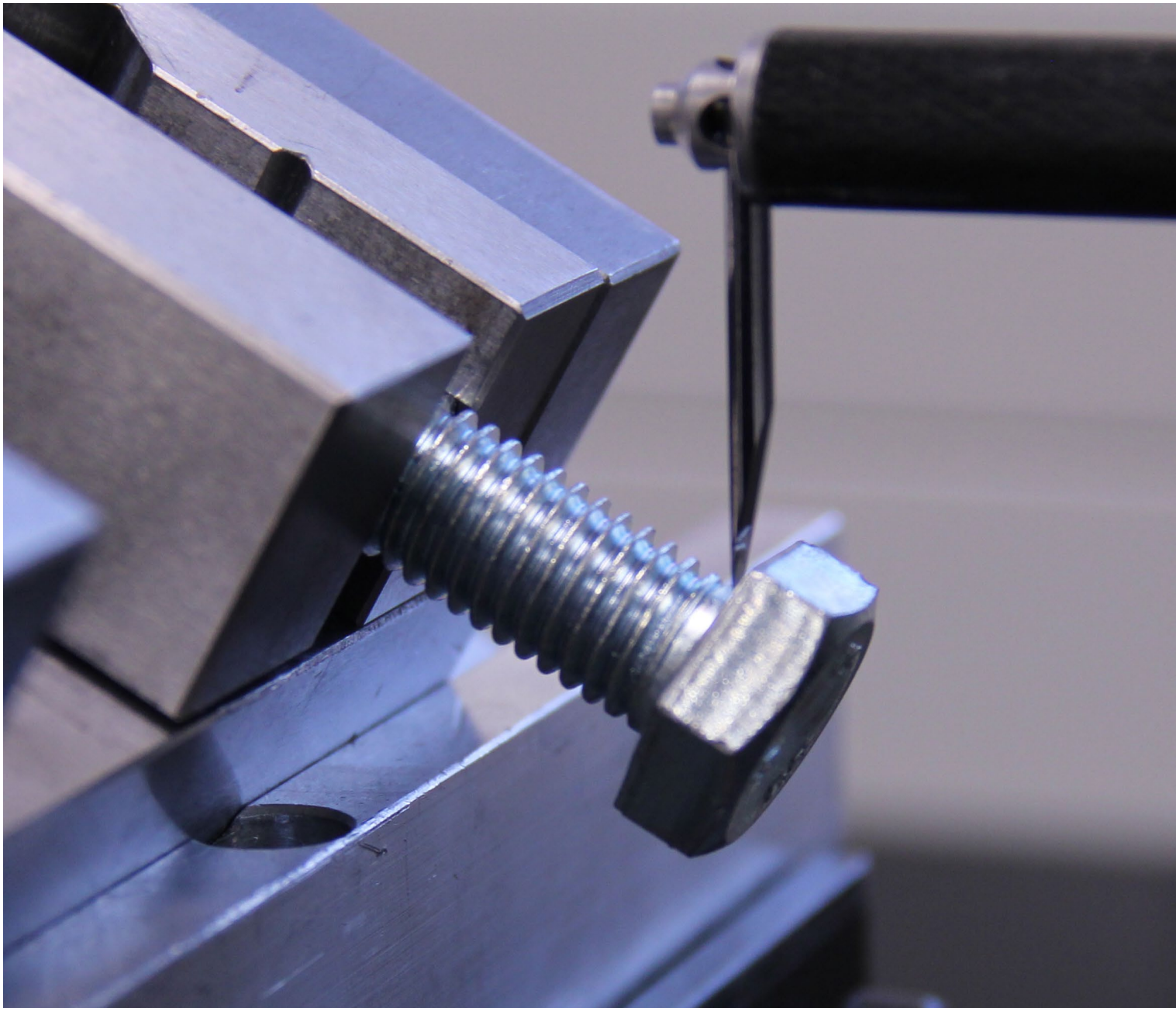
## 3D measuring — by sight, by touch and by laser

Complex geometries are particularly challenging for measuring technology. To reliably determine shape and positional tolerances in these cases, we use a state-of-the-art 3D coordinate measuring device. Using a camera, a measuring probe and laser technology, the workpiece is examined by three measuring sensors. This enables us to provide a measuring accuracy and a repeat accuracy in the micro range. To exclude the influence of temperature fluctuations and the change of length of the component, the 3D measuring instrument is located in a climate controlled room at a constant temperature and humidity.

## Contour measuring — please scan

Does the connecting piece live up to its promise? When it comes to evaluating heights, lengths, angles and radii, we test the work pieces quickly and reliably in a tactile contour measuring device. The measuring accuracy of this process is within the micro range.





# ACCREDITED TESTING METHODS

## Accredited test laboratory

We are accredited as an official test center for more than 50 standardized testing methods according to DIN EN ISO/IEC 17025.

## Trust and certainty

The official recognition of our services means one thing in particular for our customers: We are a reliable and objective partner for quality assurance and product development in line with international requirements for measuring and testing technology. It also means that our customers are justified in placing their trust in our laboratory services. Our accreditation serves as proof of our technical competence in addition to the conformity with standards and regulations that are firmly anchored in our quality management. To ensure that this is guaranteed in the future, we have a flexible scope of accreditation that allows us to use the accredited methods regardless of the version of the standard.

## A focus on progress

The current list (last updated April 25th 2018) provides an overview of our methods. However, our stated goal is to continue to obtain accreditation for further testing methods and provide our customers with the documented evidence they need.

ilac-MRA DAkkS Deutsche Akkreditierungsstelle D-PL-20518-01-00

## Accredited testing methods

| Standard | Title of Standard |
|---|---|
| DIN EN ISO 2639:2003 | Steels - Determination and verification of the depth of carburized and hardened cases (HV) |
| DIN EN ISO 6506-1:2015 | Metallic materials - Brinell hardness test - Part 1:<br>Test method (here: HBW 2,5/187,5; HBW 2,5/31,25; HBW 2,5/15,625) |
| DIN EN ISO 6507-1:2006 | Metallic materials - Vickers hardness test - Part 1:<br>Test method (here: HV0,3; HV1; HV3; HV5; HV10; HV30) |
| DIN EN ISO 6508-1:2016 | Metallic materials - Rockwell hardness test - Part 1:<br>Test method (here: HRC; HR15N; HR45N; HR30N) |
| DIN EN ISO 868:2003 | Plastics and ebonite - Determination of indentation hardness by means of a durometer<br>(Shore hardness) (here: Shore A) |
| DIN ISO 48:2016 | Rubber, vulcanized or thermoplastic - Determination of hardness<br>(hardness between 10 IRHD and 100 IRHD) (here: Method M and CM) |
| DIN ISO 7619-1:2012 | Rubber, vulcanized or thermoplastic - Determination of indentation hardness - Part 1:<br>Durometer method (Shore hardness) (here: Shore A) |
| WIS-Standard WISTQL-13-450:2018 | Micro Shore A based on DIN ISO 7619-1 |
| DIN EN ISO 6892-1:2017 | Metallic materials - Tensile testing - Part 1: Method of test at room temperature<br>(here: only method B) |
| DIN EN ISO 16047:2013 | Fasteners - Torque/clamp force testing (from M5) |

| Standard | Title of Standard |
|---|---|
| VDA 235-203:2005 | Test for coefficient of friction, coefficient of friction - Functional- and installation test (M5 to M16) |
| DIN EN ISO 148-1:2017 | Metallic materials - Charpy pendulum impact test - Part 1: Test method |
| WIS-Standard WISTQL-13-449:2018 | Microstructural analysis of fasteners on low alloy steel |
| DIN EN ISO 9227:2017 | Corrosion tests in artificial atmospheres - Salt spray tests (NSS) |
| DIN 7500-1:2009 | Thread rolling screws for ISO metric thread - Part 1: Technical specifications for case hardened and tempered screws |
| Hardness testing | Chapter 5.1 Testing the core hardness |
| Hardness testing | Chapter 5.2 Testing the surface hardness |
| Hardness testing | Chapter 5.3 Testing the case hardening depth |
| Torque meter test | Chapter 5.6 Screw-in test |
| DIN 7513:2016 | Thread cutting screws - Hexagon screws and slotted head screws - Dimensions, requirements, testing |
| Hardness testing | Chapter 5.1.1 Testing the surface hardness |
| Hardness testing | Chapter 5.1.2 Testing the case hardening depth |
| Hardness testing | Chapter 5.1.3 Testing the core hardness |
| Torque meter test | Chapter 5.2.1 Screw-in test |
| DIN 7516:2016 | Thread cutting screws - Cross recessed head screws - Dimensions, requirements, testing |
| Hardness testing | Chapter 5.1.1 Surface hardness test |
| Hardness testing | Chapter 5.1.2 Case hardening depth test |
| Hardness testing | Chapter 5.1.3 Core hardness test |
| Torque meter test | Chapter 5.2.1 Screw-in test |
| DIN EN ISO 2702:2011 | Heat-treated steel tapping screws - Mechanical properties |
| Hardness testing | Chapter 6.1.1 Surface hardness test |
| Hardness testing | Chapter 6.1.2 Case depth - Microscopic test |
| Hardness testing | Chapter 6.1.3 Core hardness test |
| DIN EN ISO 898-1:2013 | Mechanical properties of fasteners made of carbon steel and alloy steel - Part 1: Bolts, screws and studs with specified property classes - Coarse thread and fine pitch thread |
| Tensile testing | Chapter 9.1 Tensile test under wedge loading of finished bolts and screws (excluding studs) |
| Tensile testing | Chapter 9.2 Tensile test for finished bolts, screws and studs for determination of tensile strength, Rm |
| Tensile testing | Chapter 9.4 Tensile test for bolts and screws with reduced loadability due to head design |
| Tensile testing | Chapter 9.7 Tensile testing for machined test pieces |
| Hardness testing | Chapter 9.9 Hardness test |
| Hardness testing / Metallographic analyses | Chapter 9.10 Decarburization test |
| Hardness testing / Metallographic analyses | Chapter 9.11 Carburization test |
| Impact test | Chapter 9.14 Impact test for machined test pieces |

| Standard | Title of Standard |
|---|---|
| DIN EN ISO 898-2:2012 | Mechanical properties of fasteners made of carbon steel and alloy steel - Part 2: Nuts with specified property classes - Coarse thread and fine pitch thread |
| Tensile testing | Chapter 9.1 Proof load test |
| Hardness testing | Chapter 9.2 Hardness test |
| DIN EN ISO 3506-1:2010 | Mechanical properties of corrosion-resistant stainless steel fasteners - Part 1: Screws |
| Tensile testing | Chapter 7.2.2 Tensile strength, Rm |
| Tensile testing | Chapter 7.2.6 Tensile test under wedge loading of full size martensitic bolts and screws (not studs) |
| Hardness testing | Chapter 7.2.7 Hardness testing HB, HRC or HV |
| DIN EN ISO 3506-2:2010 | Mechanical properties of corrosion-resistant stainless steel fasteners - Part 2: Nuts |
| Hardness testing | Chapter 7.1 Hardness testing HB, HRC or HV |
| Tensile testing | Chapter 7.2 Proof load |
| DIN 580:2010 | Lifting eye bolts |
| Tensile testing | Chapter 6 Testing |
| DIN 582:2010 | Lifting eye nuts |
| Tensile testing | Chapter 6 Testing |
| DIN EN 15048-2:2016 | Non-preloaded structural bolting assemblies - Part 2: Fitness for purpose |
| Tensile testing | Chapter 6 Tensile test for determining the braking strength of fittings for screw connections |
| DIN 267-27:2009 | Fasteners - Part 27: Steel screws, bolts and studs with adhesive coating, Technical specifications |
| Torque meter test | Chapter 6.2.1 Test with preload (up to 150 Nm and at room temperature) |
| Torque meter test | Chapter 6.2.2 Test without preload (up to 150 Nm and at room temperature |
| Testing the coefficient of friction | Chapter 6.3 Testing the thread friction coefficient (from M5) |
| DIN 267-28:2009 | Fasteners - Part 27: Steel screws, bolts and studs with adhesive coating, Technical specifications |
| Torque meter test | Chapter 6 Test (up to 150 Nm and at room temperature) |
| DIN EN 14399-2:2015 | Fasteners - Torque/clamp force testing |
| Testing the coefficient of friction | Chapter 6 Suitability test (HV and HR trimmings, all K-classes) |

# CONTACT

**We are here for you! We would be pleased to advise you:**

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