SKYSCAN 1272

● High-Resolution X-ray Microtomograph

Innovation with Integrity

Polymers & Composites

- Resolve fine structures with voxel sizes down to 0.35 µm

- Assess microstructural composition, architecture, and porosity

- Quantify defects, fiber thickness, and orientation
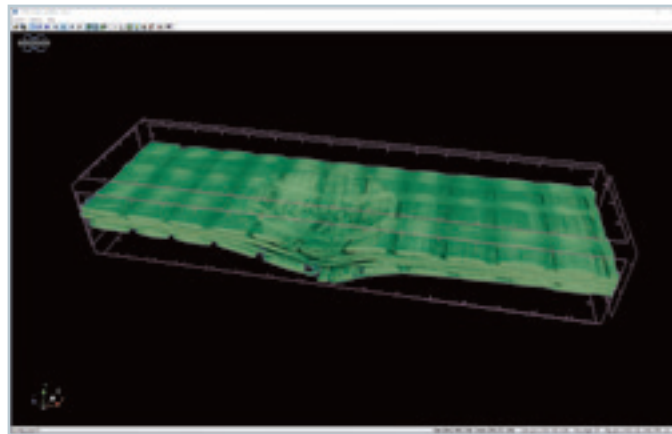
Carbon fiber reinforced polymer, after subjection to impact test; 8 µm voxel size, 70 kV, 0.5 mm Al + 0.38 mm Cu filter, 4,720 x 1,088 x 1,200 px – 40 mm sample

Geology, Oil & Gas

- Measure pore network properties, grain size, and shape

- Calculate distribution of mineral phases in 3D

- Digitize a 3D volume of precious samples, e.g. archeological finds

- Analyze dynamic processes
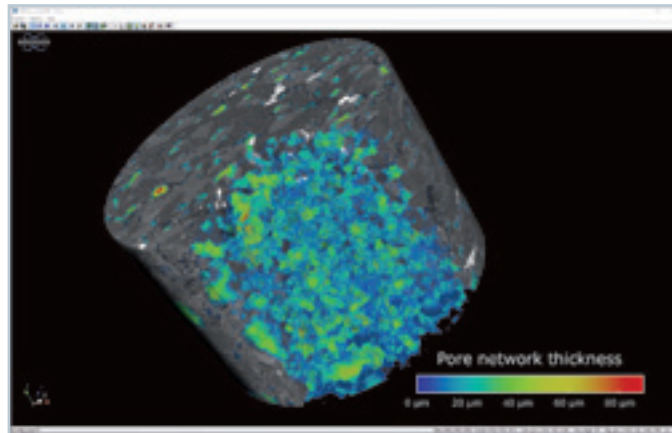
Sandstone microplug, pore network color-coded according to size
1 µm voxel size, 80 kV, 0.5 mm Al filter, 1,332 x 2,000 x 1,050 px – 2 mm sample size

Biomaterials

- Apply in-situ analysis of mechanical properties and dynamic processes

- Quantify porosity, pore network properties, and local thicknesses in 3D

- Detect inhomogeneities and deviations in the printing process
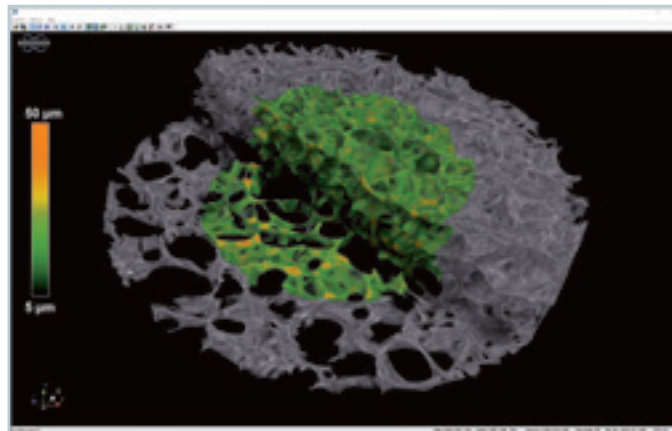
PLA scaffold, central part color-coded for local thickness of struts
2.5 µm voxel size, 50 kV, no filter, 4,000 x 4,000 x 1,700 px – 10 mm sample size

Pharmaceuticals & Packaging

- Measure coating thickness and distribution of active ingredients

- Check mechanical properties and defects

- Investigate pharmaceutical packaging up to a size of 7 cm x 7 cm x 7 cm

- Monitor and control the quality of metal and plastic components
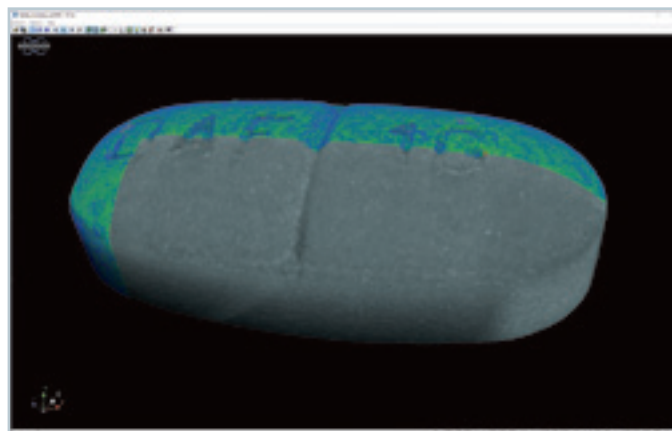
3D rendering of paracetamol tablet. The coating has been color-coded for thickness
5 µm voxel size, 50 kV, no filter, 2,000 x 2,000 x 8,000 px – 11 mm sample size

Available Now: 3D X-ray Vision for Everyone – X-ray Microtomography

X-ray micro-computed tomography (µCT) is one of the most advanced methods for getting 3D insights into samples of any material, any shape, and any size with little to no sample preparation.

Bruker microCT, a pioneer of µCT, has now made this technology easier and more accessible for everyone by offering unparalleled 3D X-ray microscopy, all in the small size, Plug'n Analyze™ SKYSCAN 1272 high-resolution desktop µCT.

A single scan is all you need to reveal the complete internal 3D structure of your sample non-destructively.

SKYSCAN 1272
An Ingenious System & Powerful Desktop Solution for X-ray Microtomography

Genius-Mode™ or keep everything under user's control

No prior µCT experience? No problem.
The SKYSCAN 1272 offers automatic selection of parameters with Genius-Mode: magnification, energy, filter, and exposure time can all be optimized automatically with a single click. The intuitive interface gives more experienced users the freedom to adjust settings as desired for the ultimate scan.

Small footprint for the largest pictures: over 200 Megapixels in every slice

Using a 16-megapixel X-ray camera in triple offset mode combined with the exclusively provided world's fastest reconstruction algorithm InstaRecon®, slices up to 14,456 x 14,456 pixels can be acquired. The large-area camera delivers high resolution over large scanning volumes, while keeping the working distance short for the best data quality. This huge image format allows zooming into any part of the 3D volume without rescanning the sample.

No hidden costs: a maintenance-free desktop µCT scanner

Our sealed X-ray tube allows running 24/7 without the frequent downtime required for changing a broken filament, saving you a lot of time and money.
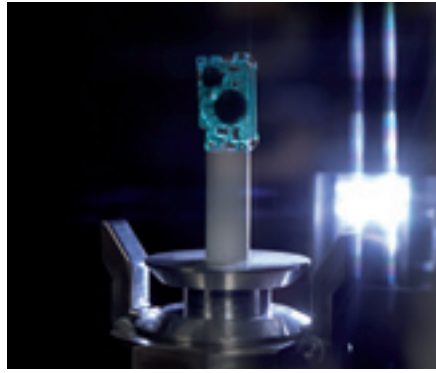
One-stop shop: full in-house knowledge and global support

Rely on Bruker's 20 years of experience in X-ray computed tomography and global team of experts for completely integrated hardware and software solutions. Come join our growing user family!
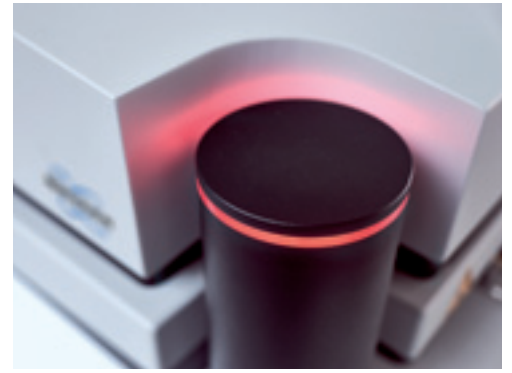
Various sample holders and in-situ stages

High resolution and ultimate ease-of-use for both the expert and novice

Smart solutions and design, such as the integrated vibration isolation, form a perfect whole

SKYSCAN 1272 high-resolution X-ray microtomograph

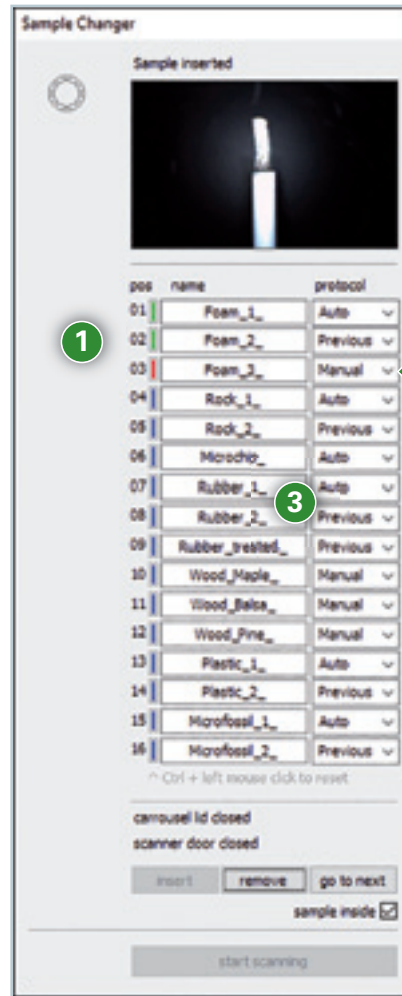Easy installation – just mount the sample changer on top of the scanner

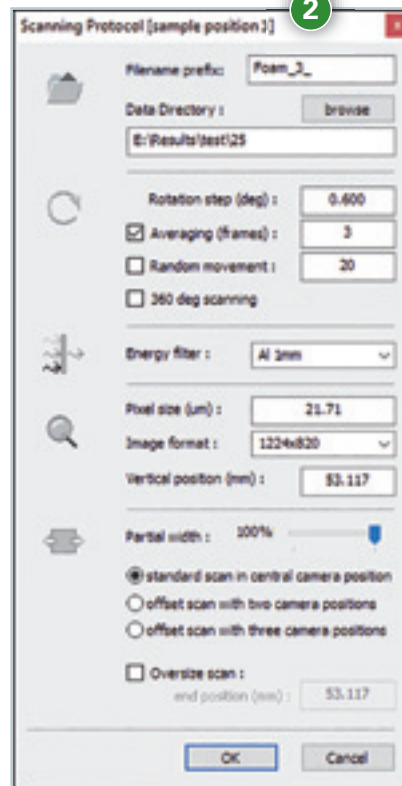Change samples at any time without interrupting an ongoing scan

Autodetection of new samples and status LEDs for every scan: ready, running, done

Rely on Genius-Mode for whatever task you may have!

1 Status display of all 16 positions

2 Automatic or user-selected parameters

3 All types of samples in the same tray

Sample changer window

pos	name	protocol
01	Foam_1_	Auto
02	Foam_2_	Previous
03	Foam_3_	Manual
04	Rock_1_	Auto
05	Rock_2_	Previous
06	Microchip_	Auto
07	Rubber_1_	Auto
08	Rubber_2_	Previous
09	Rubber_treated_	Previous
10	Wood_Maple_	Manual
11	Wood_Balsa_	Manual
12	Wood_Pine_	Manual
13	Plastic_1_	Auto
14	Plastic_2_	Previous
15	Microfossil_1_	Auto
16	Microfossil_2_	Previous

Scanning Protocol [sample position 3]

Filename prefix: Foam_3_
Data Directory: E:\Results\test\25
Rotation step (deg): 0.600
Averaging (frames): 3
Random movement: 20
360 deg scanning
Energy filter: Al 1mm
Pixel size (um): 21.71
Image format: 1224x820
Vertical position (mm): 53.117
Partial width: 100%

Scanning protocol window

Ready to Run 24/7 – as Automated as You Choose – Thanks to Genius-Mode™
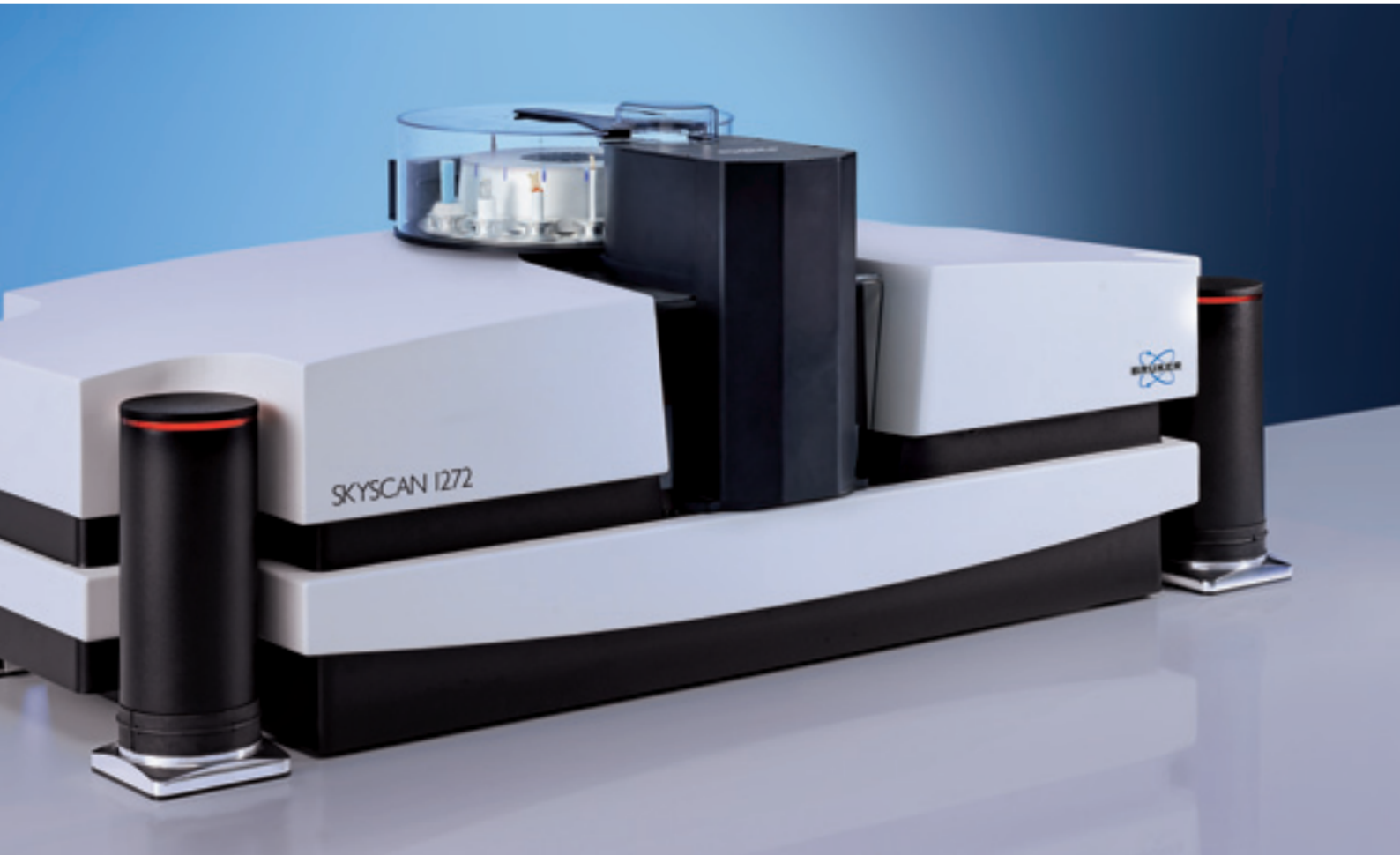
SKYSCAN 1272 with automatic 16-position sample changer

SKYSCAN 1272 with 16-position sample changer and Genius-Mode means: multiple sample types, objects, and materials can be intermixed and scanned with varying protocols, automatically.

The SKYSCAN 1272 with sample changer can be operated in three ways:

1) Fully automatic

Simply load the sample changer, select "Auto" protocol, and then let the SKYSCAN 1272 take care of the rest! All scan settings are defined using Genius-Mode. Feel confident that your work is being done – all day, all night, or over the weekend – with system-generated reports emailed directly to your inbox, including a link to access data remotely.

2) User selected

Want more control? Individually adjust scan parameters for one, some, or all sixteen samples. Once all "Manual" protocols are defined, simply press "Start" to initiate the full batch.

3) Prior selection

Streamline workflow by using the "Previous" command to assign the last settings.

Stay in charge, always. Because the sample changer operates outside the fully shielded X-ray chamber, a user can easily place a priority sample at the next position while another scan is still running.

As Easy as 1-2-3:
Let the Genius Work for You –
Fully Automated

1.
Moving to
the **Best-Scan-
Geometry**™

2.
Finding the
**Best-X-ray-
Energy-
Window**™

3.
Starting with
the **Best-Scan-
Conditions**™

Thanks to SKYSCAN 1272's movable camera and its extra large X-ray beam opening, Genius-Mode finds the Best-Scan-Geometry – as compact as possible with the largest magnification – automatically.

To find the perfect X-ray energy window, SKYSCAN 1272 automatically checks which of the six filters and X-ray energy best fits the sample's density in order to achieve the optimal image contrast.

The SKYSCAN 1272 operating in Genius-Mode selects the best exposure time and rotation step automatically.

Sample is too far away from the X-ray source, low magnification

Sample is too close and does not fit the field-of-view
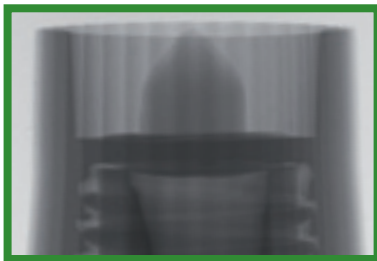
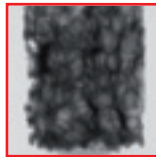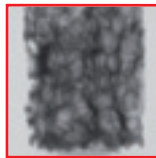Best-Scan-Geometry means: maximum magnification and minimum scan time due to the most compact setup

Low
Attenuation

High
Attenuation

50 kV, no filter

50 kV, no filter

60 kV, Al 0.25 mm

60 kV, Al 0.25 mm

70 kV, Al 0.5 mm

70 kV, Al 0.5 mm

80 kV, Al 1 mm

80 kV, Al 1 mm

90 kV, Al 0.5 + Cu 0.038 mm

90 kV, Al 0.5 + Cu 0.038 mm

100 kV, Cu 0.25 mm

100 kV, Cu 0.25 mm

For highest resolution rely on the integrated micro-positioning stage and insert the sample manually

SKYSCAN 1272 with Best-Scan-Geometry™ and Genius-Mode™

Conventional Systems with Fixed Camera Position

More Intensity and Speed

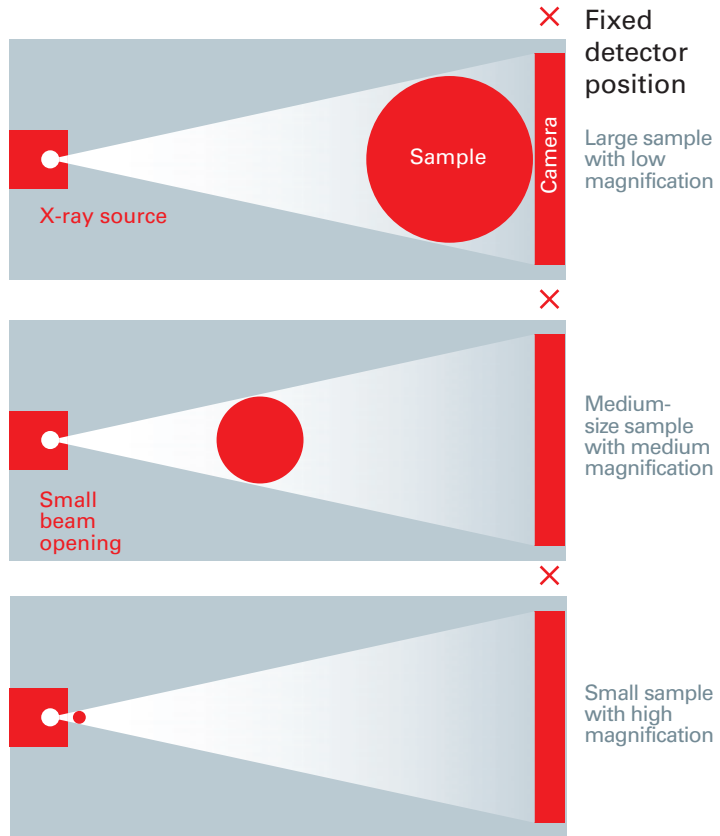Best Position, Best Intensity, Best Speed

Fixed Position, Less Intensity, Less Speed

Yes 🎖①

Variable Camera Position

No

← Variable detector position

Large sample with low magnification

Optimized X-ray source | Sample | 16-MP Camera

✕ Fixed detector position

Large sample with low magnification

X-ray source | Sample | Camera

✕

Medium-size sample with medium magnification

Wide beam opening

✕

Medium-size sample with medium magnification

Small beam opening

←

Small sample with high magnification

✕

Small sample with high magnification

2 to **5** 🎖①

Speed Factor

1

Moving both the sample and the large-format 16-MP camera as close as possible to the source increases the measured intensity dramatically. That's why SKYSCAN 1272 scans up to five times faster than conventional systems.

Conventional fixed camera systems are stuck at one scanning speed regardless of the sample size or magnification.

14,456 × 14,456 pixels

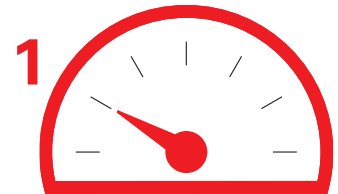**200+ MP**
Slice

pixel 0   1,000   2,000   3,000   4,000   5,000   6,000   7,000   8,000

0

1,000

2,000

3,000

4,000

5,000

6,000

7,000

8,000
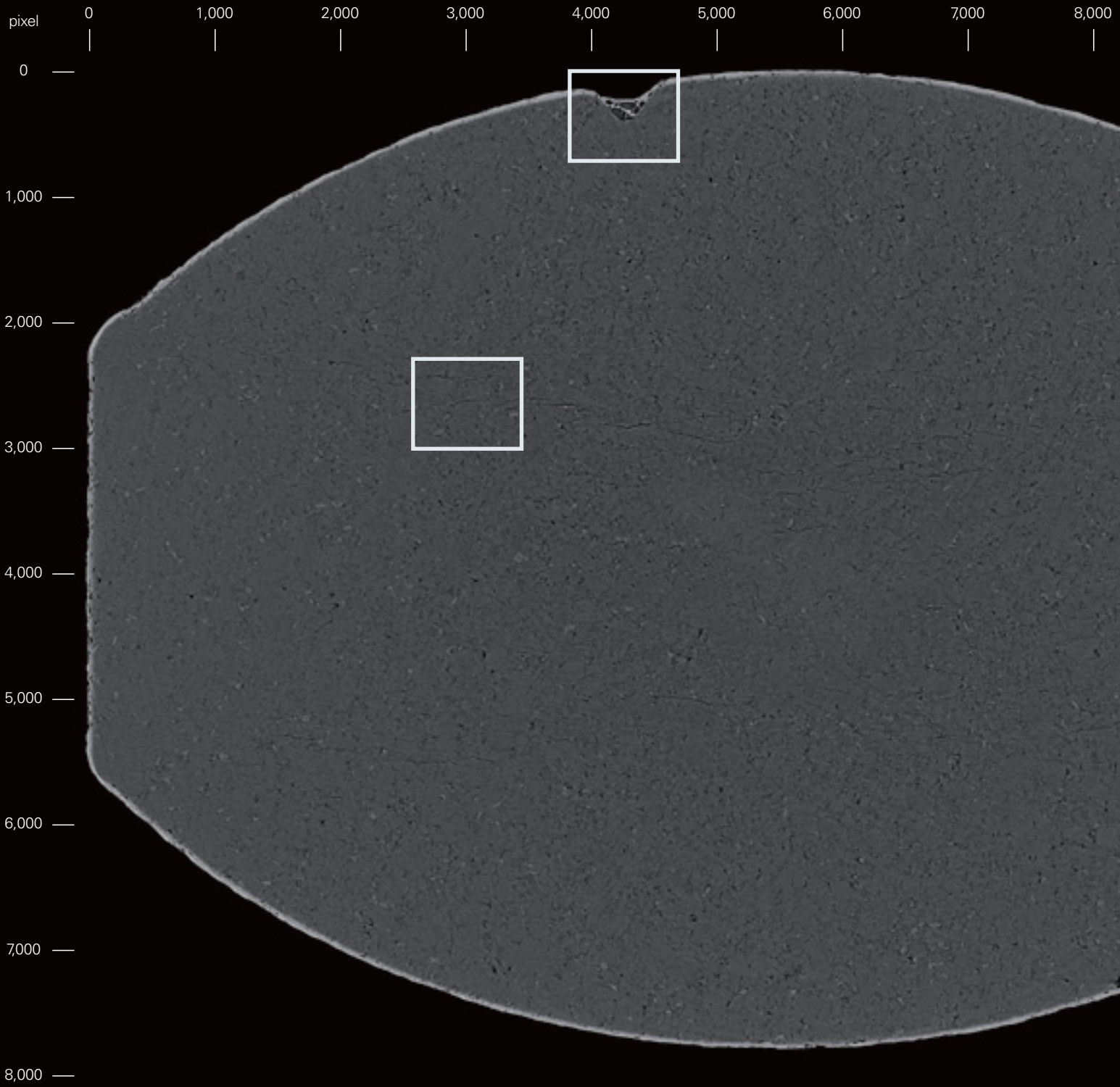
Pharmaceutical tablet scanned in triple offset
14,456 x 14,456 px with 0.8 µm resolution, 11 mm sample size

SKYSCAN 1272
Over 200 Megapixels in Every Slice – Bigger is Better

Live optical camera

11 mm

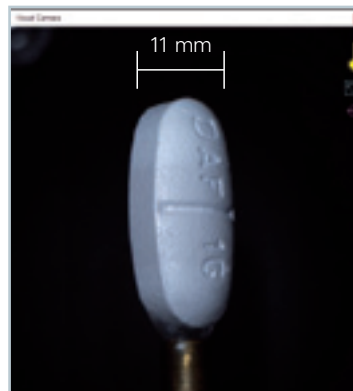Analysis of the coating, 1,200 x 1,000 px

Analysis of distribution of active ingredients and defects in the matrix, 1,200 x 1,000 px

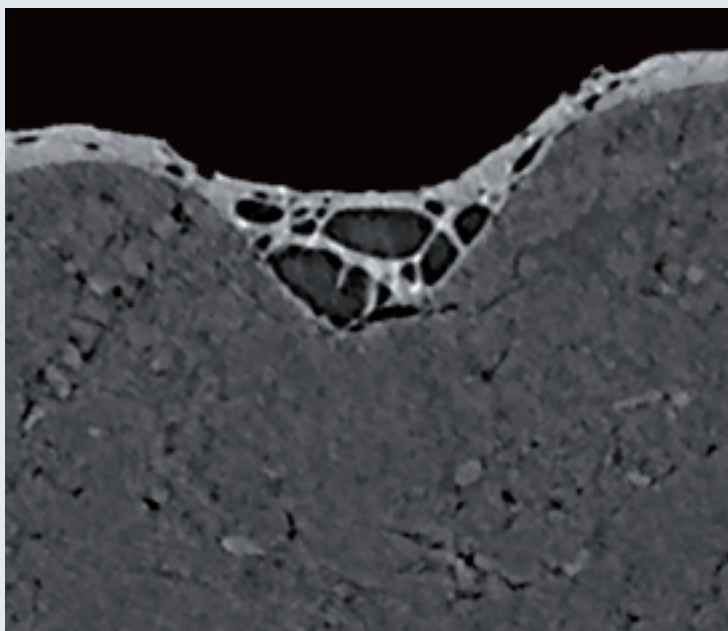## Extremely large image format for more details and faster results

The SKYSCAN 1272 uses a unique family of specially developed, extremely large-format X-ray cameras, with fast readout and precise temperature stabilization for an optimal signal-to-noise ratio.

The camera can be moved horizontally to acquire projection images in three different offset positions – left, center, and right – which are automatically stitched together into a 14,456 x 3,280 pixel image, similar to a panoramic picture. The resulting reconstructed cross sections yield more than 200 million pixels in a single image!

Sealed X-ray tube optimized for big samples and large-format imaging

By using a maintenance-free, sealed X-ray tube with a wide beam opening, the sample can be moved closer to the source while still maintaining a large field-of-view. Maximum X-ray flux is always available thanks to constant power output (10 W), independent of the filter or voltage setting, for maximum scanning speed.

The integrated regulation of the spot size, dependent on the settings, ensures a long lifetime and maintenance-free operation.

X-ray Image

- Live view of X-ray projection images
- Easy switching between raw and background-corrected X-ray images
- Direct dimensional measurements

Video Image

- Sample inspection with live optical camera
- Allows positioning of the sample for the highest resolution

Control Bar

- Slider control for magnification, object position, and rotation
- Quick control of X-ray camera modes
- Easy filter selection to match sample attenuation

Overview of the SKYSCAN 1272 control software window
Aluminum foam
6 µm voxel size, 90 kV, Al 0.5 + Cu 0.038 mm filter, 2,452 x 1,640 px

Menu

1

- Simple, uncluttered menu for scanner control
- HELP database for additional information about features and functions

Toolbar

2

- Natural left-to-right scanning workflow using clearly labeled icons
- Quick links to entire SKYSCAN software suite

Scout View

3

- Full-length overview of entire sample
- Automatic stitching of oversized images
- Just click and drag at different vertical positions for batch scanning

Just start your analysis!
Video at:
www.bruker.com/
SKYSCAN1272-Video2

SKYSCAN 1272 Software Suite means Ease-of-Use plus Enjoy-your-Work

Intuitive, simple, yet powerful – the SKYSCAN 1272 control software is designed to inspire finding out what's inside. The whole screen, including all menus and icons, is laid out in a straightforward, left-to-right manner that even a first-time user will find intuitive enough to start scanning right away. All major functions can be performed with a single click, allowing researchers to focus on analyzing their samples, rather than finding buttons or navigating nested menus.

Ultrafast reconstruction of large datasets

3D reconstruction from acquired 2D projection images used to require intensive computational power, and used to be the bottleneck of μCT analysis. The two approaches to overcome this barrier are: invest in more hardware – or use clever software.

SKYSCAN 1272 is supplied with InstaRecon® – the fastest reconstruction software available – exclusively offered by Bruker microCT.

InstaRecon® provides results up to 100 times faster than conventional reconstruction engines, operating on a single computer.

Three, Two, One… Launch:
The World's Fastest Software for Large-Format Reconstruction – InstaRecon®

Only with **InstaRecon®** can large-format images be handled in reasonable time
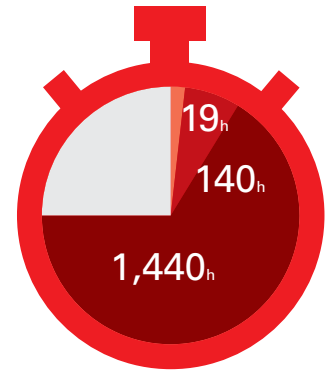
Cross section format [Pixel]	Cross sections in reconstructed volume [#]	Projections used for reconstruction [#]	1 PC & InstaRecon®	1 PC & 8 x GPU cluster acceleration	1 PC & GPU acceleration	1 PC
14,456 × 14,456	2,610	8,100	10 hours	19 hours	140 hours	1,440 hours*
8,000 × 8,000	2,495	2,157	43 min	68 min	275 min	3,552 min
4,000 × 4,000	2,255	1,990	9 min	19 min	62 min	913 min
2,000 × 2,000	1,229	996	80 sec	98 sec	247 sec	3.480 sec
1,000 × 1,000	615	499	12 sec	14 sec	21 sec	238 sec

* time estimated
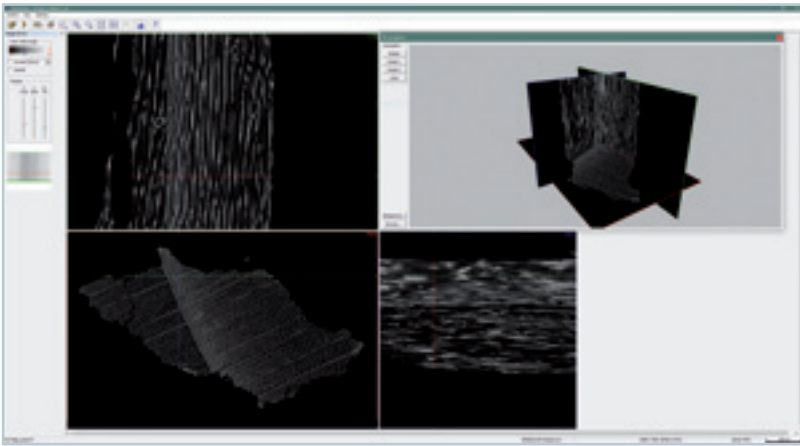
3 orthogonal slices through a wood sample in DATAVIEWER

DATAVIEWER
Slice-by-slice inspection of 3D volumes and 2D/3D image registration

DATAVIEWER allows inspection of the reconstructed volume using orthogonal slices in any direction. Objects can be rotated, repositioned, and resliced using their new orientation for more convenient visualization and saving of more efficient subvolumes. The software inc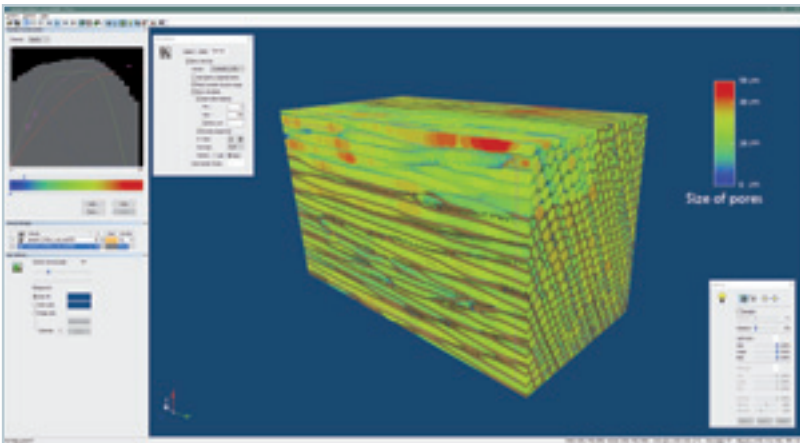ludes intuitive tools for measurement of 3D distances. 2D and 3D image registration enables the exact alignment of multiple scans of the same sample, acquired at different times.

Volume rendered wood sample, showing a color-coded pore size distribution by means of CTVOX

CTVOX
Realistic visualization by volume rendering

CTVOX is an easy-to-use volume rendering package that provides precise control of visualization parameters, ensuring a realistic representation of all types of samples. CTVOX offers intuitive manipulation of the poin-of-view, virtual slicing through objects, and full control of light, shadow, and surface properties. Creating attractive cover images and movies that impress has never been so easy.
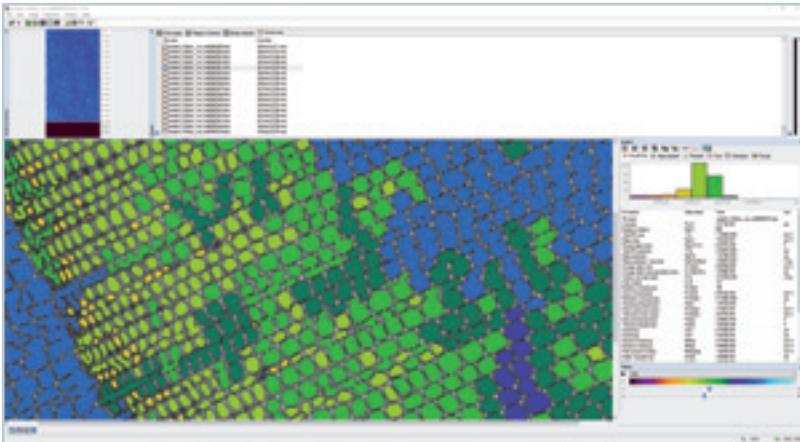
Analysis of local pore size in a wood sample by means of CTAN

CTAN
2D/3D image analysis and processing

Built over two decades from direct feedback from scientists all over the world, CTAN is one of the most used programs for quantitative image analysis. This package includes an extensive number of tools for region-of-interest selection, image segmentation and 3D measurements. Using the comprehensive library of embedded plugins or user-customized protocols, quantifying complex microstructures such as porosity, thickness, orientation, and many other properties is easy. Simplify large study sets by batch analysis.
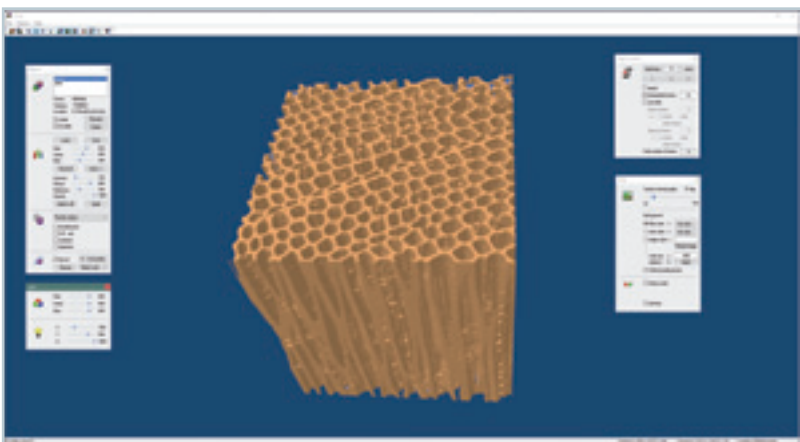
Surface rendering of a wood sample by means of CTVOL

CTVOL
Built-in surface rendering

Surface models can be visualized in CTVOL, a flexible 3D viewing environment. Volumes can be exported in STL format, to allow 3D printing of the acquired scan data or further use in CAD and modelling programs.

Best Components, Superior Technology and Utmost Quality for Saving Energy, Time & Money

Maintenance-Free	~99% Uptime	Low Power Consumption
No Hidden Costs, No Compressor, No Filaments	**Runs 24/7 for Years** and Will Never Let You Down	**Saves 21,000 kWh** Electrical Energy per Year*

The SKYSCAN 1272 provides top performance with peace of mind for years and will never let you down. No hidden costs of ownership, because our X-rays are "green" and the system is future-proof. Save maintenance, energy, and time – and in the end a lot of money!

SKYSCAN 1272 with Sealed X-ray Tube

System

Yes ① ← Mainten

➕ Maintenance-free

Power

Yes ① ← Low CO$_2$

➕ 90 W

* 24 hours, 300 days

Systems with Open X-ray Tube

SKYSCAN 1272 with Sealed X-ray Tube

Systems with Open X-ray Tube

Uptime

ance-free → **No**

Installation

Yes ① ←— Plug'n Analyze™ —→ **No**

Systems with Open X-ray Tube	SKYSCAN 1272	Systems with Open X-ray Tube
⊖ Filament break during scan	+ Plug'n Analyze	⊖ Installation 1-2 days
⊖ Filament replacement ½–1 hour	+ Standard wall socket	⊖ High-voltage power
⊖ Source cleaning ½–1 hour	+ Standard table	⊖ Reinforced floor
⊖ X-ray source maintenance 2–3 days / year	+ Standard door	⊖ Double door
⊖ Mechanical alignment of electron gun once / year	+ Lightweight 150 kg	⊖ Very heavy ~2,000 kg
⊖ Compressor maintenance once / year	+ Little space	⊖ Large footprint
⊖ Chiller maintenance once / year	+ Easy transportation	⊖ Forklift needed
⊖ Target replacement once / 2 years		⊖ Heavy-duty elevator
		⊖ Extra space compressor
		⊖ Extra space chiller

Consumption

Footprint → **No**

Operation

Yes ① ←— Failsafe & Foolproof —→ **No**

| Consumption	SKYSCAN 1272	Operation
⊖ > 3,000 W	+ Ease-of-use, made for everyone	⊖ Highly skilled operators only
⊖ Additional room cooling	+ Sample changer outside X-ray area	⊖ Sample changer inside X-ray area
	+ No pause during sample handling	⊖ Scan pause during sample handling
	+ Runs automatically 24/7	⊖ Operator needed Mon–Fri, 9–5

Rely on the Only One-Stop Shop for µCT and Become Part of the Bruker User Family

Bruker microCT Academy for education and training

CTVOX mobile app with full functionality
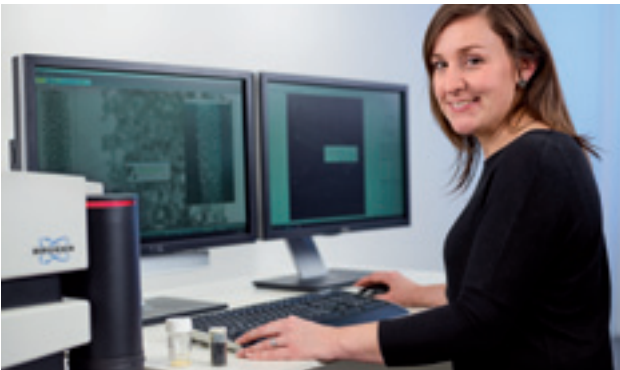
SKYSCAN 1272 desktop high-resolution µCT

Hardware

- Systems, sample stages, computers and monitors from one supplier

- Fully calibrated and extensively tested hardware

- Direct installation and support from certified service engineers

Software

- World's fastest reconstruction algorithm, InstaRecon®

- Powerful 3D analysis software and realistic 3D visualization

- Dedicated mobile app with full functionality and performance

- Multiple file formats for reporting and presentation

- Fully in-house developed software

Experts

- Direct customer support and dedicated in-house experts

- Full system and software training

- Scientific support for applications and analytical tasks

- Newsletter with method training notes

Get your CTVOX App & check out some samples!
iOS   Android

Bruker microCT employs a team of researchers, engineers and technicians to provide cutting-edge desktop and laboratory µCT systems. From hardware to software, all of our experts work closely together and with customers to provide the best solution. Welcome to the only one-stop shop for X-ray microtomography.

By relying on a SKYSCAN 1272 you become part of the Bruker user family and benefit from the exchange of knowledge and experience. Bruker organizes annual µCT user meetings.

We look forward to meeting you at our next get-together.

Get linked to the Bruker microCT Academy

www.bruker.com/products/
microtomography/academy/
academy.html

µCT user meeting in Leuven, Belgium

Overview of Features and Benefits

	Specification	Benefit
X-ray source	20 – 100 kV, 10 W < 5 µm spot size at 4 W	Covers a wide range of applications, from organics to metals
Nominal resolution (pixel size at maximum magnification)	< 0.35 µm for 16 MP camera < 0.45 µm for 11 MP camera	Detection of very small sample details
X-ray camera	16 MP, 4,904 x 3,280 px or 11 MP, 4,032 x 2,688 px 14-bit, cooled CCD fiber-optically coupled to scintillator	High resolution and large field-of-view
Reconstructed volume (after single scan)	up to 14,456 x 14,456 x 2,630 px for 16 MP camera up to 11,840 x 11,840 x 2,150 px for 11 MP camera	
Sample size	Max. Ø 75 mm Max. height 70 mm	Fits small- to medium-sized objects
Radiation safety	< 1 µSv/h at any point on the instrument surface	Meets international safety requirements Easy installation
Power supply	100 – 240 V / 50 – 60 Hz	Standard wall socket Plug'n Analyze™
Dimensions (W x D x H)	116 cm x 52 cm x 33 cm 116 cm x 52 cm x 44 cm, with sample changer	Fits through standard doors Easy installation

Front

Right

116 cm

52 cm

44 cm

33 cm

150 kg

Sample changer
5 kg
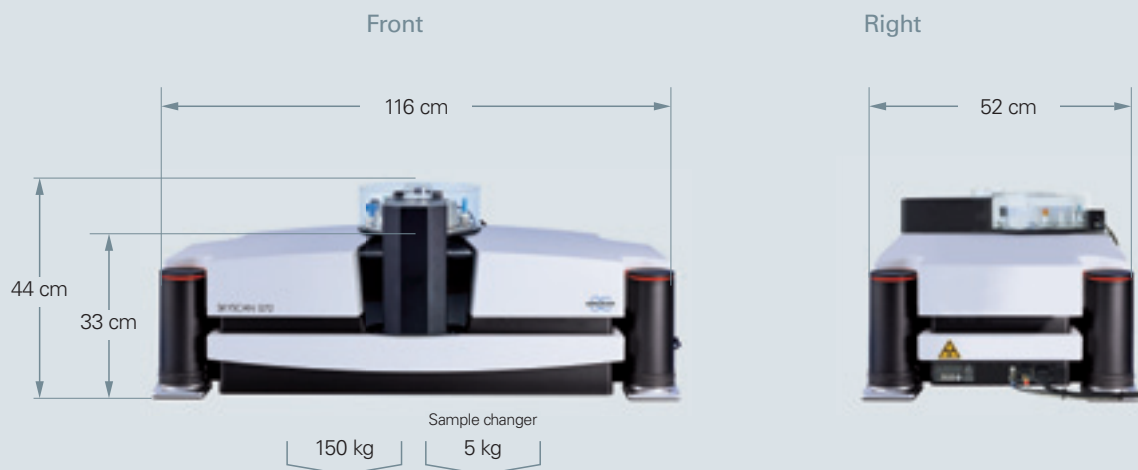
● **Bruker microCT**
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