

# YXLON FF20 CT

High-resolution computed tomography (CT)  
inspection system for fine parts

Precision at its finest

**NEW! Now also available as  
FF20 CT Metrology**



**YXLON**  
Technology with Passion



# Explore the art of detection

As a world leader in non-destructive X-ray testing YXLON has mastered the art of detection. Based on our extensive experience in designing tailor-made X-ray and CT solutions, we help our customers achieve excellent results during their scientific research and development projects as well as production inspection procedures. Making the invisible visible – that's what we call the art of detection.

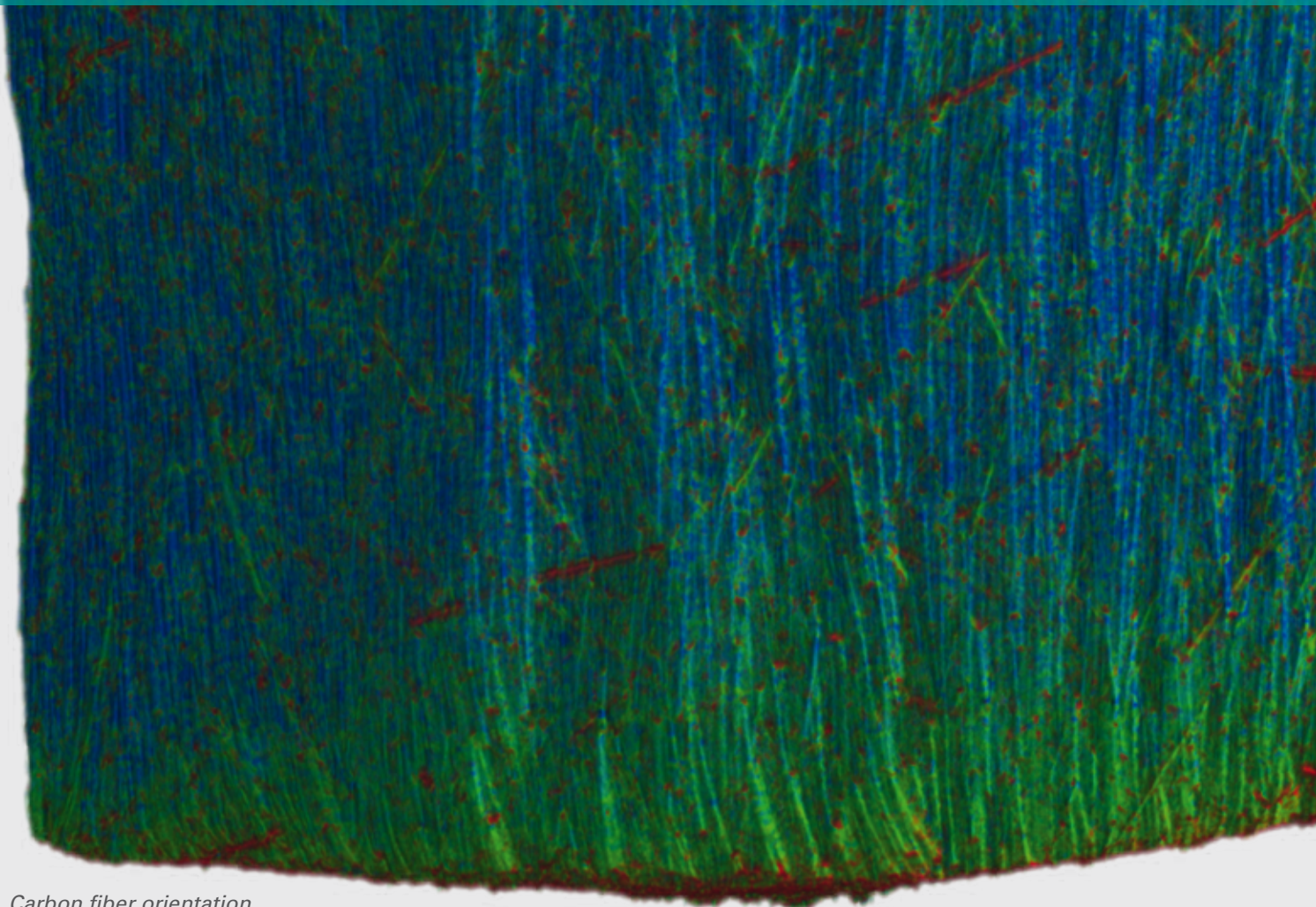
No matter what industry you're in, you'll get excellent 3D insights thanks to our smart CT systems. The diversified YXLON CT portfolio covers the widest variety of sizes and materials, with the FF20 CT focusing on small to very small parts.

YXLON CT solutions are tried and tested premium systems. They blend smoothly into your processes, guaranteeing a fast and intuitive workflow and high uptime. Our CT product range equips you with relevant information regarding the interior and exterior structures of your items enabling you to do all kinds of analyses.

Additionally, the worldwide YXLON service network is an important factor to be taken into account when evaluating the YXLON CT price-performance ratio – one that appeals to quality managers, operations personnel, and purchasers alike.

## Where do you use the YXLON FF20 CT?

- Research and development (R&D)
- Failure analysis (F/A)
- Process control
- Combined DR-CT inspection
- Defect and material analysis
- Small series inspection



Carbon fiber orientation





## Experience a structured CT inspection workflow

Do you want to improve the material testing procedures in your R&D department? Do you want to optimize your process control and small series inspection? Discover the precision of the FF20 CT with its touchscreen user interface, intelligent automation and first-rate functionality.

The FF20 CT is ideal for fine parts inspection in the automotive, electronics, aviation and material science industries where detailed results are essential in order to comply with both safety and quality requirements.

The FF20 CT supports your ability to easily carry out tasks based on the newly designed graphical user interface. Use

the intuitive touchscreen to combine 2D and 3D inspections in one sequence, and graphically create your individual imaging chain via drag and drop icons.

Various automated functions also help you save time. IntelliGuard, the automatic collision protection allows for quick and comfortable operation. The system indicates the health status of important values to make sure you always have an overview of your system.

Another way to simplify the process is to use push messages to remotely monitor the system. Plus, to efficiently manage the daily inspection schedule you can assign different user levels that range from the unskilled operator to the experienced expert.

### YXLON FF20 CT key benefits

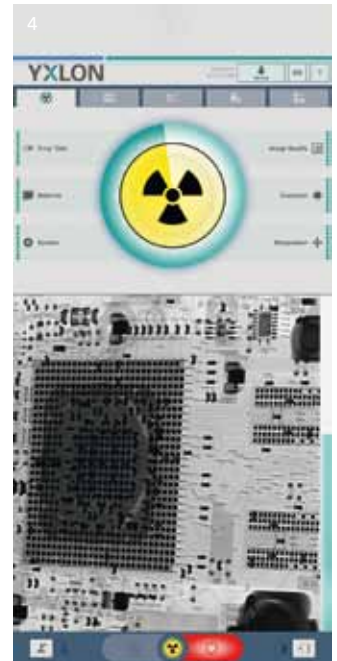
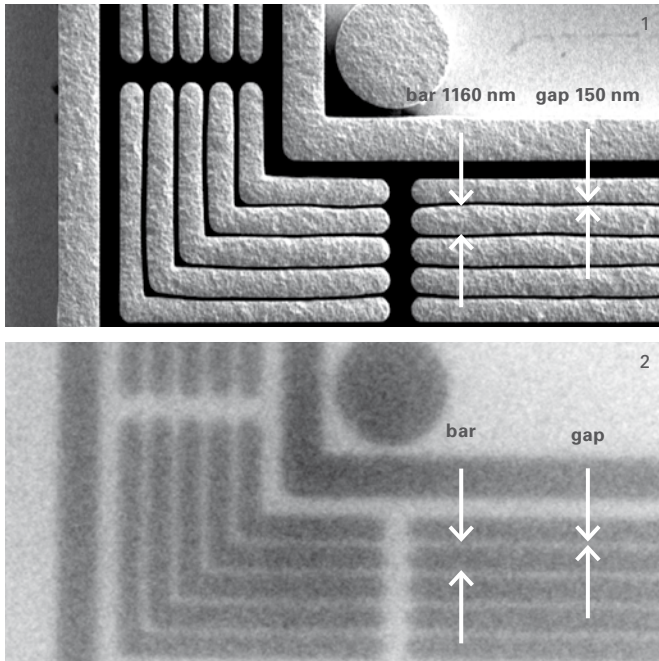
- Intuitive touchscreen operation
- Revolutionary inspection sequence creation using icons
- Flexible ROI selection thanks to virtual rotation axis
- Time saving with remote monitoring including push messages
- Expanded inspection envelope with horizontal field of view extension, Helical and dual Helical CT techniques
- Increased versatility via motorized focus-detector distance

# Detect what matters

With the YXLON FF20 CT you'll opt for comfortable and extremely precise fine parts CT inspection in your labs and R&D.

Experience the new intuitive touchscreen user interface and the astounding precision of the new water-cooled 190 kV nanofocus transmission tube.

*Defect analysis of connection bond wire 20  $\mu\text{m}$  to die*



- 1 SEM (Scanning Electron Microscope) image shows the exact dimensions of the test pattern.
- 2 150 nm gap clearly visible in the X-ray image
- 3 Remote monitoring
- 4 Health monitor, consolidated view

## Achieve accurate results with maximum spatial resolution

Experience the precise performance of the FF20 CT for defect and material analysis and other applications. Inspect a wide range of materials and sizes. With its virtual rotation axis, FlexCenter allows you to avoid repositioning inspection items.

Instead of stitching different areas of a tested object, you can use HeliExtend, the YXLON helical CT, to automatically create a single accurate image. The HeliExtend Dual, combining a horizontal field-of-view extension and helical CT, allows maximum-sized parts to be depicted in 3D. In addition, advanced image quality is supported by ring artifact and beam hardening correction. The

FF20 CT's motorized focus-detector distance simplifies the inspection process.

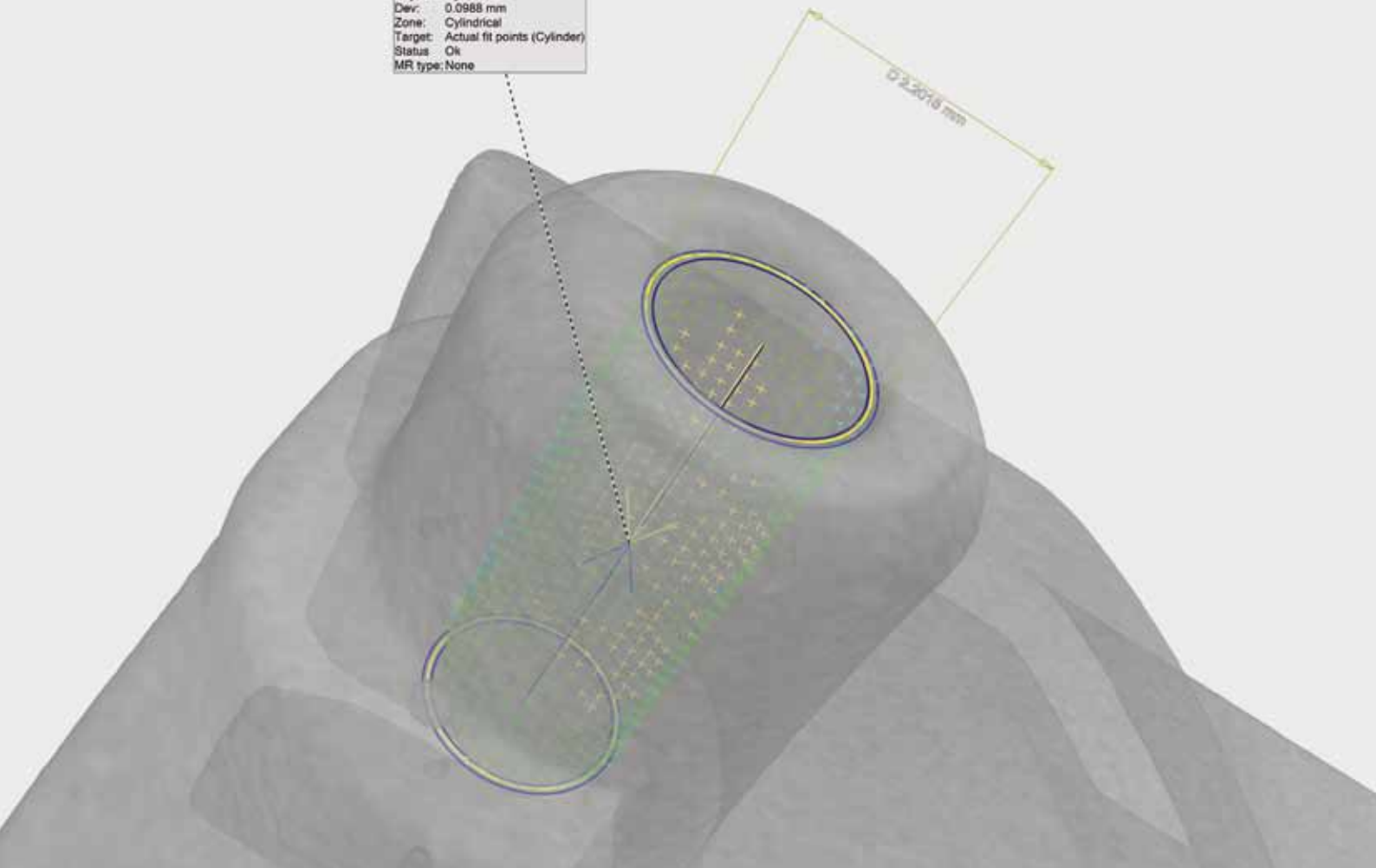
The power of the FF20 CT is founded on rock solid components such as a granite based manipulator and a water-cooled 190 kV Feinfocus nano-focus transmission tube with a detail detectability down to 150 nm (2D).

The X-ray tube's spatial resolution allows for the completion of demanding applications. Hence, the FF20 CT is the perfect solution for tasks like initial sampling, reverse engineering, quality control, and more, resulting in increased productivity.

### Which items and materials are especially suitable for the YXLON FF20 CT?

- Electronic components like SMD
- Semiconductor packaging
- Probes of new materials (e.g. metal, plastics, CFRP)
- Microsystems, MEMS, MOEMS
- Medical devices like hollow needles

cylinderform  
M 0.1000  
Object: Cylinder 2  
Dev: 0.0988 mm  
Zone: Cylindrical  
Target: Actual fit points (Cylinder)  
Status: Ok  
MR type: None



## Experience „The Art of CT Metrology“

Do you want a non-destructive way to geometrically measure internal and hard-to-access areas of industrial items? Do you want to use industrial CT to its full effect? Premium dimensional measurement with the YXLON FF20/35 CT Metrology systems for quality assurance (QA) saves time and money.

YXLON CT systems produce volume data which contains comprehensive geometrical information on the inspected item. This enables you to perform a wide variety of tests. An almost unlimited number of reference points can be used to measure the

complete part and you can add internal measurements for cavities and material interfaces in hybrids and assemblies.

Regarding wall thickness you can conveniently perform color-coded CAD comparisons. With archived CT data you are able to continue taking measurements without the original part, which also allows you to execute reverse engineering.

Plus, you can trace measurement data for safety regulations. The general equation is simple: The combined strengths lead to leaner processes which can in turn initiate cost savings.

### Strengths of the YXLON FF20 CT Metrology

- Precise, non-destructive measuring of interior structures
- Measurements of minute structures
- Non-sequential fast data acquisition with almost unlimited measurement points
- Substantial time savings via seamless defect analysis and nominal/actual comparison
- Reduced correction loops
- Fewer correction costs
- Conformity to the VDE/VDI 2630 standard





Calibrated ruby sphere gauges mounted on a high precision part holder to validate the compliance of specified  $MPE_{SD}$

## The YXLON FF20 CT Metrology

The FF20 CT Metrology is ideally suited to metrology tasks. Configured with the new water-cooled 190 kV transmission tube, it allows you to measure especially small components and diverse materials. Sharp contrast makes exact measurements possible.

A fully automated acceptance test based on VDI/VDE 2630 sheet 1.3 requirements allows the specific maximum observational error  $MPE_{SD}$  to be verified with the calibrated YXLON specimen. The results are documented both graphically and in tabular form, while measuring capability is signaled by the traffic light system of the health monitor. The temperature regulator for the interior is also integrated in this health monitor. Deviations from user-specific parameters are visible from a distance.

Temperature regulation provides for intelligent fan control which responds appropriately during focus-detector distance changes or when the loading door is opened. The offset water-air cooler can, if necessary, be placed outside the measuring room that contains the CT system. Thanks to the technology employed, the temperature range in the cabinet corresponds to measuring room quality class 3 as defined by VDI 2627.

The FF20 CT Metrology offers a seamless process without further user interaction from the start of the CT scan to the macrofied measurement of inspection parts. The system supports VGStudio MAX software with corresponding add-on packages, and GOM Inspect Professional.

### How you benefit from the YXLON FF20 CT Metrology

- Automated acceptance test with measurement report referring to VDI/VDE 2630 sheet 1.3
- Convenient access to the history of previous acceptance test measurement reports
- Indication of readiness for measurement and compliance with the temperature specifications in the health monitor
- Intelligent fan control to regulate temperature with offset heat exchanger
- Temperature range of measuring room quality class 3
- Seamless workflow with VGStudio MAX and GOM Inspect Professional

# Check out these facts

## YXLON FF20 CT

### X-ray Components

Tube	Y.FXT 190.61 transmission tube
Maximum energy	190 kV
Maximum power	80 W
Detail visibility	$\geq 150 \text{ nm}^{11}$
TXI	yes <sup>2)</sup>
Water cooling (target and int. coils)	yes

- 1) With YXLON IQI for 2D at minimum focal spot size and HRP Target  
 2) TXI = True X-Ray intensity – controls real output dose for constant intensity

### Manipulator Data

FDD (Focus Detector Distance) <sup>4)</sup>	~ 200 mm – 780 mm
FOD (Focus Object Distance) <sup>4)</sup>	~ 0 – 550 mm
Beam – hub vertical axis	~ 300 mm
Object – transversal axis	~ +/- 120 mm
Loading door	motorized
Maximum part weight	20 kg
Maximum part size	~ 150 mm Ø x 300 mm Height

- 4) Values are average. Exact values depend on detector configuration.

### Cabinet/System

Width	~ 2.400 mm
Height (w/o levelling wedges)	~ 2.220 mm
Depth	~ 950 mm
Weight	~ 3.400 kg
Manipulator design	Granite-base, vibration isolation with active level control, all axes equipped with Heidenhain length and angle encoders

Detector	YXLON Panel 2530 <sup>3)</sup>
Active area	249 mm x 302 mm
Pixel pitch	139 $\mu\text{m}$
Pixel matrix	1.792 x 2.176
Frame rate	up to 30 Hz
Detector (alternative)	YXLON Panel 1515
Active area	146 mm x 146 mm
Pixel pitch	127 $\mu\text{m}$
Pixel matrix	1.152 x 1.152
Frame rate	up to 58 Hz

- 3) Qualified acc. ASTM E-2597

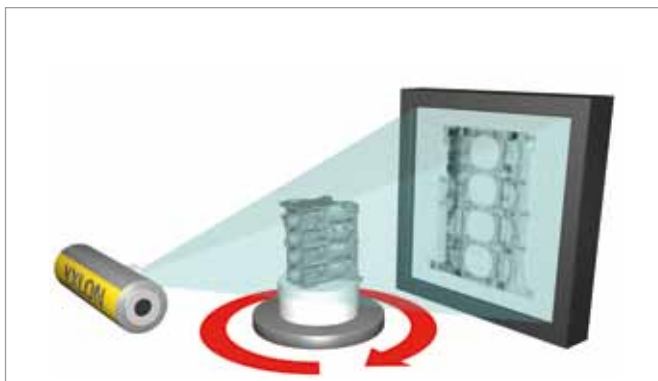
### CT

Circular scan trajectories	continuous rotation "QuickScan" start/stop scan "QualityScan"
Helical scan trajectories	standard "HeliExtend" dual "HeliExtend Dual"
Further trajectories	1.8 times horizontal extension "ScanExtend" virtual rotation axis "FlexCenter"
CT field of view, std. circular scan <sup>5)</sup>	~ 150 mm Ø x 170 mm height
CT field of view, hor. extended <sup>5)</sup>	~ 150 mm Ø x 135 mm height
CT field of view, maximum <sup>5)</sup>	~ 150 mm Ø x 300 mm height

- 5) Values valid for detector YXLON Panel 2530

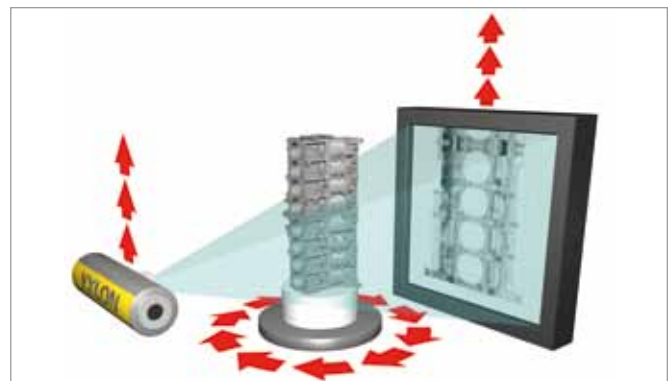
### Operator Desk

Width	~ 1.800 mm
Height	~ 700 mm – ~ 1.200 mm, motorized
Depth	~ 800 mm
Weight	~ 175 kg
Monitor	2 pcs., capacitive touch, 1920 x 1080 pixel, 21", as well as separate reconstruction and evaluation station with 27" or 30" monitor



Principle of circular-scan CT: The 3D model comprises almost\* all information acquired by the detector during the rotation.

\* Almost because in this method the inspection item is not mathematically determined completely



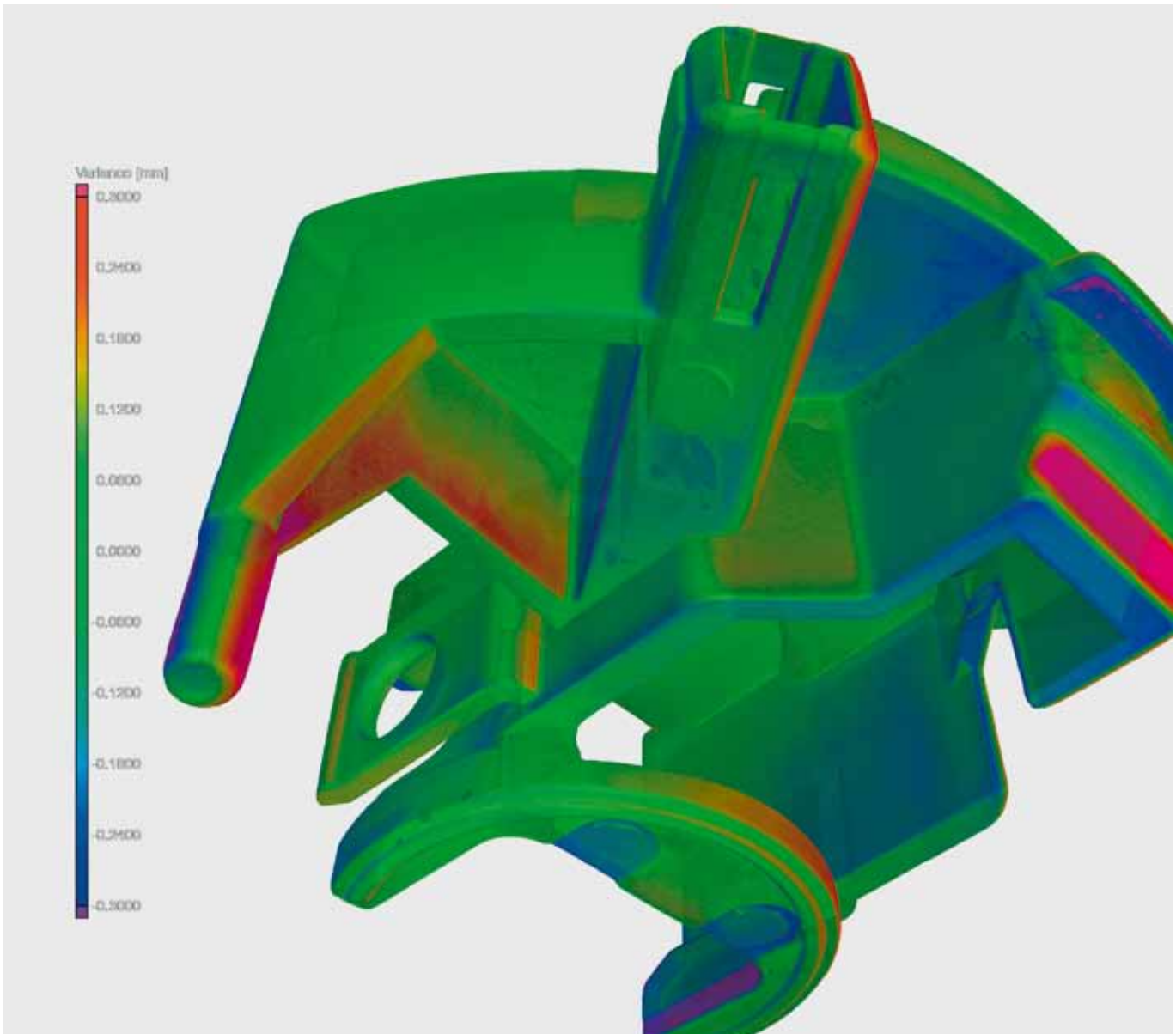
Principle of HeliExtend: With stepwise rotation of the sample and stepwise vertical manipulation of the X-ray tube and the flat-panel detector all information for precise 3D volumes of your parts are obtained. This method is also applicable for a vertical scan extension.



### YXLON FF20 CT Metrology






Conditions		Measuring accuracy	
<b>Features, Options</b>	see beside, but at printing date just with detector YXLON Panel 2530 Csl. FlexCenter (virtual rotation axis) is not available with FF20 CT Metrology.	<b>MPE<sub>SD</sub></b> <sup>6)</sup>	3.9 μm + L/75 [L=mm]
<b>Air conditioning inside cabinet</b>	yes, temperature range referring to VDI/VDE 2627 measuring room quality class 3	6) Referring to VDI/VDE 2630-1.3. Measured as deviation of sphere distance in tomographic static mode (TS) with std. circular scan. More details on request. Values valid only for YXLON FF20 CT Metrology under compliance with conditions described beside.	
<b>Systems ambient conditions</b>	Measuring room quality class 4		

## Perform nominal/actual comparisons





## Find the system that suits you best

					
	FF20 CT	FF20 CT Metrology	FF35 CT single tube	FF35 CT dual tube	FF35 CT Metrology
Part size	++	++	+++	+++	+++
Material density	++	++	+++	+++	+++
Part weight	++	++	+/+++*	+/+++*	+++
Detail visibility	+++	+++	+/+++**	+++	+++
Combined 2D and 3D	✓	✓	✓	✓	✓
HeliExtend (optional)	✓	✓	✓	✓	✓
Tilting axis (optional)			✓	✓	
FlexCenter	✓		✓	✓	
Optimized for Metrology		✓			✓

\* triple plus without optional tilting axis

\*\* triple plus with Y.FXT 190.61 transmission tube



# YXLON Life Cycle Service – more than the best image

## YXLON Life Cycle Service

- **Y.ServicePass** – the most important services tailored to your system and your needs
- **Y.SmartPass** – for customers who need instantaneous spare parts availability
- **Y.LifeCyclePass** – the all-inclusive package covering all costs throughout the entire system lifetime
- **Y.WarrantyPass** – predictable costs by extending the warranty for one or two years
- **Y.SmartSpares** – the best compatibility and added functionality using original YXLON spare parts
- **Y.Exchange** – direct replacement of defective or worn-out components to minimize system downtimes
- **Y.Updates** – up-to-date system technology and prolonged lifetime
- **Y.Academy** – professional training teaches your operators how to get the most out of the system

**What are your specific service requirements? We offer a wide range of service modules and packages tailored to your needs.**

Our highly qualified global service team is committed to providing excellent service to our customers worldwide. With eight global service centers and specialized staff at over 50 service partners, we can ensure a rapid response time wherever and whenever you need it.

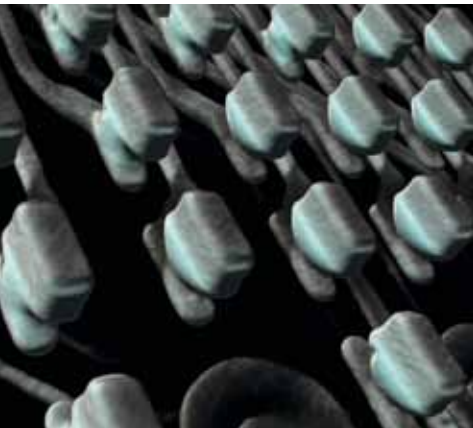
### Your benefits include:

- High system availability
- Low operating costs
- Superior inspection results
- Guaranteed operational safety
- Prolonged system lifetime

We align our organization and all service activities to comply with your requirements. With our innovative, modular service solutions you can count on true added value throughout the entire life cycle of your system.

We support you in keeping your inspection costs to a minimum. At the same time, your systems operate safely at peak performance while providing optimum inspection results throughout their entire lifetime.





Would you like to learn more about our systems?  
Interested in a test inspection?  
Please contact us by phone or e-mail.  
We look forward to hearing from you.



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## YXLON

Technology with Passion

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