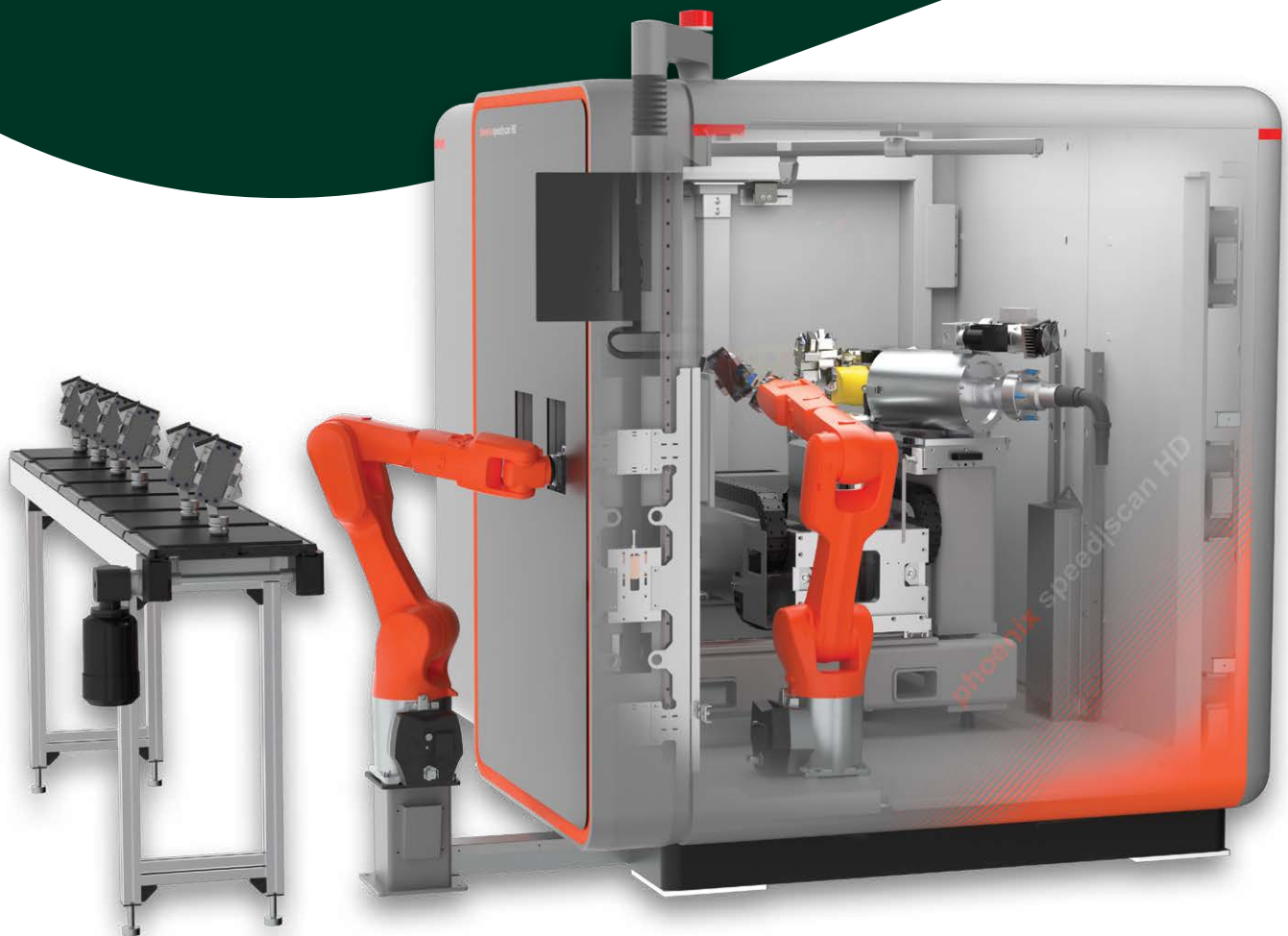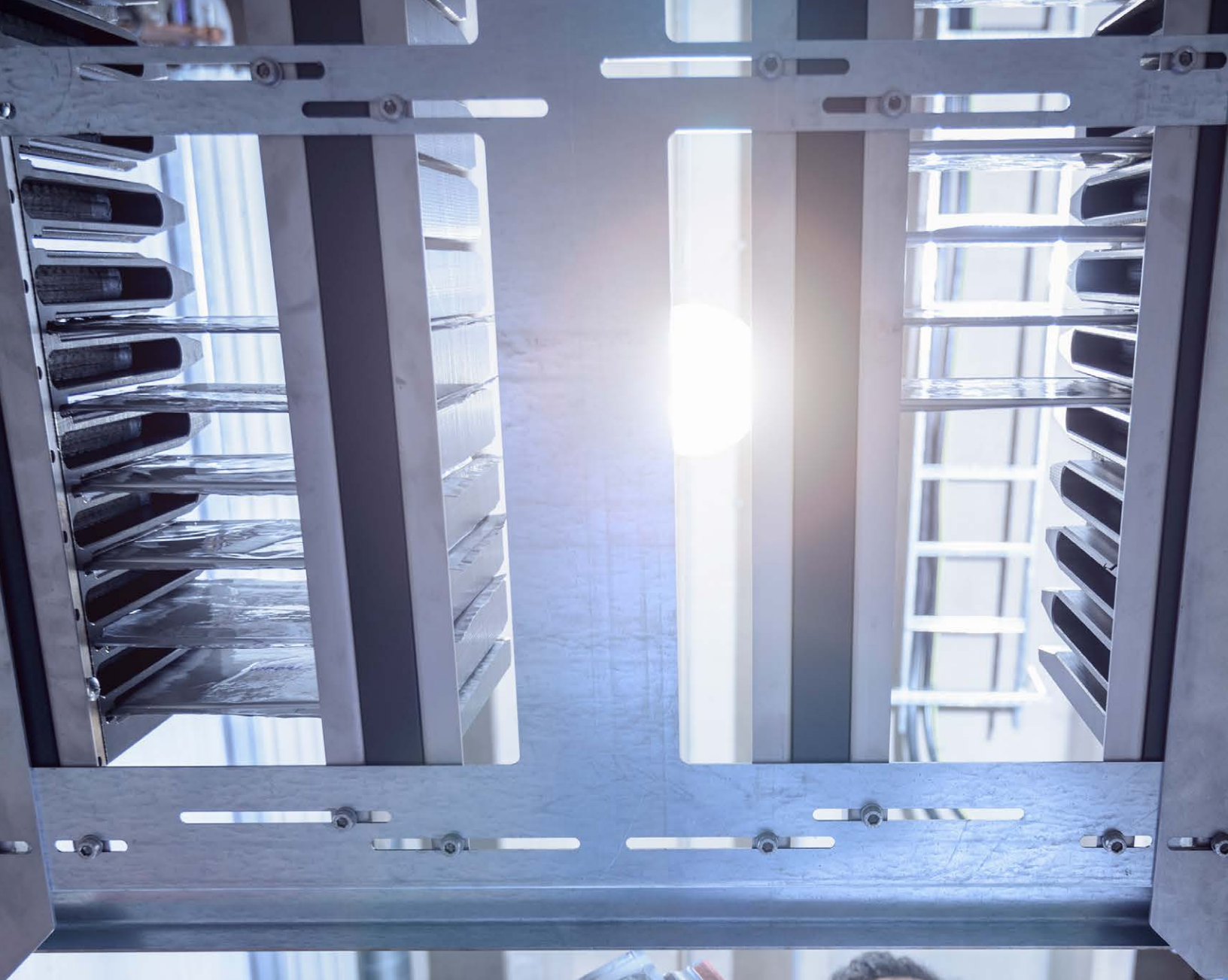# High-speed microCT inspection solution

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

Speed|scan HD

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 Tomography (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 batch 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 or even 12.5 micrometers.

With advanced artificial intelligence (AI) based analysis and the X|approver, Waygate Technologies offers the next level and premium platform for automatic defect recognition (ADR), consisting of complete and intuitive workflow management with a comprehensive ADR library.

These workflows run fully automatically in the background of the production and set new standards for reliable and precise production control. In addition, reporting capabilities are provided to identify potential negative trends in production at a glance.

Benefit from cost savings

- Reduced number of rejects and recalls— both internally and externally

- Lower cost of quality

- Faster product ramp-up and production process optimization

- Significantly higher inspection speed and 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 (Inline|edition).

- Dense material penetration
- Detail detectability down to 20 µm or even down to 10 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
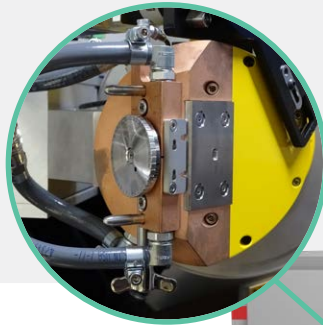
Automated filter|changer

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

Dynamic 41 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 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
- Dynamic 41|200p+ enables best detail detectability of 20 µm. The option with Dynamic 41|100 X-ray detector enables even better detail detectability of 10 µm
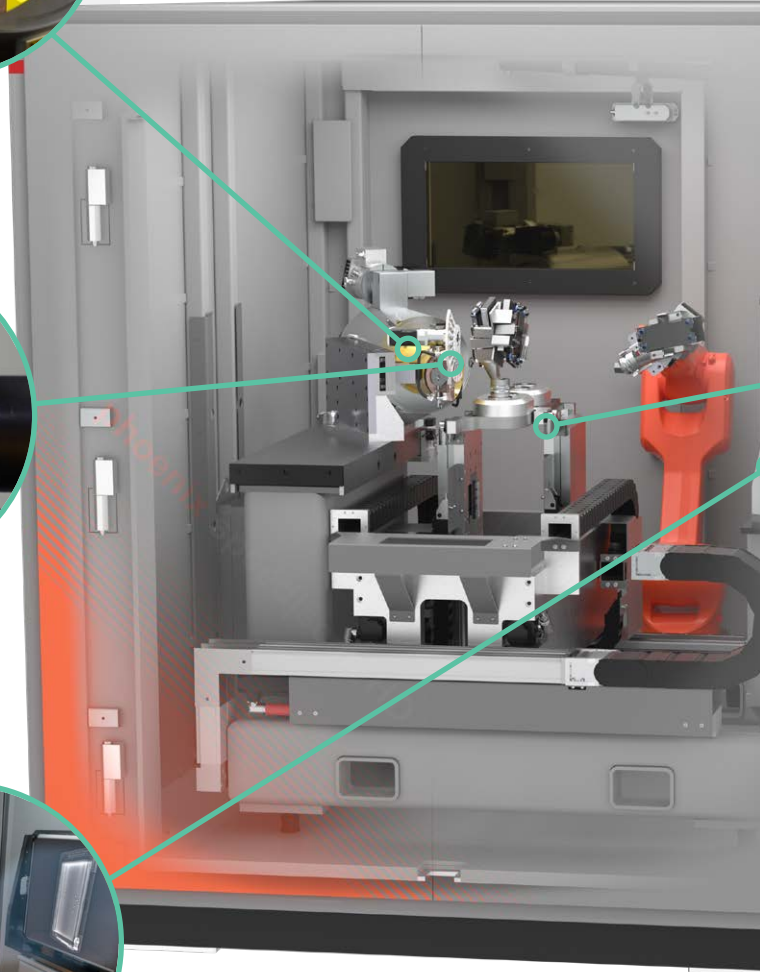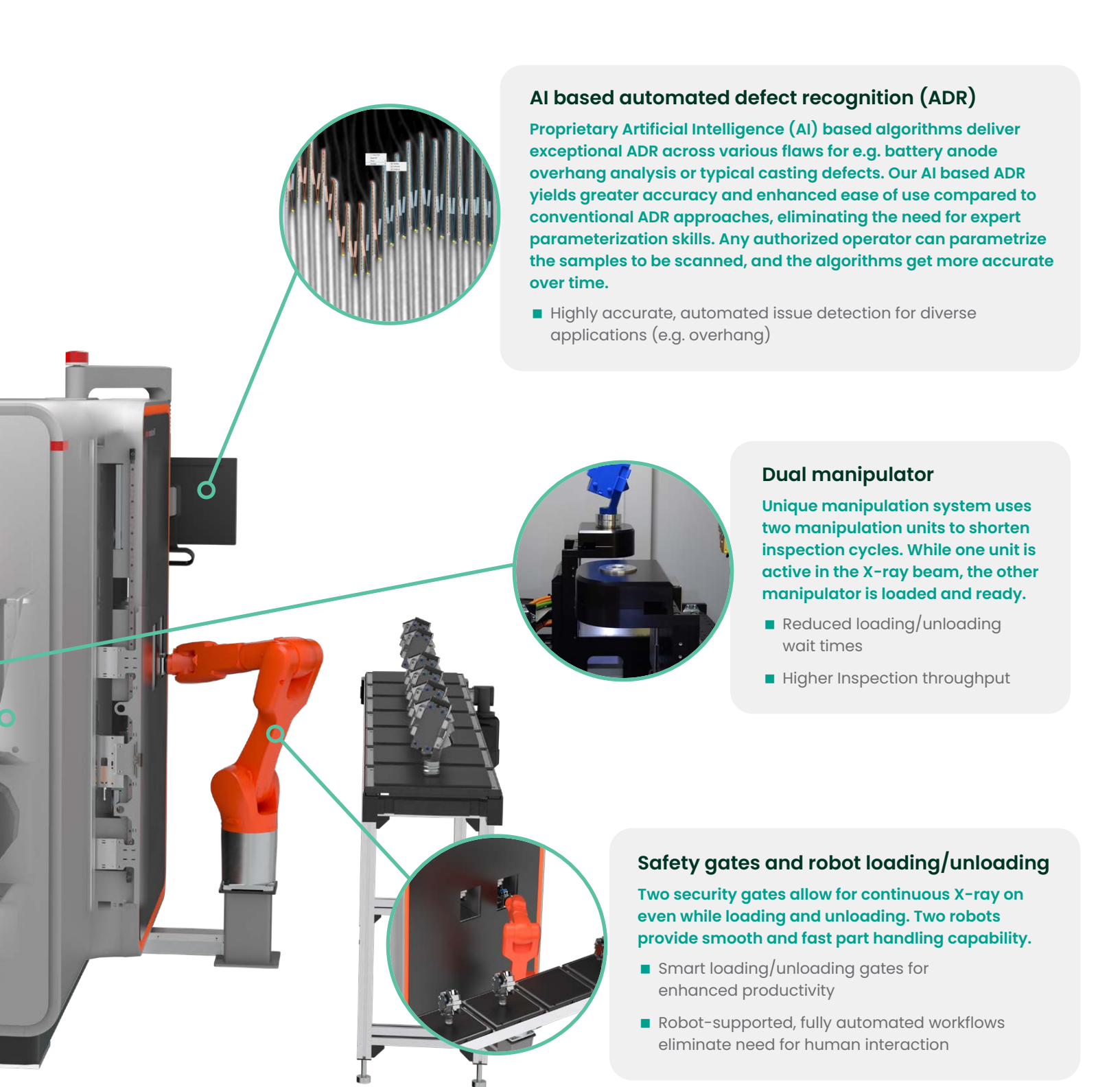
AI based automated defect recognition (ADR)

Proprietary Artificial Intelligence (AI) based algorithms deliver exceptional ADR across various flaws for e.g. battery anode overhang analysis or typical casting defects. 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 parametrize the samples to be scanned, and the algorithms get more accurate over time.

- Highly accurate, automated issue detection for diverse applications (e.g. overhang)

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
- Higher Inspection throughput

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 with InspectionWorks Care

The equipment health data of your core components can be pushed, via our InspectionWorks Care platform, 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

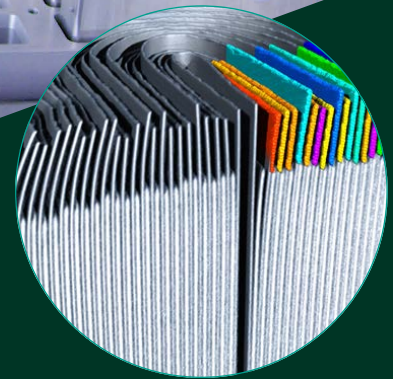**3D quantitative porosity analysis**

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 41|100 and Dynamic 41|200p+ X-ray detector for long-term stability

- Two-stage manipulation system for productivity

- 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 for increased system availability

Unique features and benefits

- High-speed and high-volume inspection capability as a result of advanced microfocus and detector technology

- Highest throughput 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 and AI based 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, even 10 µm with optional Dynamic 41|100 detector
Best Voxel size	25 µm, even 12.5 µm with optional Dynamic 41|100 detector
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, 2,036 x 2,036 pixels (4 MP), extremely high dynamic range > 10,000:1
Focus detector distance	800 mm
Maximum part diameter and height	150 mm x 200 mm
System dimensions (W x D x H)	~2,310 mm x 2,200 mm x 2,055 (without external components)
Maximum part weight	2-4 kg, depending on the application
Maximum focus object distance	500 mm
System weight	7,850 kg
Temperature stabilization	Active X-ray tube cooling | temperature stabilized detector
Filter|changer	Up to 10 filters hosted for automatic filter setting adjustment during part mix scanning
Production edition	Fully automated robot-based workflows
Software	Phoenix Datos|x 3D computed tomography acquisition and reconstruction software incl. fully automated CT process chain. 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	
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, 4,000 x 4,000 pixels (16 MP), extremely high dynamic range > 10,000:1
NAS storage with optional UPS	Network attached storage (NAS) in air-conditioned PC rack with optional uninterruptible power supply
Metrology solution	Two (2) calibration objects for enhanced accuracy in combination with optional 3D measurement software packages available upon request for 3D metrology, failure analysis, and structural analysis
Dual-stage manipulation	Four-axis precision manipulation with two independent rotation stages for faster part handling
Flash!™ image optimization	Providing outstanding image enhancement on 2D images
Speed|feed	Advanced loading unit with 40 manually loadable compartments for semi-automatic inspection operation

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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