

MicroCT X-ray tomography device

Nikon XT H 225 (3/2020-)

Skyscan 1172 (6/2006-)

X-ray images are taken usually with 180° rotation (Skyscan 1172) or 360° rotation (Nikon XT H). **Scan time** is case-specific and varies from few minutes to many hours.

Skyscan 1172 is suitable for small samples: wood, insects, teeth, tablets, seeds. Penetration power < 3 mm of low density metal.

Nikon XT H is suitable also for metallic samples: penetration power 3 cm steel or 12 cm aluminum. Manipulator tilt 30°.



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	Nikon XT H 225	Skyscan 1172
Field of view (w x h)	3D: 25 x 25 cm 2D: 28 x 28 cm	3.4 x 1.8 cm (6.8 x 5.5 cm)
Sample size (w x h)	48 x 65 cm	6.5 x 7.0 cm
Sample mass	15 kg	0.5 kg
X-ray tube	20 – 225 kV, 225 W	20 – 100 kV, 10 W
	25 – 180 kV, 10 W	
Voxel	1 – 225 µm	1 – 35 µm
Resolution	2 µm (3 µm)	5 µm
Frames	15 – 30 /s	2 – 6 /s
Image pixels	2880 x 2880 1440 x 1440	4000 x 2096 1000 x 524



A common set

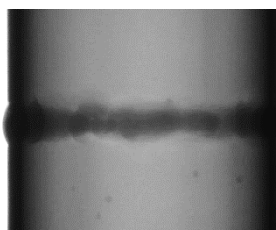
- design of scan, reconstruction and analysis,
- one microCT-scanning (tiff-X-ray images),
- optimized reconstruction and slice-images (tiff or bmp),
- one standard ROI or VOI (cylinder or rectangle) analysis in 2D or 3D and result file (.txt),
- digital data delivery, and a debitable storage medium if necessary.

Field of view (mm) Width x height	Pixel size (µm) with binning			Scan time estimate (h) with binning		
	4x4	2x2	1x1	4x4	2x2	1x1
34 x 18	34.7	17.4	8.7	0.5	2	3-9
30 x 16	30	15	7.5	0.5	1.5	2-6
20 x 11	20	10	5	0.3	1	2-4
7 x 3.5	8	4	2	0.5	1.5	2-6
3 x 1.5	4	2	1	0.5	2	3-9

Skyscan 1172

Table of scan times.

Material testing **compression** or **stretching** with traveling length of 6 mm and load of 220 N. Sample diameter < 20 mm and height < 22 mm. **Cooling** to +20... -25°C, sample size < 10 mm.



Vipuvoimaa
EU:lta
2014–2020

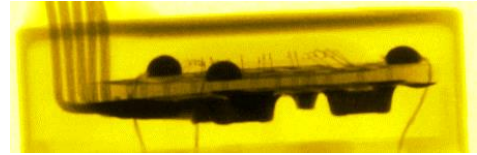


Take following things into consideration

Fix the sample securely. The sample must not move or **vaporize** harmful contaminants into the chamber. **Thawing or drying** of the sample cause artefacts, as well as fluid flows. A fan inside the chamber may cause air flows and detach light parts from the sample during the scan.

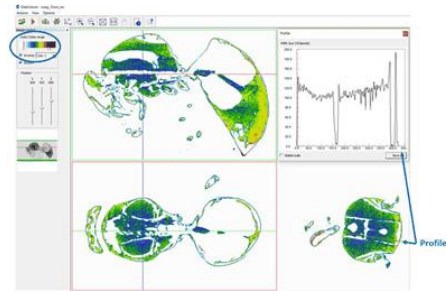
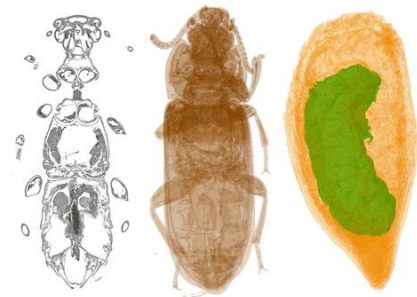
Handling the sample

- Storage, humidity, temperature? Is cutting or reshaping possible? Any preparations needed before the scan?
- How the sample can be fixed (tape, glue or clamping)? Is the surface fragile?
- Note that the sample must not thaw or dry, or vaporize harmful contaminants into the chamber.
- Surface contamination? Safe handling? Operational safety bulletin? Handling after the scan, and disposal?



The idea of the scan

- What is the sample? Size? How many samples?
- What is the purpose of the scan? The whole sample or some part of it? Is there a standard procedure for scanning or analysis?
- The scale of the features? The pixel size in the image?
- Density measurements? Attenuation (or density) range inside the sample?
- Analysis in 2D or 3D? ROI and VOI? What parameters are needed?
- Filtered slice images or 3D-stl file?
- Are false-colour images needed? How about 3D-images (stl) or videos in colours?



Use of images and results

- Can we utilize the images or results in teaching or research or publishing or public marketing?
- Confidential documents or information? Use of documents and material a client may deliver?
- Content of the report? On paper or digitally?
- What files a client wants or needs? Storage media or digital delivery?
- Schedule and costs?

