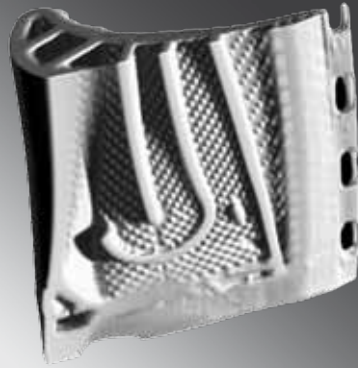


# Application:

## Quality control of turbine blades



- Inspection item:  
Aircraft engine,  
turbine blades
- Material:  
Inconel and other  
nickel-based alloys

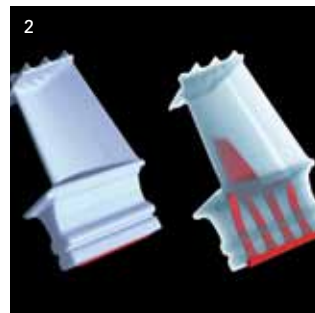
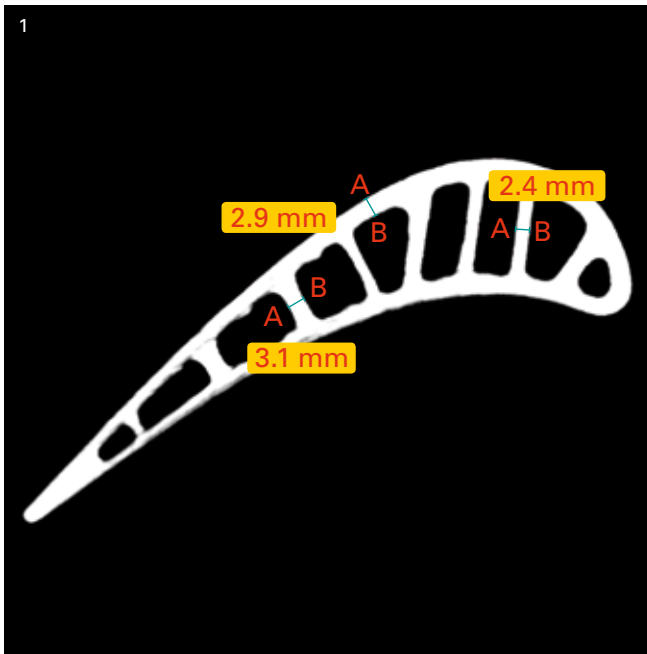
### Inspection task

The production of turbine blades, e.g. for aircraft engines, takes place in several substages. With its cooling channels, the unfinished component manufactured as a precision casting already receives a complex inner structure.

Following commencement of work on the blade root, fine laser bores are placed externally which penetrate all the way into the cooling channels. When doing so, the front wall must be drilled through completely. The rear wall, however, may not be bored into.

During production, deviations from the internal and external geometry stipulated in the construction design are permitted within tolerance limits. Impermissible variations, as a rule an altered external geometry such as the twisting of the airfoil or insufficient wall thicknesses between the cooling channel and the external wall, or between the individual cooling channels themselves, must be detected during quality control and lead to rejection of the component.

YXLON. X-ray technology at its best.



1 Measurement of wall thicknesses  
 2 Display of cooling channels in the blade  
 3 Y.CT Compact

## Analysis

Under certain circumstances, conventional radiographic testing is implemented for detecting defective blades. However, interpretation of the radiographic images is extremely difficult due to the complex structure involved. For instance, any bore contacts made with the rear wall are not clearly verifiable in the radiographic image. As a result of CT technology, the CT image allows a reliable inspection decision to be made regarding possible damage to the turbine blade.

The CT cross-sectional image allows the detection of highly precise geometries, and even the thinnest of wall thicknesses in the blade can be measured. The analysis supplies information about targeted/actual deviations in terms of materials' thicknesses.

CT measurement permits an exact inspection verdict to be reached on good/poor quality, even in light of approval regulations designed for the highest safety.

Parameter	
X-ray source	450 kV
Focal Spot (EN 12543)	1.9 mm
Detector	Line Detector Array
System	Y.CT Compact

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