

Phoenix Speed|scan CT64

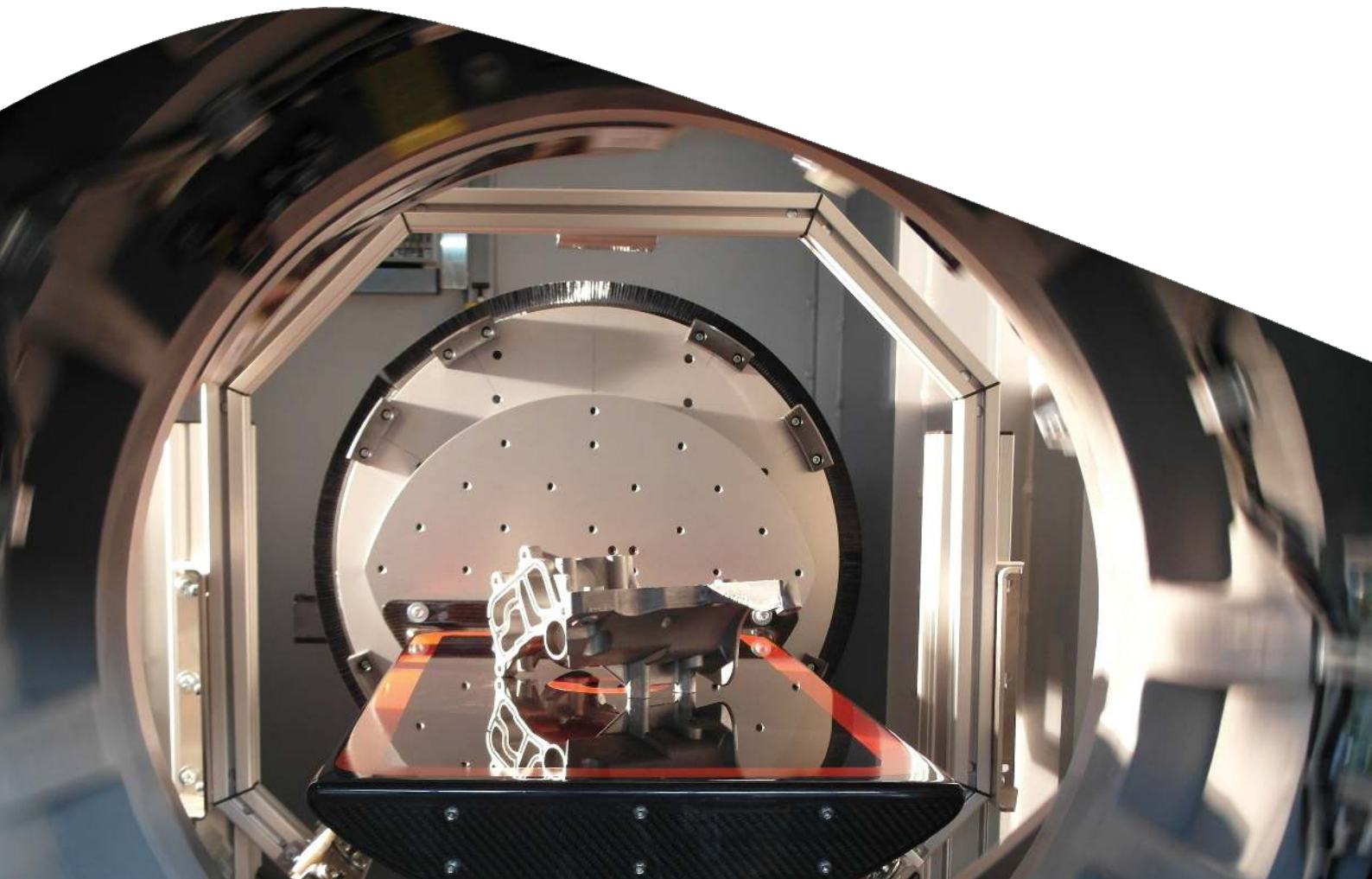
Fully Automated high-speed Computed Tomography
for production process control and optimization



Fast industrial atline and inlineCT

Key features & benefits

- Productivity and quality gain due to quantitative 3D automated defect recognition and dimensional control
- Cost savings due to faster product ramp up times and minimized rejects
- Optional Robot-handled mixed part inspection
- Scan speed down to 15 sec. for a cylinder head allows several hundred times faster 3D inspection compared to conventional industrial fan beam CT
- Max. sample size ~600 mm diameter x 900 mm length (23.6" x 35.4");
- Max. scan diameter ~500 mm (19.6")



Gantry based industrial CT technology

With our industrial Phoenix Speed|scan CT64 system, proven medical gantry based CT technology is available for revolutionary high-speed atline or inline process control in industry. The sample is being transported through the tomograph and even cylinder heads can be scanned within down to 15 seconds.

This is about 4x faster than the first Speed|scan generation and several hundred times faster than conventional industrial fan beam CT.

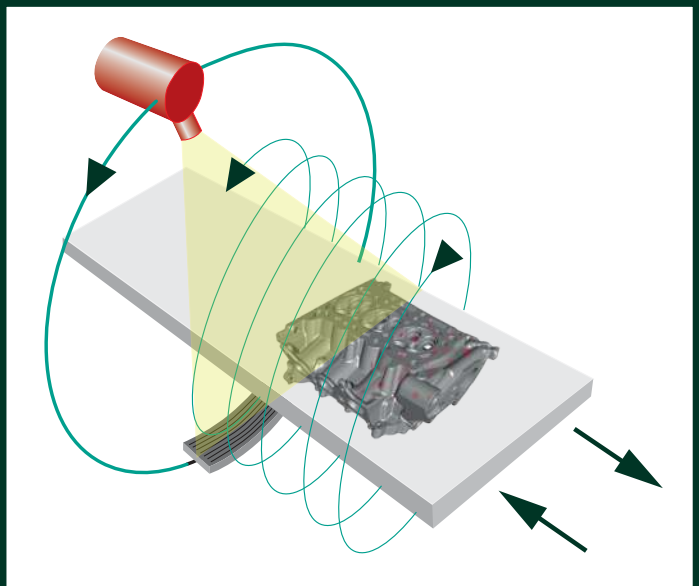
While the next part is loaded, the reconstructed CT data is automatically evaluated. By fast scanning of dozens of parts, quantitative production quality data is now available allowing immediate adjustment of the production process parameters, which have in the past been out of reach of conventional industrial fan beam CT.

Advanced helix CT

Since CT of large castings with conventional industrial fan beam CT typically takes hours, it is not suitable for inspection parallel to the production cycle time.

With helix multi-line technology, the work pieces are continuously scanned and automatically inspected with our own 3D Speed|ADR evaluation algorithms.

To ensure the required image quality with short measuring times and low scattering artifacts, the system is equipped with a high performance X-ray tube and a highly sensitive multiline detector acquiring up to 64 detector rows of scanning data during every gantry rotation.



With the high-speed automatic helix CT, a gantry with a X-ray tube and corresponding 64 channel multi-line detector rotates around the work piece being forwarded on the manipulation table.

3D evaluation parallel to the scanning process

Three-dimensional analysis and process monitoring using volumetric data offer several advantages compared with conventional radioscopic 2D inspection. Depending on the sample size and X-ray penetration length, an immediate response to processing parameters may directly lead to increased productivity:

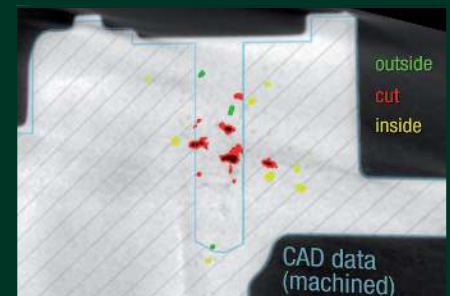
- Reducing the reject rate by analyzing the 3D position, form and size of the defects taking into account the subsequent processes the products must undergo
- Depending on their size and absorption behavior, foreign materials like inclusions or sand core remains in castings or composite delaminations may be detected, located and classified according to its density and position
- Checking the scanned work piece geometry for anomalies by using the nominal CAD data ensuring that form and size deviations can be identified at an early stage of the production process.

Fully automatic non-destructive 3D testing and measuring

Especially for quality assurance of functional and safety relevant automotive and aviation composite parts or aluminum castings, speed|scan makes it first time possible to perform a 100 % 3D inspection.

The 3 key game changers in industrial quality assurance with the advanced Phoenix Speed|scan CT system are:

- Exact 3D defect location & classification
- Dimensional control: e.g. analysis of the wall thickness
- Actual to CAD data comparison

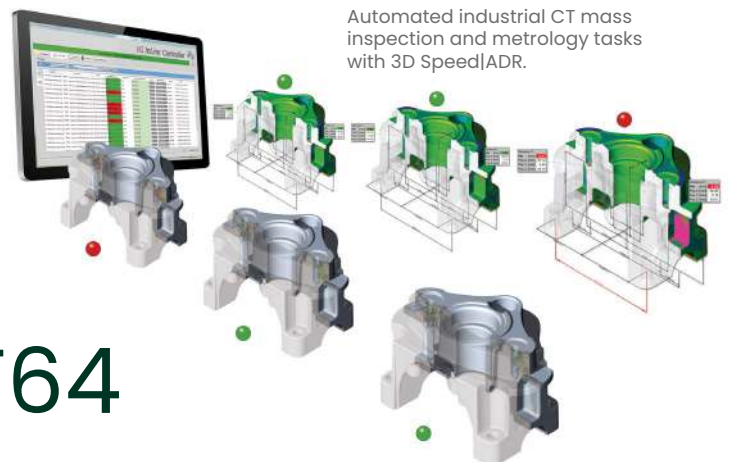


Automated 3D porosity analysis and visualization of machined areas in an automotive casting.

3D automated defect recognition (3D Speed|ADR)

Leading Volume Graphics industrial batch CT software exclusively combined with the powerful Speed|ADR algorithms providing highly precise quantitative 3D information for industrial mass production process control and optimization.

- Production oriented workflow approach optimized for throughput and part diversity
- Proprietary speed optimized 3D volume analysis and defect detection
- Customizable user interface and visualization including 3D defect result table

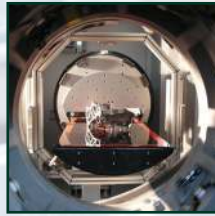


Speed|scan CT64 – your advantages

- Robot loaded inlineCT with up to 100 % 3D production process control e.g. in production or safety critical components
- Central fast CT surveilling unit controlling the output of many production lines
- Proven, gantry based 64 channel CT acquisition offers several hundred times faster inspection compared to conventional industrial fan beam CT
- Much faster CT scanning (better statistics) substituting other NDT inspection and metrology processes
- Fast 3D inspection and dimensional control of complex parts & complete feedback for improved reaction on process fluctuations
- Early scrap detection before any further processing steps
- Optimization of plant equipment and tool maintenance intervals

Speed|scan CT64

- a new workflow concept for up to
100% 3D production process control

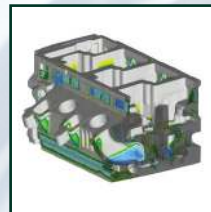
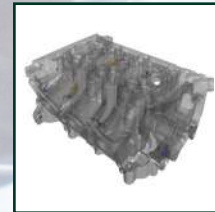
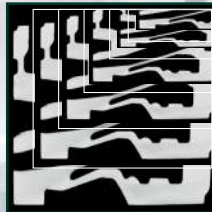


Fully automated loading

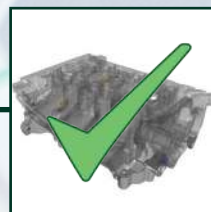
Continuous CT helix scan

Volume reconstruction and optimization

Automatic 3D defect recognition



3D metrology



Good / fail decision

Accept

Reject

General specifications

Phoenix Speed scan CT 64	
Inspection Concept	From manual loading & operator based inspection up to robot based fully automated inspection with automated 3D failure detection speed ADR and 3D dimensional control for statistical process control
Max. sample size	~Ø600mm x 900mm (23.6" x 35"); max scan diameter ~Ø500mm x ~888-979 mm (19.6" x 35-38.5")
Penetration length	Allowing inspection of Al gear cases and engine blocks depending on part geometry
Min. detectable defect size	≥ 0.5 mm ³ , depending on part size
Detail detectability	≥ 300 µm
Sample weight	Up to 50 kg (110 lbs)
3D Metrology	Fast automated CAD nominal/actual analysis and measurement tasks for process control
Scan / reconstruction / cycle speed	10,62 - 61,25 mm/s ; reconstruction speed up to 75 slices/s inspection ; typical cycle time < 60 seconds per part
High dynamic multi-line detector	64-layer parallel acquisition. The detector embodies the patented HiLight™ material, a ceramic scintillator specially developed for CT applications
High performance rotating anode X-ray tube	Max. 140 kV, 515 mA current, typical inspection parameters: 140 kV, 100 mA. The duty cycle of the X-ray tube (ratio between X-ray on and cooling time) depends on the selected parameters. Generator output of max. 72 kW with 515 mA
CT gantry	Continually rotating generator, X-ray tube, detector and data acquisition system around the test specimen. The rotation speed can be adapted within the range of 0.5 - 1 revolutions per second, depending on the required data quality and specimen throughput rate
production edition	Fully automated robot loading/unloading for high throughput inlineCT on request
Dimensions basic cabinet	2,500 mm (W) x 4,000 mm (T) x 2,500 mm (H) (98" x 157" x 98") / weight ca. 13,000 kg (28,660 lbs)
Design	Suitable for industrial environment with dust and foreign body protection
Air condition	Active air conditioning system to safely remove the heat created during the test procedure
Patented quick-slide manipulator	Speed: 10,62 to 61,25 mm/s for data acquisition, up to 1000 mm/s for loading & unloading procedure
Control unit	Operator console with 2 flat screen monitors close to the system to facilitate speedy loading and unloading by the operator. Touch panel for visualization of PLC / control
Radiation protection	Radiation safety cabinet for full protective installation without type approval according to German StrSchG/StrSchV. It complies with French NFC 74 100 and the US Performance Standard 21 CFR Subchapter J. For operation, other official licenses may be necessary
3D data analysis and visualization	Automated DICOM image transfer to analysis station. CT visualization and evaluation: <ul style="list-style-type: none"> - 3D detection and classification of pores and inclusions (GE speed ADR) combined with Volume Graphics InLine CT software is exclusively available for VG customers using our CT systems - Dimensional control tasks like wall thickness determination and - Actual/nominal CAD comparison (VG StudioMAX)
Software user level	<ul style="list-style-type: none"> - Designer for creating and modifying 3D inspection programs on- or offline - Inspector for semi- or fully automated CT data analysis based on inspection programs - VG Approver for interactive software for visualization and review of automated inspection results

By making the invisible visible, we ensure safety, quality and productivity.

Our innovative Phoenix CT solutions are designed to increase throughputs without compromising quality. From producing higher resolution scans at higher speeds with our precision line, to bringing inspection to the production floor with our production line, we are committed to helping your operation become more efficient than ever before.

Waygate Technologies – formerly GE Inspection Technologies – has been awarded by Frost & Sullivan in its latest industrial CT research studies 2016 as **Industrial Technology Leader** and 2019 as **Industrial CT Market Leader**.



WaygateTechnologies

Niels-Bohr-Str. 7
31515 Wunstorf
Germany
Tel.: +49 5031 172 100
Fax: +49 5031 172 299
E-mail: phoenix-info@bakerhughes.com

WaygateTechnologies

Bogenstr. 41
22926 Ahrensburg
Germany
Tel.: +49 4102 807 0
Fax: +49 4102 807 277
E-mail: phoenix-info@bakerhughes.com

Waygate Technologies USA, LP

11988 Tramway Dr
Cincinnati, OH 45241
USA
Tel.: 1 844 991 0474

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

waygate-tech.com

Copyright 2020 Baker Hughes Company. All rights reserved.
Phoenix-Speedscan-CT64-EN-BHPD31346-072020

Baker Hughes 