

Led by experience. Driven by curiosity.

FF20 CT

Highest resolution inspection of
fine parts in science & research.



comet
yxlon

Deeper insights.

Looking beyond the surface is our core competency at Comet Yxlon – but not only in a technical way.

Zooming in on your industry, applications and business challenges allows us to develop innovative and relevant solutions that help you shape future markets. Faster time to market? Avoiding production downtimes? The perfect image with the highest resolution, as fast and easy as possible? Whatever your goals – let's talk about it!

Comet Yxlon – this is who we are.

Comet Yxlon designs and manufactures high-end X-ray and CT system solutions for industrial environments – based on customer-centric product development. We're proud to be part of Comet, the globally leading Swiss technology company with a focus on plasma control and X-ray technology.

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The FF20 CT's 190 kV nano-focus transmission tube delivers high detail visibility.

Your benefits with the FF20 CT:

- Accurate material analyses in lab applications
- 2D detail visibility of down to 150 nm with 190 kV transmission tube
- Precise manipulation and temperature stability
- Intuitive Gemini user interface
- Metrology version available

High energy. Maximum precision.

The FF20 CT is the expert micro-CT system for inspections of very fine parts and internal structures in the electronics industry, material science and many other research areas.

Which items can be inspected with the FF20 CT?

- Electronic components incl. SMD
- Semiconductor packages
- Battery cells
- Injection molded plastics
- Products involving new materials or manufacturing methods, e.g. AM components, fiber-reinforced plastics
- Microsystems (MEMS, MOEMS)
- Medical objects, e.g. cannulas
- Geological, paleontological and biological samples

Which applications is it designed for?

- Quality assurance, material analysis, material research
- Failure and structure analysis
- Assembly checking
- Inspection of small serial productions
- Process control
- Digitization
- Segmentation

190 kV transmission tube

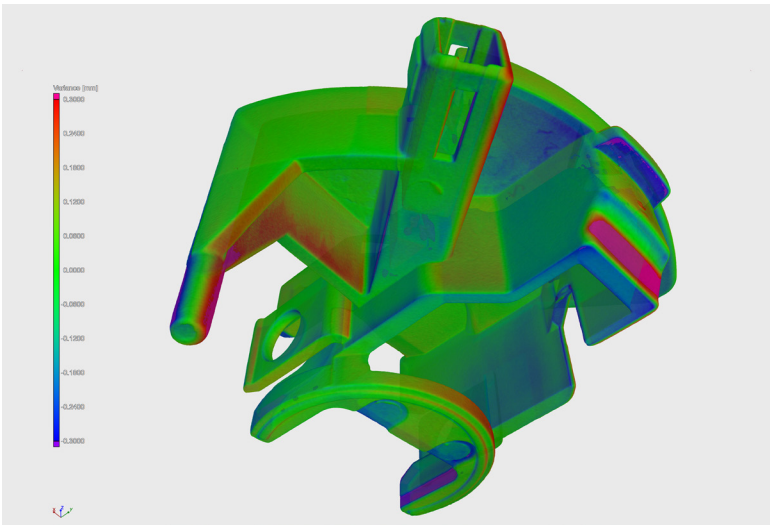
The 190 kV nano-focus transmission tube of the FF20 CT achieves a detail visibility in radioscopy (2D) of down to 150 nm. While its water-cooled target and coils allow for quick temperature balance and highest focal spot stability, four modes enable the optimal adjustment of the focal spot size in relation to power.

Granite-based manipulator

The granite-based manipulator of the FF20 CT system guarantees temperature stability and smallest thermal expansion for maximum precision and accuracy. It features six axes with a high-precision Heidenhain encoder for utmost versatility of applications.

Choice of detectors for larger FOV

With an active area of up to 430 mm x 430 mm the recommended flat-panel detector Y.Panel 4343 detector offers a generous field of view. The Csl scintillator guarantees maximum contrast sensitivity and a high spatial resolution with a pixel pitch of 150 µm and a matrix of 2,880 x 2,880 pixels.



Wall thickness analysis with highest accuracy: the FF20 CT Metrology.

The FF20 CT Metrology.

With its ability to capture nearly unlimited measuring points in one CT scan decoupled from the measurement evaluation, the metrology version of the Comet Yxlon FF20 CT takes accuracy to the next level. Seamless defect analysis and nominal-actual comparison save time and reduce correction loops. Smart fan control enables the stabilization of the interior temperature, making the FF20 CT Metrology compliant with temperature range regulations defined by VDI 2627.

Easy operation. Ultimate flexibility.

Our Gemy software helps users perform inspections as easily as possible – and boasts some highly potent CT techniques for maximum image quality and diverse field-of-view extensions.

As the single user interface for all workflows, Gemy uses automation, wizards and presets to guide users of different skill levels smoothly through the inspection process. In addition, its powerful CT techniques facilitate the optimum part size spectrum, speed, and image quality.



Gemy's Healthmonitor shows the current system condition.

Circular and helical scan trajectories

- QuickScan® – continuous rotation image acquisition
- QualityScan – start-stop image acquisition, also for ring-artifact reduction
- HeliExtend – to avoid cone-beam artifacts
- HeliExtend Dual – combined offset and helical CT scan for very large parts

Your ROI is our center

No matter where your region of interest (ROI) is, you can easily keep your part lined up with FlexCenter, our virtual rotation axis.

Scan extensions

- 1.8 times horizontal field-of-view extension
- Vertical field-of-view extension
- Combination of horizontal and vertical field-of-view extensions

Image quality optimizations.

ScatterFix 2.0

The innovative ScatterFix 2.0 functionality developed by Comet Yxlion reduces scatter radiation to improve the quality of the CT data, e.g. for optimized surface determination.

Beam hardening correction (BHC)

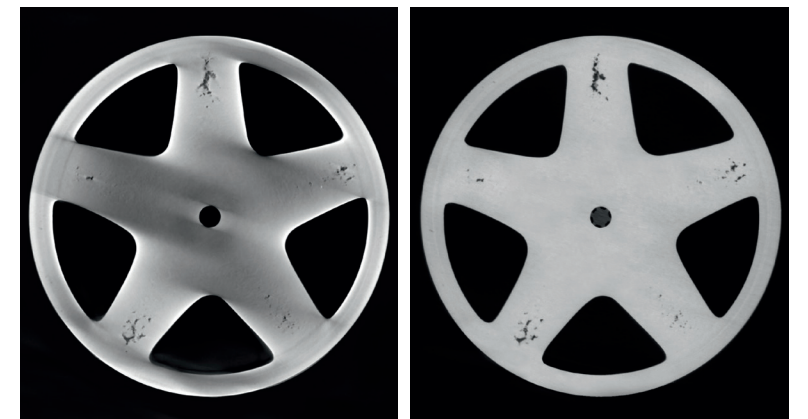
It allows the correction of unwanted gray-value gradients in otherwise homogeneous materials, e.g. in order to reliably carry out a pore analysis.

Metal artifact reduction (MAR)

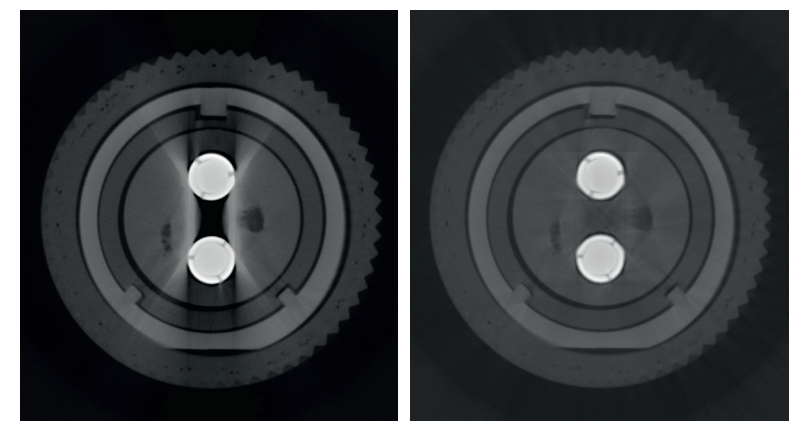
With complex components consisting of plastics and metals, MAR significantly reduces the interfering effects causing the less dense material to 'disappear'.



Improving image quality: Cone-beam CT without (left) and with ScatterFix 2.0 (right).

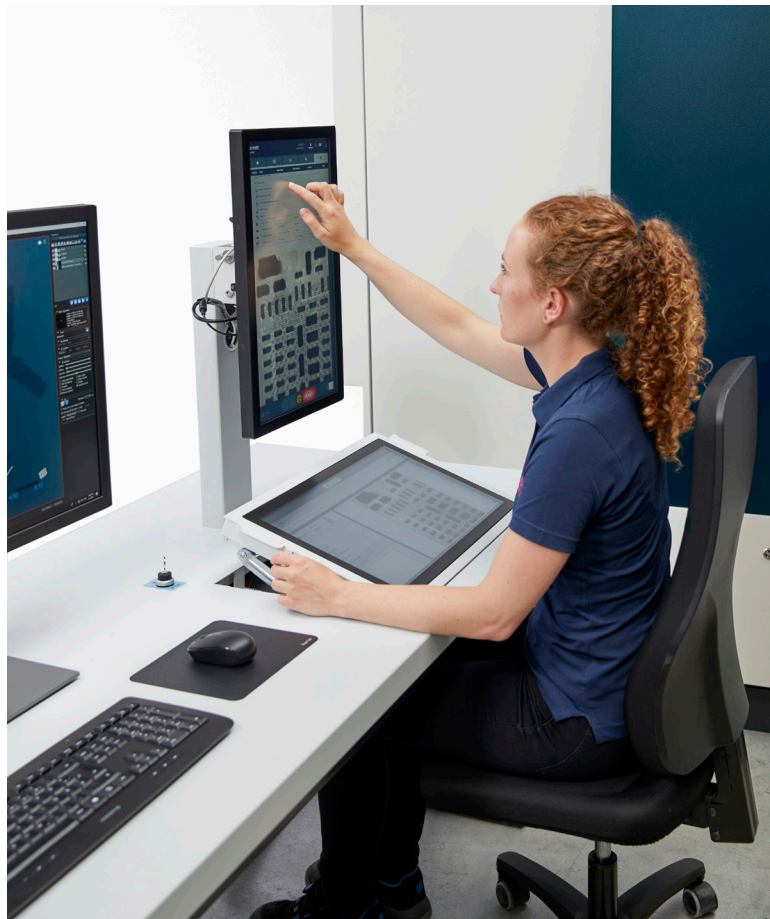


Eliminating unwanted gray-value gradients: Cone-beam CT without (left) and with Beam Hardening Correction (right).



Reducing interferences: Cone-beam CT without (left) and with Metal Artifact Reduction (right).

Ergonomic. Intuitive. Accessible.



In the FF20 CT, software and hardware work hand in hand to make system operation as easy as possible. The clean layout of the operator desk with tiltable touchscreens allows users to stay focused on the inspection task. The height of the desk can be adjusted, facilitating operation from a sitting or standing position. Healthmonitor and push messages keep the user informed about system status and inspection progress at all times.



Service Engine 4.0: taking customer care to the next level.

First-class technical problem solving combined with high economic efficiency – that’s what we call Service Engine 4.0. It drives our service, processes and partners to detect and correct failures quickly and reliably by remote access and during on-site visits. Feel free to contact our service centers and partners world-wide by phone, e-mail or via our website.

Your benefits with Service Engine 4.0

- Guaranteed operational safety
- Maximized system availability
- Minimized repair times
- Full cost control of life-cycle costs
- Extended product lifetime
- Maintaining the measuring capability of metrology systems [FF20/35 CT Metrology]

Our module-based approach with performance and feature upgrades enables you to adapt to future requirements and safeguard your initial investment by extending the product lifetime. Service Engine 4.0 does not only provide fast support now, but is predictive of your future needs.

The Comet Yxlon Lifecycle Services

- Academy** – full performance from day one through tailored training solutions
- SmartExchange** – direct replacement of defective or worn-out components to minimize unscheduled system downtime
- SpareParts** – 100% compatibility and safety through Comet Yxlon qualified spare parts
- WarrantyPass** – full cost control through our customizable warranty extension program
- ServicePass** – predictive maintenance and servicing, tailored to your requirements
- SmartPass** – maximum system uptime for customers with particularly high demands
- LifeCyclePass** – all-inclusive concept for full cost control over the entire product lifetime
- Support** – fully digitalized 1st-line support organized in a worldwide expert network, available remote or on-site
- Upgrades** – performance increase and new features for your Comet Yxlon system portfolio

The FF20 CT in numbers.

| Tube | Y.FXT 190.61 transmission tube | Detector | Y.Panel 4343 CT ^{2,4)} | Y.Panel 2530 ⁴⁾ |
|-------------------|--------------------------------|--------------|---------------------------------|----------------------------|
| Max. energy | 190 kV | Active area | 432 x 432 mm | 249 x 302 mm |
| Max. power | 80 W | Pixel pitch | 150 µm | 139 µm |
| Detail visibility | ≥ 150 nm ⁷⁾ | Pixel matrix | 2,880 x 2,880 | 1,792 x 2,176 |
| TXI | yes ³⁾ | Frame rate | up to 15 Hz | up to 30 Hz |
| Water cooling | yes | | | |

Manipulator / Inspection Part

| | |
|---|----------------------------|
| FDD (Focus-Detector-Distance) ⁵⁾ | ~ 190 mm – 790 mm |
| FOD (Focus-Object-Distance) ⁵⁾ | ~ 0 mm – 575 mm |
| Loading door | motorized |
| Max. part weight ⁶⁾ | 17 kg |
| Max. part size ⁷⁾ | ~ 280 mm Ø x 700 mm height |

CT - Trajectories and Scan Fields

| | |
|--|---|
| Circular scan trajectories | continuous rotation "QuickScan" start/stop scan "QualityScan" |
| Helical scan trajectories | standard "HeliExtend" dual "HeliExtend Dual" |
| Scan extension | 1.8 times horizontal extension, vertical extension, combination |
| Further trajectories | virtual rotation axis "FlexCenter" |
| CT field of view, std. circular scan ⁸⁾ | ~ 280 mm Ø x 220 mm height |
| CT field of view, maximum ^{8,9)} | ~ 280 mm Ø x 430 mm height |

| Dimensions | Cabinet /System | Operator Desk |
|------------------------------|--|--|
| Width | ~ 2,380 mm | ~ 1,800 mm |
| Height | ~ 2,180 mm (w/o levelling wedges) | ~ 700 mm – ~ 1,200 mm, motorized |
| Depth | ~ 9450 mm | ~ 800 mm |
| Weight | ~ 3,400 | ~ 175 kg |
| Manipulator design / Monitor | Granite base, vibration isolation with active level control, all axes equipped with Heidenhain length and angle encoders | 2 pcs, capacitive touchscreen, 1920 x 1080 pixel, 21", as well as separate reconstruction and evaluation station 30" monitor |

The FF20 CT Metrology.

| | |
|---|---|
| Features, Options | see as above, but without virtual rotation axis "FlexCenter" |
| Air conditioning inside cabinet | yes, temperature range referring to VDI 2627 measuring room quality class 3 |
| Systems ambient conditions | Measuring room quality class 4 |
| Messuaring accurency MPE _{SD} ¹⁰⁾ | 3.9 µm + L/75 [L=mm] |

With YXLON IQI for 2D at minimum focal spot size and HRP Target ²⁾ Recommended ³⁾ TXI = True X-Ray intensity – controls real output dose for constant intensity ⁴⁾ Qualified acc. ASTM E-2597. Specification for more detectors on request ⁵⁾ Values are average. Exact values are dependent on detector configuration ⁶⁾ Inspection item placed centrally on turntable, otherwise 5 kg ⁷⁾ Max. size which can be set by manual collision protection envelope ⁸⁾ Values valid for detector YXLON Panel 4343, collision protected, optimized for diameter ⁹⁾ Standard cone beam scan with vertical field-of-view extension ¹⁰⁾ Referring to VDI/VDE 2630 part 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

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