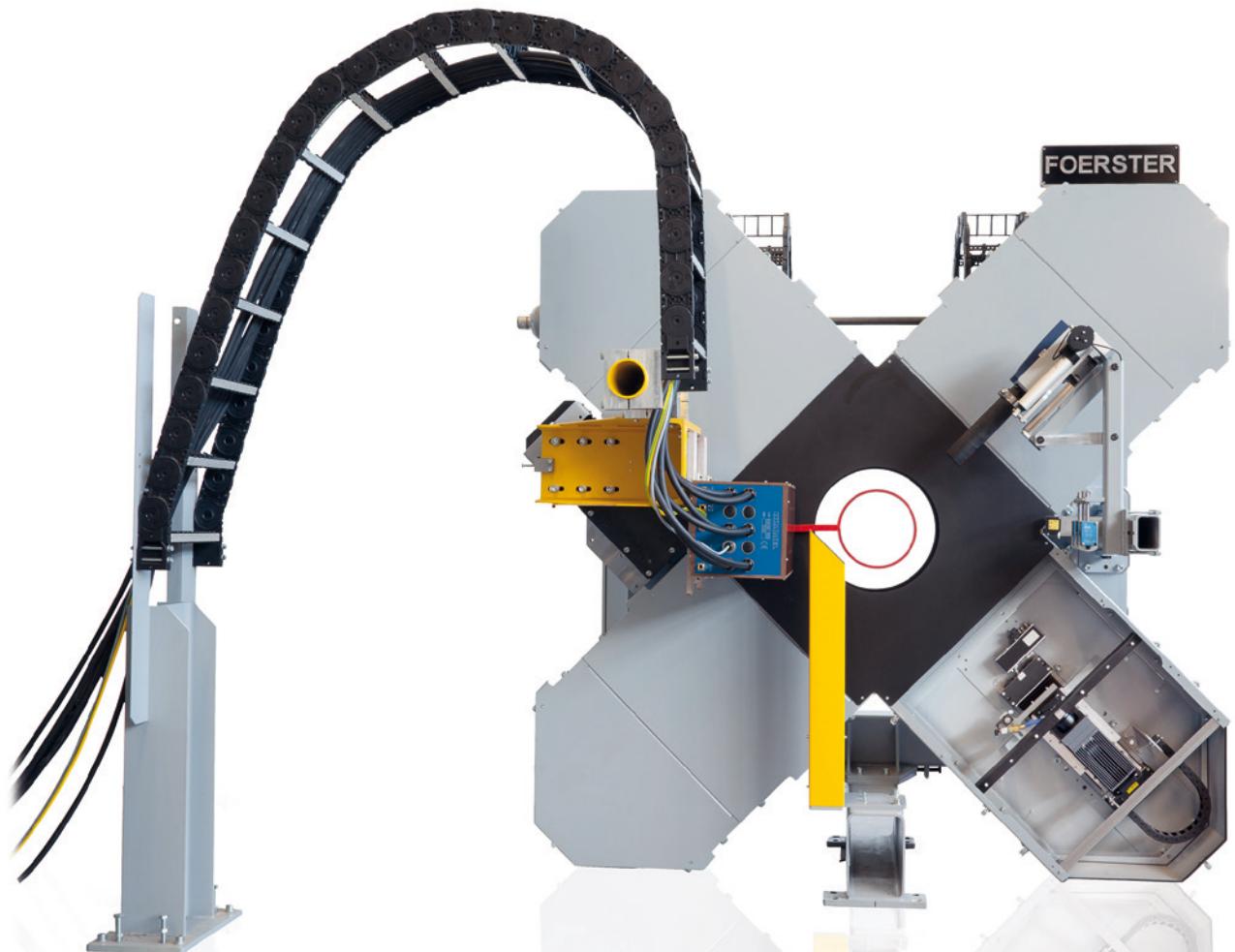


DEFECTOVISION® IR

Non-destructive testing of steel billets and tubes



proof.

The company

FOERSTER is a global technology leader for non-destructive testing of metallic materials. One of the "Hidden Champion" companies, **FOERSTER** operates worldwide with an extensive network of ten subsidiaries plus qualified representatives in more than 60 countries and works closely with its customers.

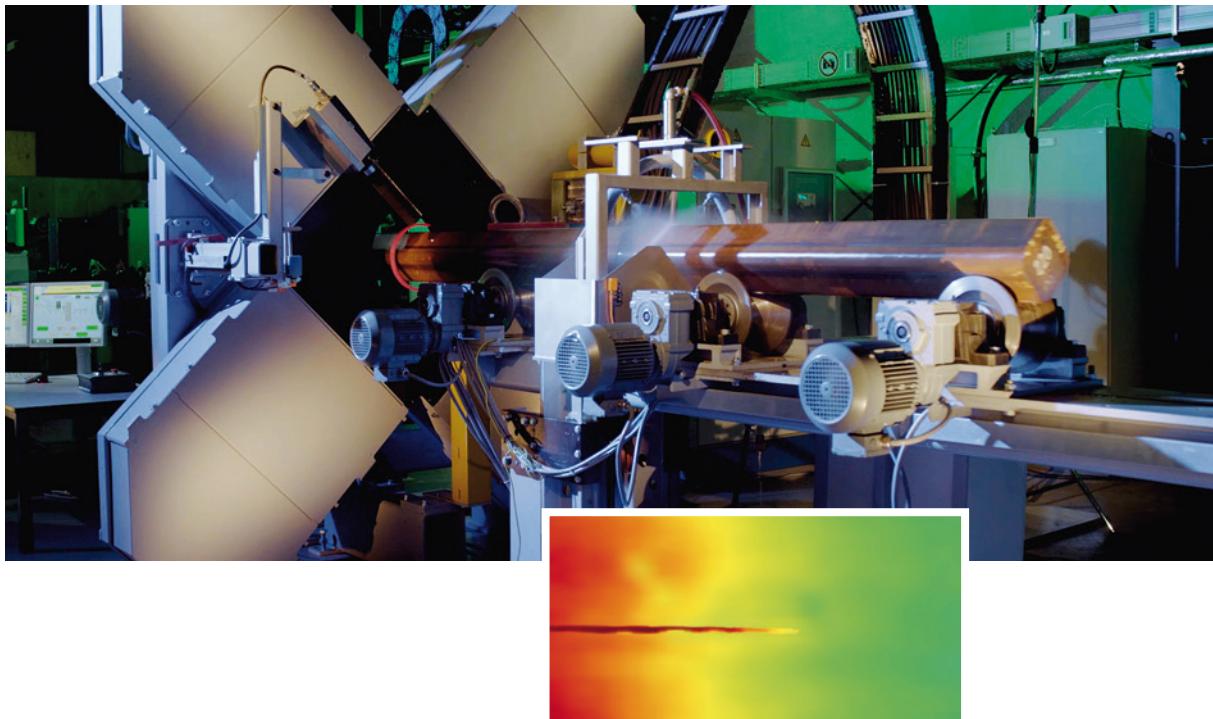
FOERSTER Division Testing Systems (TS)

Division TS specializes in developing and manufacturing systems for the automated, non-destructive testing of metallic long products and heavy plates. Electromagnetic methods such as eddy current and flux leakage testing, ultrasound and inductive heat flow thermography are used to inspect these semi-finished products for flaws that are invisible to the naked eye.

These systems are made for the metal producing and metalworking industries, where tubes, wires, bars, billets, rails, profiles, metal sheets and similar items are produced on rolling mills, drawing lines, welding lines or processed in various finishing operations. **FOERSTER** products perform many critical test applications during these processes.



DEFECTOVISION® IR – Inductive heat flux thermography



Quality assurance using heat flux thermography

Do you have applications for which conventional non-destructive testing methods fall short? With DEFECTOVISION IR, you can inspect your metallic semi-finished products non-destructively using heat flux thermography, an infrared technology that has become increasingly important for quality assurance and offers totally new approaches for inspection tasks. By analyzing the heat flux or the thermal conductivity of the test pieces, even the finest defects on the material's surface can be detected and visualized.

Reliable 100% testing

Inductive heat flux thermography is particularly suited for inspecting hot-rolled steel billets and tubes with round, square or rectangular cross-sections. Not only the surface but also the edges are examined completely – untested ends are reduced to just a few millime-

ters. Currently, diameters and edge lengths between 50 and 350 mm (minimum length 4 m) are possible; if you need other dimensions or profiles, we'll gladly develop specific solutions for you.

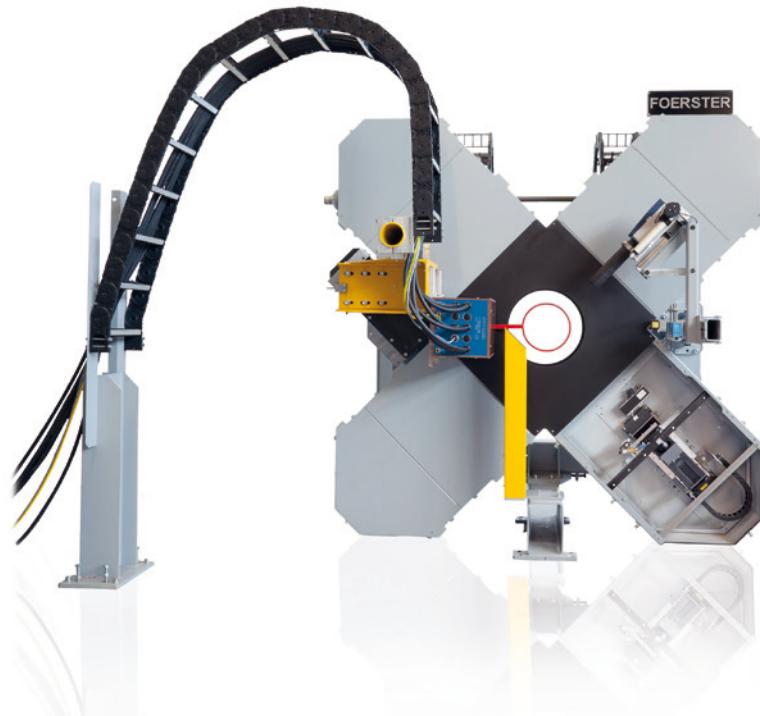
Robust and precise – DEFECTOVISION IR

Even under the harsh conditions of a typical steel plant, DEFECTOVISION IR consistently delivers reproducible and reliable test results. Since 2008, our thermography systems have been in industrial use worldwide. We bring quality to light.

Customized system configuration

Each FOERSTER system is individually adapted to your specific testing task. As a system partner, we can also provide the appropriate machinery for your DEFECTOVISION IR system and integrate it into your production environment.

Reliable and reproducible testing



The benefits

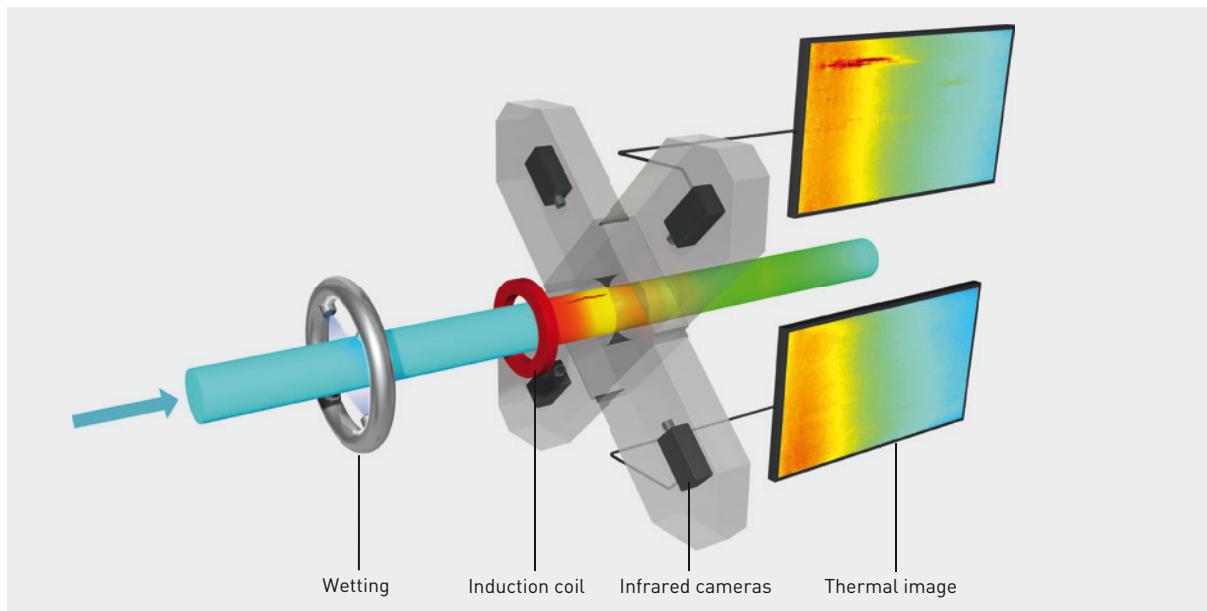
- **Fully automated testing with high repeatability:**
Increases productivity while reducing scrap.
- **Contactless method eliminates wear and tear:**
Profit from lower maintenance costs and significant time savings.
- **Rigorous examination of steel billets:** Cracks reliably detected even in critical edge areas.
- **Inspection of the entire surface:** High scanning speeds of up to 1.5 m/s and tiny uninspected ends – just 5 mm – ensure comprehensive assessments.
- **Detection of the smallest defects:** Significantly improved signal-to-noise ratio makes it possible to find defects starting at just 10 mm long and 0.3 mm deep. The defect thresholds can be individually adjusted.
- **Less scrap:** Made possible by the instrument's excellent suppression of pseudo-defects.

Modern testing methods for your quality assurance

With the development of high-performance cameras, the field of heat flux thermography has steadily grown in importance for quality assurance. But many companies still turn to manual magnetic particle inspection to obtain information about the surface of their hot-rolled, non-round semi-finished products. While this testing method is very sensitive, it relies on the subjective assessment of the person performing the test, and this high sensitivity often leads to false positives. Furthermore, the test results are difficult to reproduce and document. Because the method cannot be automated, magnetic particle inspection is also very time-consuming – and fails to answer questions about the depth of the defect.

In contrast, inductive heat flux thermography allows for reliable, automated material testing. Patented evaluation methods ensure precise, reproducible defect detection with information on both position and depth of discontinuities. At the same time, pseudo defects are effectively suppressed, thus preventing unnecessary rejects.

Patented solution with innovative technology



The principle behind heat flux thermography

Established method – new evaluation

Until now, inductive thermography techniques for testing steel billets would only take the temperature once at each surface point. But FOERSTER's newly engineered and patented evaluation principle is based on dynamic recording of the temperature development using the camera's entire field of view: multiple measurements of the same surface point are taken within a defined period. This additional time dimension provides certainty in distinguishing between true and pseudo defects in the material.

Easy to use, easy to service

To make sure that you can put the DEFECTOVISION IR testing system to optimal use, we set out to develop a system that provided intuitive operator control and simple serviceability. Maintenance-relevant components are easily accessible, so servicing downtime is kept to a minimum.

Four steps to assessment results

- **Wetting of the material to be tested:** Before testing, the sample is sprayed lightly with water; this improves homogeneity and increases the emission coefficient.

- **Defect excitation through inductive heating:**

The induction coil heats up the material; proportional to their depth, any defects that are open at the surface become hotter than the surrounding material.

- **Defect detection with modern infrared cameras:**

Four infrared cameras conduct a continuous and contactless scan of the test piece's surface, storing the collected data in real time.

- **Software analysis via heat flux algorithms:**

Special algorithms evaluate the data from the infrared cameras.

Simple software handling and integration



The clear and easy-to-use graphical interface of the DEFECTOVISION IR system

Advantages of the operating software

- **Real-time visualization of the test sequence:** The test line is displayed symbolically, status is color-coded.
- **Comprehensive documentation:** Every test job, every test piece and every defect is comprehensively logged. The stored test data enable a graphical search based on the resulting thermographic images.
- **Optimization of settings parameters using original test data:** Play through various scenarios with what-if analyses without having to run the test again.
- **Customizable user interface:** Modern graphical user interface makes operation simple and intuitive. The dialog language can be set to English or German; additional languages available via uploadable translation files.
- **Continuous operation monitoring:** Warnings and malfunctions are displayed in color-weighted plain-text messages. Five password-protected access levels with different functional scopes ensure correct operation.

User-friendly and intuitive

The DEFECTOVISION IR software features a clearly-organized user interface and modern operating structures. The system is based on Microsoft Windows® and allows the output of test reports in standardized formats such as Microsoft® Word and Excel, and Adobe® PDF. Since all test results are archived, you can create individual summaries for short- and long-term documentation, as well as for offline research.

Integration of multiple test systems

The FOERSTER Instrumentation Software allows you to centrally process test-line data from up to eight different test systems. This automation simplifies several work steps:

- Centralized setting procedure and start for all test instruments
- Common start for inspection orders
- Common test protocol for each test piece and each testing job

In addition, the Instrumentation Software allows the test line to be connected via interfaces to higher-level computer systems for quality monitoring or production control (Level 2).

In-house test line – Training – Service



Our in-house test line

So that even in unusual cases our experts can offer you the most complete technical advice, FOERSTER has its own test line. Outfitted with the latest equipment, our trial test line is perfectly suited for putting your individual application scenarios through their paces. Using customer-supplied samples, we carry out a range of different tests. Depending on the results, we find the optimal solution and the best parameters for your system. Due to their wide range of technical knowledge, our application specialists can provide you with comprehensive support in finding specific solutions – even on-site.

Training

Our courses concentrate on the practical handling of FOERSTER test electronics and sensor systems, but the ideal configuration of the key parameters for your test instrument is just as important for optimal align-

ment to the respective test line and task. Plus, we also offer in-depth training courses for service and maintenance. The training content can be tailored to your individual needs and delivered on-site, directly at your test line.

FOERSTER Service

Our team of experienced and well-qualified service engineers ensures the highest standards in maintenance and service. And when problems occur outside normal working hours, FOERSTER has a 24-hour emergency hotline that can be reached 365 days a year. FOERSTER service specialists can even initiate systematic error analysis over the telephone. When software installation or configuration questions arise, remote access can help clear up problems immediately, so your instrument is quickly ready for use again.

Worldwide sales and support offices



Headquarters

- Institut Dr. Foerster GmbH & Co. KG, Germany

Subsidiaries

- Magnetische Pruefanlagen GmbH, Germany
- FOERSTER Tecom, s.r.o., Czech Republic
- FOERSTER France SAS, France
- FOERSTER Italia S.r.l., Italy
- FOERSTER Russland AO, Russia
- FOERSTER U.K. Limited, United Kingdom
- FOERSTER (Shanghai) NDT Instruments Co., Ltd., China
- FOERSTER Japan Co., Ltd., Japan
- NDT Instruments Pte Ltd, Singapore
- FOERSTER Instruments Inc., USA

The FOERSTER Group is being represented by subsidiaries and representatives in over 60 countries – worldwide.

Institut Dr. Foerster GmbH & Co. KG

Division Testsysteme

In Laisen 70
72766 Reutlingen
Germany
+49 7121 140 0
info@foerstergroup.de

