

Y.Multiplex

Truly all-purpose



- Highly dynamic radioscopy (HDR) and CT in one universal X-ray inspection system
- Automatic defect recognition (ADR)
- Programmable inspection workflow for CT and radioscopy
- Depiction of CT tomograms directly in the system software

Increasing demands being placed on the dependability of non-destructive material testing via radiography can no longer be met solely through X-raying and visual inspection decisions. Above and beyond this, the user expects to receive precise details regarding the spatial dimensioning and position of casting flaws in order to be able to assess whether such flaws might possibly be exposed further on during processing.

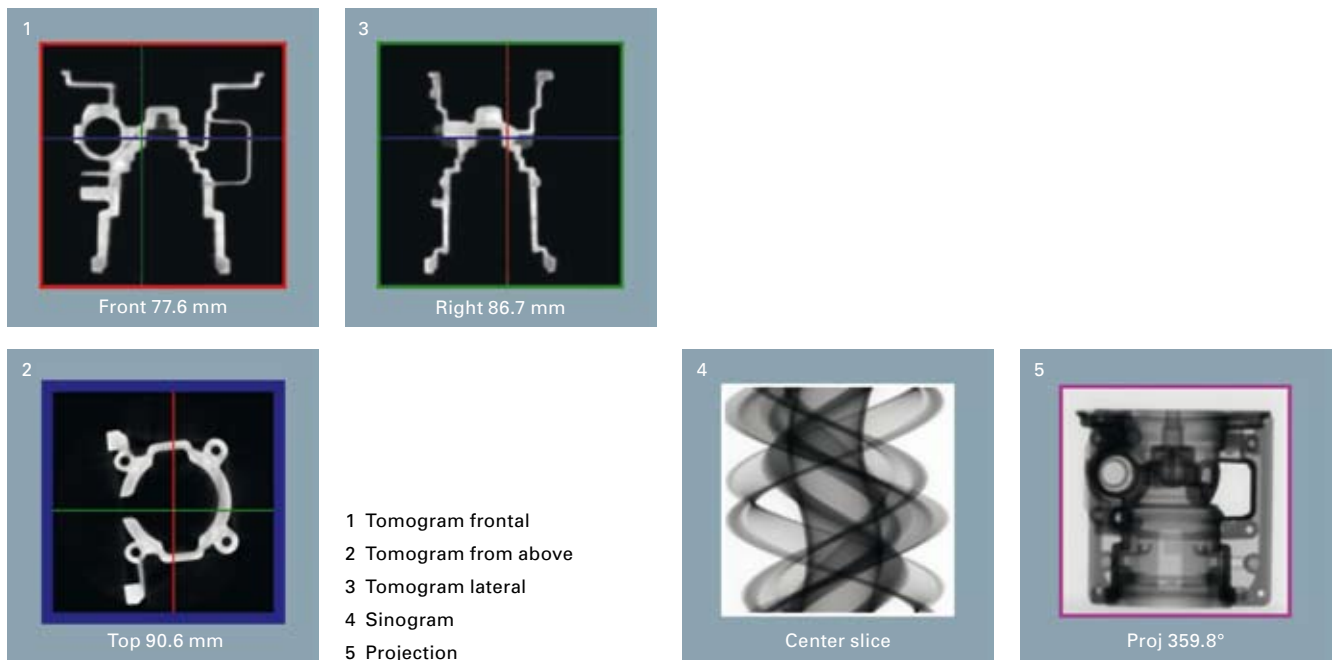
This is the reason why YXLON has equipped its universal X-ray inspection system Y.Multiplex with automatic defect recognition (ADR) as well as with computed tomography technology. Even the complex specifications set by leading automotive manufacturers can be depicted using fully automatic defect recognition (ADR). The tomographic images obtained from CT inspection provide information on the position and size of existing flaws.

Thanks to optimized methods, the CT findings are rapidly available and can be visualized directly in the radioscopic system with the help of comprehensive system software.

Radioscopy and acquired CT images can be combined as desired during programmed inspection. As a result, the operator does not require any specialized knowledge of X-raying or CT operations to perform the inspection. All that is required is merely an evaluation of the X-ray images or tomograms.

With options like these, Y.Multiplex is the optimal solution for use during production. Its large inspection envelope enables X-ray inspection to be deployed for a very large spectrum of parts.

YXLON. X-ray technology at its best.



Configuration and Specifications

Physical dimensions	M	XL
Cabinet size – width/depth/height [mm]	~ 2,500/ 1,800/2,600	~ 3,000/ 2,500/3,200
Cabinet weight – 160kV/225kV [kg]	~ 7,000/8,400	~ 8,000/10,500
Operator console – width/depth/height [mm]	~ 1,250/1,800/1,350	

Inspection envelopes*	M	XL
Radioscopy – Diameter/height [mm]	600/900	900/1500
CT-field-of-view standard – diameter [mm]	~ 155	~ 170
CT-field-of-view extended – diameter [mm]	~ 275	~ 300
CT cylinder – height [mm]	~ 130	~ 155
Magnification	~ 1.35–3.8	~ 1.2–4.5

*) Crash protection and collimator taken into account

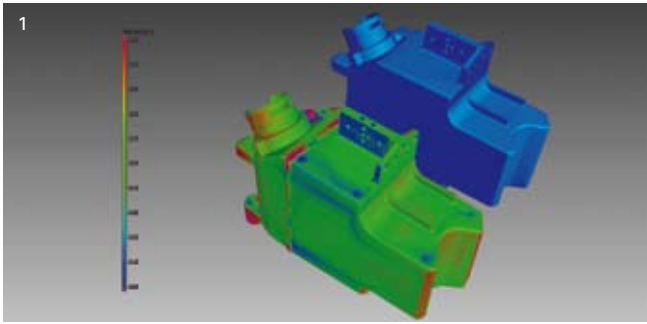
Manipulation	M	XL
Hub axis – hub [mm]	900	1500
Tilt axis angle [°]	+/- 45	
Rotation angle [°]	n x 360	
Magnification axis [mm]	600	600
Lateral axis [mm]	600	900
FDD axis [mm]	650–950	950–1250

X-ray tubes	
Tube type	Closed minifocus/variofocus tube
Voltage classes [kV]	160/225
Max. power [Watt]	1,800 minifocus/1,600 variofocus
Min. focal spot [acc. to EN 12543]	0.4 mm minifocus/ 0.25 mm variofocus

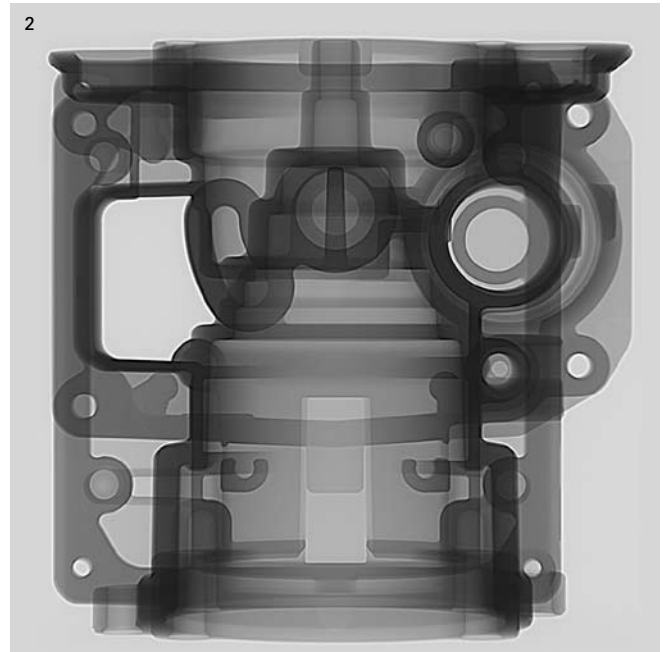
Detector	
Active area size [mm x mm]	200 x 200
Pixel size [µm]	200/400
Frame rate – 14-bit detector [fps]	15/30
Frame rate – 16-bit detector [fps]	25/50

Performance CT (*)	
QualityScan 200µm – 1440 projections	~ 14 min (5 frames integration)
QualityScan 400µm – 720 projections	~ 4 min (5 frames integration)
Y.QuickScan® 200µm – 720 projections	~2 min
Y.QuickScan® 400µm – 360 projections	~20 sec
Reconstruction time – 1024 x 1024 x 1024	~4 min
Reconstruction time – 1024 x 1024 x 128	~ 50 sec
Reconstruction time – 512 x 512 x 512	~ 30 sec
Reconstruction time – 512 x 512 x 64	~ 8 sec

*) Normally reconstruction is started parallel to scanning



1 Actual/nominal-comparison using CAD model
2 Radioscopic image using Y.HDR-Inspect



Y.Multplex – Series of universal X-ray inspection systems Y.HDR-Inspect

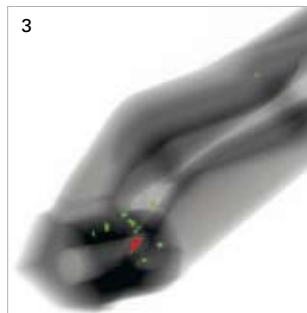
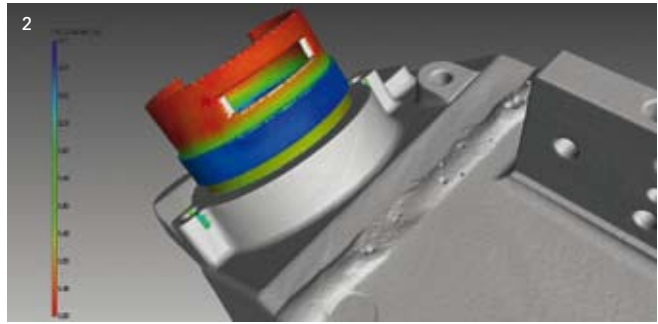
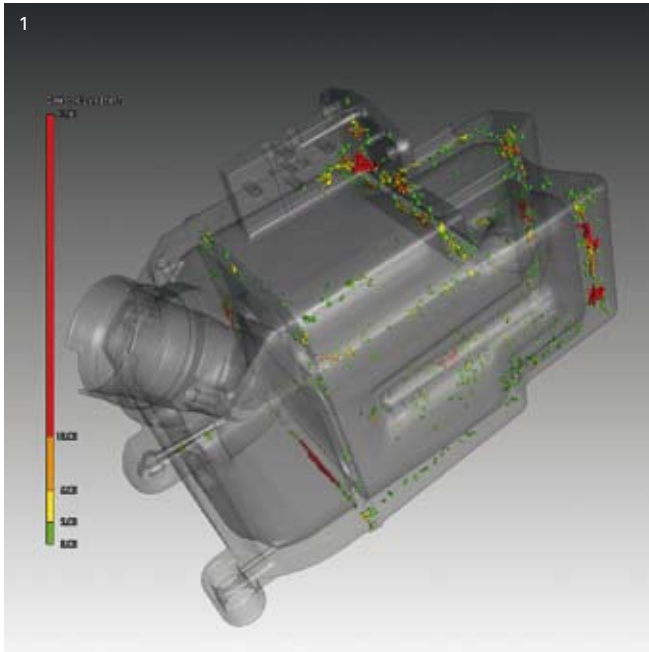
Behind the designation Y.Multplex with Y.HDR-Inspect are a number of standardized X-ray inspection systems that set themselves apart due to their outstanding components, components which distinguish themselves through a very high level of detail detectability and image quality while achieving high throughput at the same time. They combine a high mechanical traveling speed with innovations in digital radioscopic examination such as Y.HDR-Inspect. Y.Multplex systems have a high-grade multi-axis manipulator system in which the X-ray tube and detector are fixed to a U-arm. In the standard version, unipolar high-power tubes in the voltage classes 160 kV or 225 kV are used as the X-ray source. The 225 kV X-ray inspection system can be optionally equipped with the new variofocus tube. On the detector side, exclusively industrially proven digital flat-panel detectors with a very large dynamic range and image refresh rates of up to 50 Hz are installed. Operation of Y.Multplex X-ray inspection systems takes place via a separate central control console. All of the key steps for system operation and maintenance are supported by clearly arranged control elements on the operator console, or graphically via a monitor. The software integrates steering for the system, including the X-ray components and image processing for digital radioscopy, computed tomography and/or fully automatic defect recognition.

The new, innovative HDR technology (Highly Dynamic Radioscopy) is an integral element of all Y.Multplex systems that enables unparalleled brilliant image quality at a high throughput. Due to the HDR filter functioning in real time, the inspection item seems as if it were made of glass. The advantages are:

- Excellent detail detectability at a glance, even with varying material thicknesses
- Assessment of casting-flaw depth
- Robustness versus changes in X-ray parameters so that constant adjustment to the material's thickness no longer applies
- Time savings at simultaneously simpler operation

Y.Multplex Options:

- Motor-driven loading axis
- Software-controlled tube collimator
- Second monitor
- VGStudio/VGStudio MAX from Volume Graphics



1 Defect/porosity analysis inside 3D model
 2 Wall thickness analysis
 3 Radioscopic image using ADR indication

Y.Multplex CT

When Y.Multplex CT is used, computed tomography leaves the lab and enters production. The concept has been designed so that even inspection operators without specialized knowledge of CT operations are able to acquire tomographic images quickly and in a reproducible manner. In the course of 100% inspection, with this additional computer tomography the decision can also be made whether an item ought to be envisaged for follow-up processing. This is achieved by:

- QuickScan® CT scan in less than 30 seconds from start to tomogram
- Intuitive tomogram visualization and navigation at the operator console
- IO/NIO confirmation for tomograms
- Any combination of radioscopy positions and CT tomographic images within programmed inspection
- Integrated data management, including export function

Y.Multplex ADR (Automatic Defect Recognition)

Y.Multplex ADR functionality is optimal for users who want to offer their customers proof of a reproducible X-ray inspection while complying precisely with inspection specifications. Envisaged thereby is that any number of specifications involving as many specification levels as desired can be created. Any number of regions can be mapped per inspection position, even those with complex shapes. In turn, individual levels are then assigned to these regions. This allows the number of inspection positions to be minimized while optimizing throughput.

ADR functionality furthermore offers:

- Stable and fast position correction of the plotted image
- Definition of individual flaw size, sum total flaw size, flaw distance and flaw density within a rectangle, among others
- Database for IO/NIO training images and reference images
- Adjustable settings for filter sensitivity via slide control, as well as preview
- Definition of consecutively occurring filter mechanisms
- Interface to YXLON statistics program Y.AdResult

YXLON

Technology with Passion

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