

SkyScan 1176 Technical Specifications

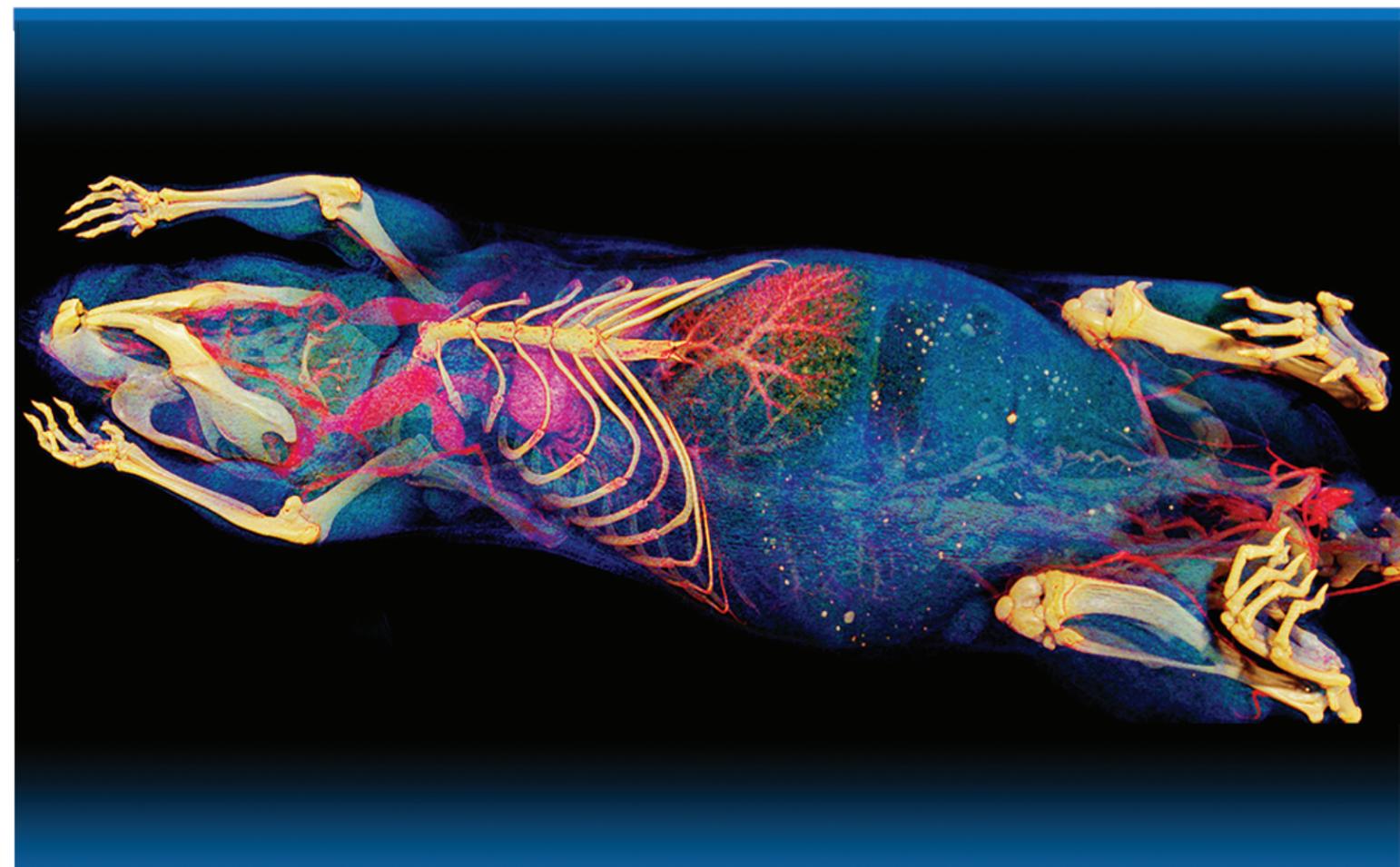
X-ray source	Maintenance-free 20-90 kV, 25 W, 6-position automatic filter changer
X-ray detector	fully distortion-corrected 11Mp (4000x2672pixels) cooled CCD fiber-optically coupled to scintillator
Nominal resolution (pixels on the object)	9µm / 18µm / 35 µm user selected
Reconstructed volume (after single scan)	up to 8000x8000x2500 pixels
Scanning space	68 mm in diameter, 200 mm in length
Max. scanning speed	1min for 1000 x 1000 pixels in every slice
Scanning trajectories	round, spiral, multiple connected scans
Physiological monitoring	integrated: breathing, ECG, movement detection
Scanning synchronization	gating and 4D (time-resolve) reconstruction
Animal beds	carbon-fibre 35mm diam.(mouse) / 65mm diam.(rat), optional - IVIS compatible (luminescence/fluorescence)
Supplied software	scanner control, GPU-accelerated reconstruction, 2D/3D image analysis, surface and volume rendering
Radiation safety	<1uSv/h at any point at the instrument surface
Dimensions / Weight	750W x 1450D x 1700H mm, 475kg
Power supply	100-240V / 50-60Hz, 800W (single PC)/2200W (cluster)

Bruker microCT is continually improving its products and reserves the right to change specifications without notice.



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SkyScan 1176

- Low Dose Micro-CT *IN VIVO* Imaging with World's Highest Spatial Resolution

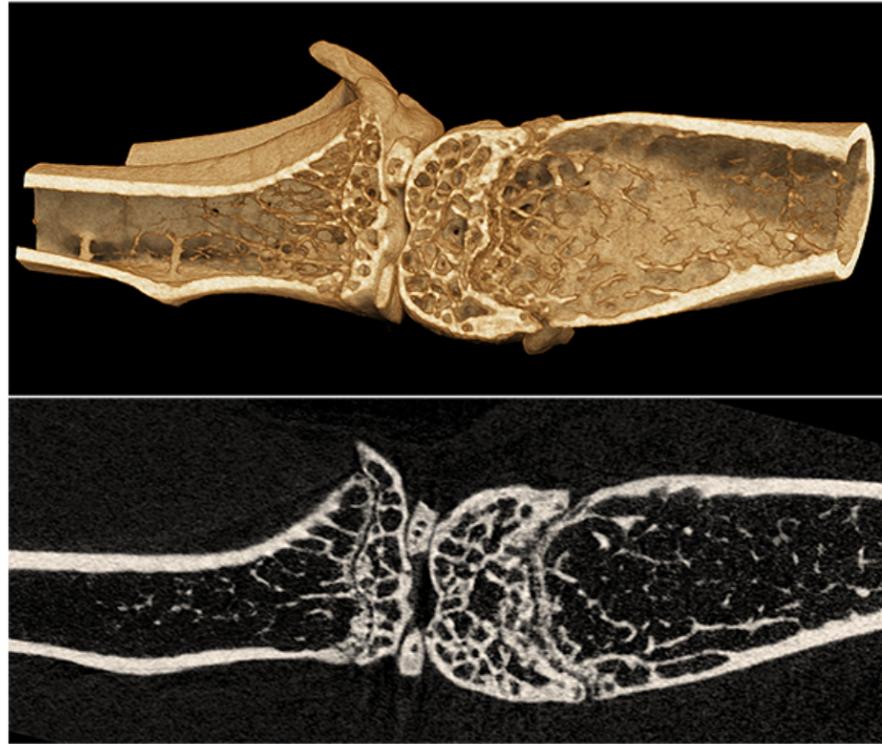
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Innovation with Integrity

MICROTOMOGRAPHY

● Uncompromising high resolution imaging

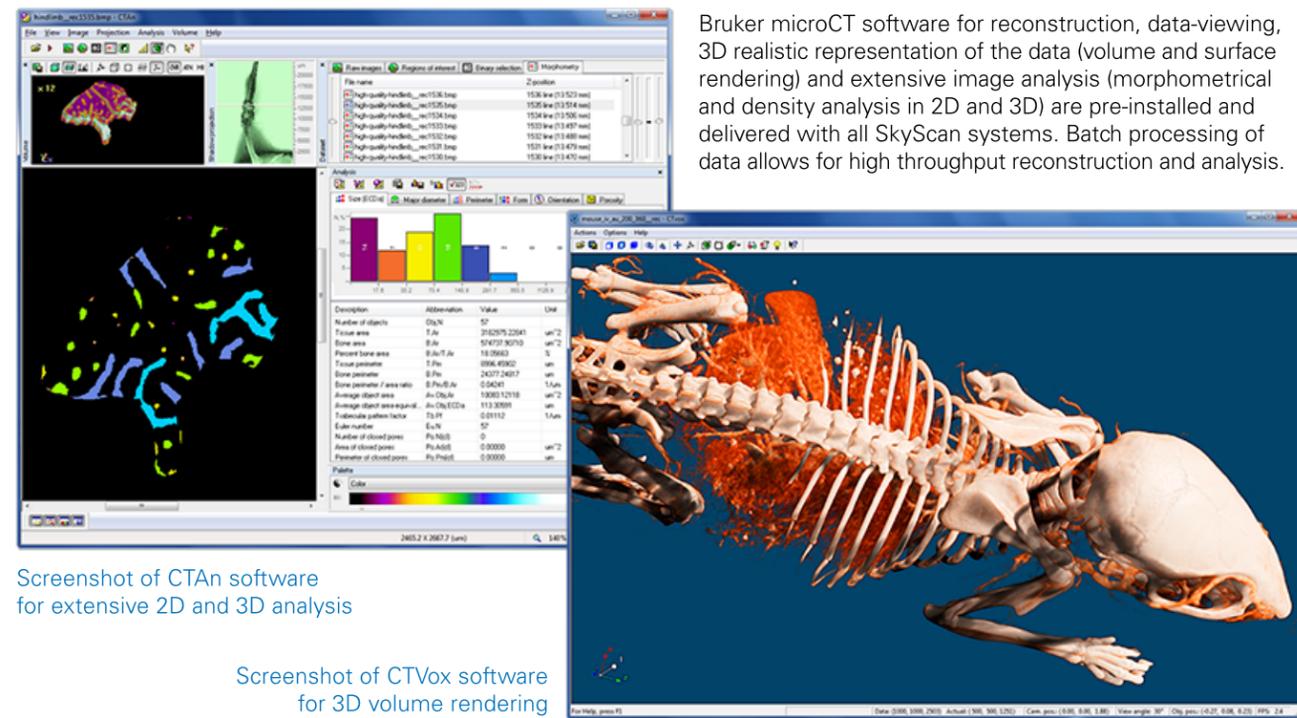
In vivo imaging at 9 µm pixel size



The SkyScan 1176 is a high performance stand-alone *in vivo* micro-CT for preclinical research that has an unrivalled combination of resolution, image field size and scan speed. The image field of view (up to 68 mm wide and 200 mm long) allows full body mouse and rat scanning and distal limb scanning for bigger animals, such as rabbits, at pixel sizes of 9, 18 and 35 µm. Variable X-ray applied voltage combined with a range of filters ensures optimal image quality for diverse research applications from lung tissue to bone with titanium implants.

The pictures show *in vivo* 9 µm pixel size scan of mouse hindlimb (knee): a volume rendering and a longitudinal section through the femur and tibia allowing cortical and trabecular structural 2D and 3D analysis at unrivalled resolution.

Software for 2D / 3D image analysis and realistic visualization



Bruker microCT software for reconstruction, data-viewing, 3D realistic representation of the data (volume and surface rendering) and extensive image analysis (morphometrical and density analysis in 2D and 3D) are pre-installed and delivered with all SkyScan systems. Batch processing of data allows for high throughput reconstruction and analysis.

Screenshot of CTAn software for extensive 2D and 3D analysis

Screenshot of CTvox software for 3D volume rendering

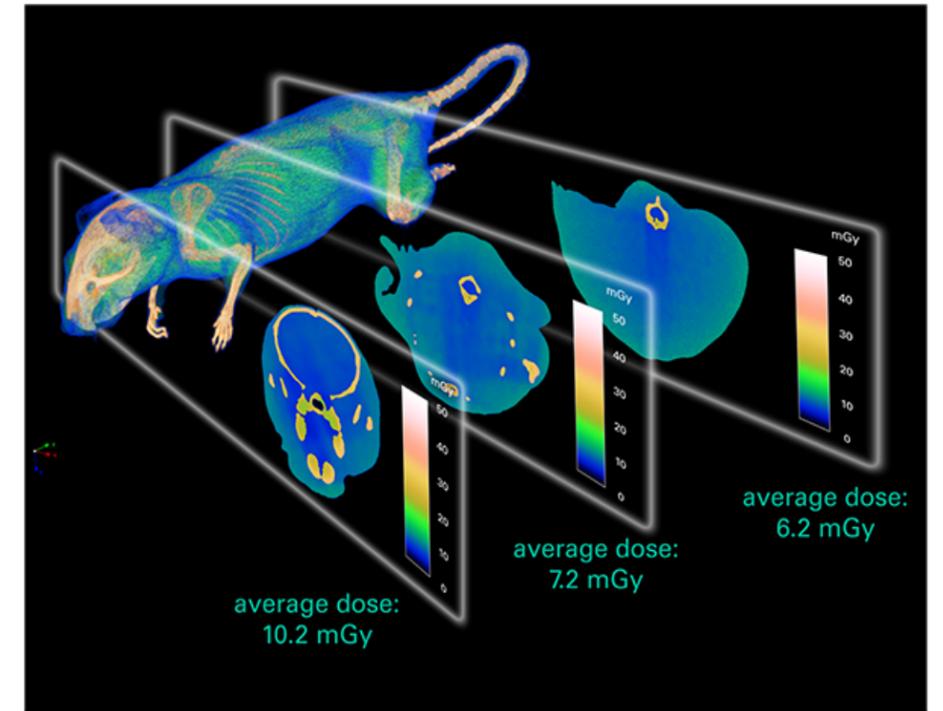
● Ultra-low dose scanning

Micro-CT scanning with average dose below 10 mGy

The SkyScan 1176 *in vivo* micro-CT allows for ultra-low dose imaging. The administered dose distribution per scan was computed using a detailed Monte-Carlo simulation. The calculated skin dose correlated very well with the actual X-ray dose measured using an Unfors PSD-2 patient skin dosimeter.

High levels of radiation exposure accumulated throughout the time course of an experiment can induce significant biological side effects and bias researcher's observations. Longitudinal follow-up of disease progression or tissue development thus requires low dose scanning protocols.

It is not sufficient to achieve a low ionising dose in a micro-CT scan; the real test of low dose capability is the resulting reconstructed image quality so analysis is not impaired!



Longitudinal studies with minimal radiation effects

The SkyScan 1176 *in vivo* micro-CT administers ultra-low radiation dose to the animals less than 10 mGy per scan, allowing multiple scans in longitudinal preclinical studies without the risk of unwanted radiation-induced effects.

Using the ultra-low dose scanning mode at 35 µm pixel size the obtained image quality allows segmentation and structural analysis of body tissues including lung, fat, lean tissue and bone.

Left top panel: Cross-section through a mouse thorax from an *in vivo* 35 µm pixel size scan (total dose 7.9 mGy) allowing quantification of lung, fat, lean tissue and bone (top right panel).

Left bottom panel: Comparable image obtained by a competitor "low-dose" micro-CT scanner. 236 µm pixel size scan of mouse thorax (total dose 11 mGy)

