

TECHNOLOGY TEST CENTER

Measuring the stress-strain curves of metals and plastics. The results are included as input parameters in reliable forecast simulation calculations.

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Functionality, reliability, quality and security are key features in connectors and systems. A profound understanding of the underlying physical interrelations is necessary to ensure them. It's also important to confirm the mechanical and electrical properties of the products in every development and design phase through numerous qualification tests along the way as well as strict quality control during production.

# 11 MEASURING, TESTING, UNDER- STANDING AND CONTROLLING

Our Technology Test Center – T<sup>2</sup>C for short – is the central linchpin for application-specific baseline investigations as well as for the development and use of many different testing procedures. In this double function, the T<sup>2</sup>C delivers the all-important knowledge base for the technical development of connectors and systems.

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# SPECIAL MEASURING TECHNOLOGY AND TESTING PROCEDURES

It's not rare for ODU to test the limits of what's physically viable both in the development and the manufacturing of new products. We consider state of the art the minimum dimension of what can be achieved. But this requires measuring and testing equipment that isn't always available on the market. That's why we develop and build it in-house. Experience, calibrated measuring devices, skilled personnel and fixed testing procedures are the basis for reproducible measuring results and the right layout of mechanical and electrical connector parameters. At the same time, measurement and testing results constantly extend the database from which these very extensive and reliable simulation procedures are pulled.

## Central testing procedures – exemplified

### Mating cycle testing – the yardstick of a long service life

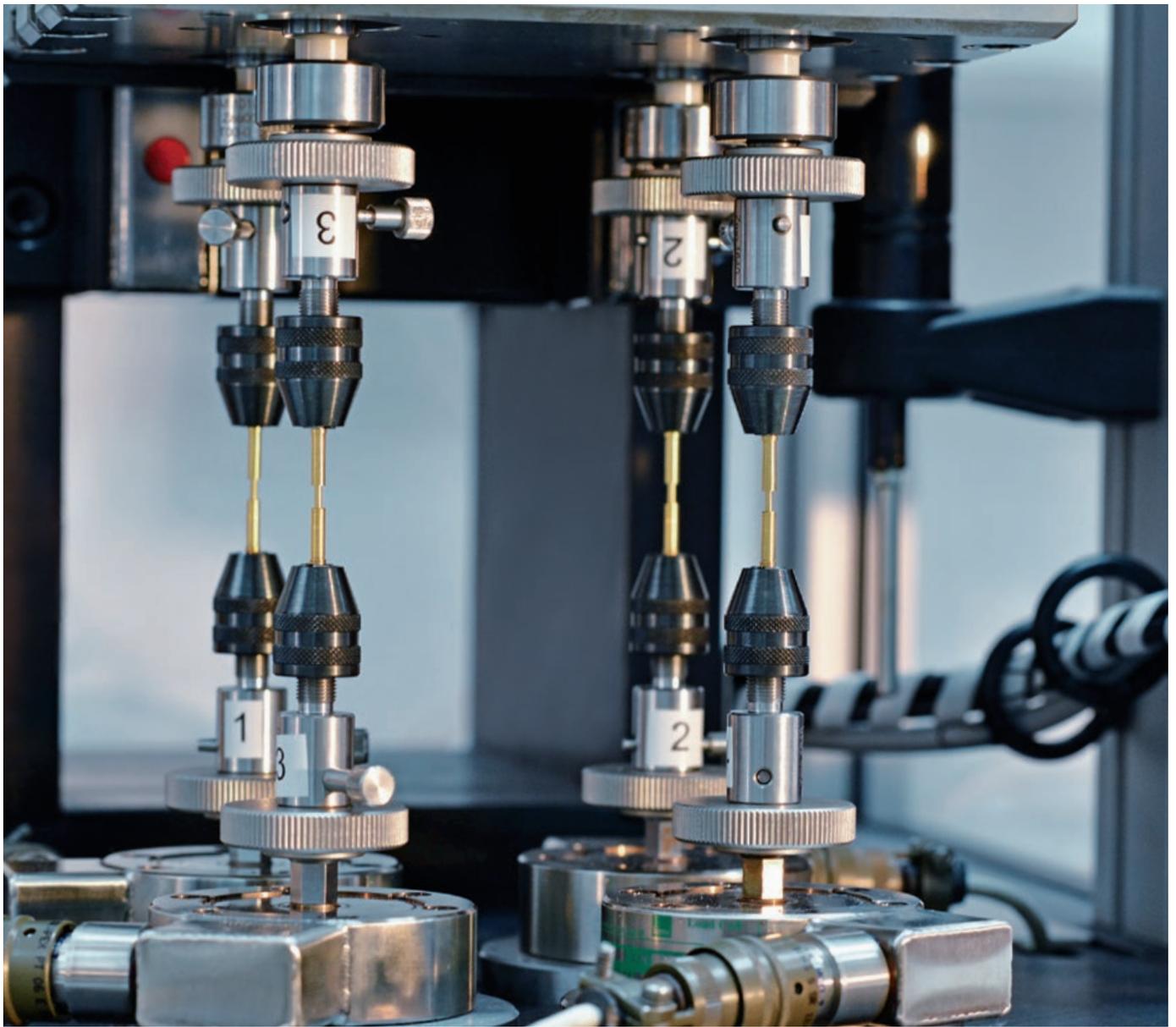
ODU is known for contacts that offer a particularly high number of mating cycles with consistent functionality. Depending on each application, up to one million mating cycles can be reached. The balance between high mechanical load capability and long-term stable electrical transmission properties is decisive. Our testing equipment developed in-house especially for mating cycle testing is used for measuring the most important contact features even during development. In addition, contacts can be energized during the cycles. The testing device thus delivers a reproducible picture of wear and contact resistance under real-life ambient conditions.

### High-voltage measurements for security

In the design of a connector, the correct dimensioning of clearance and creepage distances and adjusted choice of materials is laid out to resist high voltage. Partial discharge measurements and high-voltage testing confirm the design during the product development process. Thanks to our fully automatic 5 kV high-voltage test bench, error-free processing is also ensured during production. This integrated approach guarantees the highest quality standard and longest service life for the customer.

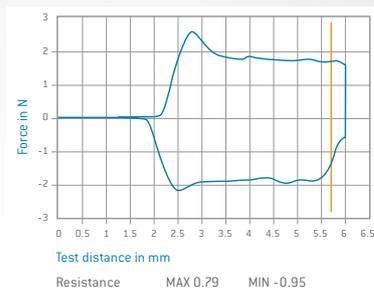


Fully automatic serial high-voltage testing – an ODU quality standard.

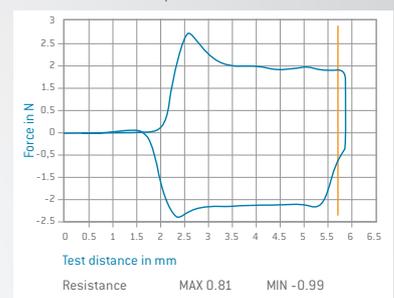


The **mating cycle test** simultaneously records the contact resistance and mating and unmating forces of each process (an ODU in-house development).

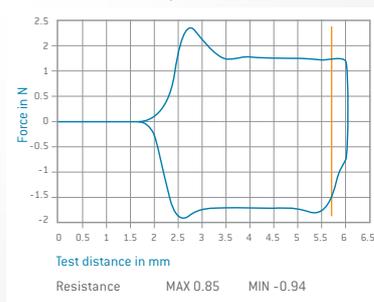
Specimen 1



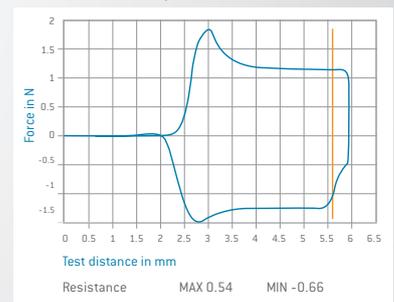
Specimen 2



Specimen 3



Specimen 4



Individual evaluation (7,040 cycles)

# PREMIUM QUALITY THROUGH COMPREHENSIVE TESTING SYSTEMATICS

At this point, not all of ODU's in-house measuring and testing methods, which are also an expression of the company's consistent quality strategy, can and should be listed. The examples of procedures named here are those upon which ODU places particular value and where the particular application knowledge contributes to the continuous development of product functionality.

## Special electrical testing

- Measuring stations for current-carrying capacity for particularly high currents used for testing temperature-dependent energy transmission (derating)
- Testing station for partial discharge: for ensuring the long-term stability of a high-voltage connector
- For data-bus applications: network analyzer for measuring insertion loss, return loss, crosstalk as well as TDR (time domain reflectometry) for recording impedance profiles
- Measurement of EMC stability (EMC = electro-magnetic compatibility) using the standard triaxial measurement method

## Comprehensive mechanical testing

- Continuous recording of the lowest forces and contact resistances
- Monitoring of wear and friction coefficients as well as evaluation of climatic load
- Targeted and tested selection of surface materials in regard to vibratory stress: using a specifically developed testing device that can reproduce friction paths of 10 to 100  $\mu\text{m}$

## Application-specific material selection and testing

- In-house material science laboratory for the selection of materials and surface finishes: mechanical testing methods, chemical analyses and micro-section preparation
- ODU's own material database with comprehensive data portfolio, also available for future applications
- Chemical area of laboratory: testing of media resistance and autoclavability based on IEC 13485 medical product regulation
- An extensive equipment pool is available to simulate environmental conditions, including cold, heat and humidity chambers. Salt-spray fog chamber, extensive testing equipment for environmental conditions such as in off-shore or military sectors.
- High-pressure chamber for testing maximum tightness
- Helium leak rate measurement equipment: for high-vacuum applications

Wide range of tests in ODU's own test laboratory:

1. By means of a testing machine, the key mechanical data of basic materials – even temperature-dependent ones – can be determined via force transducer and extensometer based on tensile test pieces.
2. S-parameter measurements of an assembled data-technology connector in quality assurance.
3. The S-parameter measurement on the network analyzer ensures transmission characteristics for data and reports.

