



OCT Seam Inspection

Fast and intelligent quality assurance

- Detection and evaluation of various seam defects
- Omnidirectional measurement across the entire OCT scan field
- Applicable during beam oscillation and on-the-fly operation
- Compatible with other OCT features



**Post Process
Seam Inspection**

Functionality – How OCT seam inspection works

Blackbird's OCT seam inspection uses high-precision 3D measurements along the weld seam. Individual OCT measurement lines are recorded during the welding process and the seam surface is automatically detected. This information is used to calculate seam profiles and check for selectable defect characteristics.

Sequence of evaluation

1 Individual defect detection at the measurement line level

A fixed limit value is stored for each selected seam defect (e.g., roll-up, burn-in notch). If the measured value exceeds this limit, the line for the corresponding defect is evaluated as NOK (not OK).

2 Collective defect detection at seam level

Minor defects affecting several consecutive lines can add up to a larger collective defect (e.g., pores). The system automatically detects such patterns based on a defined minimum size, adds them up, and outputs them as explicit collective errors.

3 Overall evaluation of the seam

The percentage of measurement lines that exhibit a specific error above the limit value is calculated. If a defined percentage is exceeded, the entire seam is considered defective.

Data communication – Full transparency during and after the process

OCT Seam Inspection can be fully integrated into modern manufacturing processes and offers flexible interfaces for every process environment:

During the process:

- Output of OK/NOK status of the seam via the fieldbus for immediate quality feedback
- Transmission of the reason for rejection in case of NOK for targeted process optimization
- Automatic switching on and off of OK/NOK markings and corrective welds
- Option for process-controlled interruption or ejection in case of serious errors

After the process:

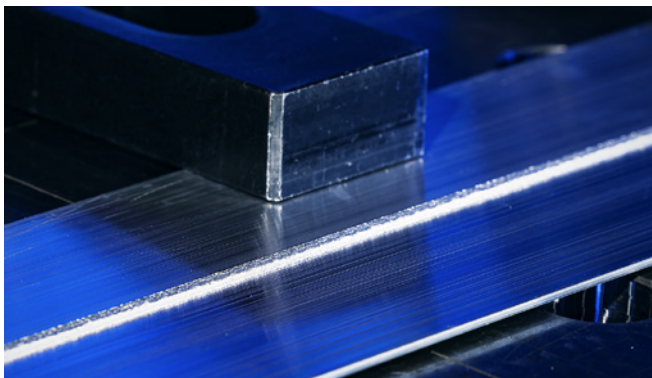
- Consolidated measurement data can be made available via standardized or customer-specific interfaces (e.g., OPC-UA)
- Ideal for traceability, series evaluation, and long-term documentation

Info

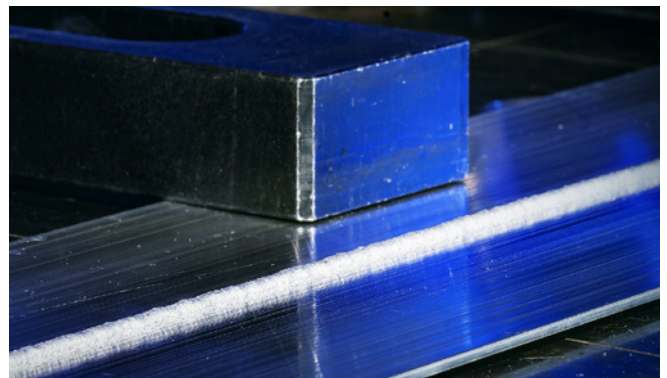
Note on defect detection:

Our algorithms for defect classification and seam evaluation are continuously being developed and expanded to cover new requirements, materials, and welding processes.

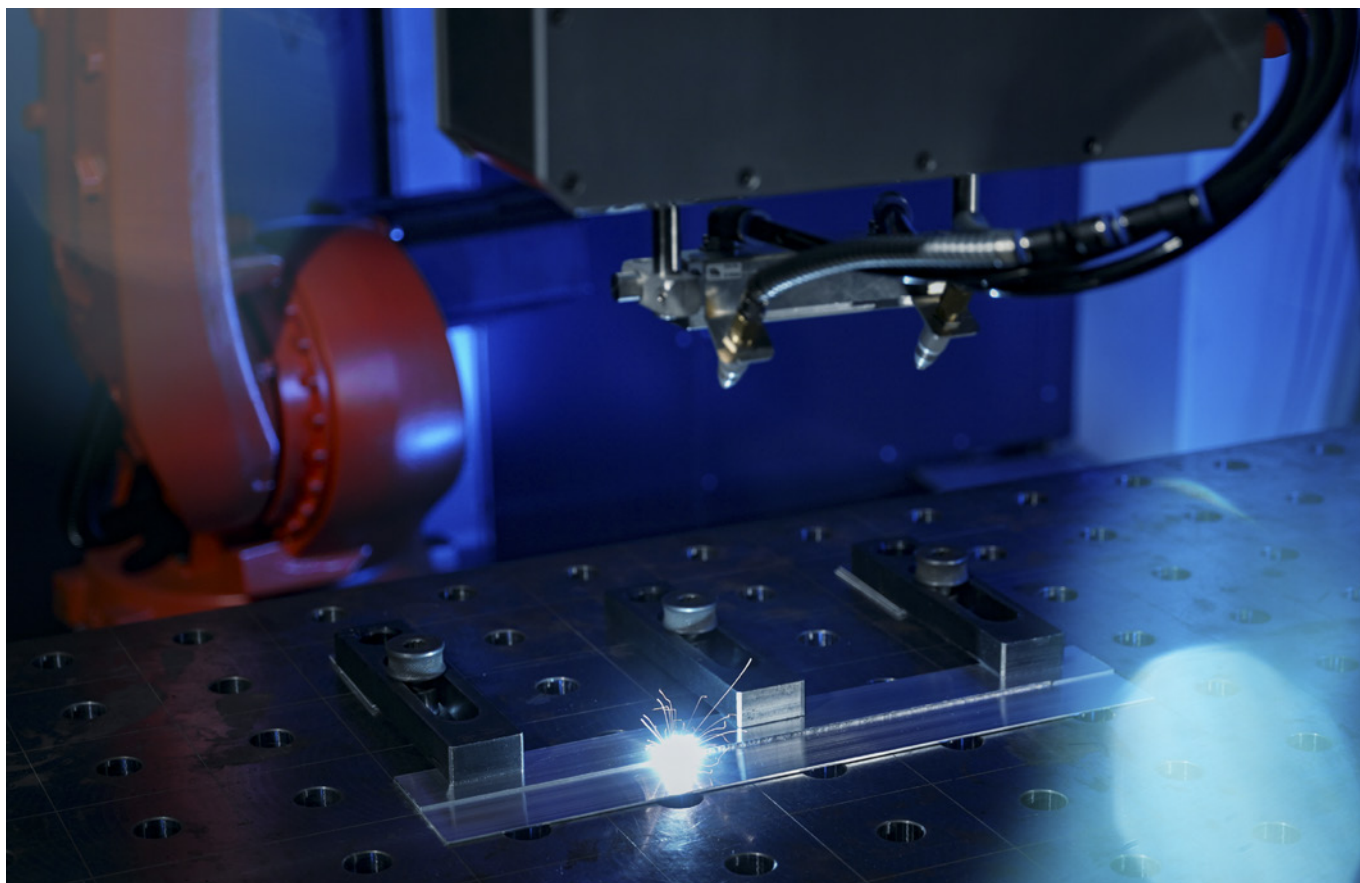
Please contact us for information on the currently available defect coverage or individual testing requirements. We will provide you with professional advice on possible extensions or specific applications.



Example of a weld classified as OK



Example of a weld classified as not OK



Capabilities – Flexible, fast, and compatible

OCT seam inspection is designed for productive series production and offers the following key capabilities:

Compatible with all other OCT functions

Seam Inspection can be easily combined with Edge Tracking, Welding Depth Measurement, etc.

On-the-fly analysis

The evaluation takes place during the measurement, without intermediate buffers or stops, even with moving components and/or a robot-guided scan head.

Oscillation up to 1000 Hz

Even with highly dynamic scanning movements, the inspection remains precise and stable.

Process-neutral

No influence on the welding process – no external light source, no mechanical influence.

Geometry-independent

Supports various seam and joint types (e.g., fillet weld, lap joint) without modifications or reprogramming.

Your benefits – Greater efficiency, less waste

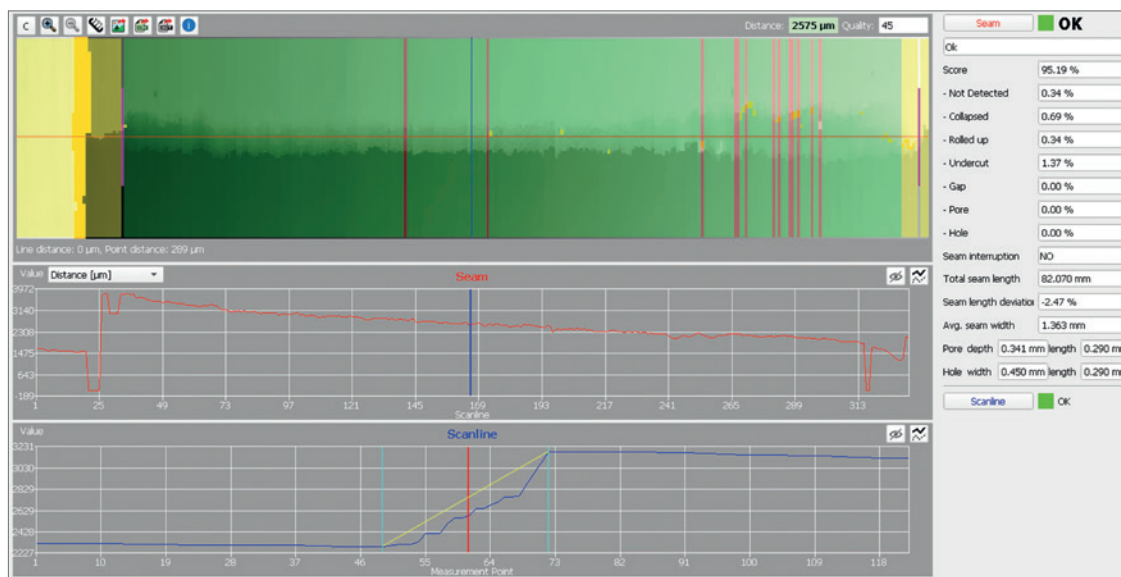
OCT seam inspection offers you numerous economic and qualitative advantages:

- **No need for separate quality stations** thanks to 100% inline inspection
- **Reduced scrap rates** through immediate fault detection
- **Traceability** down to the individual defect level
- **Low training effort** thanks to automated classification
- **Shorter downtimes** thanks to in-situ defect transmission and localization
- **Scalable** for single-item production and large series

Detectable seam defects – Wide range of defect coverage for different seam types

OCT seam inspection detects a wide range of relevant defects, depending on the seam type and joint type:

Feature	Classification
Seam width	Geometric weld characteristics
Differential seam width	Geometric weld characteristics
Differential seam height	Geometric weld characteristics
Differential seam area	Geometric weld characteristics
Seam shape deviation (convex / concave)	Form- and structure-related defects
Sunken weld	Form- and structure-related defects
Bulging / Roll-up	Form- and structure-related defects
Undercut	Form- and structure-related defects
Gap formation	Form- and structure-related defects
Excess seam material / Overlap	Form- and structure-related defects
Top sheet breakthrough	Form- and structure-related defects
Pore (individual or clustered)	Form- and structure-related defects
Hole (individual or clustered)	Form- and structure-related defects



Seam evaluation of a fillet weld in the RSU software

