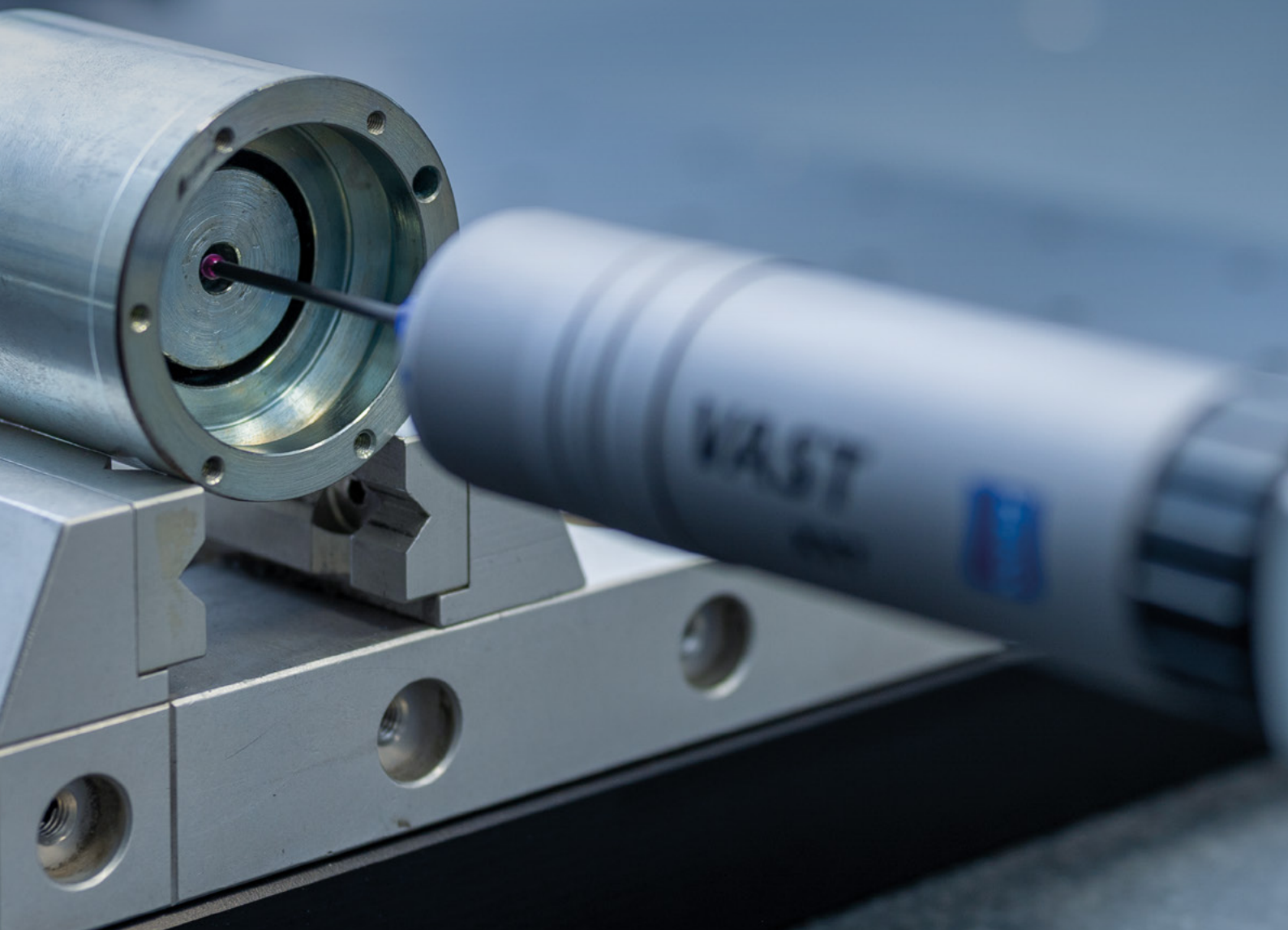


MATERIALS SERVICES  
thyssenkrupp Schulte

# Magnetic Services

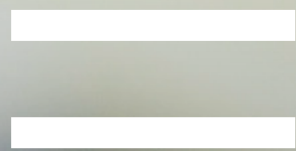
Precision for your success.



engineering.tomorrow.together.



thyssenkrupp



# Magnetic Services.

The complex demands of modern magnetics require more than just expertise and experience – they call for comprehensive technical support. At thyssenkrupp Magnettechnik, we deliver exactly that: with state-of-the-art measuring and testing equipment and highly qualified personnel. Whether it's shape, position, contour, roughness, or magnet-specific criteria, prototype production or IATA dangerous goods testing – our experts perform the magnetic and geometric measurements, as well as field-numerical and analytical calculations, that ensure your product meets the highest quality standards.



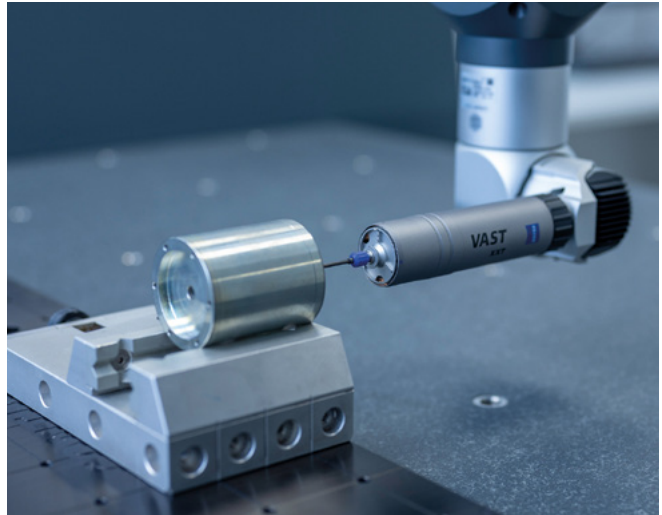


# What makes us unique...



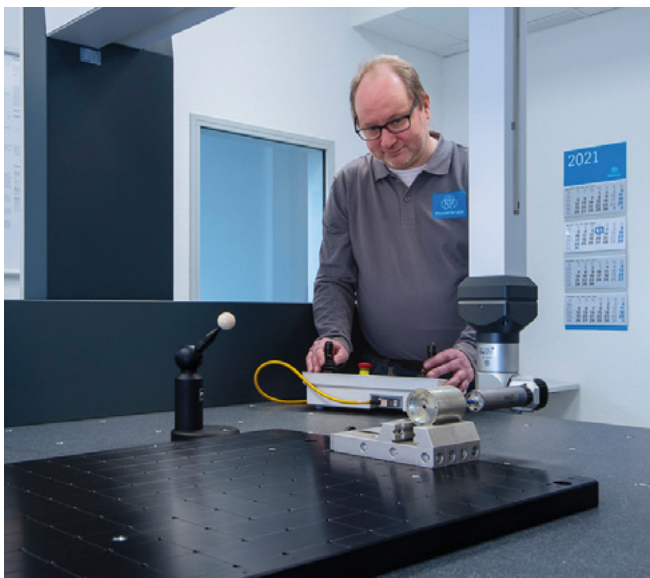
## Geometric Precision

Product quality is the baseline for competing nationally and internationally. Using advanced 3D coordinate measuring machines and tactile, analog, and optical methods, we inspect your components with maximum precision. You focus on development and production – we support your quality assurance. Geometric product specifications (dimensions, shape and position) are checked with highest measurement accuracy [ $1,8 + L/350 \mu\text{m}$ ] and volume capacity [ $1.000 \text{ mm} \times 1.200 \text{ mm} \times 600 \text{ mm}$ ].



## Programming

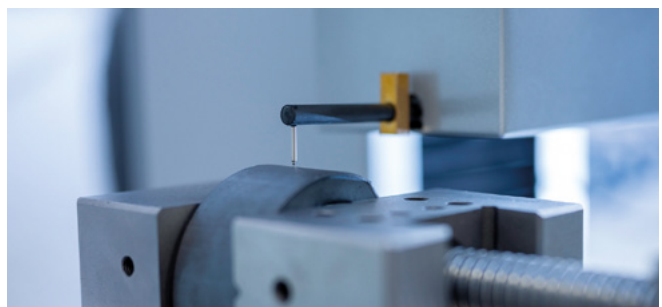
We handle both the development of customized concepts to solve your manufacturing and quality assurance tasks, as well as the creation of measurement programs for ZEISS CALYPSO – tailored to your environment and every measurement task.



## Contour

Structured functional surfaces with tight tolerances require high-precision measuring systems that can capture the topography of a workpiece or object over a large area in a short time. We provide target/actual comparisons, curve measurements, and comparisons against CAD data sets.

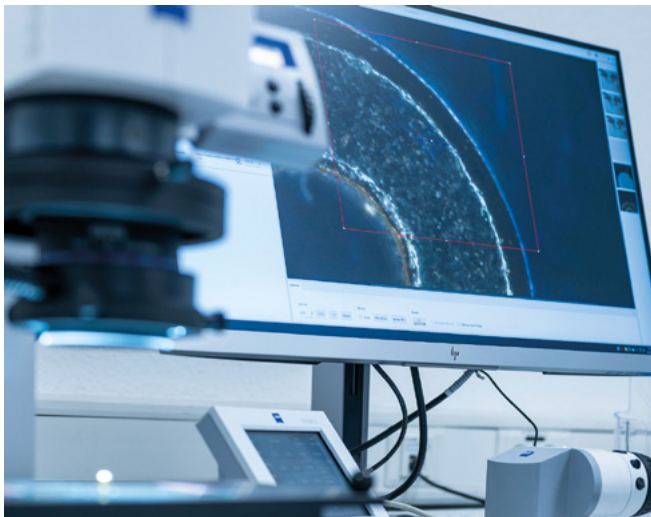
<b>Resolution-X</b>	0,016 $\mu\text{m}$
<b>Resolution-Z (Roughness)</b>	1,0 nm/ $\pm 0,025 \text{ mm}$ range up to 100 nm/ $\pm 2,5 \text{ mm}$ range
<b>Resolution-Z (Contour)</b>	0,015 $\mu\text{m}$
<b>Length Measurement Deviation-X</b>	$\pm(1,0 + 0,01L) \mu\text{m}$ Length Measurement Deviation-Z (Contour): $\pm(1,0 + 2H/100) \mu\text{m}$
<b>Straightness-X</b>	00,05 + 0,001L $\mu\text{m}$





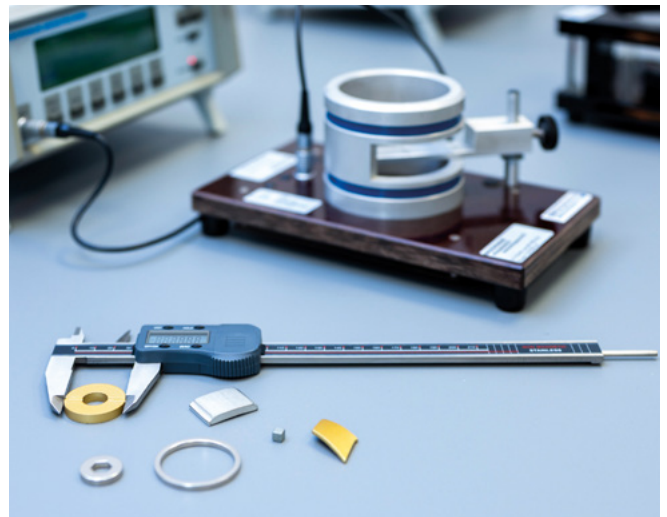
## Documentation

The initial sample, as an important component within Product Lifecycle Management (PLM), is an industry standard in quality management and quality assurance. During product launches, the initial sampling process helps minimize risk before the start of series production. Ideally, it is already applied at the supplier level within their supplier management to ensure customer requirements are met. Our initial sampling includes an inspection report (e.g., VDA or PPAP).



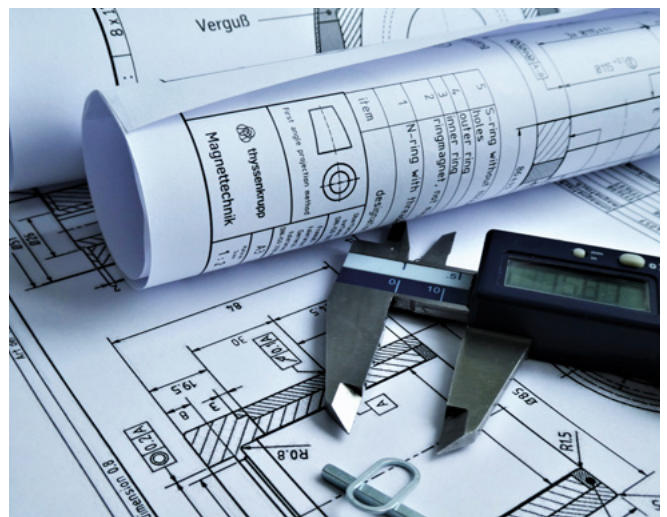
## Calibration

Calibration is the comparison of a measured value with the correct value under specified conditions, documenting the deviation, calculating measurement uncertainty, and issuing the calibration certificate. Calibration ensures and maintains the quality, reliability, operability, and readiness of measuring instruments within a company. The goal is to guarantee that measuring instruments consistently deliver the required performance. In our facility, measuring instrument monitoring is carried out using CMM checks and gauge blocks.



## Strategy

Drawing interpretation and the development of measurement strategies play a decisive role in how meaningful and stable a measurement result is. Components often require tight drawing tolerances of up to 1  $\mu\text{m}$ . We are happy to support you in creating your programs. We tailor the measurement strategy for turned, milled, and ground parts or other manufacturing processes precisely to your needs.

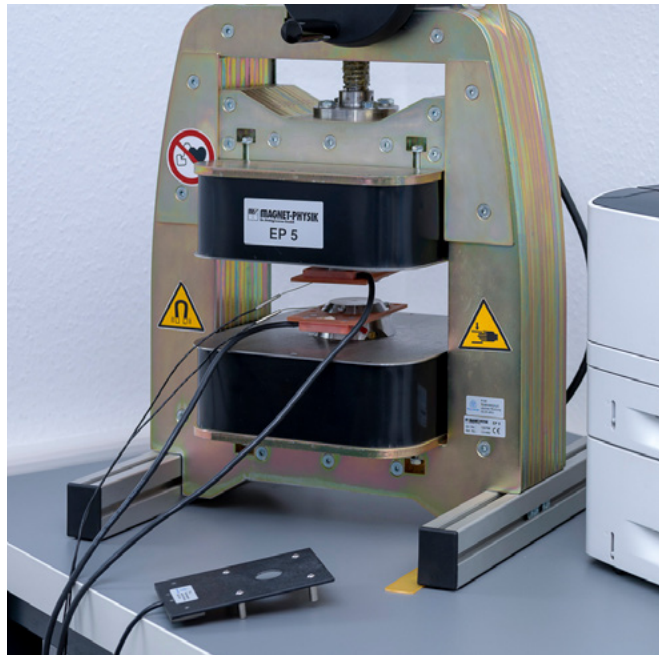




## Core Competence

As magnet experts, our core competence lies in the qualified verification of magnet-specific requirements.

Flux Measurement	F01 < 200 mVs (x1, x10, x100, x1000) 0,1µVs – 999,9mVs H75 (K = 0,01585 cm) D = 75 mm, R = 160 Ohm H01 (K = 0,0101 cm) D = 150 mm, R = 36,38 Ohm FH-150 (K = 0,011857 cm) D = 130 mm, R = 757 Ohm FH-300 (K = 0,023259 cm) D = 330, R = 60 Ohm
Angular Deviation Measurement	Measurement range 0,01 Am² – 1 Am² (1,26 µVscm - 0,126 mVscm ) Accuracy of Axis Deviation ± 0,1° Accuracy of the N/S Module ± 1%
Field Measurement	0,1 mT – 35 T (Accuracy @ 0,1 T ~ 0,13mT) DC – 50 kHz



## Analysis

A process analysis makes your company's workflows visible for the first time and opens up opportunities for optimization. We perform measurement, test equipment, and process analyses as well as hysteresis curves [2300 kA/m, accuracy 1%].

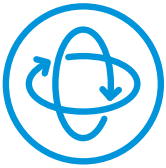


## Visualization

Our microscope cameras are scientific instruments that enable precise monitoring and documentation of samples as well as tissue. We create digital surface images with up to 150x magnification using reflected light or transmitted light methods.

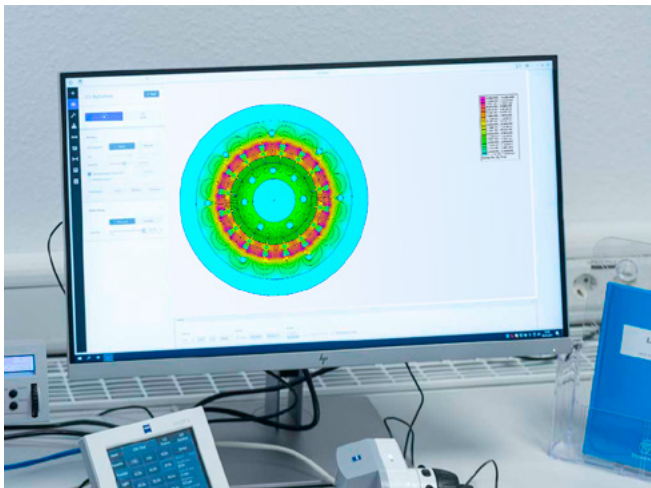






## Simulation

Using numerical simulations, magnetic fields and their effects can be precisely calculated and visualized. This allows components and systems to be optimized during the development phase, losses to be minimized, and efficiency to be increased. As a result, prototype costs and development time are significantly reduced.



## Dangerous Goods Measurement

Magnets are classified as dangerous goods in air freight transport and are subject to the regulations, limits, labeling, and documentation requirements of the IATA Dangerous Goods Regulations (DGR). With our IATA Dangerous Goods Measurement service, we support you in checking packages containing magnetic materials for compliance with magnetic limits, correctly classifying, labeling, packaging, marking, and documenting them to ensure safe and compliant shipping in accordance with DGR.



### Our Portfolio at a Glance

- **Permanent Magnets and Magnetic Systems:**  
Tailored to your needs
- **Engineering:**  
Customized solutions for your applications
- **Supply Chain Management:**  
From production to your assembly line
- **Measurement Technology / Quality Assurance**  
Using cutting-edge equipment
- **Warehousing:**  
Optimal conditions and customer-specific packaging

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