



Large volume,
versatile inspection
for any environment

Industrial
X-ray and CT



VERSATILE X-RAY AND CT VOXLS 40 C 450

Maximum capacity in a single-piece cabinet system

FLEXIBILITY AND FUNCTIONALITY

The VOXLS 40 C 450 is outfitted with two Nikon high power, microfocus X-ray sources (225 kV and 450 kV) providing exceptional flexibility for scanning a wide range of component sizes and material densities. Both sources are equipped with Nikon's unique rotating target technology, providing ultra-high resolution at industry-leading power to enable even the smallest defects inside an object to be identified quickly and easily.

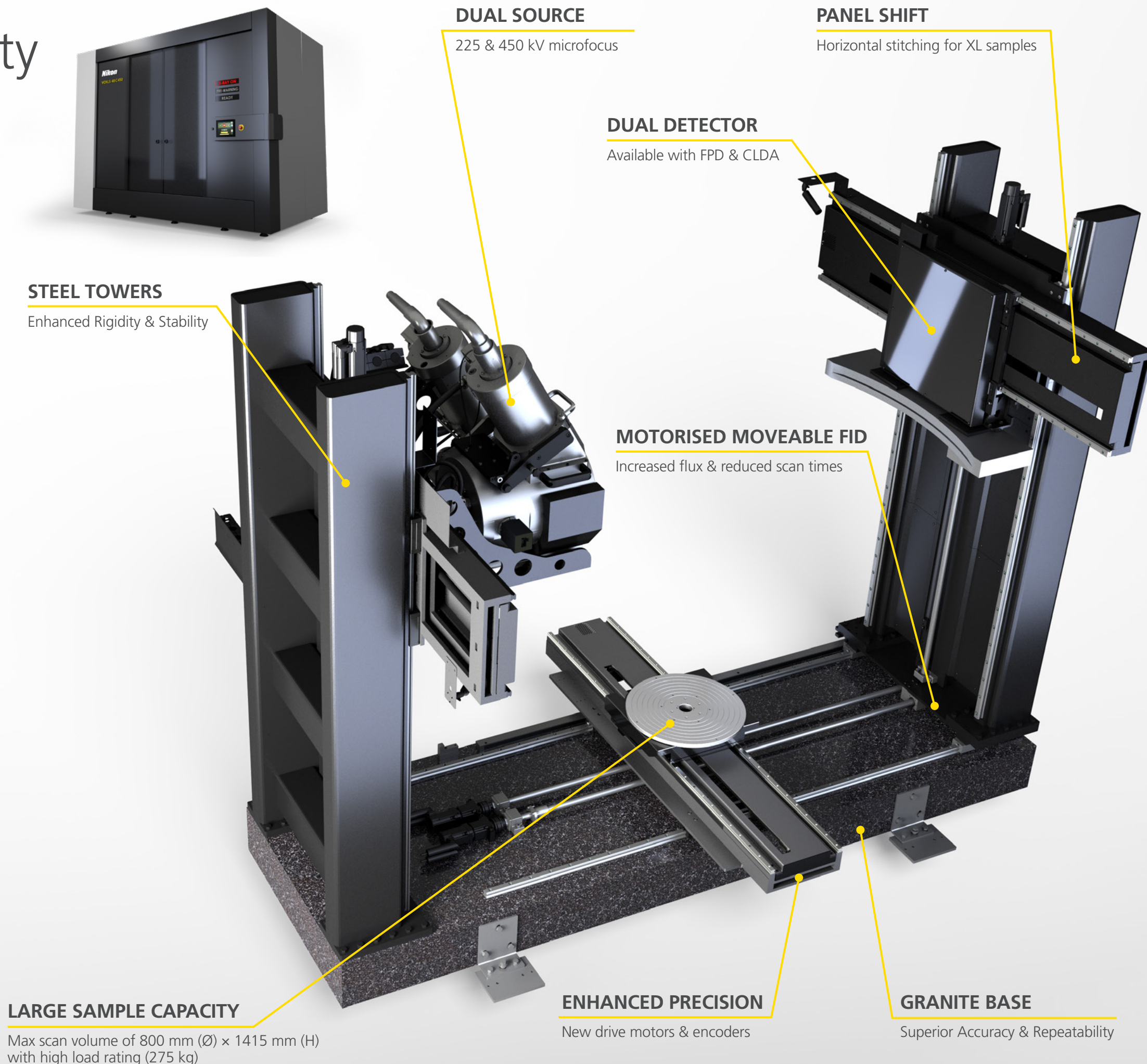
The system also possesses dual detector functionality, with a choice of industry-leading, flat panel detectors (FPD) providing ultra-clear images for 3D Computed Tomography (CT) or 2D digital radiography, as well as Nikon's unique Curved Linear Diode Array (CLDA) for 2D CT and scatter correction of high-density materials.

LARGE SCANNING VOLUME

Thanks to synchronous vertical travel of the sources and detectors, combined with 3-position horizontal panel shift, the VOXLS 40 C 450 boasts the largest scanning envelope of any single-piece cabinet system on the market today. Objects up to 800 mm in diameter, 1415 mm in height and 275 kg in weight can be inspected in exceptional detail.

METROLOGY GRADE MANIPULATOR

At the core of the system is a metrology-grade, granite-based manipulator coupled with rigid steel towers, high precision motors and linear encoders. The resulting construction provides superior mechanical and thermal stability, resulting in more accurate manipulator positioning and thus the generation of highly precise, repeatable measurement data throughout the entire scan volume.



Completely redesigned with ergonomics, visibility and automation in mind

AUTOMATION-READY

The VOXLS 40 C 450 is just at home on the shop floor as the research lab. The motorised radiation safety doors have been engineered to open or close within just six seconds. When combined with the integration of a robotic loader and the Nikon Automation OPC UA Interface, the system is automation-ready for closed-loop inspection at high speed in a Quality 4.0 production line environment.

EXCEPTIONAL VISIBILITY

The 2-meter tall bi-parting glass outer doors with manipulator-interlock give the operator unrivalled visibility into the enclosure for precise and confident positioning of the scan object. This removes the need for light curtains and minimises the risk of sample collision with the X-ray sources and detectors. Four internal video cameras continue to provide an excellent view even with the inner radiation safety doors shut and X-rays on.

ERGONOMIC SYSTEM DESIGN

As standard, the system comes with a 1.5 m ergo desk with motorised height adjustment enabling optimal positioning for all operators ensuring they can work comfortably whether seated or standing. In addition, the integrated cabinet touch screen enables effortless operation of the radiation safety doors, selection of the X-ray source and quick access to system status information.

SINGLE-PIECE CABINET SYSTEM

Unlike conventional, modular, panelized room enclosures for large X-ray systems, the VOXLS 40 C 450 has a single-piece cabinet construction. This enables significantly faster and easier transportation, on-site installation, and future relocation, if desired.

GLASS BI-PARTING OUTER DOORS

Full system interior visibility

LARGE ERGO DESK

Comfort for all operators

SINGLE-PIECE CABINET

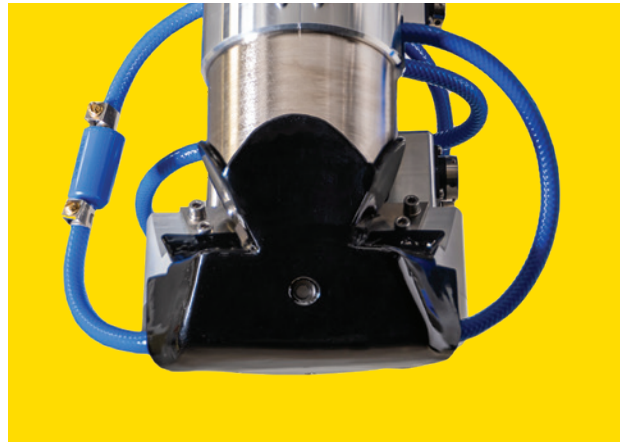
Easy to install & relocate

INTEGRATED CABINET TOUCH SCREEN

Doors & X-ray source control at your fingertips



X-ray Sources



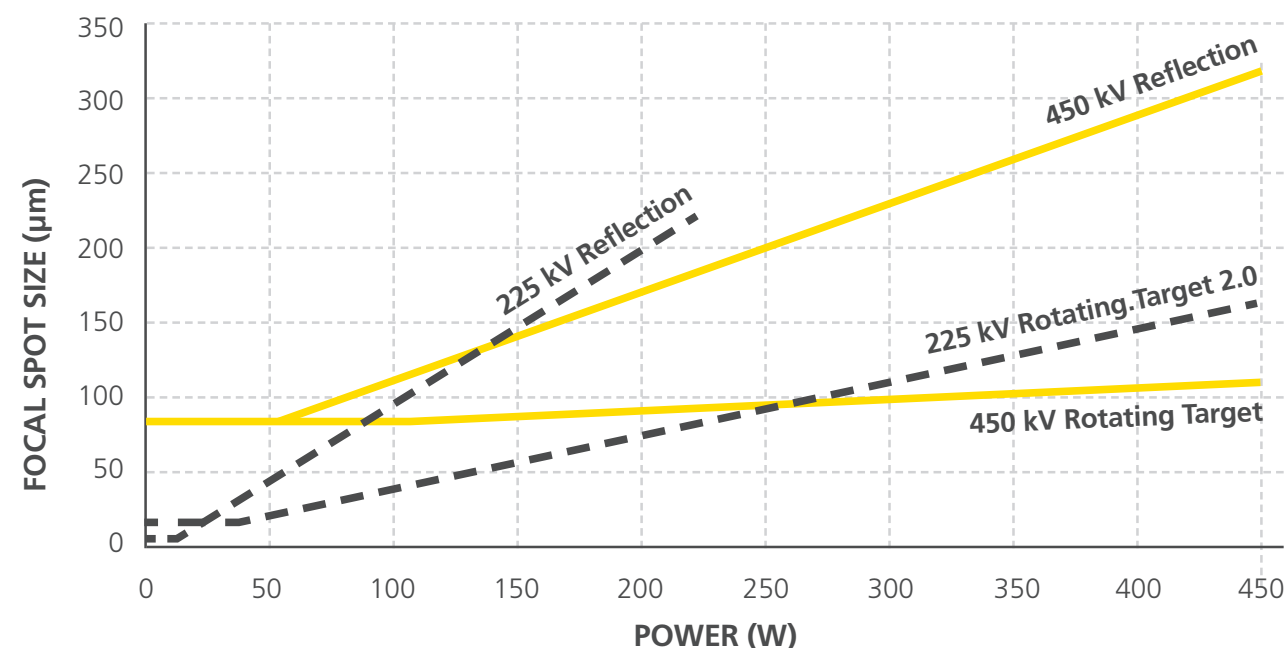
225 kV Rotating.Target 2.0

The second generation of Nikon's unique 225 kV rotating reflection target provides double the operating time of its predecessor. Spinning the target at high speed combined with advanced liquid cooling enables continuous operation even at 450 W full power, 3× greater power density than conventional reflection targets, and significantly higher X-ray photon flux. All these factors add up to dramatically faster scan times and better signal-to-noise ratio without loss of resolution.



450 kV Rotating Reflection Target

Nikon's unique 450 kV rotating reflection target builds upon the world's first 450 kV microfocus X-ray source, also designed by Nikon. Unlike traditional minifocus sources the target's innovative cooling system provides continuous operation across the full power range up to 450 W and 5-10× higher resolution. Additional benefits include 3× greater power density and flux than Nikon's standard 450 kV source these radically accelerate acquisition whilst also providing superior image quality.

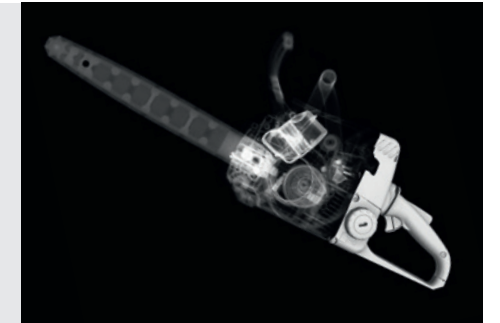


Acquisition Modes

X.Tend Helical CT

Tall objects can be scanned in a single acquisition process, eliminating artifacts introduced by the cone beam and multi-scan stitching. This also provides the added benefit of scanning objects at higher magnification resulting in significantly higher resolution.

750 mm long Petrol-Powered Chainsaw [scanned with X.Tend Helical CT] ▶



Offset.CT

Objects even wider than the detector itself can be captured in a single scan. This also allows smaller wide objects to be scanned at considerably higher magnification providing enhanced detail.

Heated Car Steering Wheel [scanned with Offset.CT] ▶



Panel Shift

Thanks to horizontal detector movement, objects much wider than the field of view can be imaged and reconstructed as an automatically combined single CT volume. Additionally, small to medium sized objects can be magnified over a wider area resulting in increased resolution.

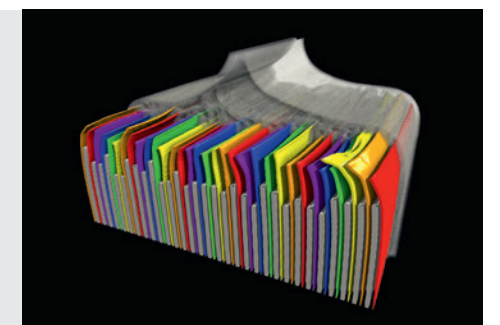
580 mm wide R-15 Car Tyre [scanned with Panel Shift] ▶



Half.Turn CT

For high throughput environments where fast cycle times are of maximum importance. This productivity gain is achieved by acquiring and reconstructing approximately half the data of conventional circular CT without loss of resolution or image quality.

Lithium-Ion Battery Pouch Cell [scanned with Half.Turn CT] ▶



Pixel Split CT

Applications that require much greater resolution than typically possible benefit from a quadrupling of the pixel count. This is achieved by horizontal and vertical detector movement at the sub pixel scale and the acquisition, combination and reconstruction of 4 automated circular CT scans.

Female UK Dung Beetle (*Geotrupes spiniger*) [scanned with Pixel Split CT] ▶



Scatter Correction CT

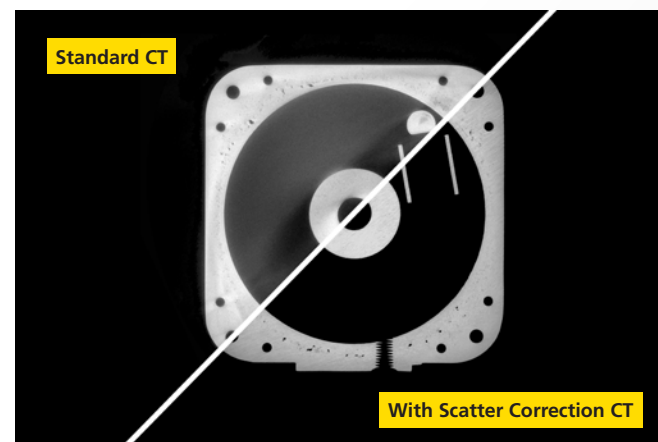


Nikon's Scatter Correction CT brings new capabilities to industrial CT scanning by employing advanced physics-based modelling to correct for X-ray scatter artifacts. This innovative solution provides unprecedented clarity and precision and is available across all Nikon X-ray sources and systems in the 225kV and above range. It is also fully compatible with all Nikon CT scanning acquisition modes.

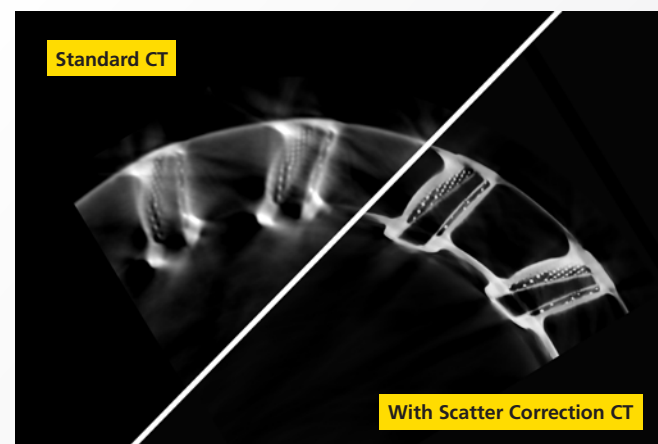
Scatter Correction CT addresses the challenges posed by X-ray scatter, such as cloudy haloes, false inhomogeneities, and edge blurring, which can obscure defects and fine details in scanned objects. By removing these artifacts, the technology allows users to uncover previously hidden information and confidently determine material surfaces. Additionally, Scatter Correction CT dramatically reduces scan times compared to traditional 2D CT methods, capturing scans more than 100 times faster for complete component inspection.

Scatter Correction CT is exceptionally easy to use. The technology is seamlessly integrated into the scanning workflow, requiring only a single click to enable it. This user-friendly approach streamlines the scanning process, reduces the need for specialised skills, and improves overall productivity in high-throughput inspection environments.

By correcting for scatter artifacts in dense materials such as aluminium, steel, ceramic, and Inconel, Scatter Correction CT expands the application options for non-destructive testing and metrology across various industries.

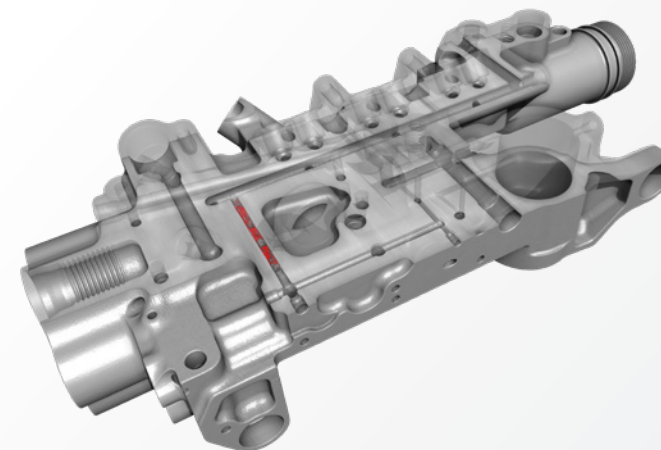


AM Rotor Casing 2D



Jet Engine Ring 2D

AI Reconstruction

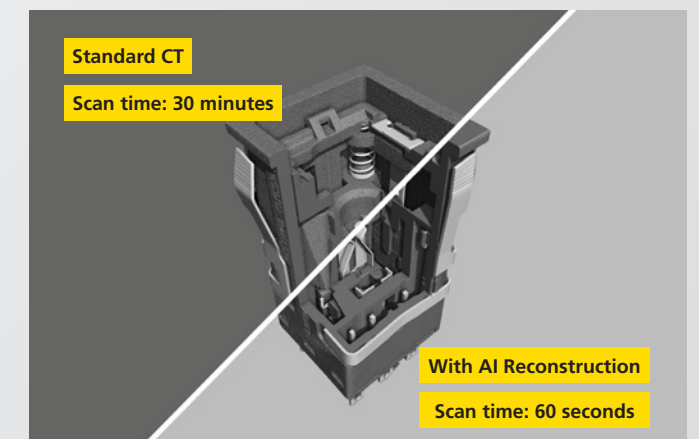
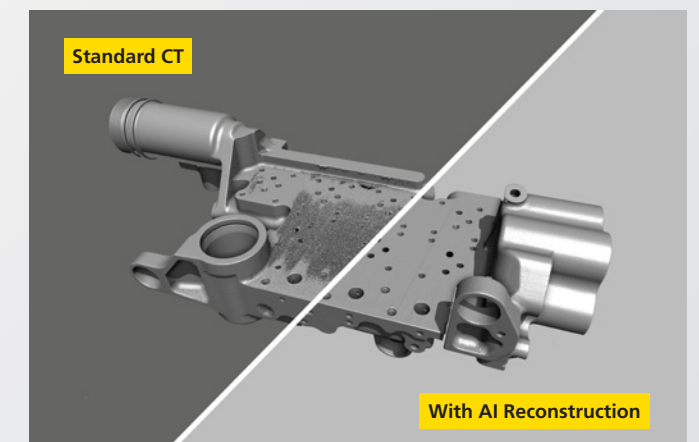


Nikon's AI Reconstruction is a groundbreaking technology that revolutionises CT scanning through the power of AI and Deep Learning. This innovative solution provides automated image enhancement tailored to each customer's needs, enabling users to achieve superior defect detection while significantly accelerating productivity.

By leveraging Deep Learning, AI Reconstruction uses models to distinguish relevant information from scan artifacts, effectively filtering noise and improving image clarity. This results in higher-quality scans that can reveal the smallest product flaws that may have been previously invisible to standard CT scans. The technology is particularly beneficial for production environments in automotive, aerospace, and manufacturing industries, where pinpoint defect detection and high throughput are crucial.

AI Reconstruction delivers the ability to deliver radically faster scan speeds without compromising accuracy. This allows customers to inspect more units per day while maintaining the highest analysis standards. The automated nature of the solution means it is reliable and repeatable, making it suitable for mass production or regular batch testing workflows.

Nikon's experienced Applications Engineering team fine-tunes the AI models to individual client needs. This enables users to unlock the full potential of AI Reconstruction, benefiting from enhanced image quality and previously unattainable faster scan speeds.



Specifications

Nikon X-ray Sources

Microfocus source	Max. kV	Max. power	Focal spot size range	
180 kV Transmission target	180 kV	20 W	1 µm up to 3 W	20 µm at 20 W
225 kV Reflection target	225 kV	225 W	3 µm up to 7 W	225 µm at 225 W
225 kV Multi-Metal target	225 kV	225 W	3 µm up to 7 W	225 µm at 225 W
225 kV Rotating Target 2.0	225 kV	450 W	10 µm up to 30 W	160 µm at 450 W
320 kV Reflection target	320 kV	320 W	30 µm up to 30 W	320 µm at 320 W
450 kV Reflection target	450 kV	450 W	80 µm up to 50 W	320 µm at 450 W
450 kV Rotating Reflection Target	450 kV	450 W	80 µm up to 100 W	113 µm at 450 W

Detectors

Detectors	Field of View	Pixel Size	Max. frame rate	
			at 1x1 binning	at 2x2 binning
Varex XRD 1611	4000 × 4000 pixels	100 µm	3.75 fps	7.5 fps
Varex XRD 1620	2000 × 2000 pixels	200 µm	3.75 fps	7.5 fps
Varex XRD 1621 EHS			15 fps	30 fps
Varex XRD 4343CT	2850 × 2850 pixels	150 µm	15 fps	30 fps
Varex XRD 4343N			15 fps	30 fps
Nikon Metrology CLDA	2048 pixels	415 µm	50 fps	

Manipulator

# Axes	7
Max. Scan Volume	800 mm (Ø) × 1415 mm (H)
Max. FID	1520 mm
FID Type	Motorised moveable
Max. Sample Mass	275 kg

Cabinet

Length	3617 mm
Width	2057 mm
Height	2743 mm
Mass	20,000 kg

Not all specifications are available simultaneously, contact us to configure a system to meet your requirements.



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