3D Metrology
of Turbine Components

ATOS ScanBox with Batch Processing System

Optical 3D coordinate measuring machine
Production-integrated inspection
Highest throughput and short feedback cycles

gom

ATOS ScanBox BPS for Turbine Component Measurement

Fast measurement cycle times and high production throughput demand increased machine utilization (OEE). The ATOS ScanBox BPS was developed to achieve customer requirements of faster cycle times and reduced operator involvement.

The ATOS ScanBox BPS is a complete 3D measuring machine, extended with a handling system and a programmable logic controller (PLC). Components are loaded into the handling system where unique identifications, such as component type and serial number, are related to a fixture RFID chip. The handling system loads the measuring machine with the component to be inspected, and automatically selects the program related to the information on the RFID chip. The ATOS ScanBox process takes over and performs the measurement cycle. The component inspection time is significantly shorter compared to traditional methods. Results can be automatically passed to external Manufacturing Execution Systems (MES).

ATOS ScanBox BPS combines airfoil and automation expertise and meets the needs of high-volume turbine component manufacturing factories of cast turbine components or turbine component repair facilities.

- Self-contained system for handling large or small batches of turbine components
- Fast, uninterrupted production inspection
- Reduced operator interaction
- Strong airfoil functionality and tools which are proven, precise and repeatable to aerospace standards AC7130-4 and AS13003

Airfoil Inspection Functionalities

The GOM Inspect software has a complete set of airfoil inspection functionalities. The inspection principles include standard and customizable options to meet different engineering standards and types of airfoil drawings. The User Defined Inspection Principle (UDIP) is one of the most powerful features for this industry, allowing fast, standardized, efficient inspection of airfoil sections.
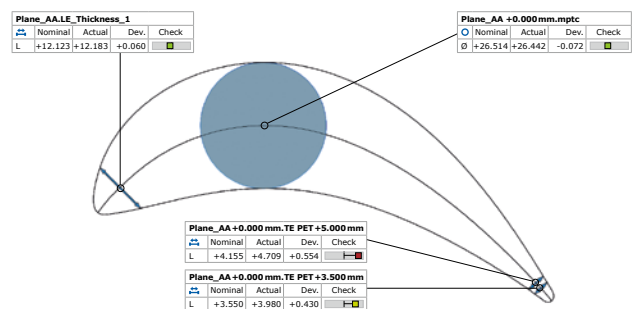
Surface comparison – A 3D representation of surface deviations to CAD or master mesh is common with the GOM technology. Surface comparisons are typically used when developing new products to look for issues in the manufacturing process. Comparisons can be made in multiple alignments including best-fit to CAD or RPS. This powerful tool highlights details about the product not possible with traditional methods.
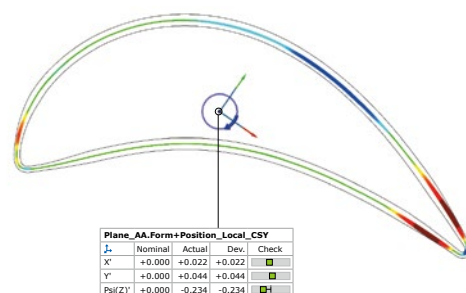

| +0.012 |
| +0.475 |
| -0.381 |
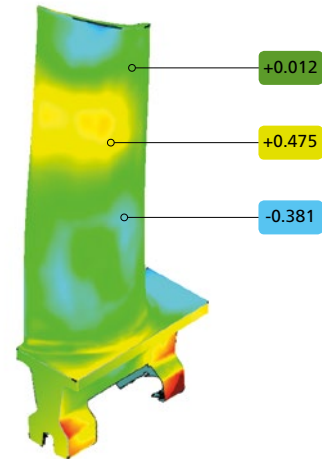
Edge points and circles – Edge point creation is a standard functionality and determined by the pierce point of the camber line at the leading or trailing edge with the suction and pressure side of the airfoil. Expert parameters allow points to be offset along the camber line. Edge circles are also automatic and generate elements at the leading or trailing edges of the airfoil.

Plane_AA +0.000 mm.TEC

○	Nominal	Actual	Dev.	Check
R	+1.222	+1.183	-0.039	
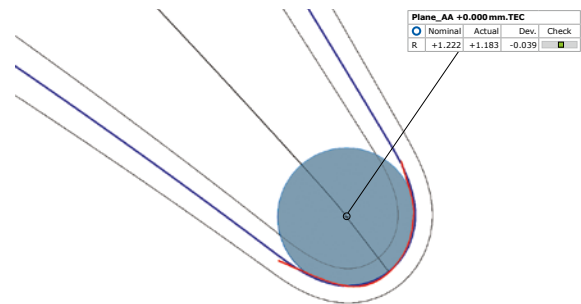
Thicknesses – Standard functionality creates thicknesses at the leading or trailing edge airfoil positions. The simple dialog prompts for a distance value at which the thickness is to be taken from the edge point. Options allow the measurement to be traced along the camber line. Traditional thicknesses at predefined drawing angles can also be created. Maximum airfoil thickness check is also available using distance, or maximum inscribed circle method.

Plane_AA.LE_Thickness_1

	Nominal	Actual	Dev.	Check
L	+12.123	+12.183	+0.060	

Plane_AA +0.000mm.mptc

○	Nominal	Actual	Dev.	Check
Ø	+26.514	+26.442	-0.072	

Plane_AA +0.000 mm.TE PET +5.000 mm

	Nominal	Actual	Dev.	Check
L	+4.155	+4.709	+0.554	

Plane_AA +0.000 mm.TE PET +3.500 mm

	Nominal	Actual	Dev.	Check
L	+3.550	+3.980	+0.430	

Form and position checks – The software enables a flexible way to evaluate the form and position of airfoil sections to meet end-user needs. Evaluation techniques of the actual section data can be compared in Chebyshev, Gaussian or best-fit by tolerance methods. The software can also compute the results with changing tolerance regions where tolerances are different across areas of the airfoil section.

Plane_AA.Form+Position_Local_CSY

	Nominal	Actual	Dev.	Check
X'	+0.000	+0.022	+0.022	
Y'	+0.000	+0.044	+0.044	
Psi(Z)'	+0.000	-0.234	-0.234	

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