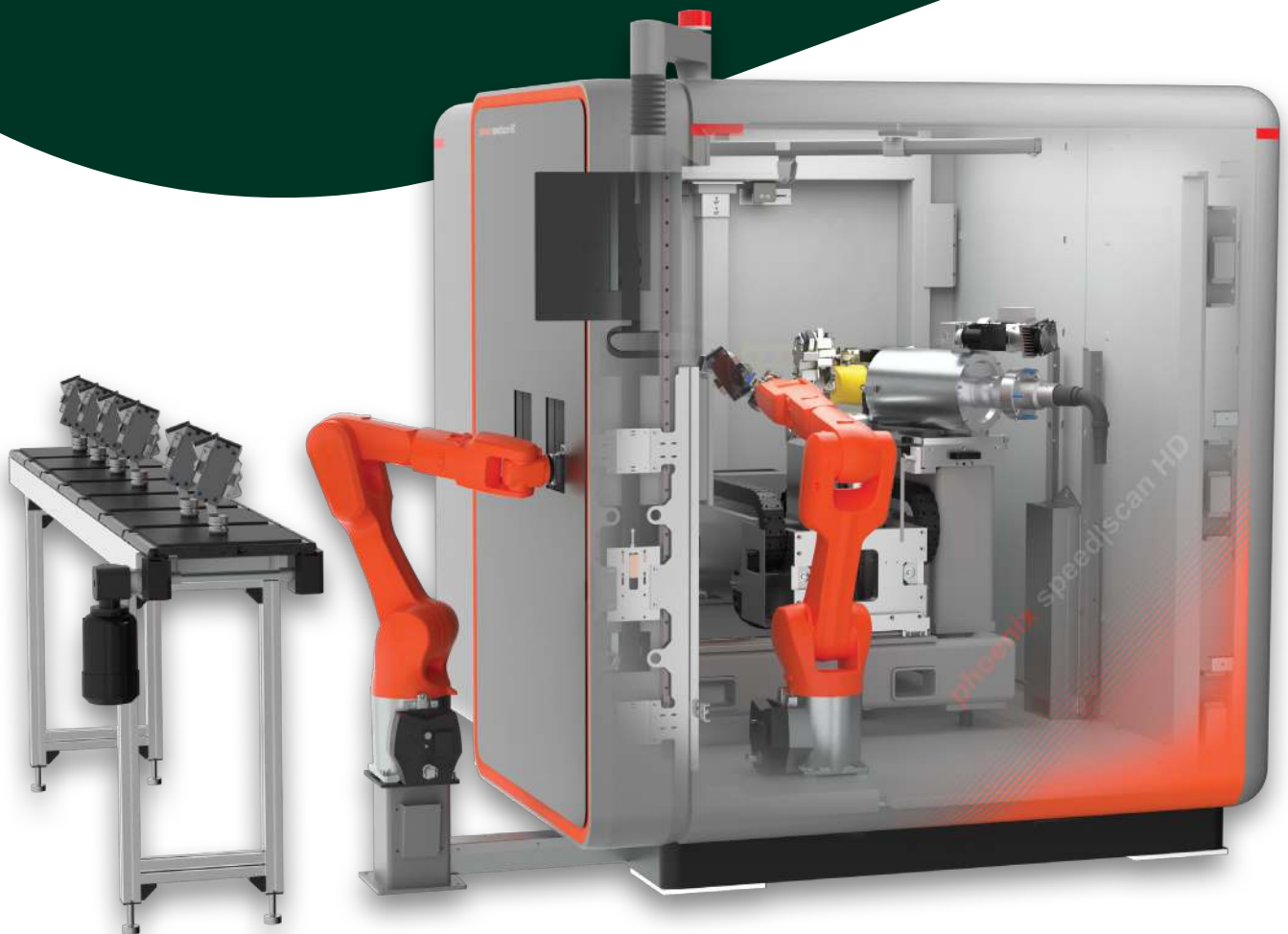


High-speed microCT inspection solution

Speed|scan HD handles large production
batches, with up to 100% inline inspection





Phoenix Speed|scan HD

Scan around the clock

Because your complex production lines must safely and consistently turn out high-quality parts and products, Waygate Technologies offers the Speed|scan HD—a fully automated high-speed inline Computed Topography (CT) system for production process control and optimization. Based on more than 20 years of industry-proven technology, the Speed|scan HD system supports large sample size inspections for up to 100% of production volume, helping you to reach your zero-defect goals.

The system is designed to allow full 3D production control across a variety of electronic, automotive, and medical device applications, including batteries, connectors, injection moldings, and complex assemblies.

Fully automated part handling and a bundle of CT innovations enable 24/7 Speed|scan HD operation at exceptional voxel resolutions down to 25 microns. With advanced artificial intelligence (A/I)-based battery anode overhang analysis as well as automatic defect recognition (ADR) for pass/fail decisions and fully automated CT workflows, the system is setting new standards for reliable and precise production control.

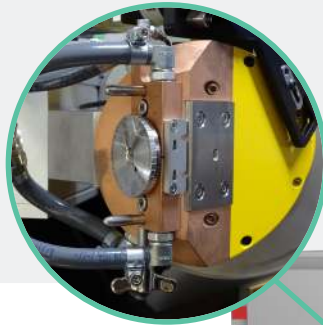
All of this translates to significant cost savings due to:

- Reduced number of rejects and recalls—both internally and externally
- Lower cost of quality
- Faster product ramp up
- Significantly less user interaction than conventional CT technology
 - 90% to 98% reduction in operator time due to robotics and automated workflow
 - 90% to 98% reduction in expert analysis time with automated defect recognition
 - 5 to 10 times greater throughput compared to manual inspection

Rugged microfocus X-ray tube dedicated for production environment

Proprietary, open, directional, high-power 240 kV/100 W microfocus X-ray tube specifically designed to deliver exceptional reliability and reproducibility on the manufacturing floor in 24/7 operation (Inlinedition).

- Dense material penetration
- Detail detectability down to 20 μm
- Liquid cooled for high reliability
- Unlimited lifetime due to open tube design: All major components like filament and target can be exchanged by the operator



Automated filter|changer

Part mix scanning just got easier. With Filter|changer—which can host up to 10 different hardware filters—you pre-define filter parameters for specified applications and the filter setting is automatically adjusted before scanning.

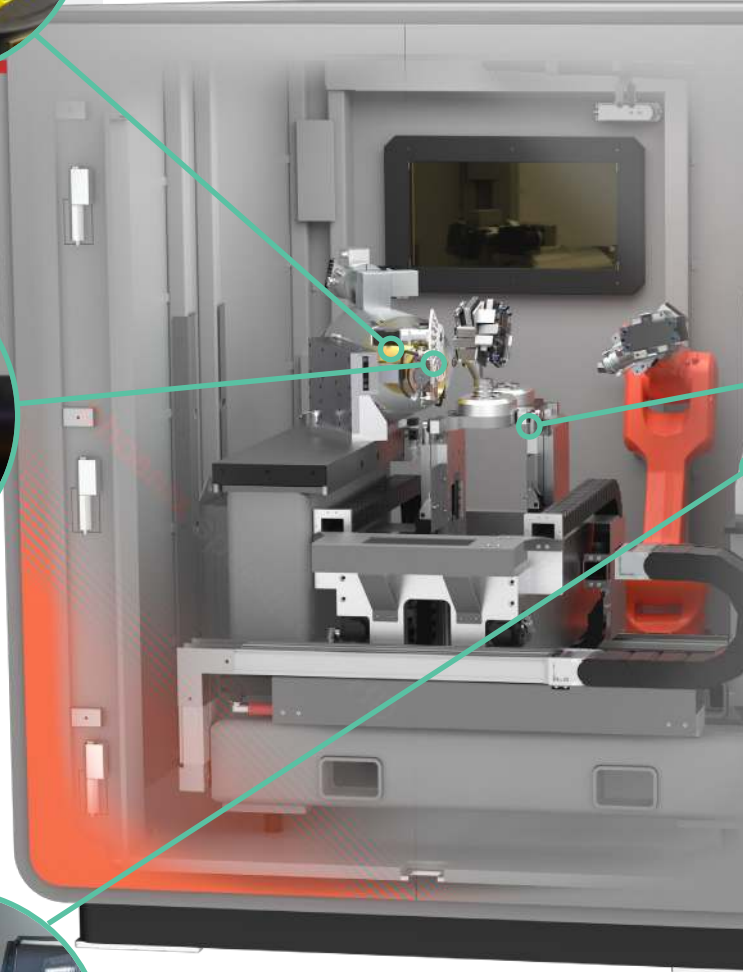
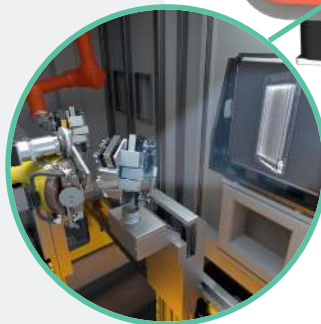
- Increased flexibility when running part mix
- Fully automated workflow without user interaction

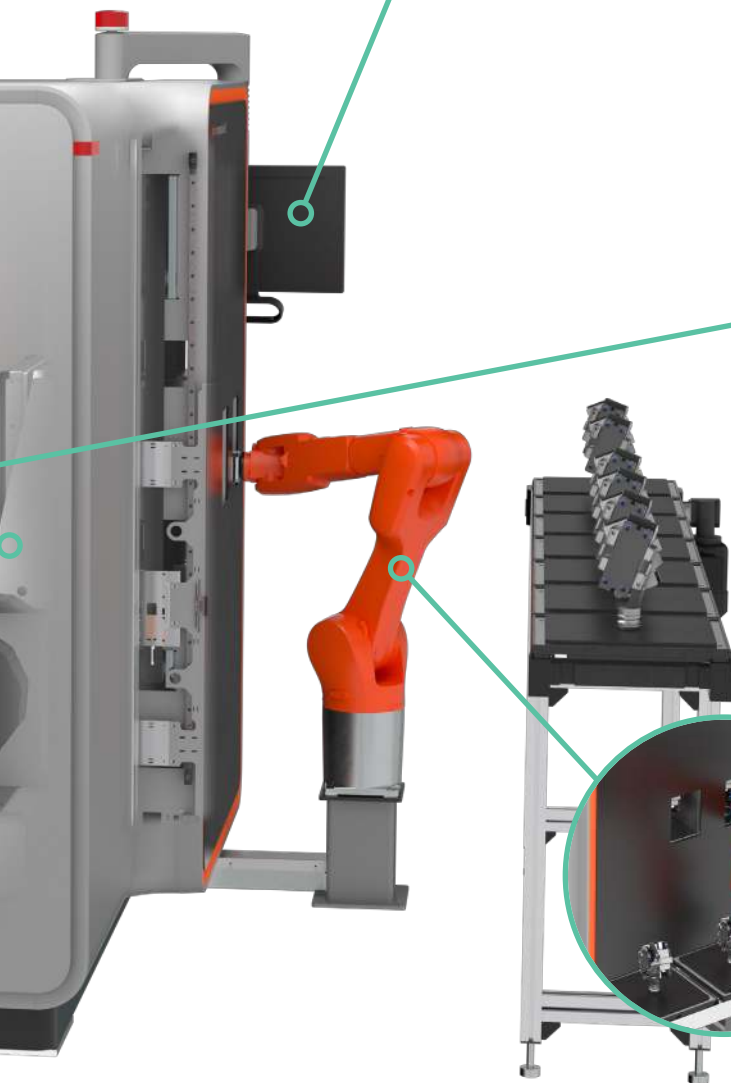


Dynamic41|200p+ X-ray detector

Specifically developed for long-term stability and reliability at industrial high-energy use in production, our next-generation photodiode flat panel X-ray detector platform delivers up to 10 times more efficiency and sensitivity than advanced technology 200 μm pixel detectors. Lifetime has considerably been increased to meet the demands of inline applications.

- High efficiency and sensitivity for short inspection cycles
- High signal-to-noise ratio (SNR) for excellent image quality in production environment
- Dedicated to industrial high energy and inline applications

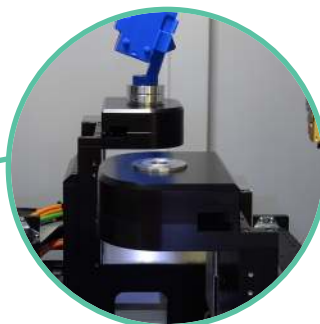




AI-based automated defect recognition (ADR)

Proprietary Artificial Intelligence (AI) based algorithms deliver exceptional ADR for battery anode overhang analysis. Our AI-based ADR yields greater accuracy and enhanced ease of use compared to conventional ADR approaches, eliminating the need for expert parameterization skills. Any authorized operator can parameterize the results, and the algorithms get more accurate over time.

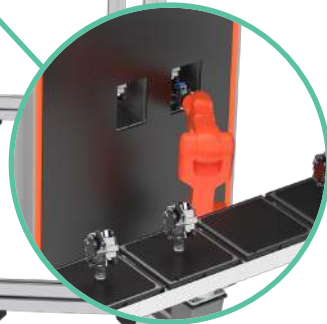
- Highly accurate overhang issue detection



Dual manipulator

Unique manipulation system uses two manipulation units to shorten inspection cycles. While one unit is active in the X-ray beam, the other manipulator is loaded and ready.

- Reduced loading/unloading wait times
- Shortened tact times



Safety gates and robot loading/unloading

Two security gates allow for continuous X-ray on even while loading and unloading. Two robots provide smooth and fast part handling capability.

- Smart loading/unloading gates for enhanced productivity
- Robot-supported, fully automated workflows eliminate need for human interaction



Remote monitoring & diagnostics (RM&D)

The equipment health data of your core components can be pushed, via our RM&D system, to our remote experts for fast system diagnosis and preventive repair, and reduced potential downtime.

- Expert issue resolution
- Reduced downtime
- Increased system availability

InlineCT with Phoenix Speed|scan HD allows a wide range of 3D evaluations:



Internal defect analysis



3D quantitative porosity analysis



Assembly control



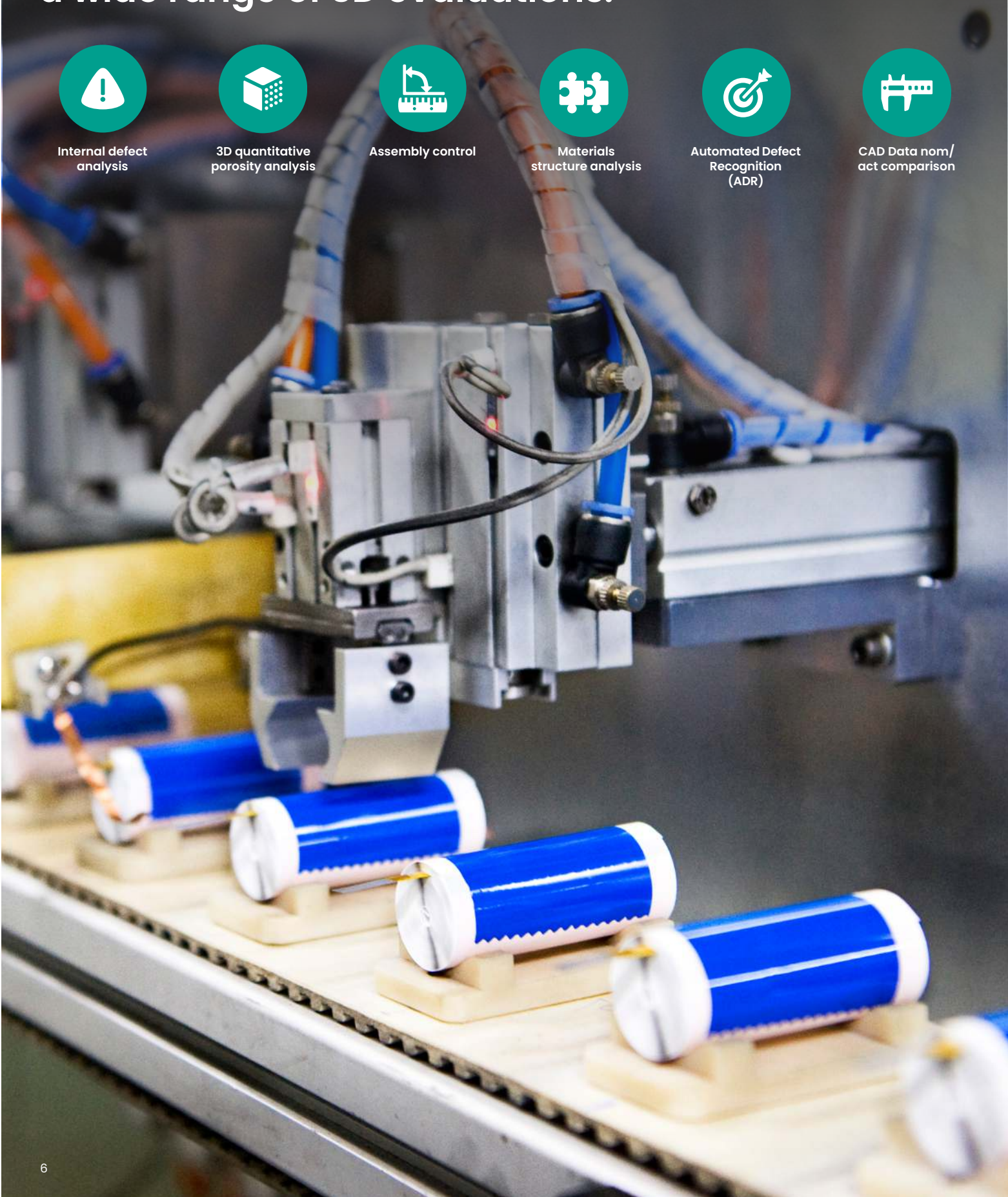
Materials structure analysis



Automated Defect Recognition (ADR)



CAD Data nom/act comparison





Key features

Speed|scan HD

- Proprietary, rugged microfocus X-ray tube (**Inline|edition, 240 kV/100 W**) designed for production environment
- Proprietary Dynamic 4I|100 and Dynamic 4I|200p+ X-ray detector for long-term stability
- Two-stage manipulation system for reduced cycle times
- Safety gates for continuous x-ray on
- Artificial Intelligence optimized automated defect recognition for evaluation without human interaction
- Automated Filter|changer for high production flexibility
- Remote monitoring and diagnostics (RM&D) for increased system availability

Unique features and benefits

- High-speed and high-volume inspection capability as a result of advanced microfocus and detector technology
- Reduced tact time delivered via X-ray security gates for continuous radiation
- Enhanced throughput achieved through fully automated part handling
- Robust design for 24/7 operation in an industrial environment
- High flexibility due to automated Filter|changer
- Parallel reconstruction of data sets and evaluation
- Automated defect recognition (ADR) for pass/fail decisions
- Safe remote monitoring and diagnostics

Up to 100% statistical quality data for process optimization contributes to a zero-defect production.

Technical specifications and configurations

Phoenix Speed scan HD	
Xray tube type	Open directional high-power microfocus X-ray tube with closed cooling water circuit
Maximum voltage/power	240 kV/100 W
Geometrical magnification (3D)	Up to 8X
Best detail detectability	20 µm
Minimum Voxel size	25 µm
Detector type	Temperature stabilized Dynamic 41 200p+ large area detector with superior image and result quality, 410 x 410 mm (16" x 16"), 200 µm pixel size, 2036 x 2036 pixels (4 MP), extremely high dynamic range > 10000:1
Focus detector distance	800 mm
Maximum part diameter and height	150 mm x 200 mm
System dimensions (W x D x H)	~2310 mm x 2200 mm x 2055 mm (without external components)
Maximum part weight	5 kg
Maximum focus object distance	500 mm
System weight	7,250 kg
Temperature stabilization	Active X-ray tube cooling temperature stabilized detector
Production edition	Fully automated robot-based workflows
Software	Phoenix Datas x 3D computed tomography acquisition and reconstruction software. Optional 3D evaluation software packages available upon request for 3D metrology, failure analysis, and structural analysis
Radiation protection	Radiation safety cabinet for full protective installation without type approval according to German StrSchV/StrSchG and in compliance with French NFC 74 100 and US Performance Standard 21 CFR Subchapter J. For operation, other official licenses may be necessary
Automated defect recognition (ADR)	Waygate proprietary automated defect recognition software with a focus on battery overhang detection
Barcode/matrix code reader	Reader for part identification
Optional features	
NAS storage with optional UPS	48 GB network attached storage (NAS) in air-conditioned PC rack with optional uninterruptible power supply
Metrology solution	Two (2) calibration objects for enhanced accuracy
Click & Measure CT	Optional fully automated CT process chain
Dual-stage manipulation	Four-axis precision manipulation with two independent rotation stages for faster part handling
Flash! filters	Providing outstanding image enhancement on 2D images
Filter changer	Up to 10 filters hosted for automatic filter setting adjustment during part mix scanning
Detector	Temperature stabilized Dynamic 41 100 large area detector with superior image and result quality, 410 x 410 mm (16" x 16"), 100 µm pixel size, 2048 x 2048 pixels (16 MP), extremely high dynamic range > 10000:1

To get in contact with our subject matter experts please visit: bakerhughesds.com/contact

For more detailed information or to request a demo, please visit our website or contact us.

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