YXLON FF35 CT MULTI-APPLICATION, HIGH-RESOLUTION COMPUTED TOMOGRAPHY (CT) INSPECTION SYSTEM FOR FINE AND MIDDLE-SIZED PARTS
It is the great advantage of industrial computed tomography systems that they non-destructively provide detailed and imaging insights into inner structures of components. On that note, it is the ideal instrument for quality assurance and material analysis in research and development.

Due to the accuracy of cutting-edge CT systems, even metrological applications are meanwhile standard. Inner structures and even elastic materials can precisely be measured. And CT is comparatively fast where numerous features need to be determined.
The extremely versatile high-resolution systems YXLON FF35 CT and FF35 CT Metrology are designed for a huge variety of parts like

- Electronic components incl. SMD
- Products made from new materials or new manufacturing methods, e.g. additively manufactured components, fiber-reinforced plastics
- Medical objects, e.g. cannulas
- Light-alloy castings
- Biological artifacts

Due to the dual x-ray tube configuration, FF35 CT covers an extraordinarily wide bandwidth of parts and applications. The transmission tube provides a resolution in the submicron range and is recommended for part sizes up to 10 mm, whereas the directional beam tube having much higher power allows quick scans in less than a minute. The FF35 CT is a dual-tube system with two HV-cables and two generators without the need for reconfigurations.

Typical applications for computed tomography are

- Research and Development
- Failure analysis
- Process control
- Inspection of small serial productions
- Quality assurance and material analysis
- Assembly checking
- Combined DR (digital radiography) and CT inspection
Based on the Yxlon system software Geminy which offers easy, intuitive operation with touch screens and graphical user interface, the FF35 CT / FF35 CT Metrology provide numerous special features. The users benefit from unrivaled image quality, utmost flexibility regarding the bandwidth of applications, and compact cabinet design.

Various automated functions help to save time. Different user levels support unskilled operators as well as experienced experts to achieve optimum results in their inspection tasks. Health monitor and push messages keep the user informed about system status and inspection progress.

A detailed description of the software platform Geminy is available in a separate brochure.
SPECIAL SYSTEM CHARACTERISTICS

1. YXLON 225 kV microfocus directional beam tube
   • 320 W power and water-cooled target for short scan times
   • 2 modes for optimal adjustment of focal spot size with respect to power
   • 4 µm spatial resolution (2D image)
   • TXI – “True X-ray Intensity” for a long-term stable dose

Optional: YXLON 190 kV nano-focus transmission tube
   • Water-cooled target and coils for quick temperature balance and highest focal spot stability
   • Diamond target for high power
   • 4 modes for optimal adjustment of focal spot size with respect to power
   • 150 nm detail detectability (2D image)
   • TXI – “True X-ray Intensity” for long-term stability

2. Granit-based manipulator
   • Smallest thermal expansion and high stability of temperature
   • Vibration isolation from the system by active dampers
   • High-precision Heidenhain encoder on all axes
   • 6 axes for utmost versatility of applications
   • Swivel mechanism for tube selection

3. Extremely precise turntable
   • Joint development of Yxlon and Heidenhain
   • Highly precise angle encoder
   • Heavy load possible
   • Low-maintenance, no need for air supply
   • Optional: tilting function

4. Selection of detectors
   • Up to 430 mm x 430 mm active area for large field of view
   • CsI scintillator for high local resolution and high efficiency
   • Qualified acc. to ASTM E2597
   • Optimized for microfocus CT applications

5. X-ray warning lamp

6. ESD connections
   • Safe static discharge for the work with semiconductor components
   • ESD-proved construction by use of appropriate materials

7. Integrated, ventilated control cabinet
   • Outstanding accessibility for service
   • Integrated high-power generator for fast installation and smallest footprint

8. Vacuum components
   • Easy service access
   • Vibration isolation from the manipulator

Software platform Geminy
The novel software platform Geminy is the heart of the computed tomography system FF35 CT. Its great number of various trajectories provides enormous flexibility regarding part sizes and inspection tasks. Details on Geminy are described in a separate brochure.

SEM (Scanning Electron Microscope) image shows the exact dimensions of the test pattern 150 nm gap clearly visible in the X-ray image

Optional: Additional 190 kV nanofocus transmission tube
FF35 CT METROLOGY

The FF35 CT Metrology additionally offers the following features:

Stabilization of interior temperature
- Smart fan control depending on door and detector position
- Separate heat exchanger which can be placed outside the measuring room
- Temperature range acc. to measuring quality class 3 defined by VDI 2627
- Display of readiness for measurement and fulfillment of temperature requirements in the health monitor

Ruby Gauge
- Execution of five different SD measurements in seven directions following VDI/VDE 2630 – sheet 1.3
- Automatic measuring process of the maximal SD deviation incl. test report
- Convenient access to the history of SD measurements for further analysis

Strengths of YXLON FF35 CT Metrology
- Non-destructive measurement of finest inner structures
- Capture of nearly unlimited measuring points in one CT scan decoupled from the measurement evaluation
- Considerable time savings due to seamless defect analysis and nominal-actual comparison
- Reduced correction loops and -costs
- Conformity with standard VDI/ VDE 2630
### Manipulator / Inspection Part

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FDD (Focus Detector Distance)</td>
<td>~ 520 mm – 1170 mm</td>
</tr>
<tr>
<td>FOD (Focus Object Distance)</td>
<td>~ 0 – 930 mm</td>
</tr>
<tr>
<td>Tilting axis (optional)</td>
<td>+/- 30°</td>
</tr>
<tr>
<td>Tube pivot axis</td>
<td>motorized</td>
</tr>
<tr>
<td>Loading door</td>
<td>motorized</td>
</tr>
<tr>
<td>Maximum part weight</td>
<td>27 kg</td>
</tr>
<tr>
<td>Maximum part size</td>
<td>~ 530 mm Ø x 800 mm height</td>
</tr>
</tbody>
</table>

5) Values are average. Exact values are dependent on tube and detector configuration.
6) Inspection item placed centrally on turntable, no tilting axis. More values on request.
7) Max. size which can be set by manual collision protection envelope.

### 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 virtual rotation axis “FlexCenter”

#### Further trajectories
- CT field of view, std. circular scan
- ~ 325 mm Ø x 270 mm height
- CT field of view, hor. extended
- ~ 510 mm Ø x 190 mm height
- CT field of view, maximum
- ~ 510 mm Ø x 600 mm height

8) Values valid for detector YXLON FF20 CT Metrology, collision protected, optimized for diameter.
9) Standard cone beam scan with horizontal and vertical scan extension.

### Cabinet/System

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>~ 2,960 mm</td>
</tr>
<tr>
<td>Height (w/o levelling wedges)</td>
<td>~ 2,120 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>~ 1,590 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>~ 6,800 kg – ~ 6,900 kg (single tube – dual tube)</td>
</tr>
<tr>
<td>Manipulator design</td>
<td>Granite-base, vibration isolation with active level control, all axes equipped with Heidenhain length and angle encoders</td>
</tr>
</tbody>
</table>

### Operator Desk

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>~ 1,800 mm</td>
</tr>
<tr>
<td>Height</td>
<td>~ 700 mm – ~ 1,200 mm, motorized</td>
</tr>
<tr>
<td>Depth</td>
<td>~ 800 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>~ 175 kg</td>
</tr>
<tr>
<td>Monitor</td>
<td>2 pcs, capacitive touch, 1920 x 1080 pixel, 21”, as well as separate reconstruction and evaluation station with 27° or 30° monitor</td>
</tr>
</tbody>
</table>

### Measuring accuracy

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring accuracy</td>
<td>( 8.0 \mu m + L/75 ) [L=mm]</td>
</tr>
</tbody>
</table>

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.
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.

GERMANY – HEADQUARTERS
YXLON International GmbH
Essener Bogen 15
22419 Hamburg
Germany
T: +49 40 527 29-0

www.yxlon.com

USA
YXLON Sales & Service Location
COMET Technologies USA Inc.
5675 Hudson Industrial Parkway
Hudson, OH 44236
USA
T: +1 234-284-7849

CHINA
YXLON (Beijing)
X-ray Equipment Trading Co., Ltd.
Middlegate, First Floor, Building 2, 103
Beijing Road,
Haidian Dist. Beijing 100004,
China
T: +86 10 8857 9581
F: +86 10 8857 9580

JAPAN
YXLON International KK
New Stage Yokohama Bldg.,
1st Floor
1-1-32 Shinurashima-cho
Kanagawa-ku
Yokohama, 221-0031
Japan
T: +81 45 450 1730

YXLON International reserves the right to make changes in specifications and/or to discontinue any product at any time without notice or obligation and will not be liable for any consequences resulting from the use of this publication.