Make the Invisible Visible
ZEISS X-Ray Series

// INNOVATION
MADE BY ZEISS

Connect to Productivity
100 years is just the start

For more information please visit:
www.zeiss.com/metrology/x-ray

EN_60_021_00081 **Printed in Germany**
Subject to changes in design and scope of delivery and due to ongoing technical development.
Printed on chlorine-free bleached paper. © Carl Zeiss Industrielle Messtechnik GmbH

ZEISS X-Ray Series

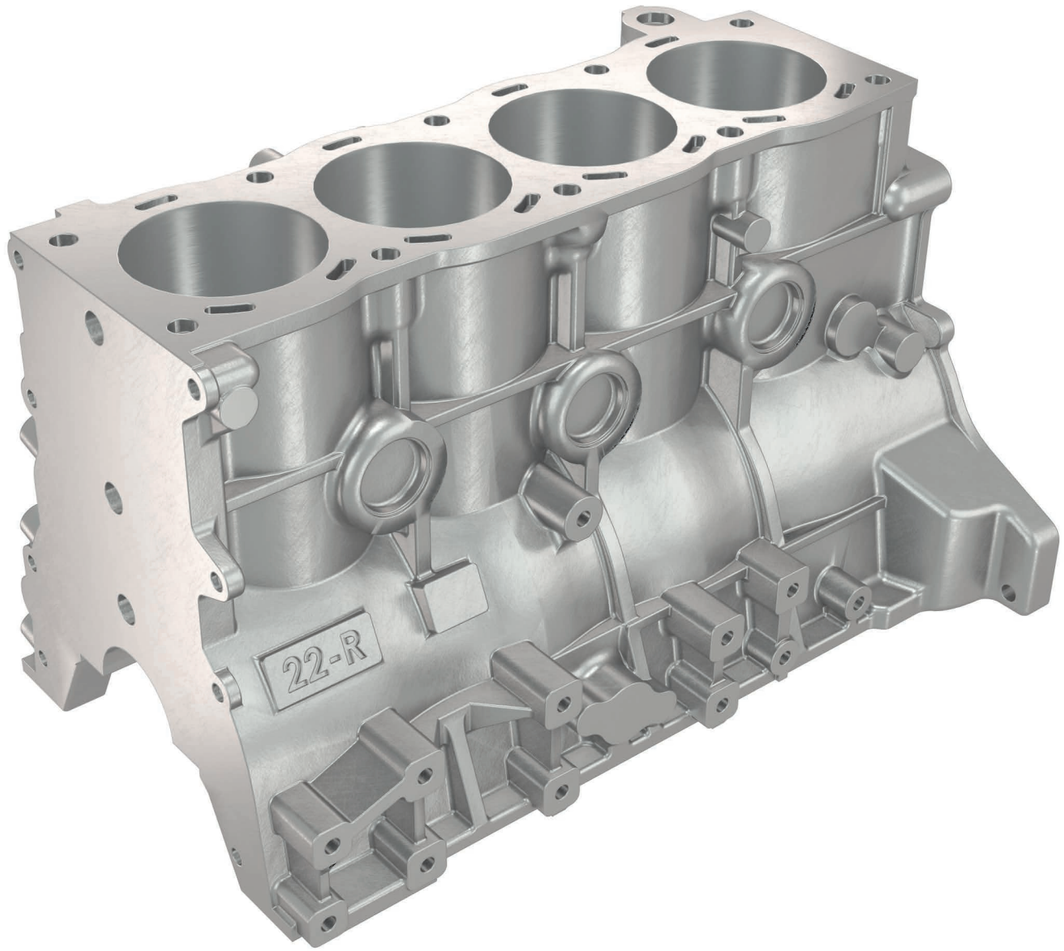
Make the Invisible Visible

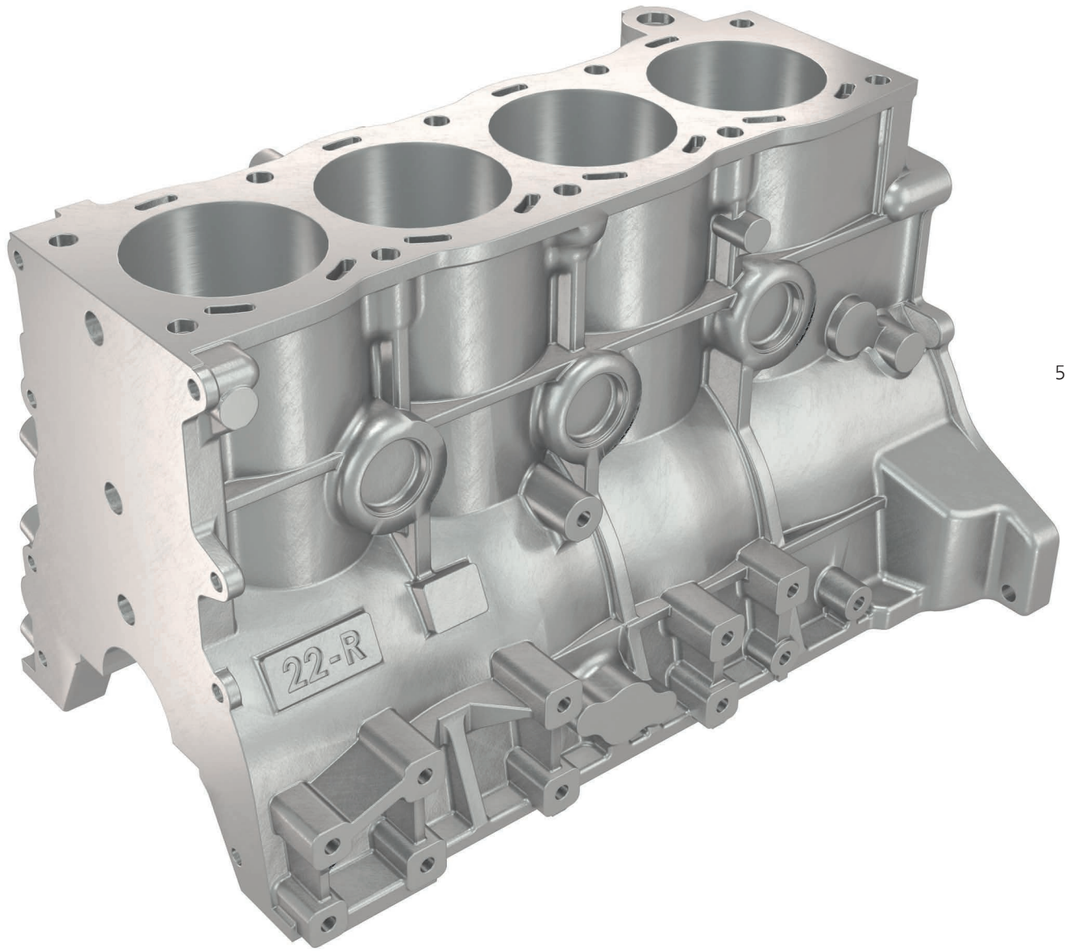
Make the Invisible Visible

ZEISS X-Ray Series

To examine things, to get to the bottom of them, to get to their core – this desire has always driven science, research, and development. X-ray technology from ZEISS has provided perfect insights for years in these and other areas. When it comes to quality and process control, it reveals what would otherwise remain hidden from even the most watchful of eyes – without destroying the part.

Only one is perfect inside.

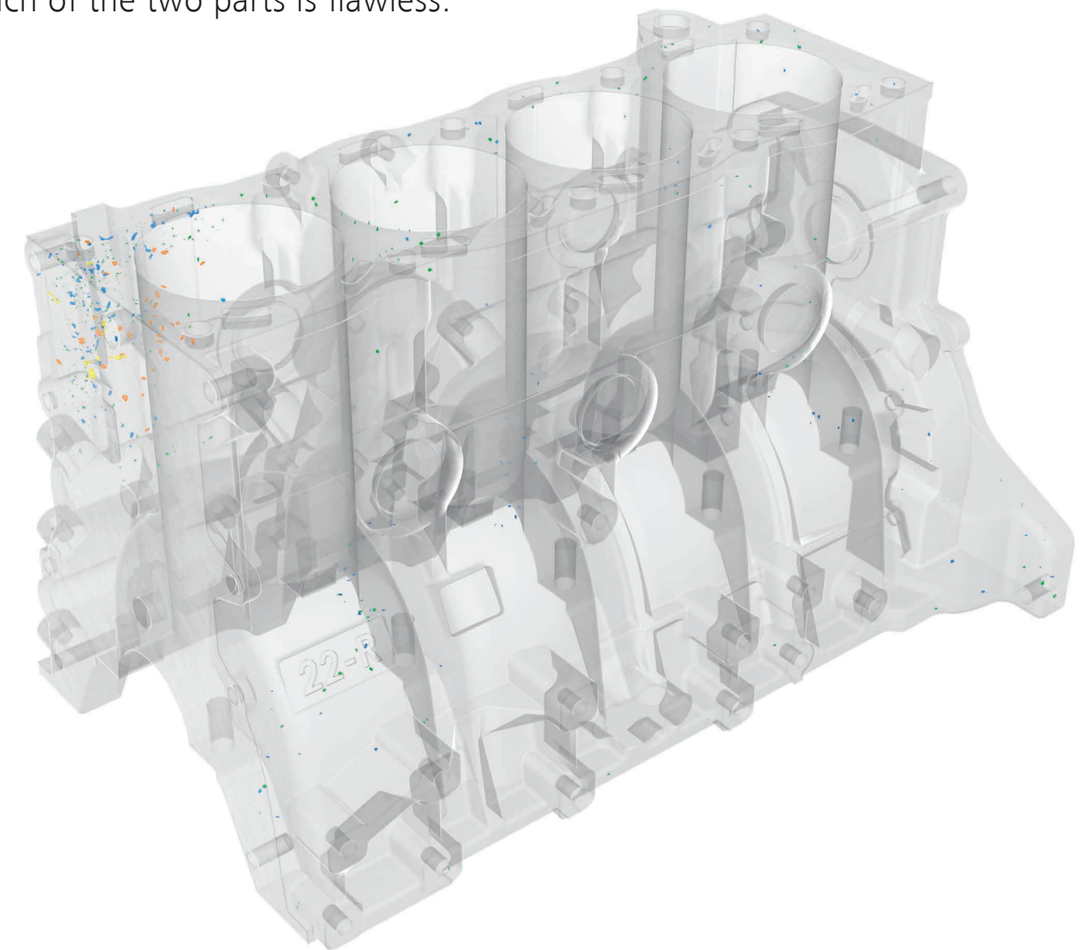


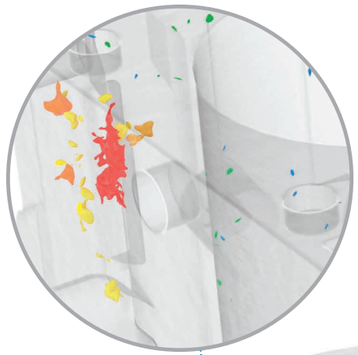


Don‘t guess. X-ray it.
ZEISS X-Ray Series. Make the Invisible Visible.

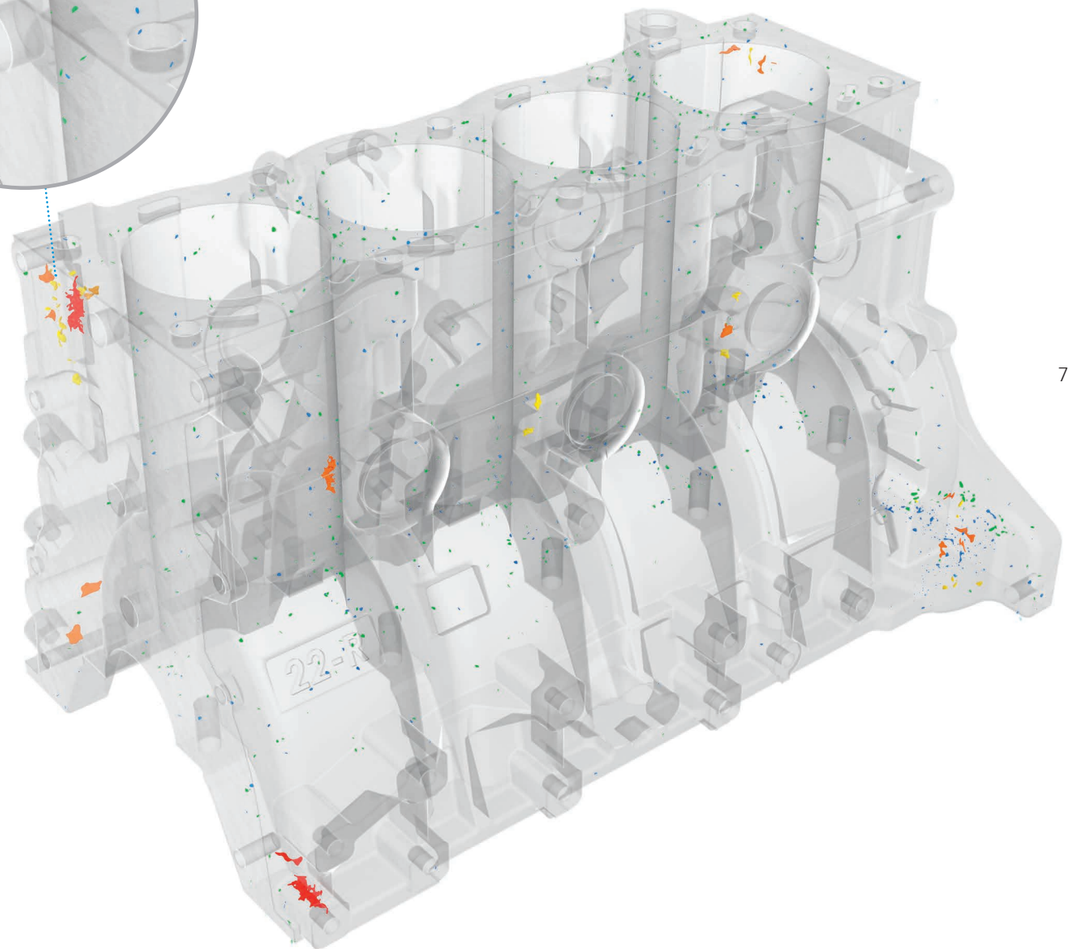
ZEISS X-Ray Series solves the mystery

Once hidden, but now visible – thanks to X-ray solutions from ZEISS. It is the only way to discover which of the two parts is flawless.





This defect would cause a product recall, resulting in enormous costs.



Can you really take the risk?

X-ray solutions from ZEISS perform advanced, non-destructive quality control. Make the invisible visible – and be absolutely sure about the quality of your parts.

Reveal the hidden secrets of your part

X-ray technology provides completely new insights into the invisible. You can capture, analyze, measure, and inspect internal structures quickly and non-destructively.

Warpage
All of the parts are finished, but they do not fit together, because they are warped? It is better to measure the internal and external structures during production and intervene early in the manufacturing process. This cuts costs.

Ø 25,5428

Pores
Pores may form if the temperature is not ideal during casting. Depending on the size, position, and number of air inclusions, this defect weakens the material and may cause functional impairments.

Cavities
Vacuum build-up during the cooling process can greatly reduce the quality of the part. If cavities are not detected, this may lead to cracks in the parts under load.

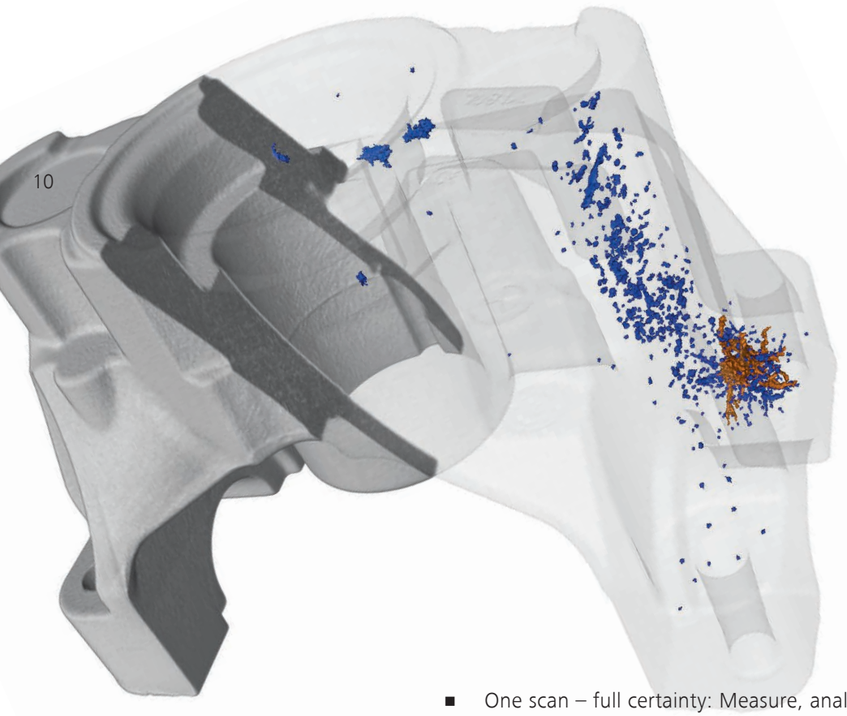
Inclusions
Inclusions of slag, oxides, sand, steel or tungsten can be a problem during further processing or cause cracks.

Residuals
Grit in the gears? This will not happen to you, if you examine your parts with X-ray technology. Residuals such as sand from casting molds or metal powder for 3D printing can be detected quickly and easily in just one scan.

Cracks
What was initially just a small crack can develop into a major problem under stress. Cracks in the material can have an enormous effect on the stability of the part. This can become a risk, especially with safety-relevant components.

Technology with benefits

It is self-evident that X-ray technology makes hidden things visible. However, the fact that this opens up completely new possibilities in quality assurance and results in significant added value for the customer is less well-known. Let us explain this to you!



- One scan – full certainty: Measure, analyze, and inspect hidden defects and inner structures that cannot be detected with coordinate measuring machines.
- Thanks to X-ray, you can cut parts non-destructively and look inside!
- No more complex fixturing. This saves time and money!
- By scanning all internal and external structures with computed tomography systems (CT), parts can be reproduced even if no CAD model is available.

Scan here for AR

An investment that pays off

Amortized after 12 months

A thorough inspection right after the casting process is important when producing aluminum castings. Companies face high costs if defects are not detected until later in production. This is why investing in an automated inline solution for quality assurance pays off in less than 12 months.

time savings

30 to 70%

Producing tools and molds is very costly, because it usually requires several iteration loops until tools are optimally adjusted and molds are perfectly formed. This process can be improved and shortened by 30-70% by capturing all structures in a 3D model with CT and the software ZEISS REVERSE ENGINEERING (ZRE). In this way, costs of tools can be significantly reduced.

Reduce setup times by up to 80%

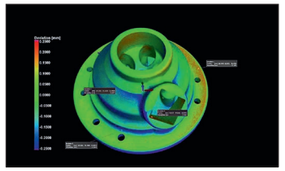
Setup time is lost time – which is why it is so important to reduce the time between scans. The setup table ZEISS FixAssist® CT will help you maximize the use of your CT and make your quality assurance processes more efficient. This accessory can reduce setup times by up to 80%. Even better: Your investment will pay for itself in less than four months!

Scan here for AR

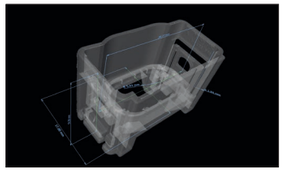
Take a close look at every detail

Automotive, aerospace, medical technology, electronics, consumer goods – each industry has its own manufacturing processes, along with different potential defects that are normally hidden from the eye. X-raying parts opens up completely new potential applications – from inspecting internal defects and the dimensional measuring of internal structures to structural material analysis.

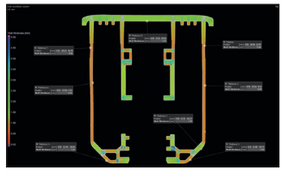
Metrology



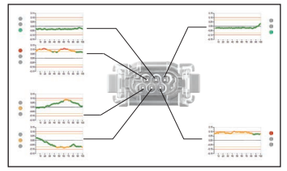
Nominal/actual comparison
Deviations from the CAD model or master part are visualized in a false color comparison.



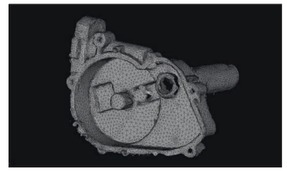
Dimensional control
Thanks to computed tomography, the dimensional accuracy of complex internal and external features can be checked in just one scan.



Wall thickness analysis
A color-coded representation shows the wall thickness of internal structures.

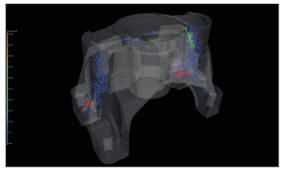


Tool & process optimization
A comprehensive inspection of the part provides meaningful information on the condition of the tools and the production process.

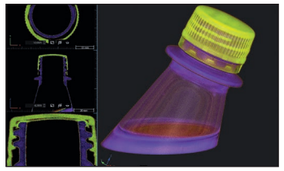


Development & Reverse Engineering
You can easily create CAD models from 3D volume data – significantly accelerating product development and reverse engineering processes.

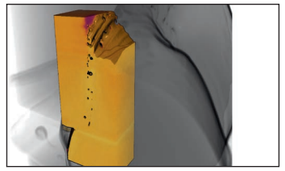
Inspection



Defect analysis
You can detect cavities, pores, cracks and other defects quickly and easily.



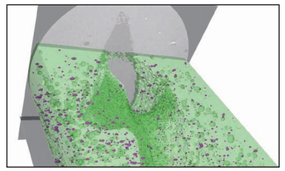
Assembly control
Assembled parts are checked for function and fit.



Joining technology control
In just one scan you can see whether welded, soldered, glued or riveted joints are really flawless.

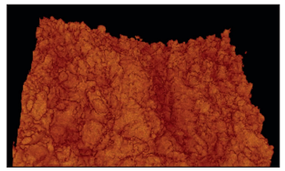
Electronic testing
Defects quickly become visible when electronic parts, e.g. circuit boards or batteries, are X-rayed.

Analysis

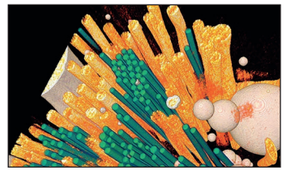


Structural analysis
A 3D structure characterization provides important insights thanks to high-resolution X-ray microscopy.

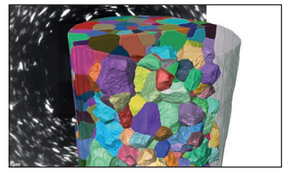
In-situ & 4D analysis
With in-situ and 4D analyses, the behavior of materials under external influences and over time can be analyzed.



Roughness analysis
Surface roughness can be analyzed for both external and internal structures.



Fiber composite analysis
Analyzing fiber composites visualizes the 3D distribution and orientation of different elements within a composite material.



Analysis of grain size & distribution
Grain size and distribution are decisive factors in determining the hardness and strength. This is why it is important to analyze them.

Your need.
Our X-ray solutions.

COMPOSITES

MATERIAL RESEARCH

BATTERY

OIL & GAS

ELECTRONICS

ALU CASTING

ASSEMBLIES

BLADE

ADDITIVE MANUFACTURING

LIFE SCIENCES

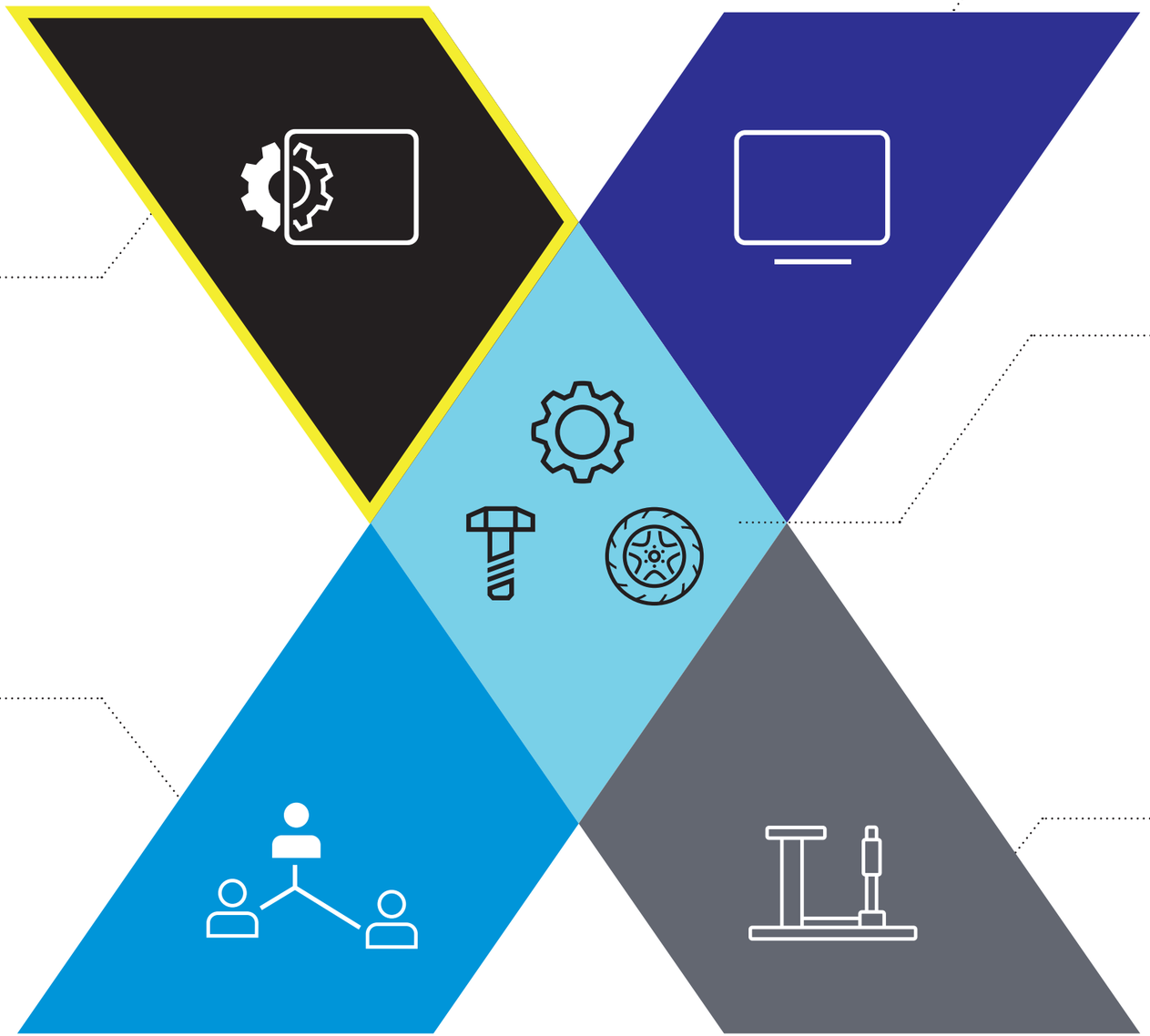
MULTI-MATERIAL PARTS

PLASTICS

Scan here for AR

Make the Invisible Visible
ZEISS X-Ray Series

The focus for ZEISS is on the customer and their application. This is why we not only offer hardware, but solutions – in fact the ones that fit your needs best. These consist of hardware systems, software, accessories, and services, precisely tailored to the respective needs. This is only possible at ZEISS.



SYSTEMS

Be it precise measurement, fast inspection or analysis down to the nanometer scale, ZEISS has the right solution for your application – with high-precision CTs, automated 2D and 3D X-ray systems, and high-resolution 3D X-ray microscopes.

- 2D radioscopy
- Computed tomography
- X-ray microscopy

SERVICES

You can even X-ray your parts without your own X-ray system – by using the X-ray scanning service at the ZEISS Quality Excellence Centers. Reap the benefits of ZEISS X-Ray Series and see for yourself without taking any risk.

- Measuring services
- Application support
- On-site trainings
- Classroom seminars
- eLearning
- Local maintenance offerings
- Guaranteed uptime
- Spare parts packages

SOFTWARE

ZEISS has other advanced software solutions to choose from besides the trusted ZEISS CALYPSO evaluation software. For instance, you can capture and post-process your 3D data with ZEISS METROTOM OS, and collect it and get reports in ZEISS PiWeb.

- Image acquisition
- Image evaluation
- Data management & industry 4.0

APPLICATIONS

Every industry and application has its challenges that need to be mastered. As a long-time expert in X-ray technology, we are familiar with your problems and can support you with our expertise and solutions.

- Additive manufacturing
- Alu casting
- Battery
- Blade
- Electronics
- Oil & Gas
- Plastics
- Composites
- Multi-material parts
- Assemblies
- Material research
- Life sciences

ACCESSORIES

We offer a number of additional options to ensure that you get the most out of your hardware solutions. With ZEISS FixAssist® CT, for example, you can reduce setup times by up to 80%. This makes you even more productive.

- Sample holders
- Setup table
- Retrofit solutions
- Automatization solutions

ZEISS X-ray systems at a glance

Scan here for AR

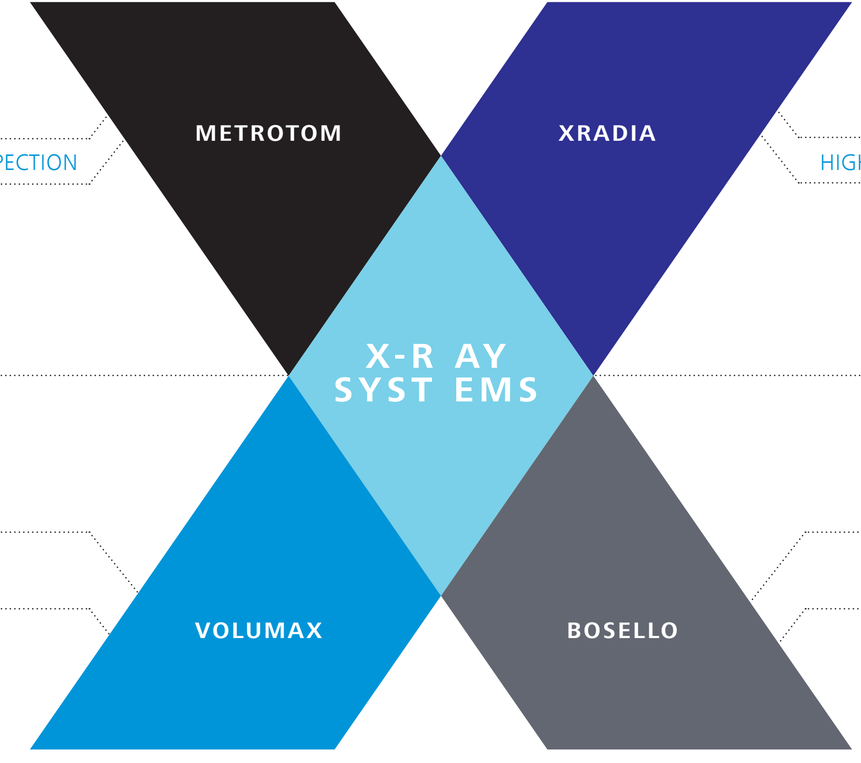
LAB
INSPECTION, METROLOGY & ANALYSIS

HIGH-PRECISION METROLOGY & INSPECTION

METROTOM 800 130 kV
METROTOM 800 225 kV
METROTOM 800 225 kV (HR)
METROTOM 1500

HIGH-RESOLUTION ANALYSIS & INSPECTION

Xradia 810 & 825 Synchrotron
Xradia 800 & 810 Ultra
Xradia 610 & 620 Versa
Xradia 510 Versa
Xradia 410 Versa
Xradia Context microCT



VoluMax M400
VoluMax M800
VoluMax F800
VoluMax F1500
VoluMax F1500 flash
VoluMax F1500 thunder

FAST & AUTOMATED 3D INSPECTION & METROLOGY

BOSELLO WRE THUNDER
BOSELLO OMNIA
BOSELLO SRE MAX

FAST & AUTOMATED 2D INSPECTION

PRODUCTION LINE
INSPECTION & METROLOGY

LAB	Resolution	Accuracy	Part size	Speed	Part density
High-precision metrology & inspection					
METROTOM 800 130 kV	* * *	* * * * *	* * *	* * *	* *
METROTOM 800 225 kV	* * *	* * * *	* * * *	* * * *	* * * *
METROTOM 800 225 kV (HR)	* * *	* * * *	* * * *	* * * *	* * * *
METROTOM 1500	* * *	* * *	* * * * *	* * * *	* * * *
High-resolution analysis & inspection					
Xradia 800 & 825 Synchrotron	* * * * *	-	*	* *	*
Xradia 800 & 810 Ultra	* * * * *	-	*	*	*
Xradia 610 & 620 Versa	* * * *	-	* *	* *	* * *
Xradia 510 Versa	* * * *	-	* *	*	* * *
Xradia 410 Versa	* * * *	-	* *	*	* *
Xradia Context microCT	* * *	-	* *	* * *	* * *
PRODUCTION LINE					
Fast & automated 2D inspection					
BOSELLO WRE THUNDER	*	-	* * *	* * * * *	* * *
BOSELLO OMNIA	*	-	* * * * *	* * * * *	* * * *
BOSELLO SRE MAX	*	-	* * * * *	* * * * *	* * * * *
Fast & automated 3D inspection & metrology					
VoluMax M400	* * *	* * * * *	* *	* * * *	* *
VoluMax M800	* * *	* * * * *	* * *	* * *	* *
VoluMax F800	*	-	* * * *	* * * * *	* * * *
VoluMax F1500	*	-	* * * * *	* * * *	* * * *
VoluMax F1500 flash	*	-	* * * * *	* * * * *	* * * *
VoluMax F1500 thunder	*	-	* * * *	* * * * *	* * * *

ZEISS Industrial Quality AR App – Connect to Productivity

Experience the new ZEISS brochures interactively. Augmented reality functions enable fast access to further information, such as videos, graphics, animations and more. You will need a smartphone or tablet with the free app „ZEISS Industrial Quality AR".

1. Download and install ZEISS Industrial Quality AR.
2. Start the app and hold the mobile device over the brochure.
3. Experience the ZEISS brochure interactively.