

REFERENCE DEFECTS AND STANDARDS

Reference parts for setup - adjustment and calibration



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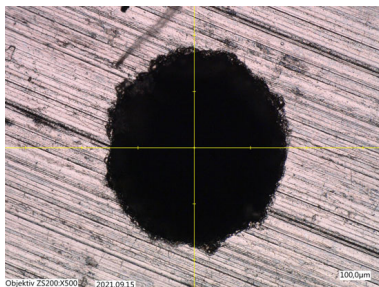
Your Path to Reliable Measurements: Tailored Reference Standards. As a test and measurement equipment manufacturer, we at FOERSTER also provide necessary accessories for setting up, adjusting or calibrating our products. Each product has its own reference parts depending on the type of application.

For eddy current crack detection, we supply individual flaws in the form of eroded grooves or bores on customer's own components - the flaw dimensions are adapted as required. For handheld eddy current testing equipment, we recommend standardized material-specific crack standards. Here we offer a high degree of flexibility.

Measuring instruments for conductivity measurement, permeability and hardness determination require a high degree of accuracy to the reference standards, which, depending on the standardization, must be approved by competent institutions (e.g. PTB, DAkkS calibration laboratories). FOERSTER has the right solution for you in its [service portfolio](#).

REFERENCE DEFECT

Reference defects to check for cracks and pores



Accurate setting and checking. For the exact setting and the cyclic inspection of eddy current test equipment, setting masters of the test parts with reference defects are required. Natural defects cannot be used for this purpose, as they are not reproducible and often do not exist.

FOERSTER can use the die-sinking EDM process to introduce reference flaws into your workpiece for testing of cracks and pores.

National and international standards or corresponding customer specifications apply as defaults. The setting defects are measured and subsequently receive a certificate according to DIN EN ISO 9001.

For better documentation, the setting masters can be engraved or clearly marked with laser.

TECHNICAL INFORMATION

DEFECTS	
WIDTH:	0.04 mm – 1.0 mm
DEPTH:	0.02 mm – 5.0 mm
LENGTH:	0.50 mm – 40.00 mm (other dimensions on request)
PORES	
SIZE:	Ø 0.2 mm – 3 mm
DEPTH:	0.02 – 5 times diameter (further dimensions on request)
BOREHOLE	from a diameter of 0.2 mm - depending on material thickness and properties

HARDNESS REFERENCE BLOCKS

Hardness reference blocks for UCI- and Leeb measuring technology



Highest demands on quality and homogeneity. Our hardness reference blocks with factory certificate (on request also with DAkkS certification) enable continuous checking and calibration of your UCI probes or Leeb rebound devices for consistently stable measurement results. The hardness reference blocks are available in different versions with certified hardness.

REFERENCE STANDARD CONDUCTIVITY MEASUREMENT

Reference standards for checking and setting up conductivity measurement



Optimum measurement results. Appropriate conductivity standards are used to check and set up the conductivity measurement with the SIGMA TEST. The better the quality of this reference standard, the better the final measurement result. Therefore, the raw material must already meet various requirements, e.g. a homogeneous material structure.

As a standard FOERSTER offers conductivity standards traceable to an AC measurement of the NPL (National Physical Laboratory). This measurement is the closest to eddy current testing and provides the best readings when all measurement uncertainties are considered. FOERSTER continues to offer standards based on a DC measurement by the PTB (Physikalisch-Technische Bundesanstalt) on request.

YOUR ADVANTAGES AT A GLANCE

Highest measurement accuracy: Highest measurement accuracy through high-quality, homogeneous reference standards

NPL Traceability: Traceability to NPL (AC) measurements for optimal eddy-current calibration

AC & DC compatibility: Compatible with both AC (NPL) and DC (PTB) conductivity standards

Minimised measurement uncertainty: Minimised measurement uncertainty thanks to AC standards aligned with the eddy-current principle

Direct standard transfer: Direct transfer of primary to secondary standards with consistent measurement electronics

Stable & reducible results: Stable, reproducible results even with challenging material conditions

Future-proof calibration: Future-proof calibration with AC-based standards

REFERENCE STANDARDS FOR PERMEABILITY MEASUREMENT

Reference standards for checking and setting up permeability measurement



Reliable reference values for reproducible measurement results. The reference standards are used for verification and setup of permeability measurements with the MAGNETOSCOPE 1.070. They enable functional checks of the measurement setup as well as regular verification of measurement performance directly on site.

Precisely defined and certified reference values support reproducible and reliable measurement results for the determination of relative magnetic permeability.

Reference standards with different certified μ_r values are available for various testing requirements.

The reference standards have a diameter of 34.2 mm and a thickness of 25 mm. These dimensions also correspond to the minimum dimensions of the test material required for permeability measurements.

YOUR ADVANTAGES AT A GLANCE

Reliable measurement results: Reproducible reference values for permeability measurements

Reliable functional checks: Verification of the complete measurement setup before testing

On-site verification: Fast validation of measurement performance during operation

Certified standards: Delivered with calibration or inspection certificate

Defined minimum dimensions: Reference standard dimensions correspond to the minimum size of the test material

TECHNICAL INFORMATION

REFERENCE VALUES:	Individually certified μ_r values for each standard (e.g. μ_r 1,0055 / 1,0368 / 1,153)
REFERENCE FIELD STRENGTH:	30 kA/m
DIAMETER:	34,2 mm
THICKNESS:	25 mm

REFERENCE CRACK STANDARD - FLAT (PLATE)

Artificial crack defect standard for setting and verifying test sensitivity



Accurate setting and checking. Flat artificial crack defect standards are used for precise setting and verification of the sensitivity of eddy current testing systems, for example the DEFECTOMETER M as well as the TCM. They are also used in other eddy current crack detection applications to ensure reliable inspection performance.

For accurate sensitivity adjustment, artificial crack standards made from the respective test material are required. Therefore, the reference standards are available in different material versions:

- NFe (non-ferrous metals, e.g. aluminium or copper alloys)
- Fe (ferritic steels, ferromagnetic)
- Aust (austenitic stainless steels, non-magnetic)
- Ti (titanium and titanium alloys)

This ensures that a suitable calibration standard is available for different inspection tasks and material groups.

Since calibration quality directly depends on the dimensional accuracy and reproducibility of the artificial crack standard, the standards must comply with the highest dimensional tolerances. These are confirmed by the DAkkS calibration certificate supplied. The use of inadequate or inaccurate crack standards may lead to incorrect inspection results.

Information on calibration procedures, statements of conformity, and decision rules can be found in the [sample calibration certificate](#).

YOUR ADVANTAGES AT A GLANCE

High precision: Reproducible artificial defects for reliable calibration results

Material versatility: Available for NFe, Fe, Austenitic and Titanium materials

Easy handling: Fast and convenient calibration of instrument and probe

Reliable testing: Secure sensitivity adjustment before every inspection

TECHNICAL INFORMATION

APPLICATION:	Calibration and sensitivity verification of eddy current crack detection systems
COMPATIBLE INSTRUMENTS:	DEFECTOMETER M, TCM and comparable systems
AVAILABLE MATERIAL VERSIONS:	NFe, Fe, Aust, Ti
MATERIAL GROUPS:	Non-ferrous metals, ferritic steels, austenitic stainless steels, titanium alloys
ARTIFICIAL NOTCH DEPTHS:	0.2 mm / 0.5 mm / 1.0 mm
ARTIFICIAL NOTCH WIDTH:	0.1 mm
STANDARD DIMENSIONS:	3 × 14 × 45 mm
CALIBRATION PURPOSE:	Gain setting and zero compensation
MOUNTING:	— Designed for secure mounting to the DEFECTOMETER housing — Separate mount for all four plates for the TCM is also available
MANUFACTURING QUALITY:	Precision-manufactured artificial flaws with high dimensional accuracy and reproducibility
CALIBRATION:	DAkkS calibration certificate for the width and depth of cracks
RECOMMENDED PRACTICE:	Calibration before each use for optimum test reliability

REFERENCE DEFECT STANDARDS - BOREHOLE

Reference defects for calibration of inspection systems using rotating probes



Accurate setting and checking. Reference standards with defined crack-type defects are used for precise adjustment and verification of inspection systems for eddy current testing of boreholes with rotating probes. They enable reproducible calibration and support reliable detection of discontinuities during borehole inspection.

FOERSTER provides two proven standard versions:

- Calibration block SCCS (split design)
- Calibration block CSRP (with notch)

These reference standards are specifically designed for calibration of inspection systems used in combination with rotating probes. They support accurate sensitivity adjustment and verification of system performance before and during inspection tasks.

In addition to standard versions, customized reference standards are available. Parameters such as material, borehole geometry, defect type, dimensions, or mechanical configuration can be adapted according to customer-specific inspection requirements.

YOUR ADVANTAGES AT A GLANCE

Reproducible system calibration: Defined reference defects enable reliable adjustment of inspection sensitivity.

Optimized for rotating probe inspection: Specifically designed for calibration of borehole inspection systems using rotating probes.

Proven standard versions available: Calibration blocks SCCS (split design) and CSRP (with notch) cover typical inspection requirements.

Reliable system performance verification: Supports regular functional checks before and during inspection procedures.

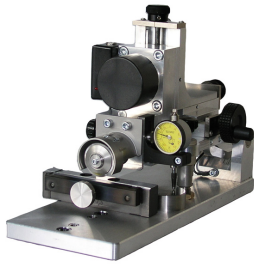
Customized reference standards available: Adaptation possible regarding material, borehole geometry, defect type, and dimensions.

TECHNICAL INFORMATION

STANDARD VERSIONS:	— SCCS (split design) — CSRP (with notch)
APPLICATION:	Calibration of rotating probe systems for borehole inspection (e.g. with <u>HRO</u>)
REFERENCE DEFECT TYPE:	— SCCS: defined crack-type reference defect in borehole area — CSRP: defined reference notch (0.3 mm)
DIMENSIONS:	— SCCS: Ø 36 mm, length 45 mm — CSRP: Ø 39 mm, length 40 mm
BOREHOLE GEOMETRY:	— SCCS: tapered reference bore Ø 13.8 mm – Ø 22.7 mm — CSRP: central reference bore Ø 6.5 mm
MATERIALS:	Standard materials available; customer-specific materials on request
CUSTOMIZATION:	Adaptable regarding material, bore diameter, defect geometry, dimensions and configuration
COMPATIBILITY:	Suitable for inspection systems using rotating probes for borehole testing

TEST DEFECT SAW

Precise Reference Notches for Reliable Calibration



Create defined longitudinal and transverse notches easily and reproducibly. Defined reference notches are essential for the reliable calibration and verification of non-destructive testing systems. International testing standards such as the EN ISO 10893 series specify requirements for reference samples and reference notches. The specified notch geometries must be produced with high precision and reproducibility.

The FOERSTER TEST DEFECT SAW S20 enables defined longitudinal and transverse notches to be introduced into metallic wires, tubes, and bars with diameters from 1 to 20 mm. Saw blade thicknesses from 0.08 to 0.3 mm and a maximum notch length of 25 mm allow different reference notch geometries to be produced with precision. The notch depth accuracy is 10 µm.

The innovative Twist clamping system allows the test piece to be positioned for longitudinal and transverse notches in a single setup. Diameter-specific clamping sets ensure secure fixation of the test piece. Two LED indicators support precise zero-point determination by indicating contact between the saw blade and the material. Combined with precise positioning along the x, y, and z axes, this enables reproducible notch geometries for reliable calibration.

Saw blades made of HSS (High-Speed Steel) and carbide are available to meet different application requirements. HSS blades are used as standard, while carbide blades provide increased wear resistance. Weighing just 3.7 kg and supplied with a robust transport case, the Test Defect Saw S20 is easy to transport and use wherever needed.

YOUR ADVANTAGES AT A GLANCE

Precise reference notches: Longitudinal and transverse notches with a notch depth accuracy of 10 µm

Flexible notch geometries: Saw blade thicknesses from 0.08 to 0.3 mm and notch lengths up to 25 mm

Single setup: Positioning for longitudinal and transverse notches without reclamping the test piece

Secure fixation: Diameter-specific Twist clamping sets for wires, tubes, and bars from 1 to 20 mm

Controlled zero-point determination: LED indicators signal contact between the saw blade and test piece

Flexible blade selection: HSS and carbide saw blades for different cutting and wear-resistance requirements

NORMS

DIN EN ISO 10893: Defines requirements and test methods for the automated non-destructive testing of steel tubes.

TECHNICAL INFORMATION

TEST MATERIAL:	Metallic wires, tubes, and bars
DIAMETER RANGE:	1–20 mm
POWER SUPPLY:	100–240 V / 47–63 Hz
EXTERNAL POWER SUPPLY:	12 V DC
POWER CONSUMPTION:	Max. 24 W
MOTOR SPEED:	200 rpm (HSS mode) 600 rpm (Carbide mode)
OPERATING TEMPERATURE:	+5 °C to +45 °C
STORAGE TEMPERATURE:	–20 °C to +70 °C
MAXIMUM RELATIVE HUMIDITY:	85% (non-condensing)
WEIGHT:	3.7 kg
SAW BLADE OUTER DIAMETER:	32 mm
SAW BLADE INNER DIAMETER:	8 mm
SAW BLADE THICKNESSES (NOTCH WIDTH):	0.08 / 0.1 / 0.2 / 0.3 mm
MAXIMUM NOTCH LENGTH:	25 mm
NOTCH LENGTH ACCURACY:	100 µm
NOTCH DEPTH ACCURACY:	10 µm
SAW BLADE MATERIAL:	HSS / Carbide
TRANSPORT CASE DIMENSIONS (W × H × D):	580 × 400 × 165 mm
WEIGHT INCL. TRANSPORT CASE AND CLAMPING SETS:	11 kg



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The FOERSTER Group is represented by subsidiaries and representatives in over 60 countries worldwide. You can find a complete overview on our website.

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