PRÜFTECHNIK

Overview of rotating systems

Reliable quality assurance for your semi-finished products

- For wire, bars, seamless tubes
- Diameters from 1.9 to 140 mm
- Robust, compact, to suit demand

High-speed eddy current testing

Rotating systems in 4 sizes – to suit any production line

To ensure the quality of semi-finished products

The eddy current method is already standard practice for non-destructive 100% testing of tubes, bars and wire. It has a high sensitivity to surface defects, can be easily integrated into the production line, works automatically and provides reproducible results and watertight documentation.
Depending on the application, different sensor systems are used. Encircling coils for testing the whole part or segmental coils for testing a single area – such as a weld – are commonplace.

The use of rotating systems specifically for longitudinal defects

For production processes in which longitudinal defects can occur, rotating systems are an industrial requirement. Rotating systems scan the specimen's surface helically and without contact. Due to the high resolution and the orientation of the probes perpendicular to the cracks, these systems are capable of detecting long, uniform defects – unlike standard encircling coil systems. And because the probes rotate at up to 12,000 rpm, the eddy current testing can keep up with the speed of any production line.

Production speed is not an issue

This is especially true for the small RS20 rotating system which is optionally available as a four-channel model (i.e. with four probes on the probe disk). With part diameters smaller than 20 mm, material throughput speeds of up to 2880 mm/s can be achieved in wire drawing or recoiling systems – while testing the entire surface area.
In summary: Rotating systems monitor the manufacturing process (process control) and ensure product quality (quality control).

Rotating system: This is how it works!

The test specimen moves longitudinally through the rotating test probes and is helically scanned without contact. If a probe passes over a material defect, it detects a change in the induced eddy current and displays this in real-time as a defect signal. The angular position of the defect along the circumference of the test specimen is shown via a special graph.

Defect resolution

The minimum defect length (i.e. the minimum safely repeatable, detectable defect length) is a function of the rotational speed of the probe and the throughput speed of the material being tested. The minimum defect depth is 0.05 mm and depends on the sample's surface qualities.

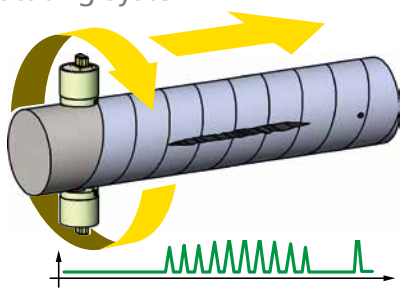
Conventional sensor technology

Segmental or encircling coils react in high resolution to the smallest changes in the material's surface. Longitudinal defects are therefore often only detected at the start and end of the defect and falsely classified as less critical point defects.

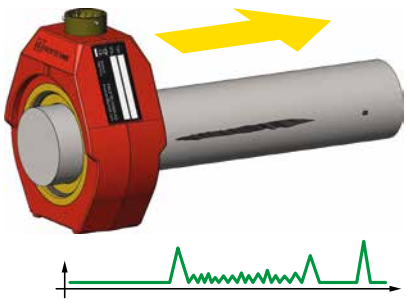
PRUFTECHNIK rotating systems: 40 years of eddy current experience

- Four systems for diameters from 1.9 to 140 mm
- For use in production lines and during final inspection of tubes, bars and wire
- Specifically for the detection of longitudinal defects
- High test sensitivity
- Distance compensation between probe and eccentric/round test specimens
- Robust design for high operational reliability even in harsh environmental conditions
- Comprehensive documentation as proof of quality
- Easy to service – resilient – economical

Rotating System

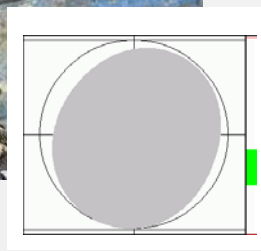


Encircling Coil



Wire testing with the RS20 rotating system

- System for testing drawn wire in the diameter range 1,9 to 20 mm
- Primary material for tool manufacture or for small springs in mechanical engineering
- Longitudinal defects 0.1 mm deep, 0.1 mm wide, 10 mm long



Control display of the material position in relation to the probe orbit

Probe disks in the RS20

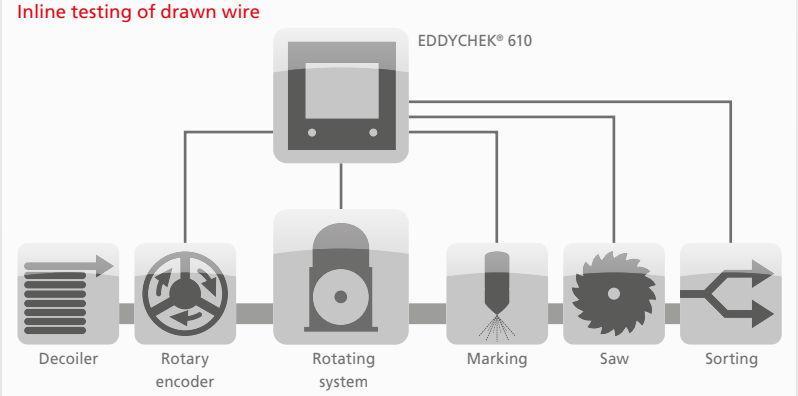
The small RS20 rotating system is intended for conductive materials with a round, oval or egg-shaped cross-section up to 20 mm in diameter. The core element is a quick-change probe disk with 2 (optionally 4) probes orbiting the test specimen at 12,000 revolutions per minute.

Each probe disk is specific for a particular material diameter and can be very easily – together with the inlet and outlet guide sleeve – switched to another diameter using just one tool in just a few minutes.

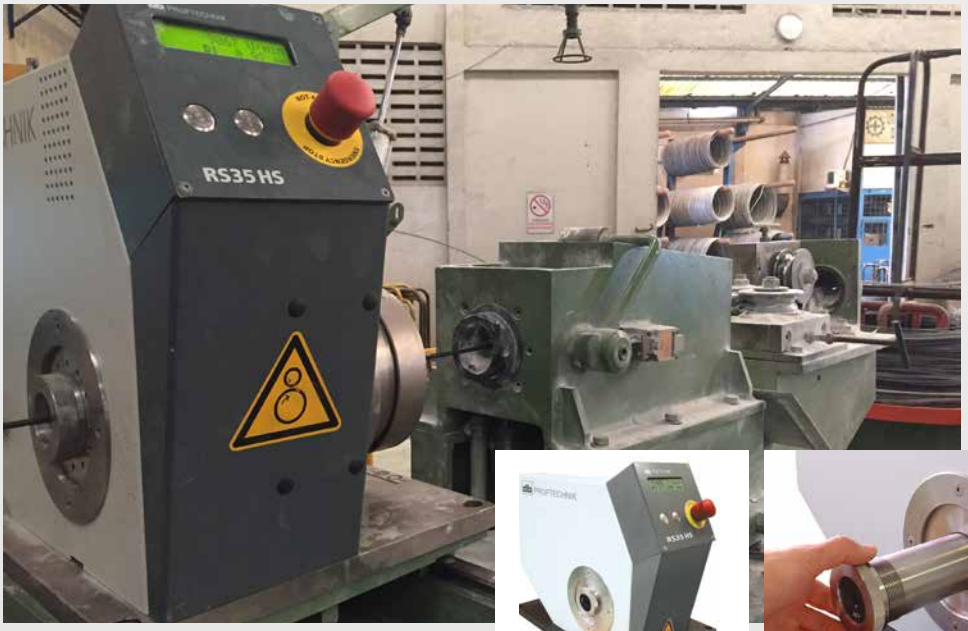
„0.05 mm minimum defect depth“

As one of the most important modern industrial inspection methods, eddy current testing provides immediate feedback about product quality during the manufacturing process. Eddy current testing provides reliable test results and enables a timely correction of the production process before waste is produced. PRUFTECHNIK provides complete roller tables and test benches based on customer requirements for upstream inline testing – including separation and sorting systems.

Inline testing of drawn wire



Wire testing with the RS35HS rotating system



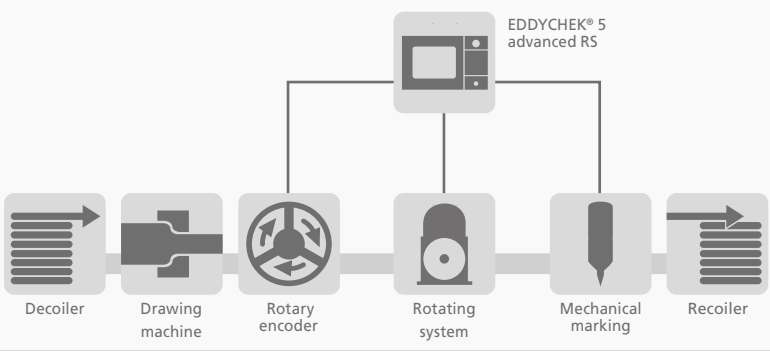
- Wire testing for longitudinal defects in a drawing machine
- Spring wire for the automotive sector, chassis springs
- First test station for cold material after the hot rolling mill
- Process control, e.g. to detect defective wire drawing dies or rollers

The RS35HS rotating system inspects semi-finished products up to 35 mm in diameter. With 6,000, 9,000 or 12,000 revolutions per minute available, it is ready for all known production speeds. Set-up times for the RS35HS are also incredibly fast: If the material diameter changes, the probe distance distance may be adjusted with a few grab handles – without tools or opening the device. Even the guide bushes can be changed without tools.

„The higher the rotation speed, the lower the minimum defect length“

Eddy current testing can be used at various stages of production. The continuous testing of wire during production ensures that the material is defect-free prior to further processing and contains no cracks, holes, periodic defects or any other type of material defect.
Simultaneously, eddy current testing with rotating systems is used for process control and detects stress cracks from annealing, transport damage or damage caused by faulty dies.

Continuous wire testing in the drawing line



Steel bar inspection with the RS65 or RS140 rotating system

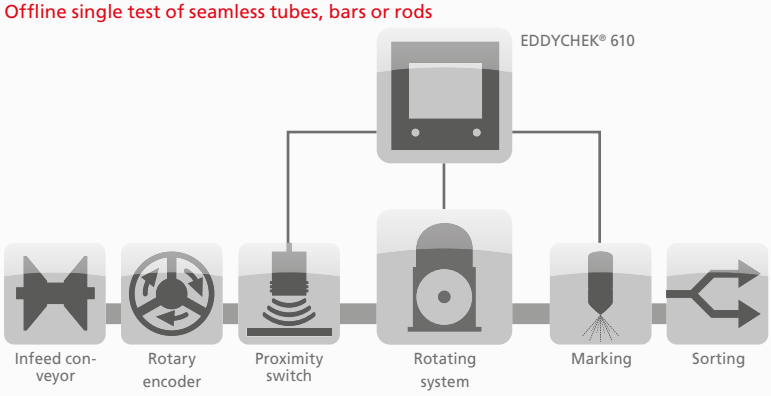
- Steel bar testing
- Straightened bars 30 – 100 mm
- Shafts and gear racks for automotive suppliers
- Primary material for products intended for use in the automotive industry

The RS65 and RS140 rotating systems inspect semi-finished products up to 65 or 140 mm in diameter. They are characterized by a disaster-proof housing, massive, 3-roller centering mechanisms (with optional guide bushes) that are adjustable from the outside, a robust probe head with spring-loaded probe arms and rapid diameter adjustment. The probes are well protected and easy to change; each probe unit includes two differential probes and a lift-off probe. Different types of probes can be used depending on the specific requirements and specifications.

„Easy handling – shorter set-up times“

Offline testing is performed as a final quality control before shipment. Even material that has been sorted out as scrap during inline inspection may be subjected to more accurate classification via an offline test.
The test also provides feedback to the manufacturing process – for example, an alert about a defective peeling tool.
PRUFTECHNIK also supplies complete roller tables and test benches for offline tests according to customer requirements.

Offline single test of seamless tubes, bars or rods



Reliable quality assurance

Combined test with RS35HS and encircling coil

- Offline bar testing
- Meets the stringent requirements of the automotive industry
- Supplementary inspection in a single pass
- Detects the smallest point defects and process-typical longitudinal defects

If you need to play it safe and detect longitudinal and point errors in equal measure, you simply cannot beat a combined inspection with a rotating system and an encircling coil. The documentation and archiving of the data plays a key role here by providing evidence for your customers. EDDYTREND PC software enables the optimal analysis of the eddy current test data:

- online for production monitoring and possible process changes, and
- offline for analysis of test data and creation of test reports and statistics

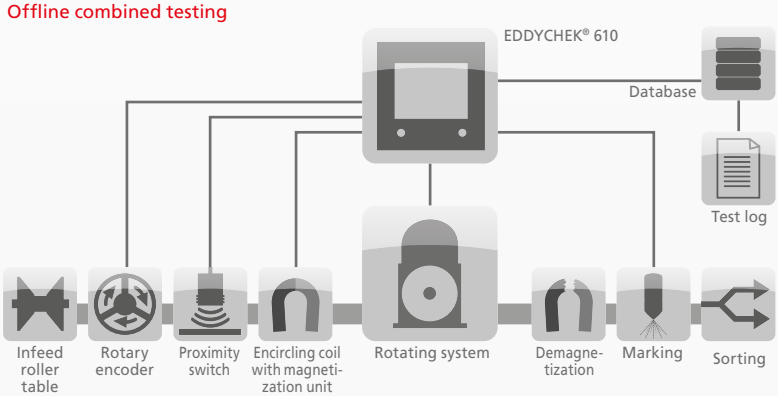
Furthermore, the system can be integrated into the customer's network and database connections.

EDDYTREND PC software with simultaneous display of up to 4 test specimens (more info in the EDDYTREND brochure).

„Minimum defect depth 0.05 mm“

The best test results are obtained by the combined use of a rotating system and an encircling coil.
Combined testing ensures that the material has no cracks, holes, periodic defects or material defects of any other kind – even small surface defects can result in a defective final product and a high reject rate after further processing.

Offline combined testing



Combined test with RS65 and encircling coil

- Offline inspection
- With RS65 rotating system
- With encircling coil in ME90 magnetization unit
- With DC and AC demagnetization

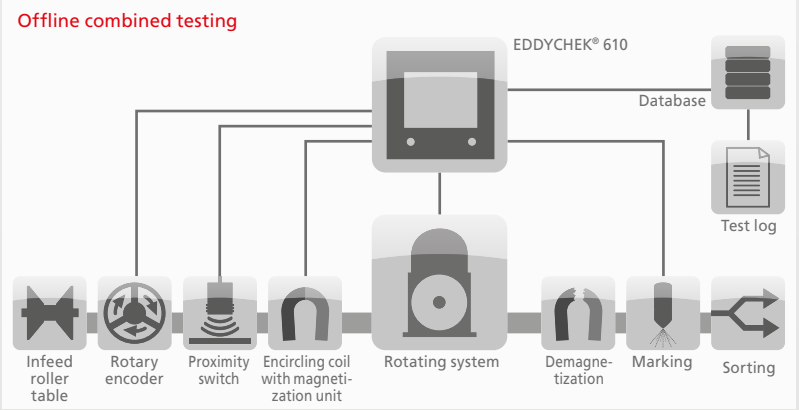
Combined testing process for quality assessment of rods. With height adjustable sliding tables for the magnetization unit and rotating system and drive rollers for centering and further transport of the material. A wide range of accessories makes it possible to meet all customer requirements with standard components.

DC demagnetization
DC demagnetization is used to bring the pipes or rods (which were also magnetized with DC) to the lowest possible level of residual magnetism.

AC demagnetization
AC demagnetization is used to further reduce the residual magnetism.

„Combined testing for point and longitudinal defects“

PRUFTECHNIK designs and manufactures complete test lines with infeed, adjustable tables, outfeed and sorting.



Systems overview

Rotating systems

Type	RS20	RS35HS	RS65	RS140
				
Diameter range [mm]	1,9 – 20 mm	2 – 35 mm	5 – 65 mm	10 – 140 mm
Speed [RPM]	12000	6000/9000/12000	3000/6000	1800 (max.)
Distance compensation	via testing system	via testing system	integrated	via testing system
No. of probes (channels)	2/4	2	2/4	8
Track width per probe [mm]	1,8/3,6	1,8/3,6	1,8/3,6	9,5
Minimum defect length [mm]	3,6	3,6	7,8	14,5
Max. prod. speed* [m/s]	2.88	2,4	2,4	2,5
Centering mechanism	Guide bushes	Guide bushes	3-roller centr.	3-roller centr.
Weight [kg]	40	77	320	650

Testing systems

Type	EDDYCHEK® 605 compact	EDDYCHEK® 605	EDDYCHEK®610
			
Channels	max. 5, modular	max. 5, modular	max. 10, modular
System design	Integration solution	All-in-one	All-in-one
Display	– (via PC)	15″	15″
Operation	remote via PC	Touchscreen	Touchscreen

Detailed technical specifications can be found in the respective product brochures.

PRÜFTECHNIK
PROVEN QUALITY
- Made in Germany
- Global Presence
- Qualified Support
- Quality Service

PRÜFTECHNIK NDT GmbH
Am Lenzenfleck 21
85737 Ismaning, Germany
www.ndt.pruftechnik.com
Tel.: +49 89 99616-0
Fax: +49 89 967990
E-Mail: ndt-sales@pruftechnik.com

A member of the PRÜFTECHNIK group

DOK5400EN.08.18