

Track & Trace Fingerprint Continuous

Marker-free position matching on continuous material

Only by determining the exact position can process parameters be matched to the right section on a coil while unwinding.

Continuous material such as metal strips or paper is manufactured at extremely fast feed rates while requiring the utmost accuracy. In the event of a production error, Track & Trace Fingerprint Continuous allows defects and process data to be matched to the original position on the strip. Defective sections can then be removed, even after the strip has been cut into sections. To achieve this, the camera-based system analyzes the specific surface microstructure.

Millimeter accuracy even at high feed rates

To ensure continuous quality assurance, linking process data with individual material sections is essential. When it comes to the production and processing of metal blank rolls, feed rates beyond 1000 m/min are not uncommon; in electrode production, the coating processes feed rates already exceed 50 m/min, with 100 m/min expected in the near future.

Track & Trace Fingerprint Continuous allows process data to be matched to a position with millimeter precision – even at a high feed rate. This makes tracing continuous material reliably possible.

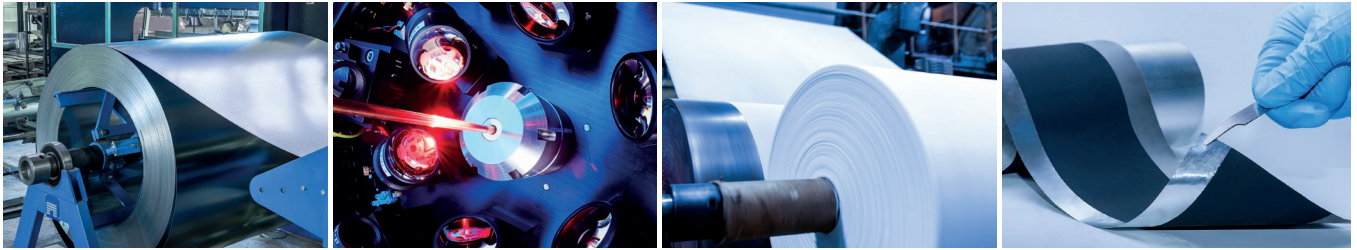
Marker-free: identification based on surface microstructure

Applying markers, such as laser engravings, data matrix codes or colored markings adds time to the production process. What's more, these types of markers are too large, too expensive or unsuitable for safety-relevant sections. To identify the area on a strip where a marker cannot be applied, rotary encoders or laser surface velocimeters (LSV) are used. However, inaccuracies or an interruption of the strip will prevent the production data from being matched to the right material section. Furthermore, once the continuous material has been cut into sections, it is no longer possible to determine the position.



Advantages at a glance

- Marker-free
- Contactless
- Capturing at a process speed of up to 80 m/min
- Process data and strip position linked with millimeter accuracy
- Identification of sections even after separation



Track & Trace Fingerprint Continuous enables marker-free position determination on continuous material such sheet metal, wire, paper, or electrode foil. This allows process parameters to be precisely assigned to a surface section after unwinding of the coil.

To determine the position, Track & Trace Fingerprint Continuous uses existing material properties: the microstructure of the surface. A few square millimeters are usually sufficient, and a camera system is used to capture them during the production process. The camera image is then converted into a reduced bit sequence – the fingerprint. It is assigned an ID and stored in a database. To identify a material section at a later point, enlarged search areas are captured that can be expected to feature at least one generated fingerprint from the database. If a match is found, the corresponding ID is displayed. This ID can be used to retrieve the strip position or other process parameters. It usually takes less than 100 ms to capture an image and generate a fingerprint. Finding a match takes between a few hundred milliseconds and a few seconds, depending on the size of the database.

Less than 50 MB data per kilometer of material

A key benefit of the Track & Trace Fingerprint technology over other optical capture systems is the small amount of data generated: With less than 50 MB per captured kilometer of material, processing very long strips is no problem. This is achieved by effectively compressing the surface information when generating a fingerprint. In addition to low memory requirements, the compression also reduces the time needed to find a database match.

Recognizing sections

The Track & Trace Fingerprint method links the surface of the material to an ID, enabling positions to be determined even after the strip has been cut into sections. As long as at least one fingerprint has been generated on the product surface, each individual product can be matched to the corresponding strip section.

Industrial cameras and high-performing LEDs are used to capture the fingerprints. The LEDs use short flashes to optically freeze the movement of the strip, eliminating the motion blur that occurs at high feed rates. The cameras are arranged so that multiple lines can be captured and identified simultaneously, in case the material is later cut lengthwise. This setup does not require much space within the production line because control electronics and computers can be installed separately.

Suitable for a wide range of materials

Tracing components in production lines with the Track & Trace Fingerprint Inline system and their identification on a random sample basis using Track & Trace Fingerprint Flex is already an established method. This technology is suitable for a wide range of materials: Metal surfaces, such as blanks, carbon steel or electrode foil, but also fibrous materials such as wood, paper, carton and various kinds of tissue have a sufficiently unique surface microstructure to enable reliable identification. It can also be used on electrode coating materials and many types of plastic.

Track & Trace Fingerprint systems



Identification in the production line
Permanently installed reading system



Identification on the production site
Cordless reading system for robust component detection



Identification via smartphone app
Quick and easy to use



Optimum preparation for the use of Track & Trace Fingerprint
Test stand for purchase or rental



Position matching on continuous material
Matching process parameters to coil sections with millimeter precision

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