

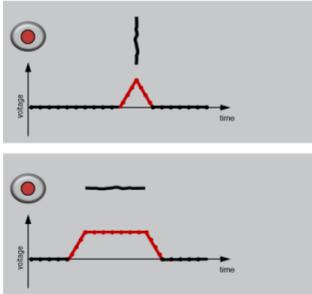
Eddy current testing made simple with all possibilities

The TCM 2.142 is the multi tool for mobile eddy current testing. It's function packages allow a flexible usage for several applications. Despite the many possibilities any testing task can be solved very simple. Several supporting features provide a support for easy usage.

The first side of this catalog shows a summary of the different options. Please make sure to choose the correct software module. If no software is chosen the TCM will have no functionalities.



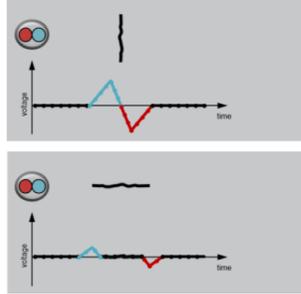
Absolute probe



- **Not directional**
- Strong effected by the material

- Typical application:
 - Crack detection in all orientations
 - Material and structure sorting
 - Residual wall inspection
 - Conductivity measurement
 -

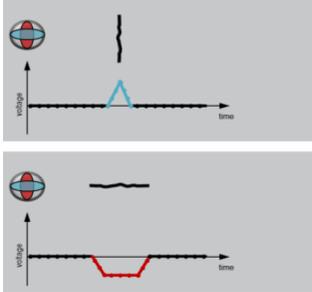
Differential probe



- Directional (nearly blind 90°)
- Less effected from material

- Typical application: **Bore hole inspection**
 - Detection of longitudinal defects in the bore hole
 - Circumferential defects are not detected

Dual axis probe / Cross winding probe



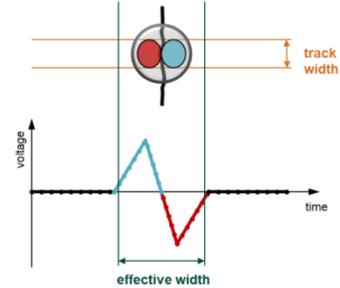
- Directional (blind 45°)
- Less effected from material

- Typical application: **Weld inspection**
 - Disturbing signal of welding bead is reduced
 - Longitudinal and transversal cracks are detected
 - Visibility of defect orientation in the signal

Definition of Track width and Effective width

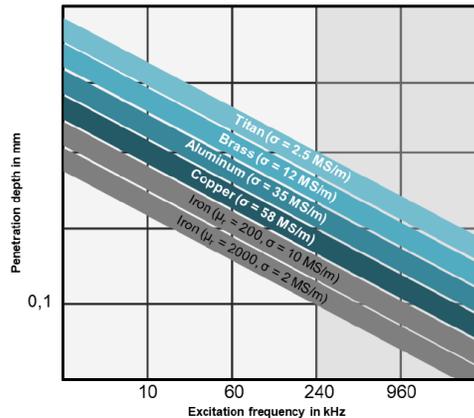
Track width:
effective size of the probe in transversal direction

Effective width:
effective size of the probe in longitudinal direction



Influence of the test frequency

It can be challenging to select the right test frequency for a particular application. This is because the test frequency, together with the electrical conductivity and magnetic permeability of the material, significantly influences the eddy current penetration depth. Choosing the correct eddy current penetration depth is critical to the success of an application. For example, when testing the residual wall on an aluminum sheet, the frequency must be set low enough for the material to be completely penetrated. When measuring the conductivity, it must be ensured that the material thickness is not less than three times the penetration depth of the eddy currents, otherwise measurement errors will occur. For crack detection, a high frequency is selected for small cracks, since a high frequency means a low penetration depth and thus a high spatial resolution.



Acronyms	Description
F	Recommended test frequency range
Bs	Probe track width
ABS	Absolute probe
DIFF	Differential probe
Dual axis	Dual axis probe
DM	Outer diameter
Bridge	Probe in bridge circuit
μ H	Cables with a μ H value include an inductance to match the probes inductance. Make sure both are similar.
rpm	Rotations per minute
NPL	Calibration blocks based on AC calibration done by National Physical Laboratory in UK
PTB	Calibration blocks based on DC calibration done by Physikalisch technische Bundesanstalt in Germany

Straight Pencil Probes*

Straight pencil probes are available in very different versions. For most applications an absolute probe (ABS) is suitable. All absolute probes are shielded to reduce edge effects.

Differential probes (DIFF) reduce the influence of the material structure. The disadvantage of this probe is the directional dependent signal.

A chip for an automatic probe identification is included to get all probe data into the software directly. Standard probes have a length B of 12.5mm.



Angeled Probes*

The angled pencil probes permits access to hard to reach locations of critical testing zones. The standard length is B=11mm and C=30mm. If there is a custom shape required for your application please contact us.



Specialized absolute probes

Absolute probes are optimized for certain applications. As example the Ring Probe with it's huge diameter is optimized to test deep into the material to check for residual wall defects or material and structure tests. The Residual Wall Testing probe is more focused on a small area to reduce edge effects, but its lift-off signal is less stable.



Weld probes

Weld probes are optimized to hide the disturbing influences of the welded surface. Commonly dual axis probes are used because of the great reduction of disturbing signals. Please note that dual axis probes are blind in 45°.



Edge probes

Edge probes are optimized to test along an edge. This probe is available in a fixed and in a tilt option. If another radius is required please contact us.



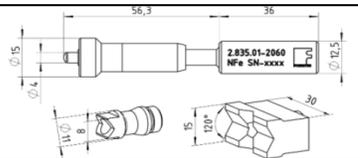
Array probes

Array probes consist the same probe element multiple times. This probes are made for scanning large surface areas in short time. The holder can be switched to another shape. The CAD data are open and every one is free to build up own holders for special geometries. Use the cable 2.142.01-9908 for all array probes.



Spring-Loaded Pencil Probes

Spring-loading of the probe ensures constant contact pressure and positioning of the probe tip on the testing material. This results in consistently good test results at high sensitivity and an easy usage.



Reference blocks, calibration standards

Calibration standards are used to set up the system with a known defect. Use a standard from a similar material you want to test. If you test different materials, you can use our additional standard holder. Our standards are measured at one point. For a higher quality control of the standards there is an additional calibration procedure based on a laser microscope measurement available.



SIGMATEST probes (conductivity measurement)

To use a SIGMATST probe the software module "SIGMATEST" is required and additional the cable 2.142.01-9912 or 2.141.01-9901



Reference block (Conductivity measurement)

The quality of the calibration standard for conductivity measurement directly effects the measurement quality.

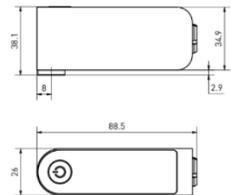


Bore hole inspection

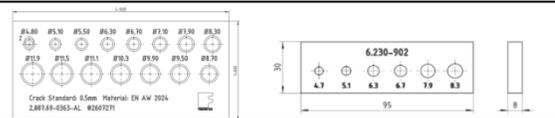
Rotary probes and rotating head

Rotary probes are optimized to allow a safe and stable test for cracks or other surface defects in bore holes. The probes are available as full manual probes which are rotated manually and as probes which are mounted in a rotating head increases the test speed and the resolution to detect smallest surface defects in bore holes.

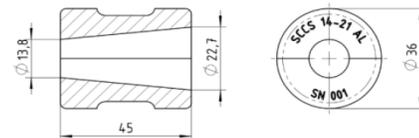
All available probes and standards can be found in the separate catalogue "Rotary systems". Specialized probes for covering a special diameter are available on request.



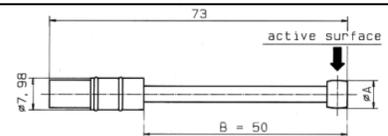
Reference block (bore hole inspection)



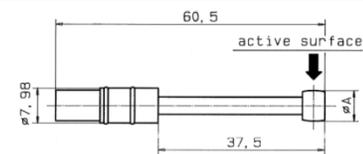
Reference block (Bore hole inspection, SCCS (splitted version))



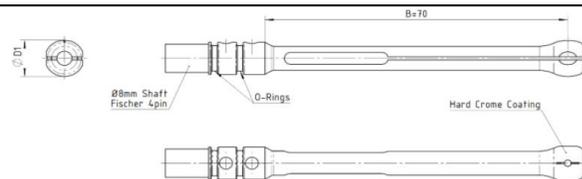
Rotating probe fix diameter stainless steel, B=50mm



Rotating Probes, fixed, Stainless steel body



Rotating Probes, splitted, Stainless steel

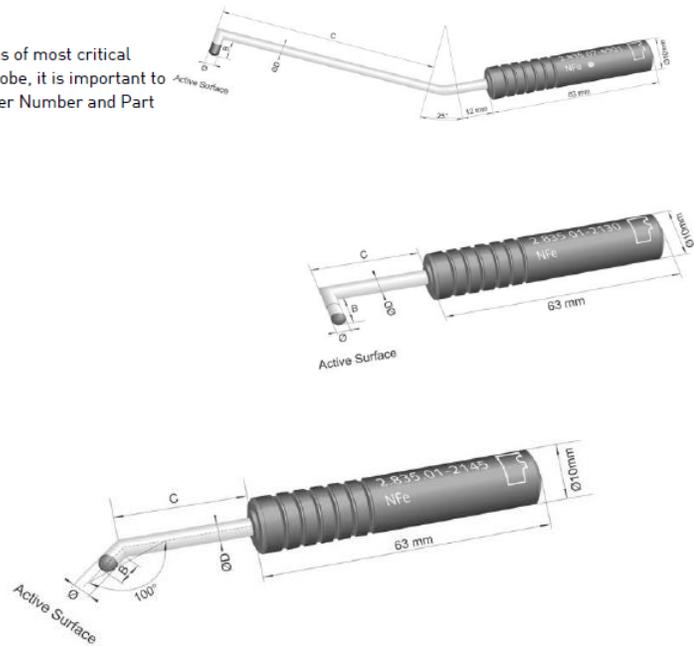


Rotating Probes, splitted, Plastic body

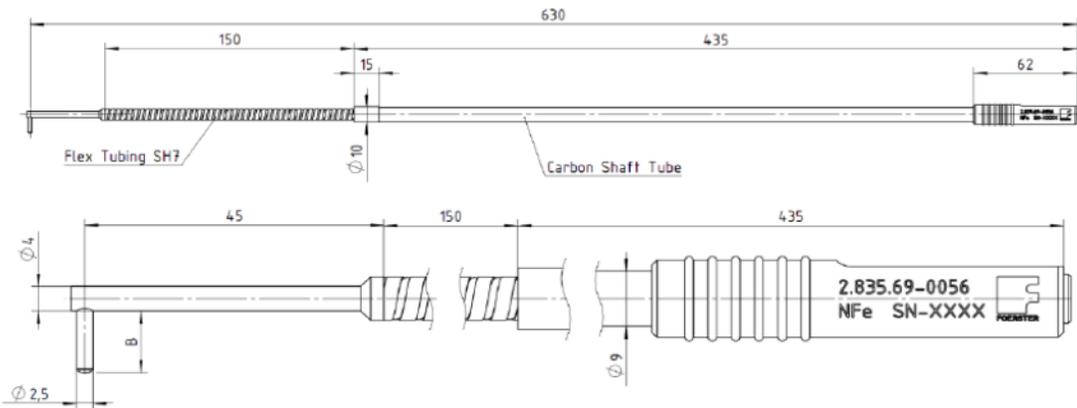
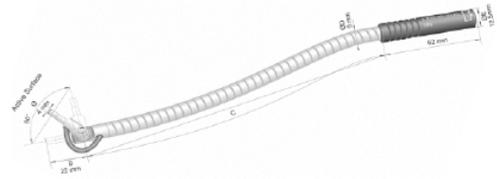


Angeled Probes

The angled pencil probes permit access to hard to reach locations of most critical component testing zones. When placing an order for a custom probe, it is important to include the desired dimensions for B and C in addition to the Order Number and Part Number.



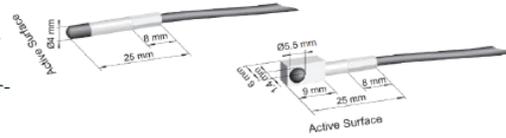
The flexible pencil probe is made with a so-called "gooseneck" with a minimum bending radius of 50mm, which permit its shape to be adapted to the specific testing location. Additionally, the probe tip with probe element can be swiveled up to 90°. When placing an order for a custom probe, it is important to include the desired dimension for C in addition to the Order Number and Part Number.



Article description	Drawing number	Order-Nr.
1 Flex Angle Probe NFe, shielded, A=Ø2.5mm, B=10	2.835.69-0056-B10	1888447
1 Flex Angle Probe NFe, shielded, A=Ø2.5mm, B=7	2.835.69-0056-B7	1888455

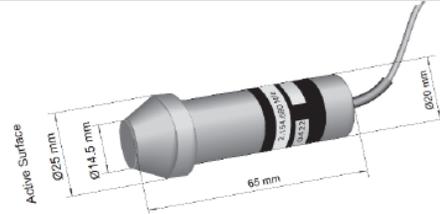
Micro Probes

Micro probes are characterized by their extremely compact design. A straight probe with a probe tip measuring only 4mm in diameter and an 90° angled probe version with 5mm width and 6.8mm tip height are available, both of which have a uniform housing length of 25mm. These compact dimensions permit the user to perform reliable testing even in extremely inaccessible test zones. At the same time, the user can guide the probe with the help of a manipulator designed based on his requirements. Testing at hard-to-reach locations and simple installation in customer-specific manipulators are typical applications of the micro probe.



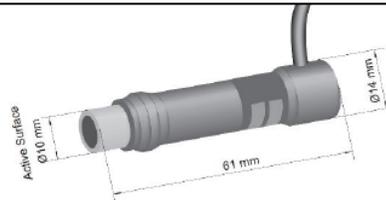
Probe for large crack depths

The probe for large crack depths is specially designed for the detection of deep material cracks. At the same time, there is good linearity between crack depth and result indication, permitting the crack depth to be inferred indirectly.



Probe with ceramic protection

The probe with ceramic protection was designed with an extremely abrasion-resistant ceramic ferrule to protect the contact surface of the probe. This protection means that the signal indication of the probe remains constant, even in the case of continuous use with high contact pressure on rough material surfaces.



Bolt Hole Probes

Bolt hole probes are intended exclusively for bolt hole testing with manual probe guidance. The main application field for these probes lies in testing bores on aircraft. In principle it is possible to test all bores in materials of the specified conductivity range on safety-critical devices, components and assemblies during their manufacture or maintenance.

Bolt hole probes possess a slotted probe tip for adaption to variations in the hole diameter. The spread of the bolt hole probe ensures:

- An even contact pressure and correspondingly constant test sensitivity
- Adaption to the hole diameter

The following tables provide an overview of the nominal diameter range and size increments in which the bolt hole probes are available and the adaption that can be attained by spreading in the respective nominal diameter range.

