



# TERASCOPE®

The revolution in coating thickness measurement

**fischer**®

# Contactless Lacquer Coating System Measurements – with TERASCOPE®

**Designed for Automation:** TERASCOPE® can be integrated for uninterrupted 24/7 operation into every painting line or other environment

**Terahertz gauge head:** Integrated 3D scanner for fast and accurate positioning



**Contactless, robot-controlled precision:** TERASCOPE® measures with high precision. Intrinsic vibration compensation thanks 1.6 kHz sample acquisition

## TERASCOPE® TDS 5

**The TERASCOPE® Laboratory Instrument:** For the precise and reliable characterization of coating systems under repeatable and stable laboratory conditions.

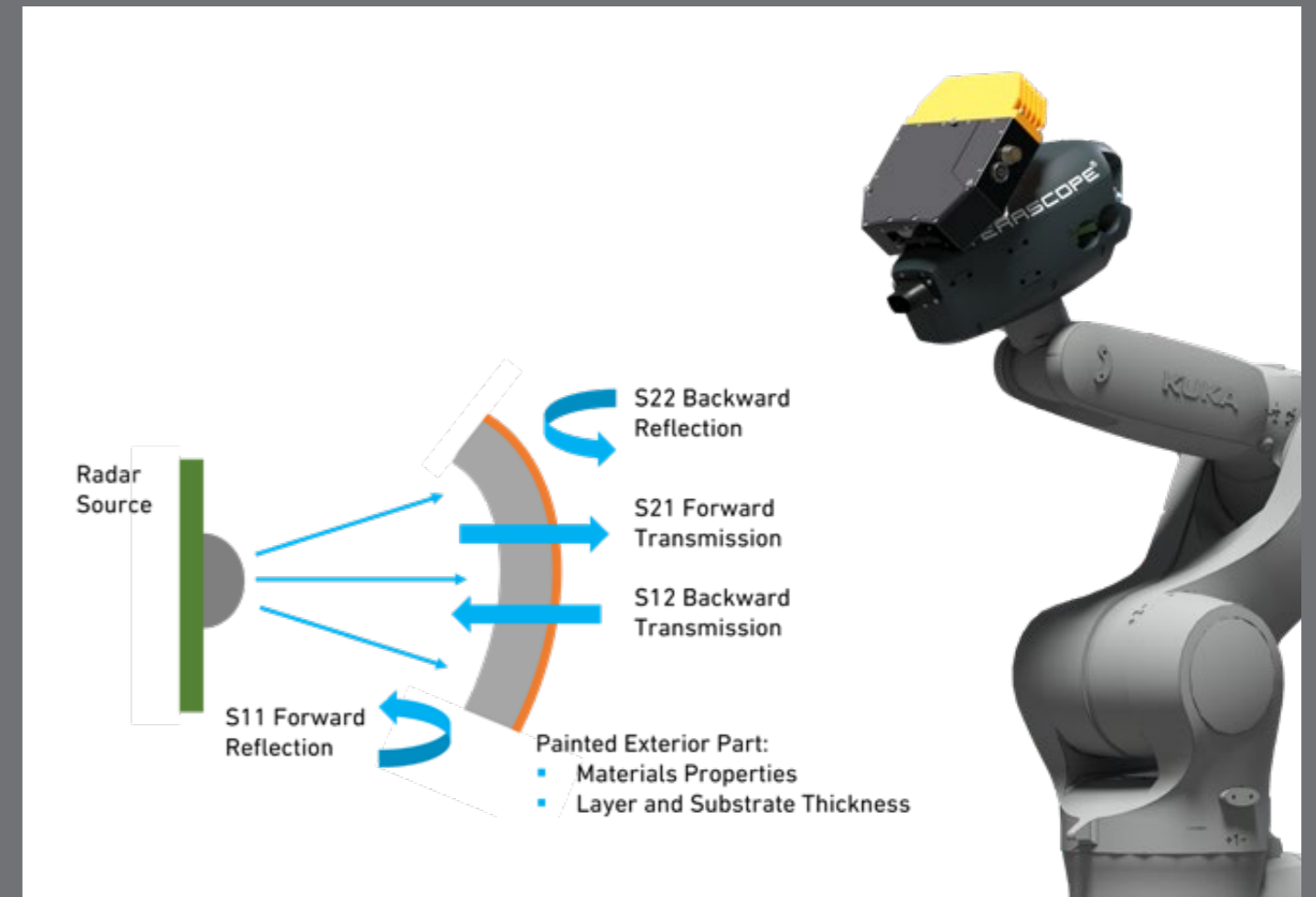


Together with the terahertz measuring head, the TERASCOPE® laboratory device forms a formidable team in non-contact, non-destructive and precise measurement of coating systems. While the measuring head on a robot performs fast and precise inline measurements, the laboratory device provides complete layer characterization. The total paint thickness is determined by optical profile and non-contact magnetic-inductive reference measurements. The vacuum table performs level positioning of the test piece. The circulation of purified air ensures that the layer characterization can be carried out with repeated accuracy.

# SMARTER QUALITY CONTROL: THE SOLUTION FOR THE INDUSTRY 4.0 PAINTSHOP

Implementing the Smart Factory in a Paintshop requires innovative new concepts, especially when it comes to quality control. Our answer to the painting process of the future is TERASCOPE®. Our solution for precise coating thickness measurement offers numerous advantages that perfectly fit into the environment of intelligent and digitally networked production. Fischer's latest innovation, the TERASCOPE®, can precisely detect and determine every single layer of paint that is involved in classic automotive painting. This includes cataphoretic coating (KTL), filler, basecoat and clearcoat. Each of these coatings can be measured simultaneously and non-destructively.

In addition, the TERASCOPE® can measure wet paint systems. The method used is substrate-independent. This means that it can also analyze coating thicknesses on plastics and lightweight construction materials such as carbon fiber reinforced polymer (CFRP). Depending on customer requirements, the system can be implemented as a fully automated measuring system integrated into the paint line or as a desktop device. The inline solution can be linked seamlessly with higher-level system programmable logic controller (PLC) via Fieldbus.



## Testing of radar transmission / reflection properties with Fischer's THz technology

Modern cars today have various radar sensors, integrated behind bumpers or radomes. For safety reasons the radar transmission / reflexivity properties of these parts must be monitored during production.

An advanced method for monitoring these radar properties is Fischer's Terahertz technology. With our TERASCOPE® system you can measure these radar properties fully automated.

Additionally, accurate measurements of all individual paint-layers of the bumper / radome allows root cause analysis and process adaptations. The Fischer TERASCOPE® can be easily integrated on robots.

A major advantage of the radar transmission / reflection measurement with the TERASCOPE® is single-sided measurement with easy access and faster positioning to the test pieces.





## Innovation from Fischer: The Terahertz Software

The software developed especially for the TERASCOPE® offers comprehensive functionality with many customizable options. The user is supported at every stage, including the calibration process, the actual measurement process, and the evaluation of the results. The measurement is graphically displayed and the different layer thicknesses are visualized. The user interface enables intuitive operation of the entire measuring system. Measurements can be carried out automatically in the inline system and or remotely depending on the customer's requirements.



# TERASCOPE® System at a Glance

### How does the Terahertz measurement system work?

The terahertz radiation used in this system consists of electromagnetic waves with frequencies between 0.1 to 6 THz. This radiation has a shorter wavelength than microwaves but has a longer wavelength than visible light. The technology to measure this frequency range was only developed in recent years.

The special feature of the terahertz radiation is that it can penetrate multiple coatings. The terahertz radiation is partially reflected at the transitions between layers. This means that the "echoes" generated arrive at the detector at different times. From this, the Fischer terahertz software can determine the thickness of up to four layers - the entire measurement only takes one second.

### Excellent Repeatability

The accuracy of the terahertz method is impressive: Layer thicknesses of 5 to 10 µm can be measured on a measuring spot of less than 2 mm. Compared to the repeatable magnetic induction method, the TERASCOPE® offers a repeatability that is 10 times better at 1%.

### Non-destructive

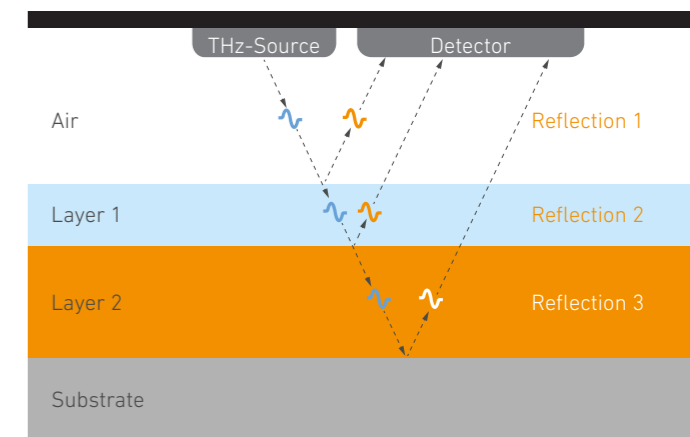
As the paints are transparent to terahertz radiation, they are not affected by the radiation. That means that the measurement is completely non-destructive.

### Non-ionizing

Terahertz is much lower in energy compared to X-rays. Thus, these devices can be used openly and do not require radiation protection.

### Contactless

Unlike magnetic induction and ultrasonic testing, terahertz is contactless. Thus, it is suitable for measuring wet paints as well.



The terahertz radiation penetrates the coatings and is reflected at the boundary of each material. The Fischer terahertz software calculates the layer thickness from the time the reflections take to reach the detector.

### General Specifications

- Beam size on sample: 1 mm @ 1 THz
- Bandwidth: 6 THz
- Acquisition speed: 1.6 kHz
- Contactless thickness measurements with a large working distance of 70 mm

### Single Layer Measurement

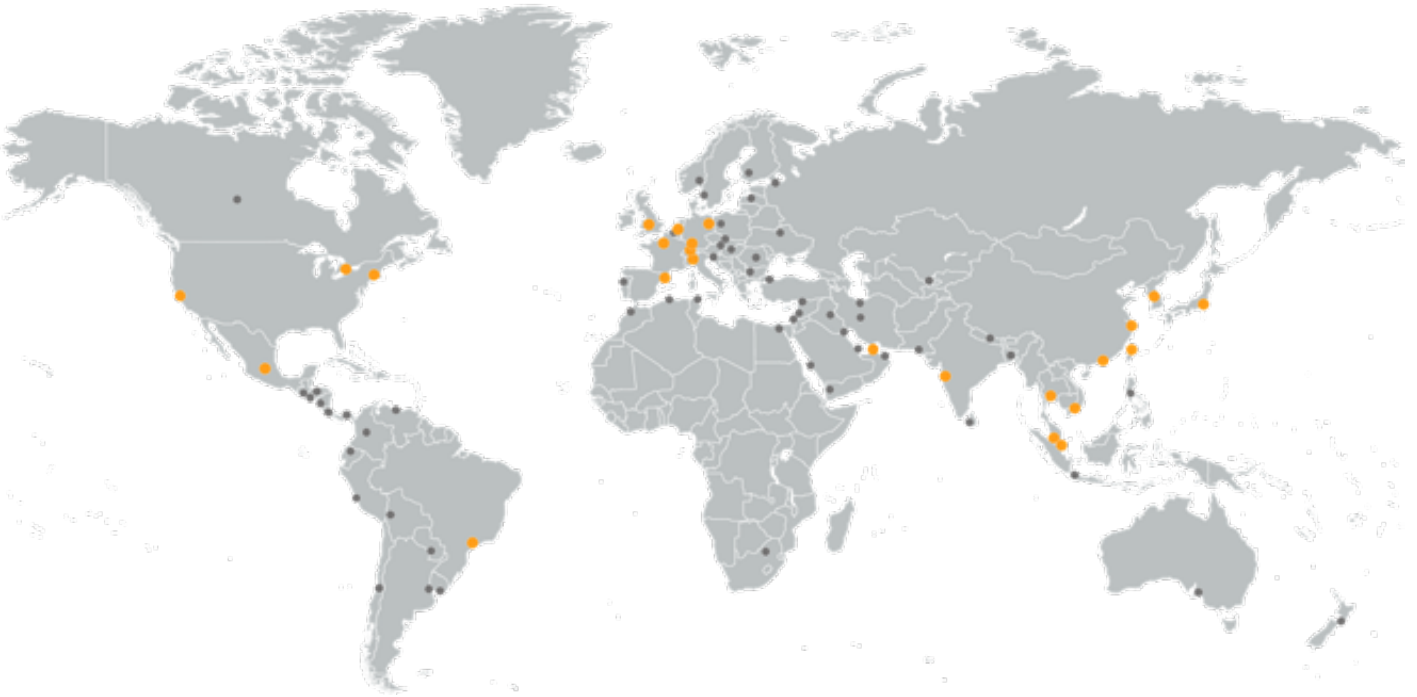
- Thickness range from ~10 µm up to several millimeters
- Thickness accuracy <1 µm or <1 % of thickness
- Thickness repeatability typical 0.1 µm

### Multilayer Measurement

- Maximum 7 layers
- Thickness accuracy typical ~1 µm or 1 % of thickness, dependent on application

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Our measuring instruments, software and accessories are developed, produced and constantly optimized in-house. The goal is to make the world of our customers measurably easier – made in Germany!

Our experienced staff will be happy to advise you locally and in your national language. Please find your personal contact at:

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