New Base Features

- Set Default Window Layout
- Zoom-to-Area
- 0.001” Measurement Precision

Enhanced Features

- Irregular Region of Interest
- Free Rotate
- Split Window Viewing
- MMX & FPX Scanner Support

LOGOS 7.0

The Logos Imaging Application (LIA) allows users to capture, edit, save, and share images captured with all Logos Imaging devices and TWAIN compliant devices. Below is a list of standard and enhanced* features of LIA 7.0.

Adjustments
Auto Correct
Auto Level

Backup and Restore
Create Backup
Restore from Backup

Filters
Adaptive Histogram
Alacrity*
Colorize
Despeckle
Emboss
Equalize
Filter Paramaterization*
Invert
Original Image Restore
Percept*
Sharpen
Smooth
Outline
Weighted Outline*

Image Details
Cursor Position
Pixel Value
Image Width and Height
Created Date
Pixel Format
Image Processing History
Export Image Script

Image Levels
Histogram
Expanded View
Auto Levels
Brightness
Contrast
Gamma

Image Management
Combine Images
Copy Selection
E-mail Images
Export
Import
Image Database
Image Notes
Image Stitching
Run Filters in Stitch Window*

Image Rotation
90 CW
90 CCW
180
Flip Horizontal
Flip Vertical
Free Rotate*

Image Viewing
Pan Control
Magnifying Glass
Zoom In
Zoom Out
Zoom to Area
Fit to Window
Grid Overlay
Show/Hide Markup

Languages
Chinese (Traditional)
English
German
Korean
Japanese
Russian

Tools
Line
Polyline
Rectangle
Region of Interest (RoI)
Irregular RoI*
Ellipse
Text
Measure (0.001")
Calibration
Line Profile

Workspace Layout
Menu Bar
Tools Palette
Image Pane
Incident Manager Pane
Image Correction Pane
Set Default Layout
Split Window Viewing*

***Enhanced features are not included in Logos base software upgrades**

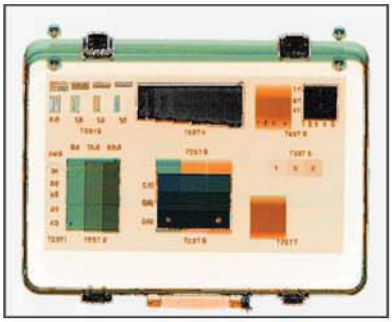
DETEK, Inc.
6805 Coolridge Drive
Temple Hills, MD 20748-6940
800-638-0554 **FAX 301-449-7011**
www.detek.com sales@detek.com

CHRÓMA

The CHRÓMA for Logos DR systems is an organic discrimination module for use with the Golden Engineering XRS-3 X-ray machine. The CHRÓMA uses X-ray beam filtering to allow dual-energy exposure from the fixed voltage produced by the XRS-3. And, since the CHRÓMA is an add-on accessory that requires no modification to the XRS-3 or Logos DR panels, users can upgrade their existing equipment with no concern regarding down time caused by equipment upgrades.

The CHRÓMA connects to the 5-pin LEMO connector* on the Golden Engineering XRS-3. This connection provides power to the CHRÓMA and interfaces with the Asýrmatos wireless X-ray firing trigger. When attached to the XRS-3, this enables the CHRÓMA to operate wirelessly with no requirement for an additional power source or an additional X-ray triggering device.

The CHRÓMA is designed to meet the requirements of ASTM F792-08. Under this standard, the CHRÓMA module and Logos DR system must meet compliance by being tested using the new Security X-Ray Test Object developed by the FAA and Transport Canada. This test object assesses performance levels and image quality of X-ray screening systems in nine distinct test areas: Wire Display, Useful Penetrations, Spatial Resolution, Simple Penetration, Thin Organic Imaging, Sensitivity, Organic/ Inorganic Differentiation, Organic Differentiation, and Useful Organic Differentiation.



Sample Image from ASTM F792-08 Test Piece

*If your Golden XRS-3 does not have a 5-pin connector, Logos Imaging can update the X-ray machine with a membrane switch control and 5-pin connector for a nominal cost.

DETEK, Inc.
6805 Coolridge Drive
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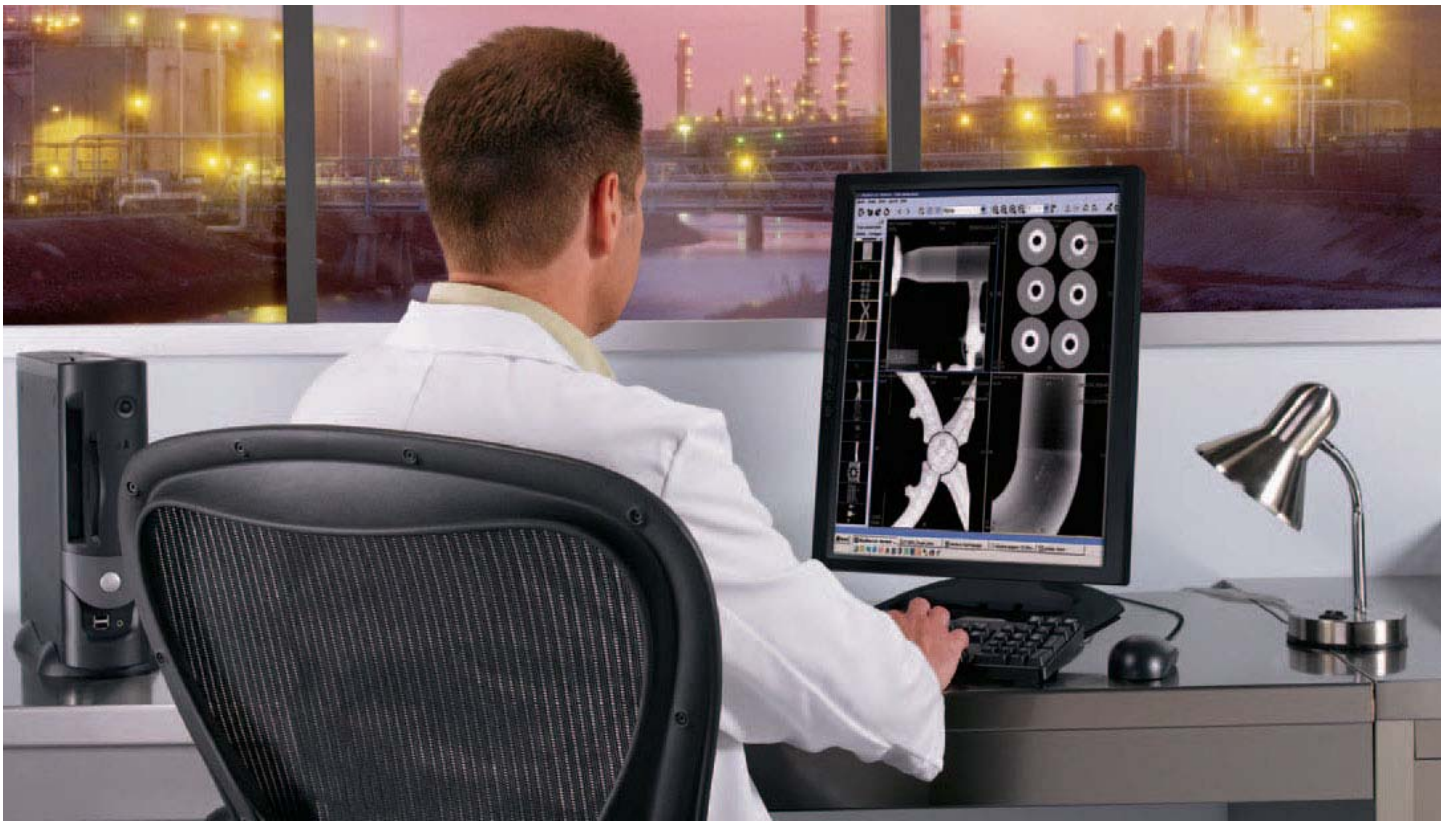
GE
Inspection Technologies

Rhythm®

Total X-ray Inspection Software



Rhythm Software—Data Management for X-ray Inspection Information

Acquire
Analyze
Share
Report
Archive

The Rhythm suite of user-friendly software from GE Inspection Technologies offers advanced image review tools and data management for all X-ray inspection modalities, including computed radiography, digital radiography and film digitization. Its advanced data sharing capabilities allow significant improvements in productivity and enable faster identification of quality problems, leading to reduced production defects or better in-service asset management.

Using industry-standard, non-proprietary data transfer formats, Rhythm provides an elegant and cohesive solution to data management and sharing needs, while creating a stable platform for future NDT software capabilities.

Enhance the Business Impact of NDT

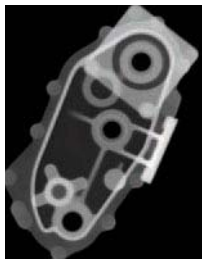
Improve efficiency and reproducibility
Advanced image review tools cover all X-ray inspection modalities including computed radiography, digital radiography and film digitization.

Save time and money
Send information electronically to the inspection experts rather than sending the experts to the information. Share information between workstations, locations and within the supply chain.

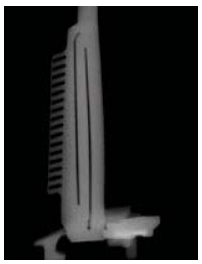
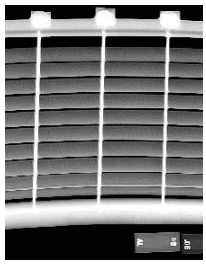
Automate specific inspection tasks
Application-specific tools improve process efficiency.

Protect your investment
Scalable architecture allows the solution to grow with your needs. DICOM/DICONDE compliance ensures your data will not become obsolete.

Reduce training requirements
Quickly and easily learn this user-friendly solution.


Automotive

Aerospace

The Power of Four

The new Rhythm software suite comprises four integrated modules, all of which use off-the-shelf hardware.

Rhythm Acquire

Interacts with the inspection source to collect digital information that it passes on to Rhythm Review. It contains a database of the relevant inspection techniques and can control the inspection equipment.

Rhythm Report

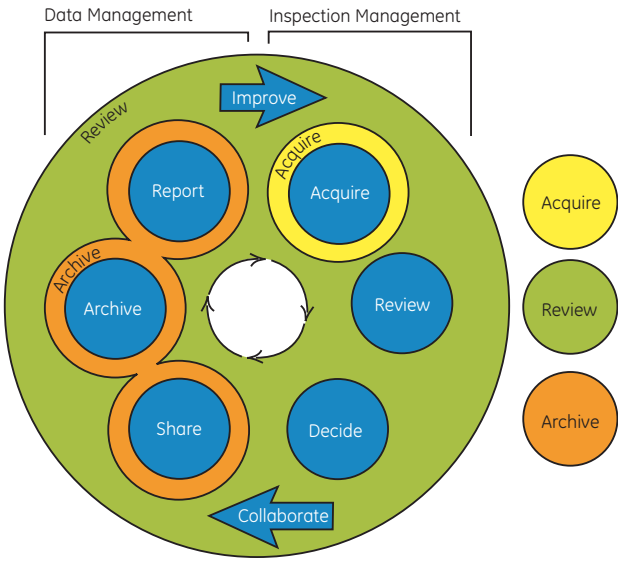
Allows creation of reports of findings with Rhythm with standardized templates or easily configured customized formats. Rhythm Report increases your productivity by allowing you to generate reports right at the inspection site.

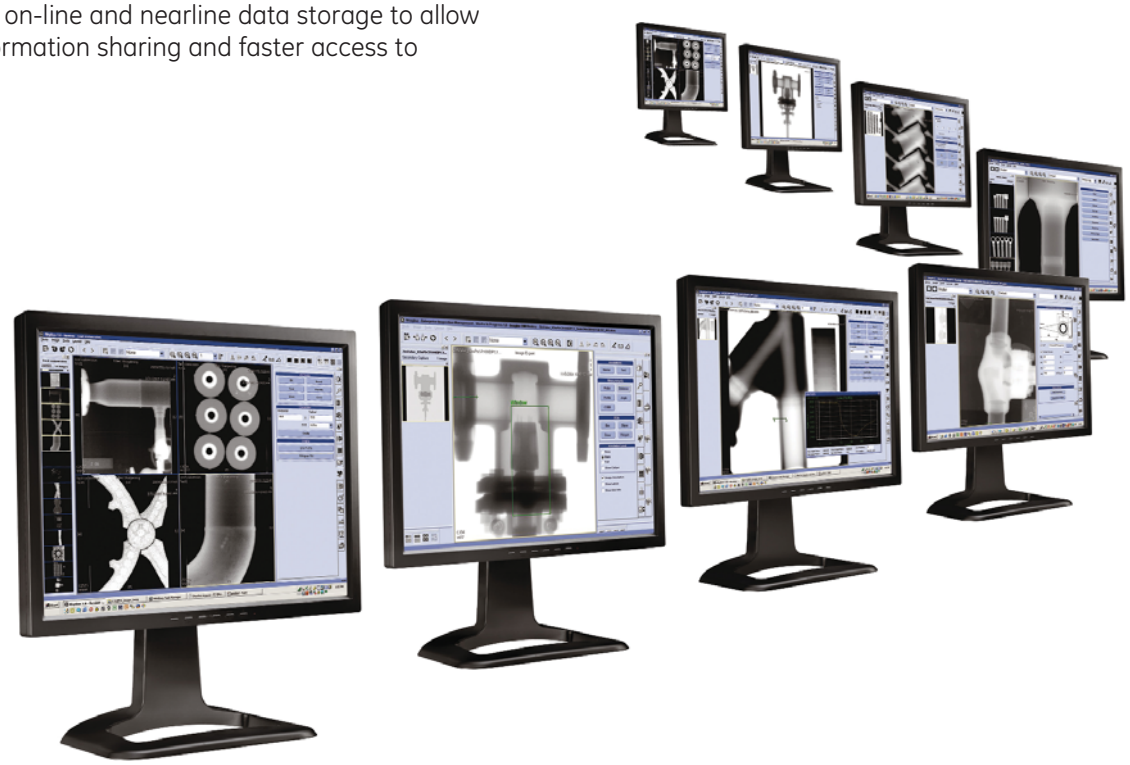
Rhythm Review

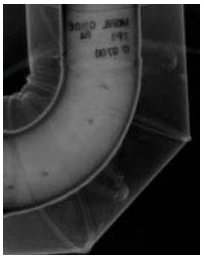
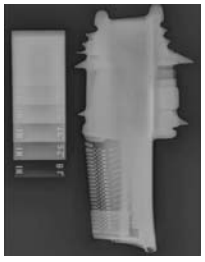
Accepts data from Rhythm Acquire, other Rhythm Review workstations, and removable media, such as CD and DVD. Provides application tools for analysis, enhancement, measurement and storage of received data.

Rhythm Archive

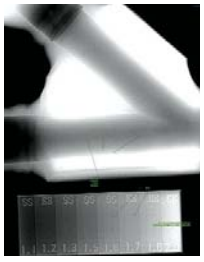
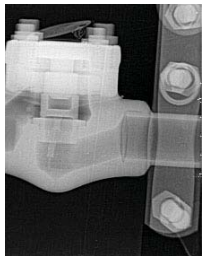
Provides both on-line and nearline data storage to allow simplified information sharing and faster access to information.





Power Generation

Oil and Gas

Rhythm Modules

Rhythm Acquire

Standardized Inspection

Rhythm Report

Consistent Quick Reports

Rhythm Review

Expert Review and Analysis

Rhythm Archive

Data Storage and Enables Trending

Rhythm Acquire

Acquire is a one-time activity (or entered as new parts are inspected or new techniques used).

- Input the information used to identify inspected parts.
- Input information about radiographic techniques used to inspect each part.
- As parts are inspected and imaging plates are scanned, information is passed along with the image in a DICONDE file to Rhythm Review.
  - The image and information are always together.
  - This information is used to find the image in Rhythm Review or anywhere in your digital imaging network (workstations, shelf-managed archives, central on-line archives).

Rhythm Report

Rhythm Report is an automated report generator tool that allows you to create reports of your findings with Rhythm with just a few clicks of a mouse.

- Leverage Microsoft® Word-based reports that you can send, query on, modify and receive. Reports are treated separately from associated images so that they con be amended and sent independently over a network.
- Create real time reports at the inspection site with pre-formatted templates.
- Generate labels with annotations and measurements that can be viewed or hidden with your study and report.
- Establish reporting profiles to display your report windows in a particular way that helps you manage your reports.

Rhythm Review

Rhythm Review uses the data from Rhythm Acquire to automatically organize your inspection information.

- Sort “Studies” using this data. A “Study” is a unique combination of Component ID, Component Name, and Study ID.
- Field labels are easily customized, like those in Rhythm Acquire.
- Other DICONDE fields, like Study Status and Study Date, help you easily retrieve and manage your data.
- When multiple images are created of the same part, Rhythm organizes the images into one study to simplify retrieval, review and archiving.
- Rhythm allows you to query the DICONDE information for quick retrieval when you have accumulated a large amount of inspection data at your workstation.
- Rhythm allows you to query the DICONDE information to find Studies even after they have been archived to CD/DVD.

Rhythm Archive

Rhythm Archive delivers a complete scalable and flexible DICONDE storage solution for NDT images.

- Provides fast, reliable storage and retrieval of images using Plasmon Ultra Density Optical (UDO) technology.
- Manages various types of storage devices, including both internal and external RAID-based, EMC Centera and NAS interfaced storage.
- Stores uncompressed, lossless, lossy and JPEG2000 formats.
- Sends data to DICOM/DICONDE-ready devices.

With Rhythm Archive, all studies are stored centrally with no need to query individual Rhythm Review workstations. Rhythm Archive manages workflow to automatically route, archive and delete images from local review stations. It also provides full review and analysis capabilities.

Enhance Rhythm Functionality with Optional Modules

Rhythm Local Archive

- The Local Archive module allows archiving of component, study and report data on a single removable media from any removable device that has a Windows®-based driver. It is useful for organizations that have "shelf managed" archives or that want to distribute images via removable media.
- Data is written in DICOM/DICONDE format readable by third party systems compliant in that format. Local Archive presents the first step in digital archiving with growth to full DICOM/DICONDE archiving.
- A browser-based viewer allows for exporting of images and reports outside of the network, along with an option for printed reports.

Rhythm Multi-Monitor/Mixed Monitor Module

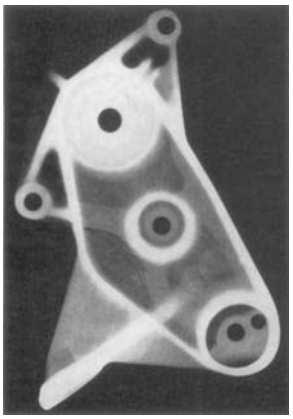
- Multi-Monitor/Mixed Monitor allows Rhythm to run on more than one monitor, which increases your information display space, as well as configuring Rhythm to run on color and monochrome monitors and monitors with different resolutions.
- View images on high-resolution color monitors and reports and data on lower resolution commercial monitors with a powerful work list that minimizes the need to toggle between images and data.

Quality Control Module

- The Quality Control module is a quality assurance tool for post-processing acquired data. It verifies that images and studies are correct and that they have the right information associated with them before they are shared or permanently stored and provides the capability to modify them.
- The module assesses if component or technique data was entered incorrectly, if images are not in the right order, that DICONDE information is incorrect or missing, or if window level settings during acquisition were not optimal.
- The Quality Control module also provides access to the study status history so that you can determine when components were inspected, by whom, and with what outcome.

Rhythm DlCOM Print Module

- The DlCOM Print module provides a solution for the inevitable need to provide print images from within the digital imaging network. It supports printers from high-end DICOM-compliant ones to off-the-shelf printers with standard Windows® drivers. It supports color and monochrome printers and also allows for multiple printer connections.
- It allows the printing of series or studies in pre-defined film layouts or from your custom layouts. In addition, it offers a "virtual film sheet" that allows you to compose print jobs on the fly from within the Viewing section—rearranging, annotating and post-processing images before sending them to the printer.



The Right Tools for the Job

One of the major factors that allows Rhythm to increase inspection efficiency is its integral range of advanced, application-specific tools.

Rhythm's advanced image review and tools enable the following benefits:

- Save time through quicker image evaluation.
- Improve quality of inspections through advanced review tools.

Wall Thickness Measurement

- Performs computer-assisted wall thickness measurement to detect local corrosion in projection radiographs by use of tangential or penetration wall measurement tools.
- Saves the measurement results and the exposure parameters.

Area Measurement and Calculations

- Allows users to select an area around a porosity and automatically calculate the loss of material/area measurement of the defect.

Multi-film Inspection Tool

- Reproduces the conventional film method of putting two or three different sensitivity films on top of one another and shooting a part, then having different cross-sectional thickness ranges available for analysis.

  This tool splits the dynamic range of the selected radiographic image into two or three exclusive partitions for better visualization and analysis of image features.

Defect and Material Loss Measurement

- Allows users to measure material loss in the X-ray beam direction (similar to the wall thickness penetration measurement), showing material loss instead.

Protecting Your Future Today

Rhythm doesn't just ensure your NDT needs are met today, but also looks to what you may require in the future.

This is achieved through the scalable architecture intrinsic to the design of the software, DICOM/DICONDE compliance, and GE Inspection Technologies' focus on application-specific tools.

- While Rhythm is currently configured for X-ray inspection management, ultrasonic and eddy current capabilities are planned for the near future.
- As your requirements grow, you can add more review stations, database capacity and DVD jukeboxes to your system. This ensures you will always have the capacity required without the expense of investing in a new solution.
- Because the software is DICOM/DICONDE compliant, you will not face the problems of being locked into propriety solutions where time and expense is wasted on maintaining previous NDT systems.
- GE Inspection Technologies is committed to working closely with you to develop application-specific tools that can be deployed quickly as Rhythm plug-ins.

Minimum Hardware Specifications	
Processor	Intel Core d Duo E6700 2.67 4/MB 1066
Operating System	Windows® XP Professional, 32-bit US
Chassis Configuration	Mini-Tower
Memory	4GB (4x1GB) DDR2-667 ECC
Hard Drive	80GB WD Raptor SATA NCQ 10K
2nd Hard Drive	80GB WD Raptor SATA NCQ 10K
DVD	16x DVD± RW SuperMulti SATA (1st)

Plasmon Ultra Density Optical (UDO) data storage

GE
Measurement & Control

Portable, Wireless and Robust.

DXR250U-W DXR250C-W

Inspection Technologies

Wireless Digital Detectors

Enabling the inspection of field installations to be more flexible and efficient.

GE imagination at work

DXR250C-W: Engineered for Industrial Radiography

The DXR 250C-W portable detector combines GE's unrivalled wealth of experience and expertise in medical and industrial radiography. This new digital detector is specifically designed to meet the demanding requirements of industrial radiographic inspections.

- Reduced exposure time for increased personal safety.
- Reduced barricade time on units to inspect for optimized process safety.
- Reduced setup time for maximized productivity.

The system set-up, image acquisition and data processing is simplified with powerful Wi-Fi communication modes

Choice of semi- or fully ruggedized notebooks for harsh environment operations. Pre-installed Rhythm software for enhanced analysis capabilities with instant image review

Ruggedized detec
pixel pitch with op
image quality, wi
dose efficiency w

Compact & Portable

The 8"x8" detector weighs just 3,5 kg (7lb) and has a thickness of only 25 mm (0.98"). Ideal for places which offer difficult access and where utmost portability is needed.

Wireless

The detector uses wireless and battery-operating technology. Simplifying handling and operation. And leading to overall productivity gain for its users.

- Robust wireless operation (802.11 g, up to 80 m communication range, WEP2 security) with online wireless strength, detector temperature and remaining detector battery power monitoring
- Access Point mode with portable access point for extended range
- Ad-hoc communication for fast image transfer
- Optional power saving mode to increase battery usage

Ruggedized hard-cover for mechanical protection, easy transportation and installation in industrial set-ups

ctor with 8 x 8" GOS scintillator, 200 µm
otimized imager design for excellent
de dynamic range and improved
ith both X-rays and Gamma-rays

Hot-swappable Li-Ion battery with inbuilt remaining power indicator

Battery charger for fast-charging and battery recalibration

Robust

With its industrial packaging and ruggedized design, the DXR250C-W handles the toughest environments.

- Ruggedized design with aluminum housing and shock absorbing panel support (shock, water and dust protected housing) with additional rugged perimeter bumper
- Carbon fiber front window
- Shielded electronics for improved radiation protection
- Optional hard-shell with additional tie-off points and shock bumpers for additional mechanical protection
- Extended operating temperature range
- Industrial power supply with On/Off switch and detachable tether

The Power of Rhythm

The new **Rhythm RT DR Acquire** provides additional functionality for portable wireless detectors and allows operators to acquire images in a non-proprietary and reliable DICONDE format.

A new wireless—dashboard for ease of operations and troubleshooting includes tools to determine detector connectivity and to monitor relevant conditions such as wireless signal strength or battery status. New acquisition modes such as synchronized operation for pulsed X-ray sources and increased exposure time per frame to up to 150 sec, enables the detector to expand in new applications.

Together with **Rhythm Review** the entire portfolio of image enhancement-, administration-, reporting- and archive-modules can be accessed on one DICONDE compliant platform (Enterprise Archive, Flash!Filters, Wall Thickness-Measurement, Report Generators, etc.) and adapted to the individual customer workflow and application needs.

Rhythm RT Lite: A special entry-level version of Rhythm that supports simple, intuitive out-of-the-box image aquisition and processing.

Both portable wireless detectors can be used with the full DICONDE compatible Rhythm RT Lite and open up a path to digital inspection in a very economical way.

Key Segments and Applications

- Mechanical integrity for small, medium and large sized parts
- Wall thickness, corrosion, erosion
- Weld quality
- Pipe and tube quality
- Heat exchangers
- Small and large bore piping
- Pipe supports touch point corrosion
- Rope access in all types of petro-chemical and other industrial environments

Flexible Operating Modes

- Both detectors can be operated from hot-swappable on-board battery or from the optional power supply
- Wireless configurations with ad-hoc or access point hosted communication

DXR250U-W: Optimized for a wide range of radiographic inspections

The DXR250U-W builds up on the established application space of GE's portable 16x16" detector series DXR250V. The new detector utilizes the same wireless and battery technology of the DXR250C-W. This extends the use to a versatile digital inspection system especially for medium to larger objects.

Optimized battery, wireless technology and packaged for the toughest environments, the DXR250U-W will deliver additional productivity for radiography inspections in the field. DXR250U-W is fully compatible to most DXR250C-W accessories and Rhythm installations.

- 200 µm, GOS, 16x16" digital imager with optimized scintillator for better dose efficiency and shorter exposure times
- Ruggedized design with shock absorbing panel support and carbon fiber front window
- Industrial packaging, ruggedized accessories (hard-cover, power supply)

- 802.11 g wireless operation in ad-hoc and access point mode
- On-board battery with extended life time
- Extended operating temperature range

Universal & Portable

Even with a larger imager size of 16"x16" the detector weighs only 5 kg (11 lbs) and has a thickness of only 26 mm (1.02"). The detector can be used for a wide range of radiographic applications covering medium to large sized objects. Extended by its wireless capabilities and the portable design, the detector is qualified as universal inpection device for a broad range of industrial inspections in the field.

Accessories

Ruggedized hard-cover

Semi-ruggedized mobile Rhythm workstation HP 8770W

Ruggedized mobile Rhythm workstation Panasonic Toughbook CF-53

Carrying case

Power supply

Battery charger

Battery

Portable wireless router / access point

Soft-case*

* only for DXR250C-W

Technical Specifications*

Detector	DXR250C-W	DXR250U-W
Flat Panel Type	Amorphous silicon	
Scintillator Material	Gadolinium oxysulfide (GOS)	
Active Area (approx.)	200 mm x 200 mm	405 mm x 405 mm
Image Format	Full: 1024 x 1024 / Binned: 512 x 512 / center Region of Interest: 512 x 512	Full: 2048 x 2048
Pixel Pitch	200 µm	
A/D Conversion	14 bits	
Min. Exposure Time Max. Exposure Time	130 ms 150 sec	
Interface	Gigabit Ethernet (separate line) WIFI 802.11g (adhoc / Access Point)	100 Mbit Ethernet combined with battery plug WIFI 802.11g (adhoc / Access Point)
Dynamic Range	10,000 : 1	
Dimensions	408 mm x 257 mm x 25 mm (16.06" x 10.12" x 0.98") (30 mm in the battery bay area)	600 mm x 460 mm x 26 mm (23.62" x 18.11" x 1.02") (28 mm in the battery bay area)
Weight	3.5 kg (7 lb) (including battery, without hard-shell)	5 kg (11 lb) (including battery, without hard-shell)
Operating Temperature	-20°C to 50°C (reduced dynamic range at higher temperatures in this range)	
Storage Temperature	-40°C to 70°C (-40°F to 158°F)	
Operating Humidity	RH, 10-90% non-condensing	

Power Supply	
Voltage	Input: 100-240 V, 50-60 Hz Output: 12 V DC
Dimensions	105 x 60 x 240 mm (4.13" x 2.36" x 9.45")
Weight	0.7 kg (25.7 ounces)
Tether	Detachable, length 3 m (10 ft)

Battery Charger	
Type	Two bay, level-3, stand alone battery charger compliant with Smart Battery System (SBSBus)
Power Supply	Input 30 V DC, including wide-range power supply
Features	Sequential charging Battery calibration in left bay LED status indicator
Dimensions / Weight	175 x 124 x 58 mm (6.89" x 4.89" x 2.30") 440 g (15.5 ounces)

Battery	
Type	Lithium Ion
Rating	11.1 V, 1.85 Ah, 21 Wh
Features	Charging status indicator

Portable Wireless Router / Access Point	
Type	150 Mbps portable battery / USB powered wireless router
Wireless Features	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n 2.4 - 2.4835 GHz Supports 64/128 bit WEP, WPA-PSK/WPA2-PSK, Wireless MAC Filtering, Enable/Disable, SSID Broadcast
Power Supply	Internal 2000 mAh rechargeable battery, 5 V DC / 1.0 A external power adapter, Micro USB
Dimensions / Weight	100 x 62 x 16 mm (3.9" x 2.4" x 0.6") 94 g (3.3 ounces)

* Subject to change without further notice

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GEIT-40056EN (09/13)

GE
Sensing & Inspection Technologies

DXR250P

Direct Radiography

Designed for field use, the DXR250P provides a compact digital radiography solution that is ready to be deployed in some of the most challenging environments. The portability of the DXR250P allows for use in applications that have been previously limited to computed and film radiography. DXR250P enables shorter exposure times and instant image review, reducing the need for re-shooting of images and leading to overall productivity for users.

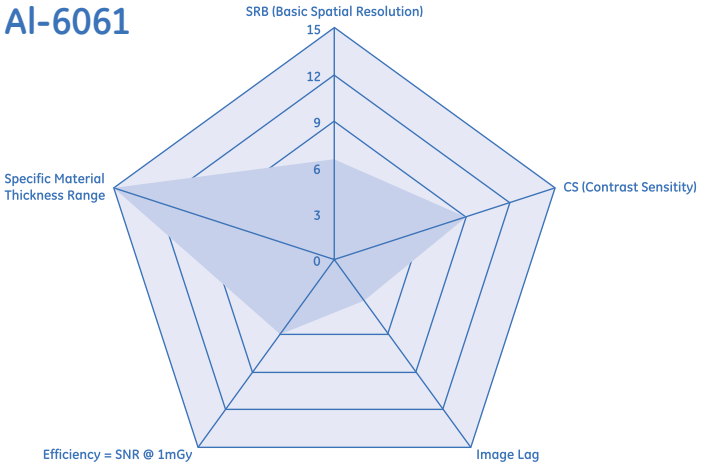
Features and Benefits

- Highly efficient CsI scintillator requiring minimal dose to produce premium images
- Lightweight, thin packaging allowing for maximum accessibility
- Detachable quick disconnect tether cable for easy set-up
- Ruggedized covering and carrying case for field deployment (optional)

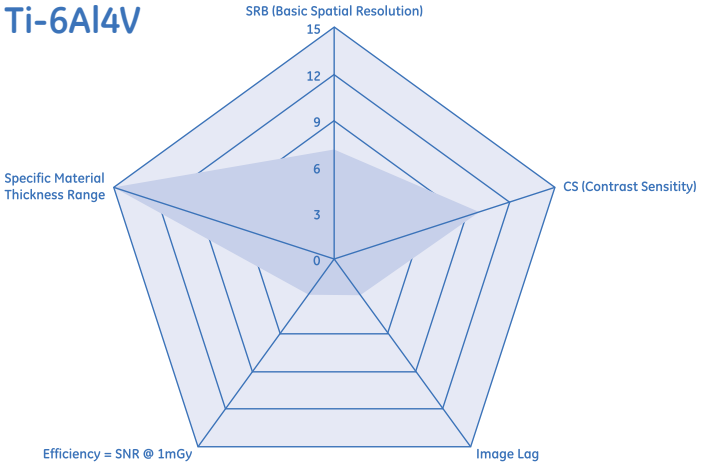
Applications

- Erosion corrosion
- Flow assisted corrosion
- On-wing
- Foreign object detection

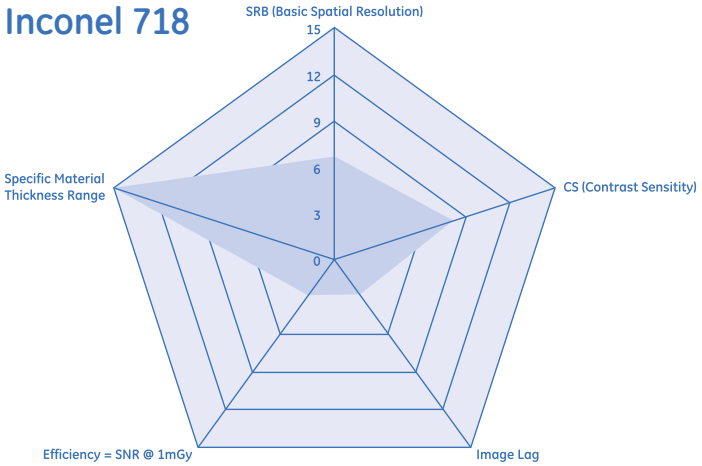
Al-6061



Ti-6Al4V



Inconel 718



Detector Characterization Charts

The detector characterization charts provided on the left are completed in accordance to ASTM E2507-07 Standard Practice for the Manufacturing Characterization of Digital Detector Arrays. This standard allows for the direct comparison of DDAs by ensuring data is collected and reported in a consistent and specified manner. The standard also enables guidance for the appropriate pairings of detectors with applications.

Pixels are identified as bad per one or more of the seven definitions described in the ASTM E2597-07 document. The pixels marked as bad will be corrected through GE's software utilizing data collected from good neighborhood pixels.

Technical Specifications

Detector Specifications	
Flat Panel Type	Amorphous Silicon
Scintillator Material	CsI
Active Area (approx.)	410 x 410 mm (16 x 16 in)
Image Format	2048 x 2048
Pixel Pitch	200µm
A/D Conversion	14 bits
Min Exposure Time	130 ms
Interface	Gigabit Ethernet
Dynamic Range	10,000:1
Dimensions	585 x 465 x 27mm
Weight	6 kg (13 lb)
Operating Temperature	10° to 35° C (50° to 95° F)
Operating Humidity	10-90% non-condensing

Power Supply	
Voltage	100-240V, 50-60Hz
UT Output Connector	163 x 287 x 56 mm (6 x 11 x 2 in)
Weight	3 kg (7 lb)

www.gesensinginspection.com

GEIT-40048EN (01/10)

GE
Inspection Technologies

DXR250V

Direct Radiography

Designed for field use, the DXR250V provides a compact digital radiography solution that is ready to be deployed in some of the most challenging environments. The portable DXR250V is an entry-level detector that allows users to apply digital radiography to applications previously limited to computed and film radiography. DXR250V enables shorter exposure times and instant image review, reducing the need for re-shooting of images and leading to overall productivity for users.

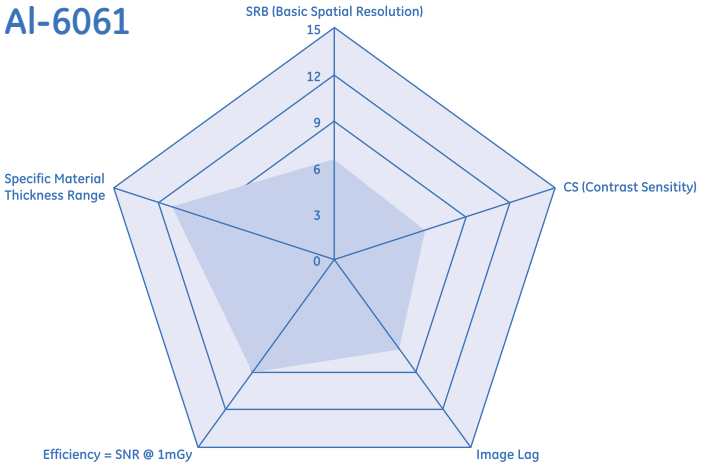
Features and Benefits

- Lightweight, thin packaging allowing for maximum accessibility
- Detachable quick disconnect tether cable for easy set-up
- Ruggedized covering and carrying case for field deployment (optional)

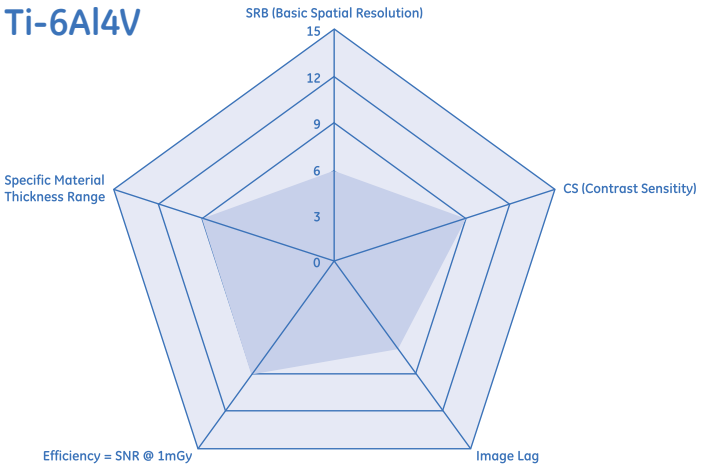
Applications

- Erosion corrosion
- Flow assisted corrosion
- On-wing
- Foreign object detection

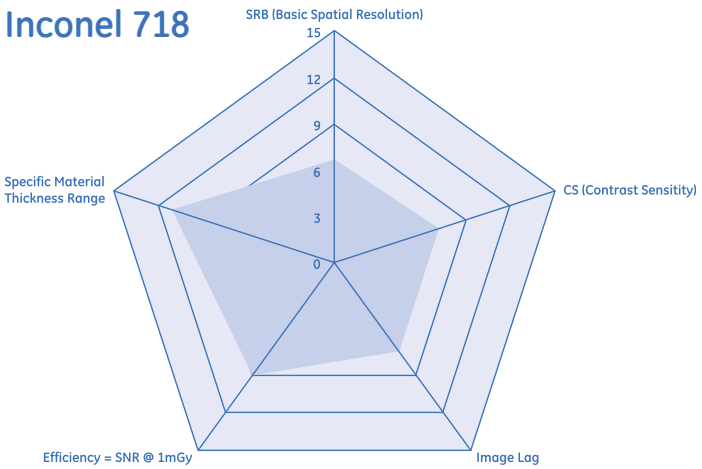
Al-6061



Ti-6Al4V



Inconel 718



Detector Characterization Charts

The detector characterization charts provided on the left are completed in accordance to ASTM E2597-07 Standard Practice for the Manufacturing Characterization of Digital Detector Arrays. This standard allows for the direct comparison of DDAs by ensuring data is collected and reported in a consistent and specified manner. The standard also enables guidance for the appropriate pairings of detectors with applications.

Pixels are identified as bad per one or more of the seven definitions described in the ASTM E2597-07 document. The pixels marked as bad will be corrected through GE's software utilizing data collected from good neighborhood pixels.

Technical Specifications

Detector Specifications	
Flat Panel Type	Amorphous Silicon
Scintillator Material	GOS
Active Area (approx.)	410 x 410 mm (16 x 16 in)
Image Formate	2048 x 2048
Pixel Pitch	200µm
A/D Conversion	14 bits
Min Exposure Time	130ms
Interface	Gigabit Ethernet
Dynamic Range	10,000:1
Dimensions	585 x 465 x 27mm
Weight	6 kg (13 lb)
Operating Temperature	10° to 35° C (50° to 95° F)
Operating Humidity	10-90% non-condensing

Power Supply	
Voltage	100-240V, 50-60Hz
UT Output Connector	163 x 287 x 56 mm (6 x 11 x 2 in)
Weight	3 kg (7 lb)

www.gesensinginspection.com

GEIT-40050EN (03/10)

- Computed Radiography Imaging System
- Greater than 4 lp/mm, 16-bit Images
- On Target Equipment Weight Less Than 20 lbs (9 kg)
- Internal or External Image Plate Erasing Light
- Contact Free Image Processing

LOGOS

LOGOS

The Logos Digital Imaging System offers users a truly portable Computed Radiography (CR) product designed to be field deployable. With a footprint measuring 31 inches x 23 inches, the complete Pelican case mounted system fits in a typical response vehicle for easy transport to and from the work site. Additionally, the soft-sided carrying case option offers users the flexibility of choosing a smaller, one-man portable design.

The system uses thin, flexible, storage phosphor plates as the imaging medium. These image plates are reusable after being erased with fluorescent light, and they can be connected using the supplied image plate frame system to x-ray large objects in a single exposure with minimal downrange equipment weight and minimal downrange time.

The scanner relies on a contact free, carousel based scanning method to read the image plates. The benefit of contact free scanning is that dust and debris on the image plate surface will not damage the plate or the scanner during processing. Therefore, even in extreme environments, there is no consumable expense for daily cleaning products required to maintain trouble-free operation.

The wide dynamic range of the Logos Digital Imaging System also allows users the ability to capture a quality image in one X-ray exposure. The scanner outputs 16-bit grayscale images (65,536 levels of gray) providing a high level of contrast adjustment to easily correct over and under exposures without requiring another trip downrange. The standard Logos Imaging Application offers a suite of automated image processing filters enabling even novice computer users to quickly capitalize on this powerful image processing capability.

Specifications

Height:	15.5", 39.4 cm
Width:	19.4", 49.3 cm
Depth:	10.8", 27.4 cm
Weight:	35 lbs, 16 kg
Interface Cable:	USB 2.0 Cable
Voltage:	110-240 VAC
Frequency:	50/60 Hz
Power:	110 watts max (T100 - w/o integrated eraser) 150 watts max (T110 - with integrated eraser)
Laser Classification:	Compliance per DHHS Radiation Performance Standards 21 CFR, 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated June 24, 2007. Also complies with IEC60825-1/A2: 2001 Class 1 Laser Device
Image Plate Size:	8"x10", 20 x 25 cm & 8"x17", 20 x 43 cm
Resolution:	150 dpi, 2.2 lp/mm, 51 second scan; 300 dpi, 4.4 lp/mm, 102 second scan

Specifications are subject to change without notice

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Temple Hills, MD 20748-6940
800-638-0554 **FAX 301-449-7011**
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- Compact, Desktop, Single Plate Reader
- 25 Plates/hr (14"x 17"), 60 sec to Image Display
- Multiple Image Plate Size Options
- Industry Leading Image Quality
- Logos Software Platform

EVRÝ

EVRY

Specifications

CR Reader Type	Compact Desktop Reader with Integrated Image Plate Eraser
Image Plate & Cassette Sizes	14" x 17" (35 x 43 cm) 10"x12" (25.4 x 30.5 cm) 8"x10" (20.3 x 25.4 cm)
Throughput (with 120 sec erase / IP)	
Standard Resolution	15 plates / hour
High Resolution	13 plates / hour
Image Display Time	
Standard Resolution	90 seconds
High Resolution	130 seconds
Resolution	
Standard	150 DPI (5.9 pixels/mm) 169 micron square pixels approximately 2.9 lp/mm
High	300 DPI (11.8 pixels/mm) 85 micron square pixels approximately 5.9 lp/mm
16 bits/pixel	
Weight	49 lbs (22 kg)
Dimensions (H,W,D)	12.6" x 28.4" x 16.4" (32 x 72.1 x 41.7 cm)
Interface Cable	USB 2.0
Electrical Voltage	100-240 VAC, 50/60 Hz Auto-sensing
Power	110 W Max - 200 VA Max

Storage and Shipping	-40° to 122° F (-40° to 50° C) (stored inside carrying case)
Environmental Operating Conditions (Reader)	
Temperature	32° to 104° F (0° to 40° C)
Relative Humidity	5% to 95% RH, Non-condensing
Environmental Operating Conditions (Image Plate)	
Temperature	59° to 93° F (15° to 34° C)
Relative Humidity	30% to 80% RH, Non-condensing
Safety Standards	
General	UL 60601-1 (2003), IEC 60601-1 (2005) CAN/CSA C22.2 No 601.1-M90
EMI	EN 60601-1-2 (2007) Group 1 Class A IEC 60601-1-2 (2007) Group 1 Class A
Electrical	Class I (grounded)
Laser	IEC 60825-1 (2007) Class 1 Laser Device

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- Wired and Wireless Operation Standard
- Large Imaging Area, 14”x17” (360 x 432 mm)
- Ultra Thin, 0.6” (15 mm)
- Easily Attaches to a Tripod with Standard Equipment
- High Image Resolution, 150 µm Pixel Size
- Hot-Swappable Batteries

ORAMA

ORAMA

The ORAMA is a portable digital x-ray flat panel detector that generates high-resolution, high-sensitivity digital images. The complete x-ray imaging system consists of a scintillator directly coupled to an a-Si TFT sensor, an operating PC (available as an option), LIA image acquisition and enhancement software, wireless and wired computer to panel interface, X-ray machine (available as an option), and Pelican carrying case.

Technology	Flat Panel Detector Assembly Csi a-Si TFT- Pin diode
Pixel size	150 um
X-ray sensitive area	360 x 432mm (14" x 17") 2,400 x 2,800 pixels
AD Conversion	14 bits
Grayscale	16,384
Communications interface	Wireless or Wired LAN
Dimensions (W x L x H)	491 x 480 x 15mm 19.3" x 18.9" x 0.6"
Weight	3.8 kg 8.4 lbs
Power	100-240 VAC (50-60 Hz) using included power supply 18.5 V, 5.200 mAh, Li-Ion hot-swappable battery pack 18.5 V, 2,600 mAh, Li-Ion internal backup battery
Operation Environment	+10 to +40° C 30 to 75% RH (Non-Condensing)
PC Requirement	At least Intel Pentium IV HT with 2.8GHz, Intel Core Duo / Core 2 or comparable AMD Dual Core processor At least 2 GB RAM At least 40 GB hard disk Windows XP Professional or higher Ethernet Adapter

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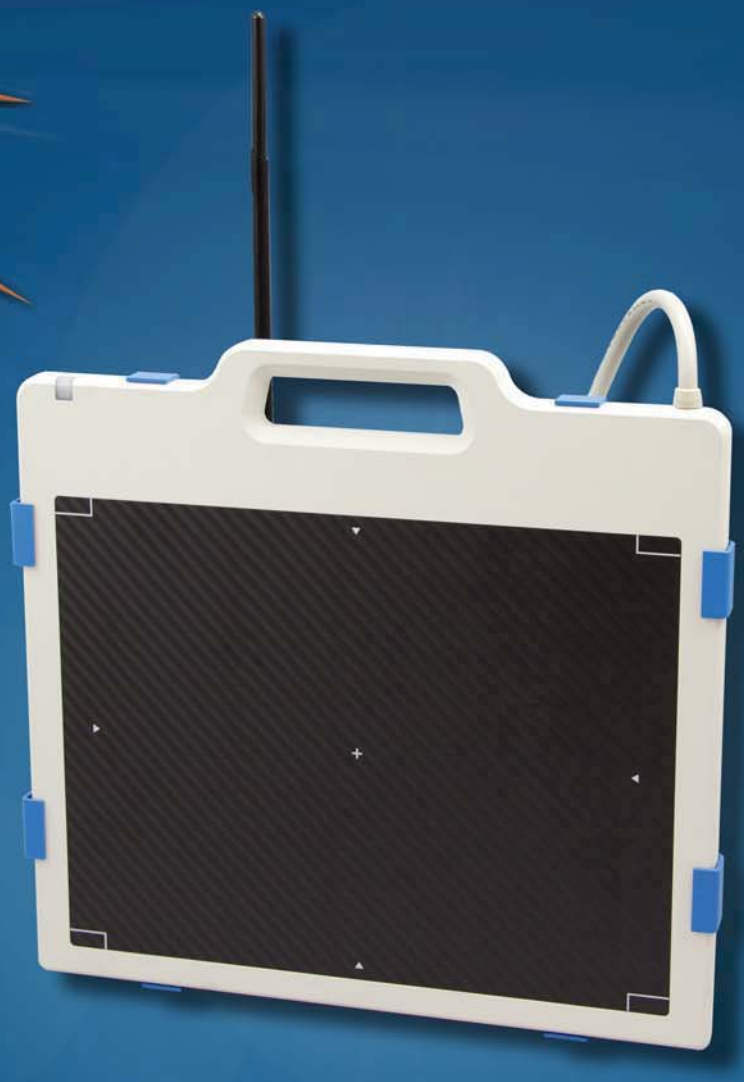

- Wired and Wireless Operation Standard
- Easily Attaches to a Tripod with Standard Equipment
- High Image Resolution, 127 µm Pixel Size
- Hot-Swappable Batteries
- Compatible with All 5 Pin Golden Engineering Sources
- Logos Software Platform

NEOS

NEOS

Logos Imaging's NEOS portable, Direct Radiography (DR) imaging system is a lightweight, man or robot deployable, EOD/IEDD solution. With its superb image resolution, wide image format, and fast image acquisition, the NEOS system is an ideal, cost-effective digital x-ray tool for your everyday imaging needs.

Weighing less than 15 pounds with the tripod mount, hot-swappable battery, and interface, the NEOS can be deployed by one person in less than five minutes. Once deployed, the NEOS hot-swappable battery system allows users to operate the system all day with no down time even when 100/220v power isn't available.

Shown with interface attached. Interface quickly disconnects from panel reducing thickness to approximately one inch.

Already have a Logos Digital Imaging System? NEOS utilizes the same Logos Imaging software, version 6 and above, that you are currently using. No need to have two laptops: one software platform, two different imaging solutions.

The complete NEOS system, including the optional computer and Golden Engineering XR200 or XRS-3 x-ray machine, fits in one carrying case.

The NEOS system includes full wired and wireless capabilities. Wireless communication between the imager and the computer, as well as wireless firing for Golden Engineering X-ray machines is included in the base NEOS system. There is no need to buy additional wireless accessories.

NEOS

Specifications

Technology	Amorphous Silicon, CsI: TI
Pixel size	127 µm
Pixel area (active)	264 x 325 mm 10..4" x 12.8"
Pixel matrix	2,080 x 2,560 pixels
AD Conversion	14 bits
Grayscale	16,384
Dynamic Range	>73 dB
Communications interface	Wireless or Wired LAN
Power	100-240 VAC (50-60 Hz) using included power supply 18.5 V, 5.200 mAh, Li-Ion hot-swappable battery pack 18.5 V, 2,600 mAh, Li-Ion internal backup battery
Dimensions (W x L x H)	403 x 422 x 22 mm 15.9" x 16.6" x 0.9"
Weight (panel only)	3.5 kg 7.7 lbs
Weight (panel & interface)	6.6 kg 14.5 lbs
PC Requirement	At least Intel Pentium IV HT with 2.8GHz, Intel Core Duo / Core 2 or comparable AMD Dual Core processor At least 2 GB RAM At least 40 GB hard disk Windows XP Professional or higher Ethernet Adapter

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- Quick Release Panel Mount, Single Approach Delivery of All Equipment
- Full Wireless, No Additional Equipment Required
- Controls and Powers the NEOS and ORAMA DR Systems
- Hot-Swappable Batteries Allow All Day Use
- Battery Fuel Gauge So You Know the Charge Status

ASÝRMATOS

ASÝRMATOS

The Asýrmatos interface is a three part system that controls and provides power to Logos DR panels. The standard interface system allows users to operate the NEOS and ORAMA in full wireless or wired modes. In wireless mode, the hot-swappable battery provides the interface with day-long operation and a wireless communication range of over 300 yards even when the radio is set in short-range mode.*

The wireless x-ray firing module connects to any Golden Engineering x-ray machine fitted with a 5-pin LEMO connector** to allow full wireless x-ray control from within the Logos Imaging Application. The module receives power from the Golden machine and does not require batteries of its own.

The PC-side interface connects to the notebook computer and wirelessly transfers commands between the PC and the DR panel. In wired operation mode, the computer interface is not required.

The panel-side interface connects to the DR panel and wirelessly transfers commands between the DR panel and the PC-side interface. In wired operation mode, the panel-side interface connects directly to an Ethernet port on the PC using the network cable included with the system.

*If your aplications require extended range wireles comunication, Logos can configure the system's existing wireless radios to meet your requirements at no additional cost.

**If your Golden XR200 or XRS-3 does not have a 5-pin connector, Logos can update the X-ray machine with a membrane switch control and 5-pin connector.

Shown with interface attached. Interface quickly disconnects from panel reducing thickness to approximately one inch.

ASÝRMATOS

Specifications

PC-Side

Communications Interface	Wireless or Wired LAN
Dimensions	159 x 165 x 54 mm (6.3" x 6.5" x 2.1")
Weight	1.0 kg (2.3 lbs)
Antenna	2.4 GHz 9 dBi Rubber Duck (N-Type Female Connector)
Wireless Data	802.11, 2412-2462 MHz
Wireless Data Approvals	FCC, IC, CE
Power	100-240 VAC (50-60 Hz), 3A using included power supply
	18.5 V, 2,600 mAh, Li-Ion internal backup battery
Battery Endurance	Eight hours continuous operation (1,000+ image acquisitions)

Panel-Side

Communications Interface	Wireless or Wired LAN
Dimensions (with ext battery)	177 x 248 x 99 mm (6.95" x 9.75" x 3.91")
Weight (with ext battery)	3.1 kg (6.8 lbs)
Antenna	2.4 GHz 9 dBi Rubber Duck (N-Type Female Connector)
Wireless Data	802.11, 2412-2462 MHz
Wireless Data Approvals	FCC, IC, CE
Wireless X-ray	IEEE 802.15.4, 2.4 GHz
Wireless X-ray Approvals	FCC, IC, CE
Power	100-240 VAC (50-60 Hz), 3A using included power supply
	18.5 V, 5.200 mAh, Li-Ion hot-swappable battery pack
	18.5 V, 2,600 mAh, Li-Ion internal backup battery
Battery Endurance	
External Battery	Four hours continuous operation (500+ image acquisitions)
Internal Battery	Two hours continuous operation (250+ image acquisitions)

X-Ray Firing Module

Dimensions	98 x 64 x 34 mm (3.9" x 2.5" x 1.4")
Wireless X-ray	IEEE 802.15.4, 2.4 GHz
Wireless X-ray Approvals	FCC, IC, CE
Power	5V from Golden X-ray machine

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ASÝRMATOS

Specifications

(continued)

Battery Charger

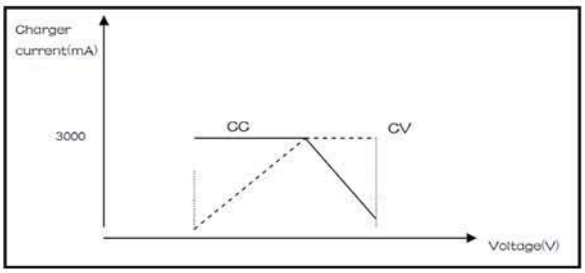
Dimensions	158 x 86 x 52 mm (6.22" x 3.39" x 2.05")
Weight	900 g (1.9 lbs)

Input

Voltage	
Minimum	100 Vrms
Normal	115/230 Vrms
Maximum	240 Vrms
Frequency	47-63Hz
Current	3.15A (Max)
Inrush current	115V/40A (max.), 230V/80A (max.) at 25C at cold start
Power efficiency	80% (min.) at full load, 110Vac or 230Vac 50Hz

Output

Charge curve (CC @3A, CV@ 21 +/- 1%V)



Output voltage	21+/-1%V at standby
Environment	
Ambient operation temp	0C to +40C
Ambient operation RH	20% to 85%
Ambient storage temp	-40C to +70C
Ambient storage RH	10% to 95%

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VARIAN
medical systems

X-RAY
PRODUCTS

PaxScan® 2520E+

Amorphous Silicon Digital X-Ray Imager

Product Description

The PaxScan 2520E+ is a ruggedized X-ray imaging subsystem designed for high-speed radiographic imaging in the field. Based upon the new Gigabit Ethernet interface standard, images are displayed instantaneously on a user-supplied workstation or laptop fitted with the appropriate Gigabit controller chipset. The lightweight magnesium housing is shock-resistant.

An optional I/O interface box is available with a radiographic exposure handswitch, Li-ion battery, and USB 2.0 interface for software-based exposure control.

Technical Specifications

Receptor Type ..... Amorphous Silicon

Conversion Screen ..... CsI, DRZ Plus, or Gd_2O_2S: Tb (Kodak Lanex Screen)

Pixel Area Total ..... 19.5 x 24.4 cm (7.68 x 9.6 inch)
Active ..... 17.9 x 23.8 cm (7.05 x 9.38 inch)

Pixel Matrix Total ..... 1,536 x 1,920
Active ..... 1,516 x 1,900

Pixel Pitch ..... 127 μm^2

Limiting Resolution ..... 3.94 lp/mm

MTF, X-Ray ..... ≥48% 1 lp/mm, Gd_2O_2S:Tb screen (80 kVp)

Energy Range ..... 40 - 150 kVp

Fill Factor 57%

Image Capture ..... Intel PRO/1000MT Desktop Adaptor (PCI) (Customer supplied)

Scan Method ..... Progressive

A/D Conversion 14-bits

Frame Rate ..... 1-10 fps (1 x 1) (Workstation dependent)

Data Output ..... Gigabit Ethernet

Laptop/PC Interface ..... Ethernet Port

Exposure Control ..... USB port on host computer

Software

The software release includes ViVA™, a basic application for image acquisition and viewing on an end-user workstation or laptop running Microsoft® Windows™. The developer's software package includes a "Virtual Command Processor" software interface that performs detector calibration, receptor set-up, image acquisition, and image corrections. ViVA™ includes file translators for .viv, .raw, .jpg, and .bmp formats. Windows® XP compatible.

Environmental

Shock ..... High-shock tolerance

Temperature Range - Operating ..... 1°C to 35°C (max.)
(Ambient) - Storage ..... -20°C to +70°C

Humidity - Operating (non-condensing) ..... 10 to 90%
Storage (non-condensing) ..... 10 to 90%

Regulatory

Classified by Underwriters Laboratories, Inc. to UL 60601-1, IEC 60601-1, CSA 22.2 No. 601.1-M90, and CE.

Mechanical

Size ..... 17.03 x 9.26 x 1.01 inch [43.26 x 23.52 x 2.57 cm]

Weight (with cables) ..... 7.3 lbs. (3.3 kg)
I/O Interface Box (optional) ..... 5.15 lbs. (2.34 kg)

Housing Material ..... Magnesium

Sensor Protection Material
Carbon fiber plate (2.5 mm thick) and magnesium

Power

Power Dissipation ..... 15 watts (cont.)
16 watts (max.)

Power Supply/Adaptor ..... +12 VDC

VARIAN
medical systems

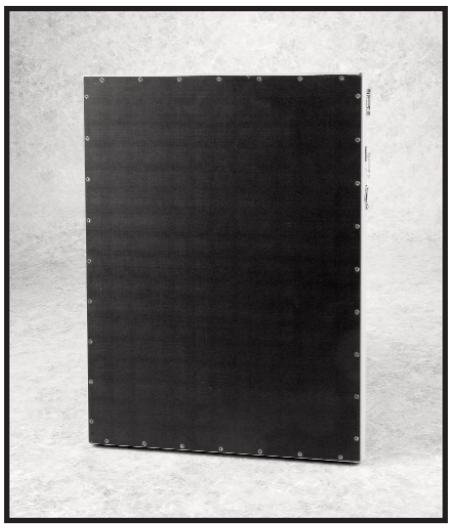
X-RAY
PRODUCTS

PaxScan® 4030E

Amorphous Silicon Digital X-Ray Imager

Product Description

The PaxScan® 4030E is a digital X-ray imaging system designed for high-speed radiographic imaging in the field. Based upon the new Gigabit Ethernet interface, images are displayed instantaneously on a user-supplied PC running Varian ViVA™ application software.



An optional I/O interface box is available with a radiographic exposure handswitch, and USB 2.0 interface for software-based exposure control.

Technical Specifications

Receptor Type	Amorphous Silicon
Conversion Screen	DRZ Plus
Pixel Area Total	29.3 x 40.6 cm (11.5 in. x 16.0 in)
Pixel Area Active	29.1 x 40.5 cm (11.5 in. x 16.0 in)
Pixel Matrix Total	2,304 (h) x 3,200 (v)
Pixel Matrix Active	2,304 (h) x 3,200 (v)
Pixel Pitch	127 µm
Limiting Resolution	3.94 lp/mm
DQE (with DRZ Plus)	> 30%
MTF, X-Ray (with DRZ Plus)	>45% (1 lp/mm)
Energy Range	40 - 150 kVp
Fill Factor	57%
Contrast Ratio	Large Area (12 cm): <2% Small Area (1 cm): <10%
Scan Method	Progressive
A/D Conversion	14-bits
Frame Rate	1 fps (1 x 1)
Data Output	Gigabit Ethernet

Software

Varian ViVA™ application software for image correction, viewing, image mosaic, and calibration. Includes file type translators for .viv, .raw, .jpg, and .bmp file formats. Windows® XP compatible.

Environmental

Temperature Range - Operating	10°C to 35°C (max.)
(Ambient) - Storage	-20°C to +70°C
Humidity	10 to 90%
Storage (non-condensing)	10 to 90%

Regulatory

U.S.	UL60601-1
Canada	CSA 22.2 No.601.1-M90

Mechanical

Size	45.0 x 33.7 x 3.4 cm (17.7 x 13.3 x 1.3 in.)
Weight	12.3 kg (27 lb.) approx.
Housing Material	Aluminum
Sensor Protection Material	Carbon fiber plate (2.5 mm thick) and aluminum

Power

Power Dissipation	35 Watts
Power Supply/Adaptor	100 - 240 VAC, 47 - 63 Hz

GE
Measurement & Control

High Resolution Weld Inspection and All-Purpose

Computed Radiography Scanner

Inspection Technologies:

CRxVision

Packed with innovative features to increase throughput, extend plate life and provide excellent image quality, the CRxVision is designed specifically for the inspection of welds. The scanner is developed to cover the stringent ISO 17636-2 Class A and B requirements, as well as ASTM, ASME and EN weld standards. Because of its versatility, it can also be used for many other applications across the NDT industry.

GE imagination at work

CRxVision: the versatile, new tabletop scanner from GE.

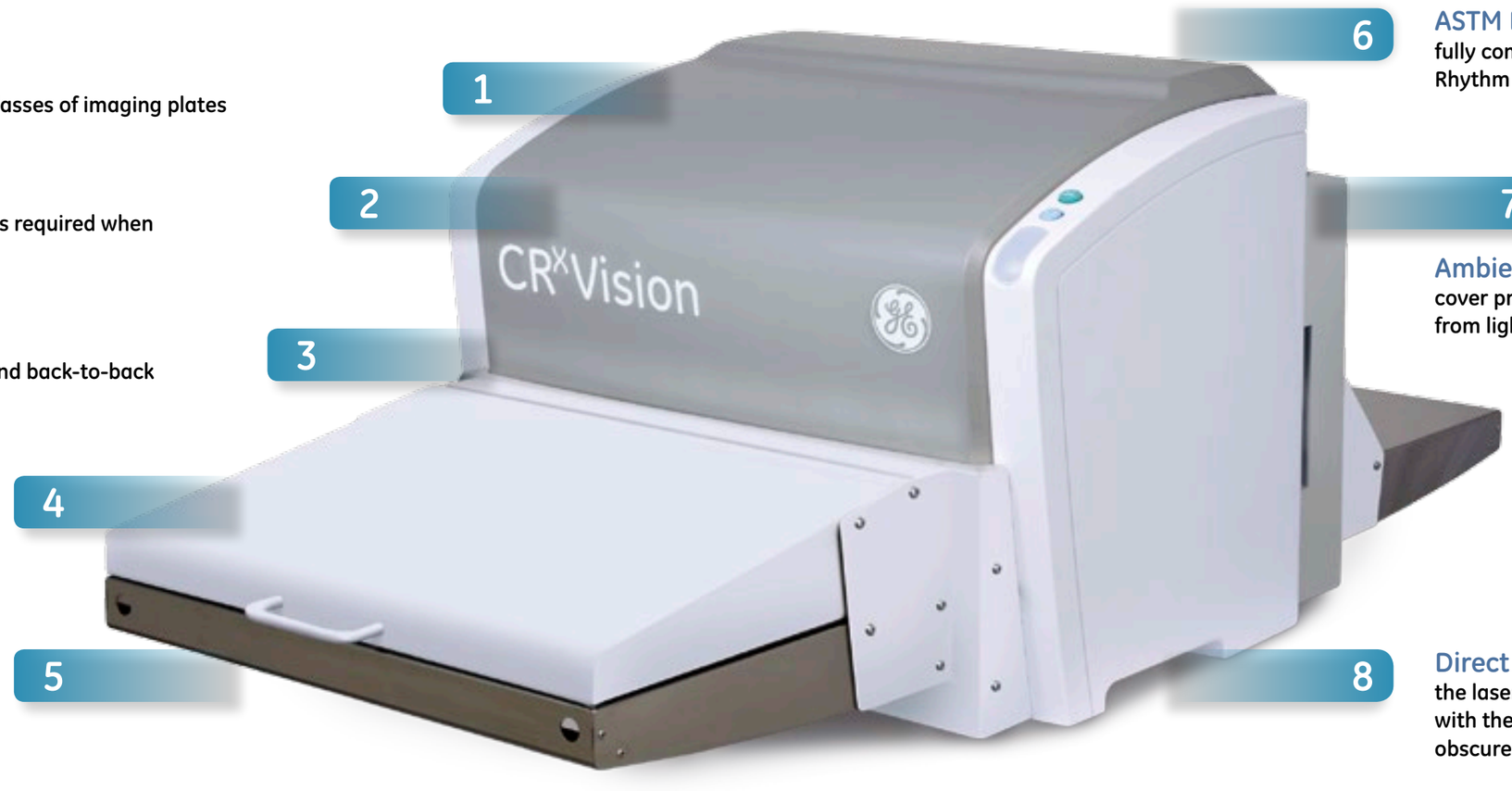
Flexible
accepting a wide range of sizes, shapes and classes of imaging plates

Intuitive
no gain setting or photomultiplier adjustments required when exposing various thicknesses

Fast
multiple plate scanning option: side-by-side and back-to-back with a flat transport path

High Resolution
new laser optics for profound reading and higher data extraction

Extended Plate Life
no mechanical handling of the imaging plate during scanning and erasing



ASTM DICONDE Compliant
fully compatible with GE´s existing Rhythm Software Platform

Ambient Operation
cover protects the imaging plate from light exposure

Direct Laser Contact
the laser beam is in direct contact with the imaging plate (no glass to obscure data collection)

Your Benefits:

— **Compliant** to ISO 17636-2 Class A and B, ASME, ASTM and EN **weld inspection standards**.

— The CRxVision has an **extremely wide latitude** eliminating the need for multiple gain settings when exposing over a wide range of thicknesses. This is the result of a 16 bit image processing at selectable **35 or 70 microns resolution**.

— **Exposure times** for welds are equal or better than existing film exposure times (to comply with Code Standards like EN and ASME) and can be reduced by up to ten times for non-code type applications like erosion/corrosion or valve placement.

— Designed for extremely **high throughput:** 90 plates/hr at 70 microns or 28 plates/hr at 35 microns for a 10 x 40 cm (4.5 x 17") plate. The scanner allows multiple imaging plates to be scanned simultaneously ... side-by-side and back-to-back as well as various lengths to be scanned together. This is a result of the straight and flat, in-line scan and erase transport path.

— Ability to scan **any shape or size of imaging plate** from from 20 to 1500 mm (0.75 to 60") in length. Imaging plates can be exposed in any type of cassette, then simply removed and inserted directly into the scanner without the need of any type of adapter, template or leader.

— A new **innovative imaging plate design** now provides the GE CRxVision imaging plates with more flexibility. This new design allows each imaging plate the ability to return to a flat state after being constantly bent around pipes for the inspection of welds. This feature also helps **improve productivity** by allowing the imaging plates to be easily extracted and reinserted into cassettes.

— Plate transport through the scanners is achieved by a **magnetic transportation system**. This new combination of scanner and imaging plate design allows the imaging plate to be transported through the scanner without any mechanical handling of the phosphor ultimately extending the overall life of the plate.

— The updated Rhythm RT software simplifies inspection workflow. It now has the ability to **automatically crop the images** by detecting the physical edges of each individual plate when they are processed. Consequently, each individual plate can be separately identified and saved or grouped together and saved as one file.

— The new scanner enjoys all the functionality offered by GE´s Rhythm Software giving the inspector the ability to view, enhance, measure, annotate and comment on the images. The CRxVision system is completely **DICONDE compliant** and compatible with all existing modules in GE´s Rhythm Software platform.

— The CRxVision can be used in **ambient light conditions** with suitable handling as the light cover protects the plates from light exposure during the scan cycle. The cover can be removed for work in darkrooms if required.

— The scanner weighs **less than 45 kg** (99 lbs) and has a footprint of 560 x 560 mm (22 x 22 inches). It extends to 560 x 1280 mm (22 x 50 inches) when the feed and exit tables are attached.

— The light guide can be easily cleaned with an internal brush which is operated by simply turning a set screw. The eraser section of the scanner is **completely sealed** from the optics section to prevent migration of any dust particles into the machine.

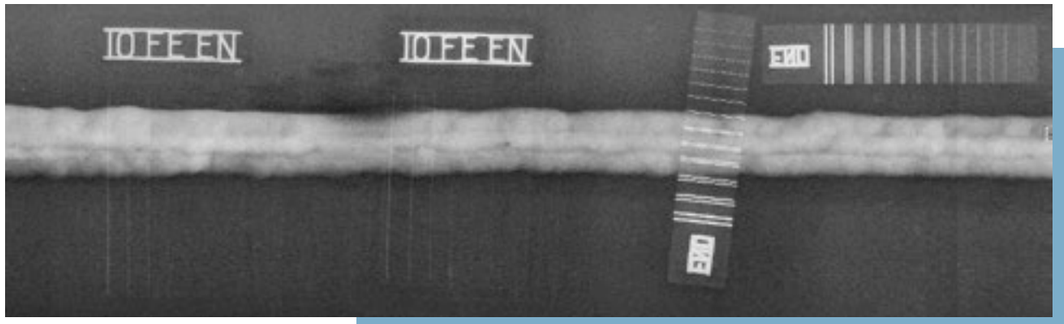
Applications

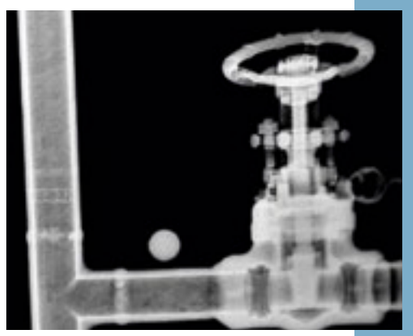
Even though the CRxVision was designed for the inspection of welds, it also has the ability to cover a wide range of industrial radiography applications, from Oil & Gas to Aerospace, and from Power Generation to General NDT.

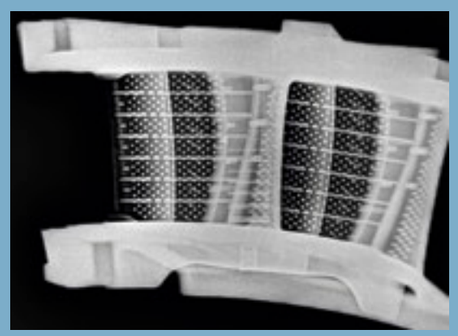
- Weld inspection
- Erosion/Corrosion inspection (CUI, FAC, etc.)
- Castings (In-process and final)
- Valve positioning
- Concrete and Structure inspection
- Government (Arsenals, National Laboratories, Proving Grounds)
- Military (in-service aircraft, ships, etc.)

In all applications the CRxVision offers the following significant benefits of digital radiography:

- No darkroom facilities/trucks needed
- Eliminate processing chemicals and chemical disposal/silver recovery
- Improved image interpretation and inspection quality level with Flash!Filters™
- Consistent & operator–independent results with the Automated WT Measurement tool
- High reduction in retakes due to the wide dynamic range of the imaging plates
- No development time, as images are immediately available after scanning
- High reduction in storage space when archiving digital images
- Data management (trending) and data sharing advantages
- Fully DICONDE compliant







Rhythm RT for Workflow Optimization

Both GE´s Rhythm RT and Rhythm RT Lite provide a powerful, ASTM DICONDE Compliant operational software platform, which simplifies the overall inspection workflow.

After entering the component and technique data, select the required scan resolution and then the scanner will prompt you to insert the imaging plate. Once the imaging plate is scanned, the image will appear and any Region of Interest (ROI) may then be identified on the computer screen and enhancements, annotations and measurements applied. The image can then be saved for further review and/or storage. The files can be saved in TIFF, BMP, JPEG, and/or DICONDE formats.

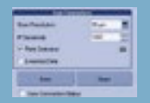
Rhythm RT workflow

1 Select the required resolution

2 Enter the component and technique information

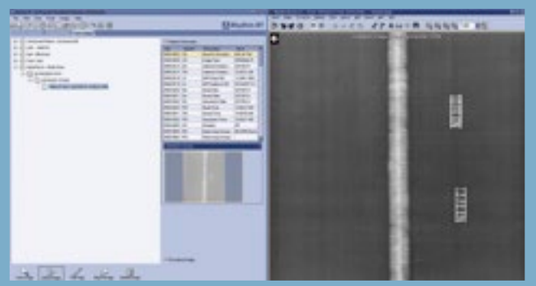
3 Insert the imaging plate(s) to start the cycle

4 Press scan



5 Select a specific ROI (if desired)

6 Send image to review



Imaging Plates

Four different types of imaging plates with a ferromagnetic back layer have been developed specifically for the CRxVision. This allows the imaging plates to be magnetically transported through the scanner with no phosphor touch points. In addition, this new design helps reduce backscatter which improves the overall quality of the image as well as allows the imaging plate the ability to return to a flat position after being constantly bent around curved objects.

GE´s four imaging plate types are as follows:

- **IPC2:** Standard Resolution & High Speed - for general purpose
- **IPS:** High Resolution & Medium Speed - for inspection of welds
- **IPS2:** High Resolution & Medium Speed – for inspection of welds Excellent for very low contrast, homogeneity type applications and premium weld quality inspections.
- **IPU:** Extreme High Resolution & Slow Speed - for extremely high resolution applications when very low micron range sensitivity is required.

Plates are available in various size formats ranging from 70 mm (2.76") wide to 1500 mm (60") in length.

Protective Cassettes

A range of flexible and hard cassettes are also available. Both versions may be supplied with or without lead, depending on the application.

Technical Specifications of CRxVision

Functional Data		
Principle	High performance table-top flatbed scanner with contactless plate transport	
Eraser	Inline	
Resolution	Standard resolution (SR)	70 µm
	High resolution (HR)	35 µm
Maximum basic	Standard resolution (SR)	80 µm (6,25 LP / mm)
Spatial resolution	High resolution (HR)	40 µm (12,5 LP / mm)
Scan width		35 cm (14 inch)
Throughput (10 x 40 cm 4.5 x 17")	Standard resolution (SR)	90 plates/hour
	High resolution (HR)	28 plates/hour
Time to image (in Rhythm RT)	Standard resolution (SR)	40 sec
	High resolution (HR)	147 sec
LUT (look up table)	Linear (native Square root)	
Bit depth		16 Bit
Dimensions	Scanner	56 x 56 x 47 cm (22" x 22" x 19")
	Scanner including I/O table and light cover	128 x 56 x 47 cm (52" x 22" x 19")
Weight	Scanner	45 kg (99 lbs)
	Scanner including I/O table and light cover	50 kg (110 lbs)
Interfaces	Ethernet, RJ45	
	DC voltage, coded 8-pin, female	
Certifications	CE, UL (NRTLus), cUL (cNRTLus), C-Tick, Customs Union Mark	

Environmental Conditions		
Operation	Temp. allowed	15 °C to 35 °C (59 °F to 95 °F)
	Relative humidity	15% to 80% (non condensed)
	Magnetic field	Compliant with EN 61000-4-8, Level 2
Transport	IEC721-3-2 (1997): class 2K2 and 2M3, with following restrictions	
	Temperature	-25 °C to +55 °C (-13 °F to 131 °F)
	Vibration	5 to 200 Hz (vertical, longitudinal, transversal axis)
Mechanical conditions for transport	In packaging	IEC 721-3-2 (1997): class 2M2
Shock specifications	In packaging	IEC TR 60721-4-5 (1997): class 5M2

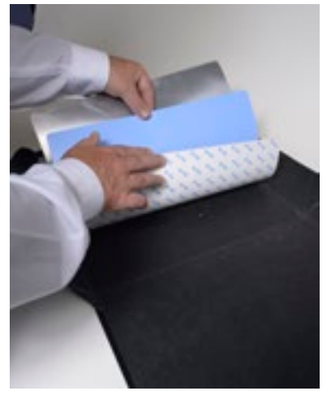
Electrical Data		
Operating voltage	Auto-ranging external power supply from 100 V to 240 V, DC Output 24V	
Mains frequency		50/60 Hz
Mains fuse protection	Europe	min. 10 A, max. 16 A
	USA & Japan	min. 10 A, max. 15 A
Power consumption	Standby 110 V - 240 V / 50-60 Hz	max. 22 W
	During operation 110 V - 240 V / 50-60 Hz	max. 140 W (absolute peak)

Application Compliance		
ASME	ASME Code Section V Article 2	
ISO 17636-2	Class A / Class B (in defined exposure conditions)	Verified with X-ray, Ir-192, Se-75, Co-60
EN14784-1	IPS, IPS-2: 1/80, IPU: 1/40	Certified by BAM
EN2446-06	IPS, IPS-2: S/80, IPU: S/40	Certified by BAM

Accessories	
I/O Table with light cover	Quick mountable, stainless steel, input/output table set with 43 cm (17") tray length and light cover for input side
Long I/O table	Input/output extension for long plates scanning 150 cm (59")
Flight Case	Robust Flight Case with shock-absorbers, wheel, ruggedized handles and compartments for I/O tables, laptop, accessories

Imaging Plates		
IPC2	High speed plate	Use: CRxVision can scan any shape or size imaging plate from 20 to 1500 mm (0.75 to 60") in length.
IPS	High resolution	
IPS2	High resolution	
IPU	Extremely high resolution (X-ray)	

Cassettes		
Flexible cassettes	PVC or vinyl envelopes	different sizes
Hard cassettes (for defined exposure conditions)	35 x 43 cm, 20 x 24 cm, 24 x 30 cm, 15 x 30 cm 14" x 17", 8" x 10", 10" x 12", 6" x 12"	



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Below are some of our locations. Visit www.ge-mcs.com for a complete listing.

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- Prague, Czech Republic
- Stockholm, Sweden
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- Dubai, UAE
- Buenos Aires, Argentina
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- Airdrie, Alberta, Canada
- Toronto, Ontario, Canada
- Montreal, Quebec, Canada

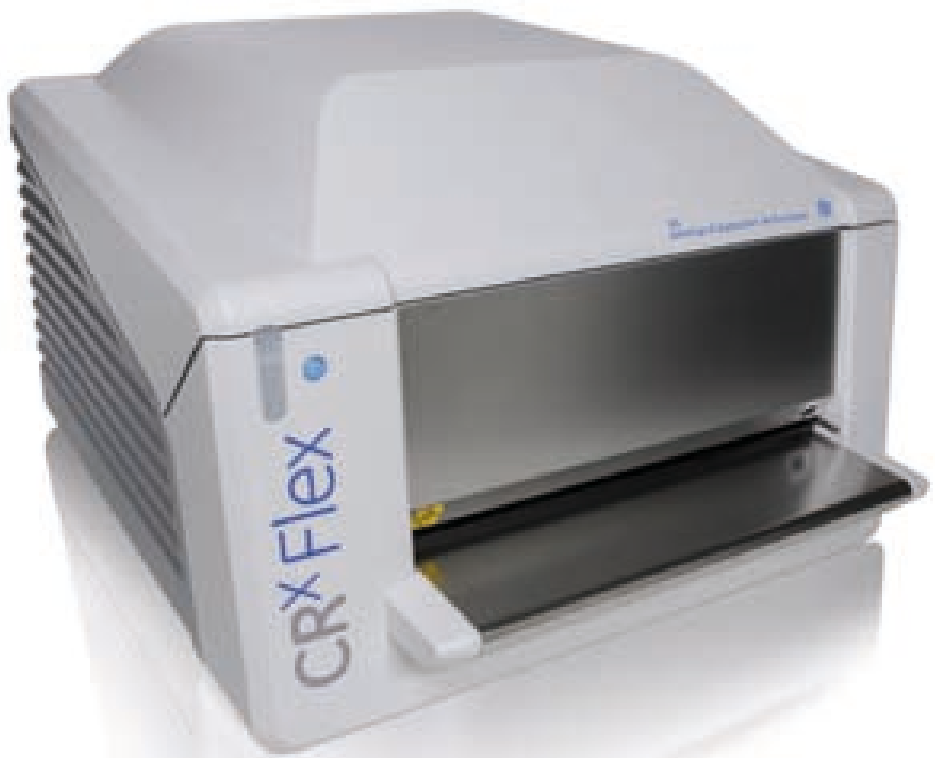
www.ge-mcs.com/x-ray

GEIT-40058EN (06/14)

GE
Sensing & Inspection Technologies

CR^{x}Flex

Computed Radiography



Reliability, Versatility and Performance in Harsh NDT Environments

The CR^{x}Flex computed radiography scanner from GE Sensing & Inspection Technologies combines flexibility, reliability, dynamic range and ease-of-use.

Designed specifically for applications in non-destructive testing, the CR^{x}Flex is suitable for usage with both isotopes and X-ray sources. It is well suited for a broad range of applications in the aerospace, oil & gas, power generation and automotive industries.

GE imagination at work

Extending the Boundaries of Computed Radiography

Versatility

The CR^{x}Flex phosphor scanner also offers extremely wide dynamic range and high signal-to-noise ratio, which typically results in streamlined technique development and higher component throughput. A broad range of thicknesses can be inspected in a single exposure with the wide dynamic range making the CR^{x}Flex a perfect match for the inspection of castings and/or piping for erosion/corrosion. This capability also leads to less exposures and fewer re-takes.

Flexibility

One of the more unique features that the CR^{x}Flex offers is it's ability to be utilized with either hard cassettes (in which the phosphor imaging plate never leaves the cassette) or the ability to scan any size of phosphor screen up to 35 x 43 cm (14 x 17 inches): any unique shape or size: circles, triangles, rectangles, pie shape, etc. These unique sizes can be exposed using a soft, flexible cassette and then scanned by the CR^{x}Flex.

Reliability

The robust CR^{x}Flex has a small tabletop footprint and is designed for reliable operation in the harshest of NDT environments.
Its modular internal construction allows ease of servicing and features long mean-times-between-failures (MTBF) and maintenance (MTBM) — minimizing downtime and maximizing uptime.

Horizontal Transport System

The CR^{x}Flex has a state-of-the-art, horizontal transport system that is designed to have limited, or no direct contact with the imaging plate during the scanning process. The result of this is that there is no imaging plate damage and/or physical wear that occurs during the scan. The phosphor scanner can accept imaging plates that are used with soft cassettes and/or can be used in a hard cassette for applications in which the imaging plate would not have to be removed from the cassette — extending the life of the imaging plate.

Superior Image Quality

Because of its specially designed optics, true square 50 micron pixel size and its unique 30 micron laser spot size, the CR^{x}Flex can guarantee image quality with excellent IQI sensitivity. This superior image quality is supported by its BAM certificate that states that CR^{x}Flex is IP Class Special/60 (ASTM E2446-05) and/or IP Class 1/60 (EN 14784-1) — ideal for weld inspection.

Rhythm® Software

The CR^{x}Flex, in conjunction with the GE's Rhythm software, allows users to acquire, review, report and archive inspection data. The DICONDE-compliant Rhythm platform also permits image enhancement and data sharing to provide significant improvements in productivity and faster identification of defect indications.

Applications

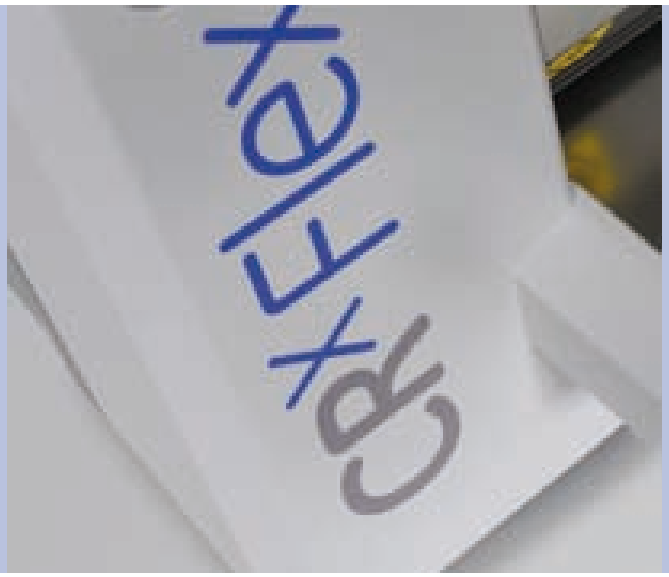
The CR^{x}Flex is suitable for a wide range of applications spanning various industries.

Aerospace
Manufacturing
On-wing inspection

Oil & Gas
Plant construction
Asset management
On-stream inspection

Power generation
Plant construction
Asset management

Automotive
Component manufacturing
Assembly inspection



Imaging Plates

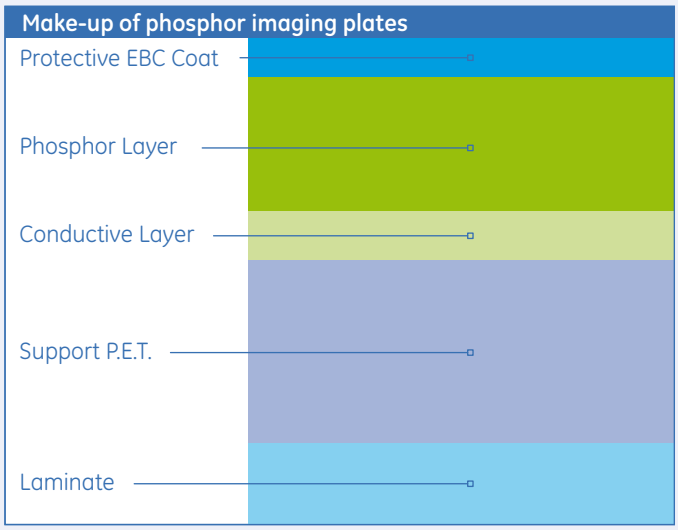
Our offering consists of different types of phosphor imaging plates. The plates have special/proprietary protection layers that prevent scratches and damage. Odd sizes and/or shapes up to 35 x 43 cm (14" x 17") imaging plates and associated inserts can be manufactured to support your specific application and scanned by the CR×Flex.

Fewer Retakes
High tolerance for varying exposure conditions and a greater freedom in the selection of the exposure dose.

Dose Reduction
In many cases, imaging plates allow the visualization of all diagnostic information with only one exposure.

Long Lifetime
Imaging plates are protected by an EBC (electron-beam-cured) topcoat. This results in plates with superb protection from mechanical wear and excellent chemical resistance.

Image Quality
The composition of the imaging plate storage phosphor material ensures optimum performance. The material has high absorption efficiency, excellent homogeneity and short response time to ensure high sharpness and contrast.



Cassettes

GE cassettes are specifically designed for NDT applications. The CR cassettes are lightweight and very simple to use. Synthetic material provides maximum rigidity for overall durability.

The higher radiation energies used in industrial X-ray makes the use of standard medical cassettes impossible. Therefore, the cassettes can be supplied with built-in, front lead (Pb) screens of 250µm (0.010") and are always lead-backed with 150µm (0.006") to ensure optimal backscatter protection resulting in optimal image quality.

Technical Specifications - CR^{x}Flex

Functional Data		
Throughput (Cassettes/Hour)	35 x 43 cm (14 x 17")	54/Hour @ 100 µm
		27/Hour @ 50 µm
	18 x 24 cm (7 x 9")	80/Hour @ 100 µm
		40/Hour @ 50 µm
	Multi-plate scanning	
	e.g. 4 x (6 x 24 cm) OR 4 x (4.5 x 10")	216/Hour @ 100 µm
		108/Hour @ 50 µm
Laser Spot Size	30 µm	
Pixel Size	50 µm and 100 µm	
Bit Depth	16-bit Linear	
Image Buffer	256 MB	
Certifications	CE, UL, RoHS, CCC, WEEE	
Dimensions	693 W x 786 D x 497 mm H (27.3 W x 30.9 D x 19.6" H)	
Weight	75 kg (165 lb)	
Interface	FireWire (IEEE 1394)	

Electrical Data	
Voltage	100 - 240 V AC, autosensing
Frequency	50/60 Hz
Power Consumption	120 W standby, 320 W peak

Consumables	
Imaging Plate Sizes	All sizes up to 35 x 43 cm (14 x 17")
Custom Imaging Plate Sizes	Any size and/or shape up to 35 x 43 cm (14 x 17")
Cassette Sizes	35 x 43 cm (14 x 17")
	15x 30 cm (6 x 12")
	18 x 24 cm (7 x 9.5")

www.gesensinginspection.com

GEIT-40044EN(02/09)

GE
Measurement & Control

CR^{x}25P

Portable Computed Radiography

Portability, Versatility and Performance in Harsh NDT Environments

The CR^{x}25P computed radiography scanner from GE's Inspection Technologies business combines portability and durability with simple operation to create high-quality digital images within seconds.

The scanner is constructed to withstand the demanding conditions of industrial radiography for both in house and field service applications.

The proven imaging performance of the CR^{x}25P in conjunction with GE's phosphor plates is certified by the German BAM.

GE imagination at work

Extending Computed Radiography to Portable Applications

Designed for Field Service

Weighing only 21 kg (46 lb), the CR×25P is a truly portable computed radiography system designed especially for applications requiring multiple relocation. The scanner offers a portable digital imaging solution for in-house, field and even off-shore applications where size and weight portability are critical to the environment and workflow.

A lightweight extruded aluminum frame resists dents. Rubberized isolating/damping feet minimize vibration and thus protect image quality. Users can select a rugged hard case. For operation in almost any environment, a built-in rechargeable battery option is also available.

Critical decisions on the spot

The new scanner produces excellent quality digital images in just seconds. The image quality is reliably consistent and results are repeatable, enabling you to make critical decisions in almost real time.

Simple, Familiar Operation

The CR×25P scanner is extremely easy to use as it is seamlessly integrated into the Rhythm Software architecture. Imaging procedures are familiar because the system is built on familiar film techniques. Obtain quality digital images in three steps — Expose, Insert and View. These radiography systems produce a digital image by scanning reusable phosphor imaging plates (IP) coated with an X-ray photostimulable material. When exposed to X-ray or gamma rays emissions, the plate stores the image. Once the CR×25P scans the plate, the image is ready for viewing on a computer within seconds. An in-line erase feature allows you to erase images in a single continuous cycle, so that you can immediately reuse the plates. The CR×25P accepts Imaging Plates in all standard sizes up to 35 cm (14 in) wide, and a feed guide supports long plates during scanning.

Focus on Image Details

Once you have scanned the images into a computer, you can use Rhythm imaging software, delivered together with the scanner to magnify, invert, sharpen and enlarge the images. You can alter brightness and contrast or apply line segment and angle measurement tools Optional software tools like Flash!Filters enable instant image enhancement for faster reviewing and immediate decision-making. DICONDE image standards support retaining images and notes in a single file for consistent data management.

Economical and Eco-Friendly

By eliminating the need to chemically process film (along with the related costs including storage and disposal), the CR×25P cuts imaging expenses. Also, digital imaging aids in protecting the environment from harmful chemicals.

Key Features

- Truly portable computed radiography system suitable for in-house and field service
- High and standard resolution images, capable of a resolution of 17 micron, 25 micron, 50 micron and 100 micron
- Can operate in direct sunlight
- Eliminates need for film, chemicals, and processor maintenance, as well as storage and disposal procedures
- Accepts phosphor imaging plates up to 35 cm (14 inch) wide by any practical length, and custom shapes
- Flexible, wire-free imaging plates to conform to object shape
- Feed guide supports long imaging plates
- Works with X-ray and gamma sources including Se 75, Ir 192 and Co 60
- Customizable settings for optimum dynamic range
- Built-in eraser with manual or auto erase function
- Lightweight extruded aluminum frame
- Hard-cases available for transportation
- Optional self-contained battery
- BAM Design-Type tested

One Solution for Specific Applications

CR×25P Scanner

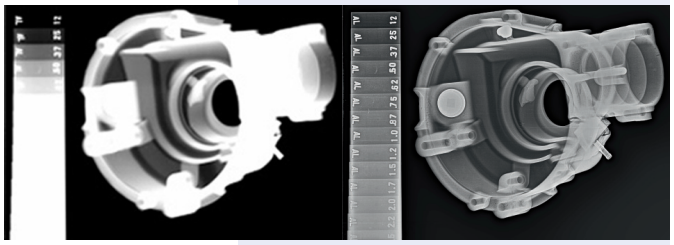
The CR×25P represent the latest generation of portable scanners. It features an upgraded plate transport system, which optimizes plate handling and accepts flexible phosphor imaging plates up to 35.5 cm (14 inch) wide. The scanner offers all the acknowledged benefits of computed radiography over film radiography in terms of faster exposures, wider latitude, fewer retakes and overall reduced materials and labour costs.
The new CR×25P replaces the CR50 for high contrast / medium resolution applications in the corrosion / erosion space. In addition, it extends the application space because of its high resolution mode at a pixel size of 17 and 25 micron and is therefore designed for weld inspection in compliance with international standards.

Imaging Plates

Our offering consists of different types of phosphor imaging plates. The plates have special/proprietary protection layers that prevent scratches and damage. Odd sizes and/or shapes up to 35 x 43 cm (14" x 17") imaging plates can be manufactured to support your specific application and scanned by the CR×25P.

Rhythm Software

The Rhythm Radiography software suite from GE combines advanced image acquisition, review and data management tools for all X-ray testing methods, including computed radiography, digital radiography and film digitization. Its advanced data sharing capabilities allow significant improvements in productivity and enable faster identification of quality problems, leading to reduced production defects or better in-service asset management.



Two views of the same component. Left image shows a conventional radiograph (raw image), the one on the right with Flash! Filters software applied (enhanced image).
See the difference in detail and resolution.

Key Features & Benefits

- **Save Time and Money:** Send information electronically to the inspection experts rather than sending the experts to the information. Automated Report Generators help to share information easily between workstations at different locations and within the supply chain.
- **Automate Specific Inspection Tasks:** Application specific tools improve process efficiency.
- **Improve Efficiency and Reproducibility:** Advanced image review tools for all modalities including computed radiography, digital radiography and film digitization.
- **Protect Your Investment:** Scalable architecture allows the solution to grow with your needs. DICOM/DICONDE compliance ensures your data will not become obsolete.
- **Reduce Training Requirements:** Quickly and easily learn this user friendly solution.

Technical Specifications - CR^{x}25P

Functional Data	
Dimensions	39 cm (15 1/2") W x 46 cm (18") L X 35.5 cm (14") H
Weight	20 kg (44 lbs.) without optional battery, 21 kg (46 lbs.) with optional battery
Grey Level Resolution	16 bit, 65536 greylevels
Laser Spot size	12.5 µm
User Selectable Scan Resolution	17 µm, 25 µm, 50 µm and 100 µm
Interface	USB
Accessories	Flight case, 55 cm (21 1/2") W x 63.5 cm (25") L x 56.5 cm (22 1/4") H, 16 kg (36 lbs) Image Plate Guide/Extension Kit Compatible Rhythm software required (not included)
Electrical Data	
Voltage	110-240 V AC
Frequency	50/60 Hz
Environmental Conditions	
Operating Temperature	20 to 104°F (-7 to 40°C), Humidity: 5% to 95% (Non-condensing)
Storage and Transport Temperature:	-21 to 130°F (-29 to 55°C), Humidity: 5% to 95% (Non-condensing)
Consumables	
Imaging Plate Sizes	All sizes up to 35 x 43 cm (14" x 17") Note: Images scanned in High-Res modes (17 µm, 25 µm) may exceed the file- and memory size limitations of the used operating system, application filters or software modules. Please ask your sales or service representative for detailed information on usable plate formats.
Certifications	
Class I laser Product, Compliance with FDA HHS 21 CFR 1040.10 and IEC 60825-1	
CE, UL	
BAM Design-Type Tested	

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GEIT-40051EN (04/11)

GE
Inspection Technologies

IPS & IPC2 Phosphor Imaging Plates

Computed Radiography

Exclusively designed for industrial use, targeting all classes in both ASTM and CEN standards, the IPS and IPC2 Imaging Plates from GE Inspection Technologies deliver superior image quality, exposure speed and enhanced life. The combination of a wide dynamic range and exposure latitude results in substantial reduction of downtime and greater throughput. Both plates are the latest high-tech components of GE's computed radiography systems for industrial applications.

Discover superior image quality

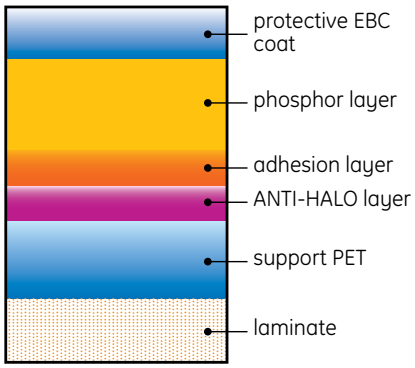
The storage phosphor in the IPS features excellent homogeneity and short response time. The previous pixel is fully faded before the laser stimulates the next one and, as a result, a very high level of sharpness and Signal-to-Noise Ratio (SNR) is obtained. The IPS imaging plate is ideal for weld inspection, castings, and honeycomb structure applications.

The storage phosphor in the IPC2 features high absorption efficiency with excellent homogeneity. This results in an extremely fast plate with higher image quality and better SNR than our traditional IPC. The IPC2 imaging plate is ideal for erosion-corrosion inspection applications.

Enjoy enhanced durability and lifespan

Both IPS and IPC2 plates are protected by an Electron-Beam-Cured (EBC) topcoat. This is proprietary technology for hardening a pre-polymer lacquer coat into a high-density polymer shield protecting the phosphor layer. The results are superb resistance to mechanical wear and extensive immunity to chemical cleaning solutions.

Overall, you'll enjoy greater return on your investment.

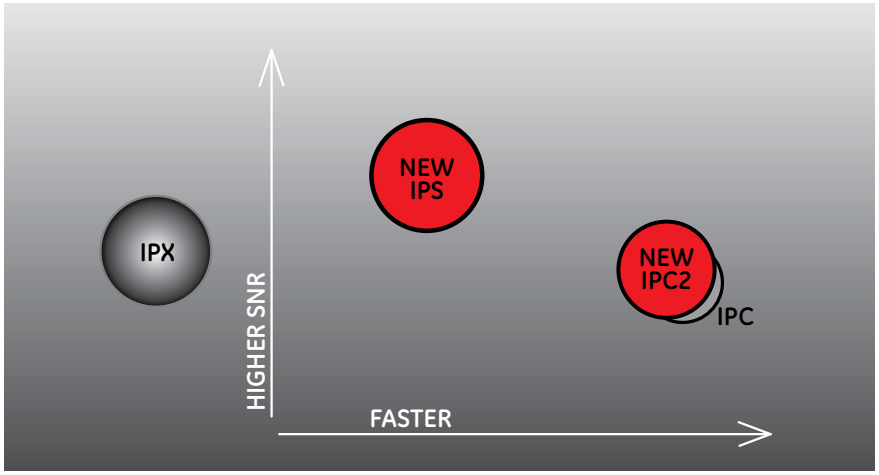


Profit from greater efficiency

The storage phosphors on our CR plates have a wide dynamic range, resulting in high tolerance conditions and a larger degree of freedom in selecting the used exposure dose.

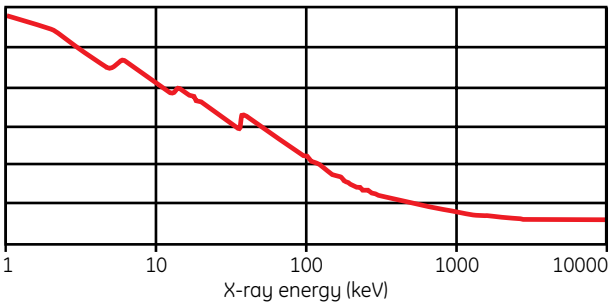
In addition, the wide exposure latitude of these imaging plates in many cases allows the visualization of all information with a single exposure - e.g. thick and thinner material. Combined, these features have the effect of drastically reducing the retake rate, helping substantially reduce downtime and/or facilitate higher throughput.

GE imagination at work

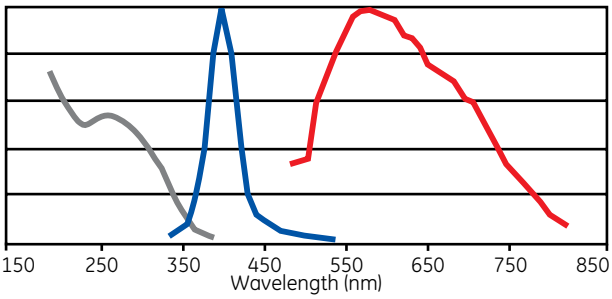


Relative exposure time and SNR using X-ray. The graph shows the improvement in speed, SNR and sharpness of the new IPS plates versus the former IPX. The new IPC2 results in an improved sharpness and SNR compared to the IPC.

Spectral absorption curve



Excitation-Emission-Stimulation



Technical specifications:

- Phosphor composition:
  - $BaSrFBrI:Eu^{2+}$
  - Typical luminescence: 390nm
- Sizes:

IPS:	14x17 inch	IPC2:	14x17 inch
	8x10 inch		8x10 inch
	6x12 inch		
	4,5x10 inch		
	4,5x17 inch		

  Customized sizes on request
- Handling:
  - Relative humidity: 30 – 80 %
  - Temperature: 10° C – 40° C (50° F – 104° F)
- Cleaning
  - For plate maintenance use only GE's Cleaning Wipes

GE Inspection Technologies
The evolution of NDT

When it comes to technology-driven, non-destructive testing (NDT) solutions, GE Inspection Technologies has been setting the global standard. Our radiography systems epitomize our expertise in pioneering and developing proven technologies that offer real, tangible benefits for industries from aerospace to oil and gas.

GE Film Digitizer

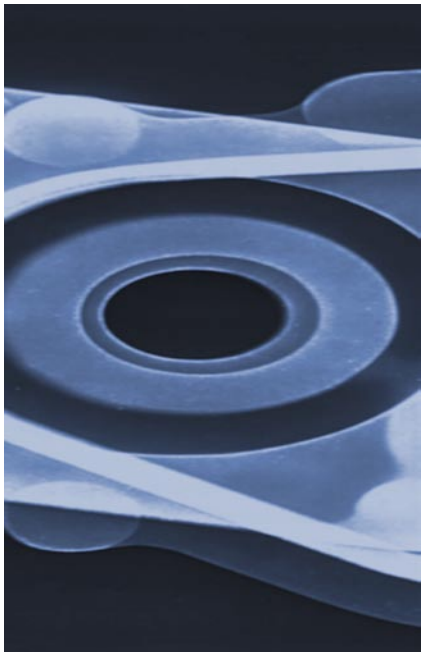
FS50 / FS50B

GE Film Digitizers FS50 / FS50B are designed to provide high-end performance in film digitizing, offering superior quality at high throughput. The steel housing gives the robustness needed for the industrial environment of NDT applications. All standard film formats can be digitized, up to a width of 14 inch (35 cm), without length limitation in any resolution between 50 µm and 500 µm. The FS50B is the first and only digitizer on the market that can handle the full density range (D = 0 up to 4.70 D) in one working range with the requested contrast sensitivity. This makes the scanner meet the requirements for class DS film digitizers, according to EN 14096 part 2. This classification has been evaluated and confirmed by BAM, the German Federal Institute for Materials Research and Testing.

The system employs a HeNe laser beam, which sweeps across the film by a polygon mirror system. The F-Teta lens avoids distortions of the image, by keeping the optical distance of the laser beam unchanged at all spots of the scanned area. The logarithmic amplification process guarantees high signal to noise ratios up to 4.70 density (FS50B).

Every scanner is calibrated and characterized at the time of shipment, and a unit-specific LUT is delivered with each machine. This guarantees an artifact-free scanning at the highest possible precision, repeatability and speed. A 14 x 17 inch film can be digitized in as little as 7 seconds.

The cost-effective film digitization solution for anyone handling archives, for easy image transfer or for using the advanced viewing features of the GE Inspection Technologies system.



Technical Specifications FS50 / FS50B

Light source	HeNe laser 632.8 nm
Laser scan resolution	50 µm to 500 µm in steps of 1 µm
Density range FS50	0.05 to 4.0 D
Density range FS50B	0.05 to 4.7 D
Scan speed	14 x 17 inch: 7 sec (Speed mode, 200 µm)
	14 x 17 inch: 120 sec (Quality mode, 50 µm)
Pixel depth	12 bit (4096 gray levels) logarithmic
Film size	Min: 60 mm - 2.4 inch width
	Max: 355 mm - 14 inch width
Weight	45 kg
Dimensions	526 x 764 x 330 mm - 13 x 21 x 30 inch
Interface	SCSI, SCSI II
Power	100 - 120 V; 200 - 240 V
	50 / 60 Hz; 400 W
Safety labels	CE, UL, GS
Operating condition	15 - 30 °C (59 - 86 °F), 30 - 75% RH
Storing condition	10 - 40 °C (14 - 104 °F), 10 - 90% RH
Transportation condition	10 - 50 °C (14 - 122 °F), 10 - 90% RH

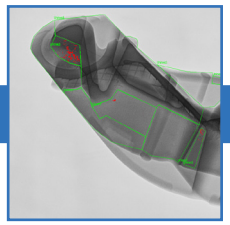
Film Digitizer FS50

GE
Measurement & Control

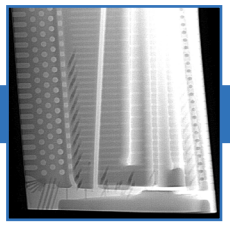
Radioscopic automotive and aerospace component inspection with up to 320 kV

Seifert x|cube series

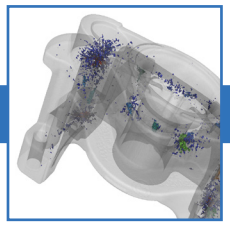
Versatile X-ray system for real-time 2D inspection with 3D computed tomography option



Assisted automatic 2D defect recognition (ADR) in an aluminum casting



Radiographic turbine blade inspection



Precise defect localization and quantitative porosity analysis with 3D CT

Key features & benefits

- Wide application range from automotive's high throughput requirements up to high resolution requirements for aviation casting
- The new 320 kV version comes with maintenance free high voltage plugs and can handle samples up to 300 kg
- Simple loading with extractable parts manipulator
- Max. sample size 600 x 900 mm (800 x 1,500 x|cube XL)
- Patented extremely low vibration C arm manipulator, flexible swivel angle of +45° to -45°
- Robust design and intuitive operator guidance with x|touch® control panel and teach and learn functions
- DICONDE standard compliant image management
- Optional CT functionality for virtual 3D sections and quantitative porosity analysis

2D X-ray real-time inspection

Flexible automotive and aerospace components assessment

Besides the inspection of safety-relevant castings in the automotive and aerospace industry, the Seifert x|cube is also applied in all areas of industry where there is a need for the fast and effective X-ray inspection of castings, welded structures, plastics, ceramics and special alloys. Its versatility means that it can be used equally well in production, incoming materials inspection and failure analysis environments. Its robust design and the software safety cage ensure it is also ideal for busy industrial areas. The proven Seifert inspection system is now even faster, more flexible and easier to use, while offering a full computed tomography option for when traditional 2D radioscopy is unable to provide clear results.

Designed for a wide application range

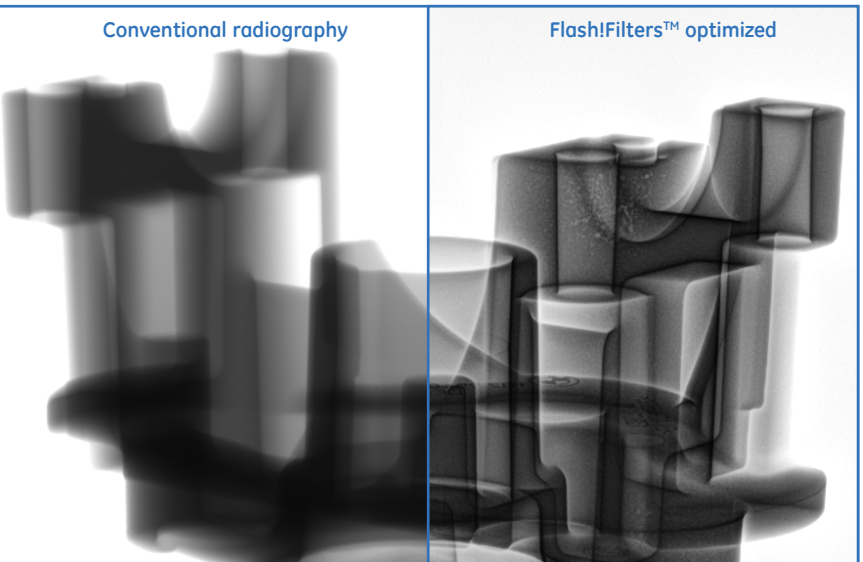
Depending on the inspection task, two x|cube models are available:

- The x|cube Compact is offered with 160 kV, 225 kV or 320 kV, and can handle workpiece dimensions of up to 600 mm diameter and 900 mm height, and an overall weight of up to 100 kg (max. 300 kg at 320 kV).
- The XL model, available with 160 kV or 225 kV, has a larger X-ray protection cabinet and is, thus, suitable for the X-ray inspection of parts with dimensions of up to 800 mm diameter and 1,500 mm height.

Fast, flexible and easy to use

A number of innovative elements ensure that the Seifert x|cube is extremely easy to use. Faster set-up, cycle and image management times result in improved productivity:

- Immediate operational availability without homing
- Fast PLC-type Fanuc servo drives
- Intuitive user guidance with teach and learn capabilities
- x|touch® panel for easy teach-in inspection program creation in less than 30 seconds
- Software safety cage to prevent collisions
- VISTAPLUS software for live, top quality images
- Optional automatic 2D defect recognition (ADR)



Flash!Filters™: See more – know more

GE's proprietary image optimization technology provides brilliant inspection results optimized for the human eye. This helps significantly to ensure short failure detection times and rich contrast increasing failure detection rate and therefore productivty. Two options are availiable:

- Flash!Filters™ for casting inspection
- Flash!Filters™ for weld inspection

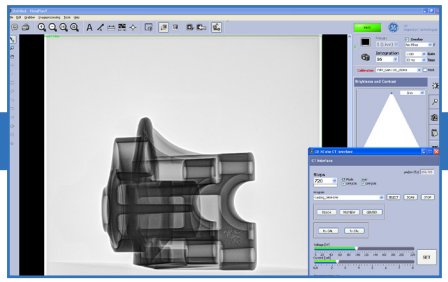
Quantitative 3D failure analysis with CT

Determine the shape, position and size of defects

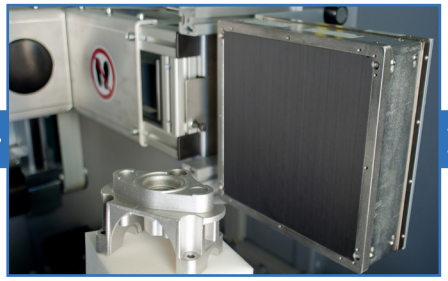
The new computed tomography option converts the Seifert x|cube into an extremely versatile inspection system that also enables detailed 3D inspections. Thanks to the highly dynamic GE DXR digital detectors, it is possible to display the finest contrast differences such as cased by hidden porosity. The program for CT set-up, image acquisition, volume reconstruction and visualization is easy to use. In contrast to 2D X-ray inspection, 3D analysis and process control using volume data offer considerable advantages:

- Reduction of the reject rate due to the 3D analysis of the position, shape and size of defects
- Depending on their size and their absorption behaviour, impurities, such as inclusions or sand core residue in castings or composite delamination, can be detected, located and classified according to their actual density and position

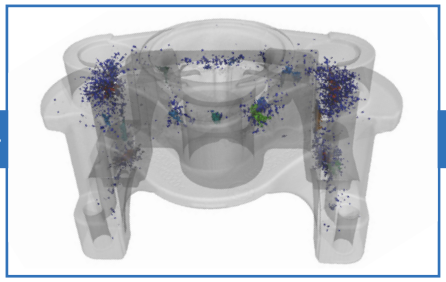
Computed tomography workflow:



With the GE intuitive software it takes just a few clicks to set up the CT scan...



... while the workpiece rotates in the X-ray beam, the extremely fast GE DXR flat panel detector captures a series of 2D radiographic images...



... the reconstructed volume is automatically opened for the 3D analysis and enables, e.g., any virtual sections and quantitative pore analyses.

ASTM and DICONDE compliant inspection solution

The x|cube ensures X-ray inspection according to international NDE standards:

- Interface to GE Rhythm software for inspection and automatic image archiving compliant with the international DICONDE standard which incorporates many features that are NDE-focused describing all of the necessary syntax, attributes and data elements

Seifert x|cube – your benefits

- **Fast and flexible for a wide range of 160, 225 or 320 kV applications**
- **Inspection task programming and ADR for high sample throughput**
- **Intuitive operator guidance**
- **Visual real-time inspection combined with optional 3D CT capability**
- **DICONDE compliant digital image analysis and data management**
- **Modular design configuration for customer oriented solutions**
- **All relevant hardware and software components are GE technology**
- **Reduced maintenance – lower operating costs**

Technical specifications

Seifert x|cube	Compact			XL	
Energy (max.)	160 kV	225 kV	320 kV	160 kV	225 kV
Max. sample size (Ø x height in mm)	600 x 900 **	600 x 900 **	600 x 900 **	800 x 1500**	800 x 1500**
Max. sample weight	100 kg *	100 kg *	300 kg *	100 kg *	100 kg *
Cabinet dimensions, incl. backpack (L x W x H in mm)	2540 x 1700 x 2455	2540 x 1700 x 2455	2540 x 2230 x 2400	2865 x 2106 x 3100	2865 x 2106 x 3100
Cabinet weight approx.	3950 kg	4550 kg	10.500 kg	6550 kg	6550 kg
Control panel weight approx.	350 kg				
Manipulation Travel					
Max. horizontal motion across the X-ray beam	650 mm		660 mm	850 mm	
Max. external loading/ unloading position	250 mm		150 mm	250 mm	
Max. horizontal motion magnification axis	650 mm		620 mm	850 mm	
Focus detector distance (FDD)	800-1000 mm		800-1050 mm	1000 - 1200 mm	
Max. vertical motion	900 mm		950 mm	1500 mm	
Max. tilt of the C arm	± 45°				
Max. sample rotation	n x 360°				
2D software	Integrated image optimization system VISTAPLUS, optional with semi-automatic defect recognition (pass/fail assessment by the operator)				
System control	Simple and intuitive system control and programming of recurring inspection tasks thanks to X-Touch® Panel				
Control / Drives	Hardware PLC PC independent / Fanuc servo drives				
Detector options	Selection of various digital flat panel detectors, e.g. temperature stabilized highly-dynamic GE DXR 250RT digital detector for pin sharp live images and very fast CT scans, the GE DXR 500 L detector for particularly high-resolution applications or the DXR 250 providing a large active area				
Flash!Filters™ option	Proprietary live image optimization technology for easier visual defect detection in castings or weldings				
Tube options	Various mini to macro focuses as well as various high-power X-ray tubes up to 320 kV for Compact, 225 kV for XL				
Computed tomography add-on	CT package contains all the required hardware and software components for combined 2D/3D operation with GE detectors				
CT scan range	Max. 170 mm Ø x 170 mm height at DXR 250RT 8"x8" detector				
Min. voxel size	Up to 100 µm, depending on the sample size				
Connection values / capacity	3N PE 400/230V 50/60 Hz, 35 A (160+225 kV), 50 A (320 kV), TN-S or TN-CS network / up to approx. 16 kVA***				
Earthing	Separate earthing for X-ray device and high-voltage generator (< 2 Ω) with at least 6 mm²				
Means of transport	Complete X-ray protection cabinet with fork lift truck / Control panel (on pallet) with fork lift truck				
Ambient conditions (in accordance with IEC 60 601-1)	Ambient temperature +10° C to +40° C, air pressure 700 hPa to 1060 hPa				
Compliant with national and international standards	ISO 9001; VDE 0100; UW; DIN EN 60204 (VDE 0113); VBG; DIN EN 60529 / IEC 529; German Radiation Control Act (RöV) of 1987 (with amendments in the current version); DIN EN 954-1; CFR 1020.40; DIN 54113				
Radiation protection	The radiation safety cabinet is a full protective installation without type approval according to the German RöV. It complies with French NFC 74 100 and the US Performance Standard 21 CFR Subchapter J. For operation, other official licenses may be necessary.				

* Depends on the loading position.

** Longer workpieces are possible, this involves the workpiece being reloaded and inspected.

*** Depends on the applied X-ray tube

Note: The inspection volume that can be X-rayed varies according to the total wall thickness and the material density.

www.ge-mcs.com/x-ray

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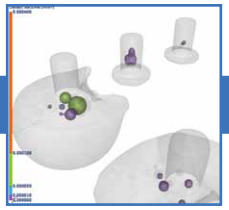
GEIT-30006 EN (12/15)

GE
Measurement & Control

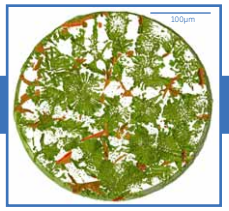
Unique spatial and contrast resolution on a wide sample range

phoenix nanotom m

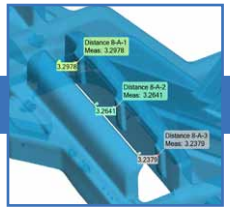
180 kV / 20 W X-ray nanoCT® system for high-resolution analysis and 3D metrology



nanoCT® of TSVs in an electronic package. The voids in the copper filling are clearly visible.



3D volume slice of an AlMg5Si7 alloy (Ø 350 µm): Fe-aluminides and Mg_2Si-phases.



3D metrology image of an injection molded part showing feature details.

Key features & benefits

- Unique temperature stabilized digital GE DXR detector (3,072 x 2,400 pixels) for a high dynamic range > 10,000 : 1 and up to 4 times faster data acquisition at the same high image quality level
- Granite-based manipulator for high stability
- Max. sample size 240 mm Ø x 250 mm in height
- New open 180 kV / 15 W high-power nanofocus X-ray tube with down to 200 nm detail detectability, optimized for long-term stability
- diamond|window for extremely high focal spot stability and up to 2 times faster data acquisition at the same high image quality level
- Down to 300 nm minimum voxel size
- Optimized ease of use due to intelligent system design and advanced phoenix datos|x CT software
- 3D metrology package with temperature stabilized cabinet and high accuracy direct measuring system

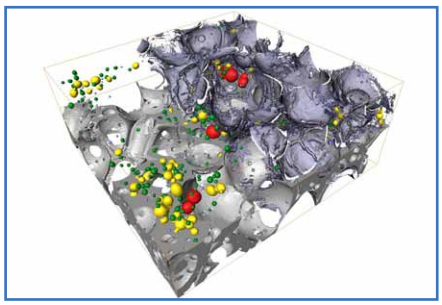
GE imagination at work

phoenix nanotom m

Versatile 3D computed tomography system

High-resolution computed tomography (CT) has become a powerful inspection tool for a wide range of industrial and scientific inspection and metrology applications such as non-destructive structure and failure analysis as well as for quality assurance or production control. With its 180 kV / 20 W ultra high performance nanofocus X-ray tube, precision mechanics and advanced software modules, the phoenix nanotom m is the inspection solution for a wide range of 3D CT applications. Once scanned, the fully three dimensional CT information allows many possibilities for analysis, e.g. non-destructive visualization of slices, arbitrary sectional views, or automatic pore analysis. Since the whole geometry of the object is scanned, precise and reproducible 3D measurements of complex objects and even the automatic generation of first article inspection reports within an hour are possible.

nanoCT® – closest to synchrotron CT



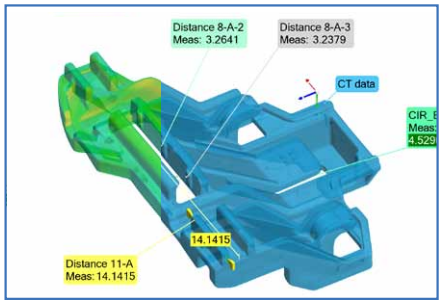
3D nanoCT® evaluation of artificial bone (ceramics matrix with aluminium coating)

With its special design, the nanotom m provides focal spot sizes in the submicron range. Smaller focal spots ensure very little geometric unsharpness and therefore improved image resolution. And due to the new high dynamic range GE DXR detector the system offers long-term stable and optimized image quality.

In pursuit of high-resolution images, the potential, convenience and economy of nanoCT can compete in many application fields with limited available synchrotron facilities, e.g.:

- Materials science
- Micro-engineering
- Electronics
- Life sciences
- Geosciences and much more

3D metrology with high-resolution CT



CAD variance analysis and measurement of 5 features of an injection molded part

Especially if complex parts with hidden or difficult accessible surfaces have to be measured, CT offers big advantages in comparison with conventional tactile or optical coordinate measuring machines (CMMs). With its optimized 3D metrology package, the phoenix nanotom m includes all essential features for CT with extremely high accuracy and reproducibility:

- Temperature stabilized cabinet
- High accuracy direct measuring system
- Vibration insulation of the manipulator
- Temperature stabilized GE DXR detector for brilliant image quality
- Long-term stability optimized X-ray tube with diamond|window – reduction of artefacts
- 2 calibration objects
- phoenix datos|x software “click & measure|CT” and “metrology”

First article inspection report in less than 1 hour possible

phoenix datos|x advanced CT software

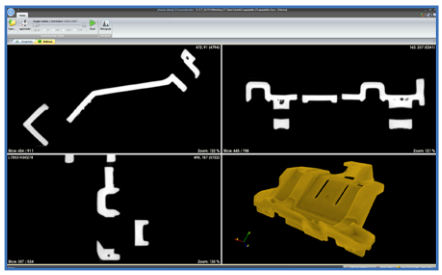
Fully automated data acquisition and volume processing

With datos|x, the entire CT process chain can be fully automated. This minimizes operator time and influence, while highly increasing the repeatability and reproducibility of CT results. Once the appropriate setup is programmed, the whole scan and reconstruction process incl. volume optimization features (e.g. automatic beam hardening correction) or surface extraction can be fully automated. Furthermore, 3D failure analysis or metrology tasks like generation of first article inspection reports can be executed automatically.

Precise, reliable and fast CT results

By using phoenix datos|x CT software, 3D metrology and failure analysis with phoenix|x-ray CT systems becomes as fast and easy as never before

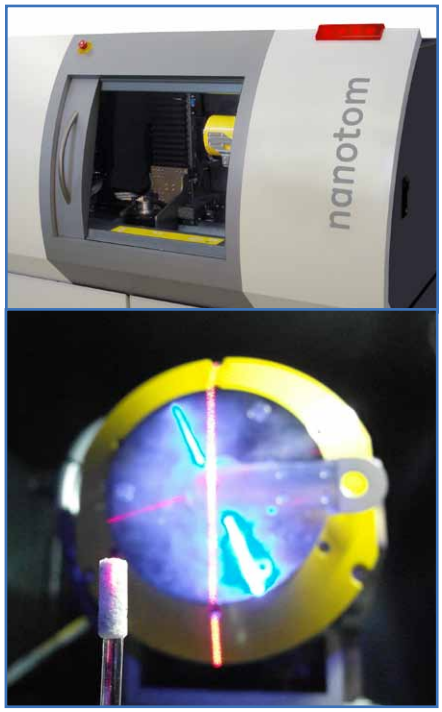
- click & measure|CT: Fully automated data acquisition and volume processing – insert sample, start CT scan, check results
- Reproducible high precision 3D metrology and failure analysis tasks performed with a minimum of operator training
- Significant reduction of required operator time by factor of up to 5
- Wide spectrum of modules for ease of use and accurate CT results
- Accelerated sample throughput due to batch CT scans and up to 9 times faster volume reconstruction



Intuitive graphical user interface for easy usage and a fast learning curve due to clear display of CT results in 2D axis views and 3D render mode.

phoenix nanotom m - Your Advantages

- Unique spatial and contrast resolution on a wide sample range - from small material to medium sized plastic samples covering 3 orders of magnitude (0.25 mm to 250 mm sample size)
- Optimized 3D metrology package for stable acquisition conditions, fast reconstruction within minutes and reproducible measurement results
- Extremely high image quality due to unique temperature stabilized GE DXR detector (3,072 x 2,400 pixels) with a high dynamic range > 10,000 : 1
- Max. sample size 240 mm Ø x 250 mm in height and 3 kg (6.6 lbs.) in weight
- Automatic and continuous adjustment of the magnification
- Optimized ease of use due to system design and advanced phoenix datos|x CT software



New tube design optimized for long-term stability

Technical Specifications & Configurations

	phoenix nanotom s	phoenix nanotom m
X-ray tube type	Proprietary open high-power nanofocus X-ray tube, optimized for long-term stability	
	Optional X-ray tube cooling	Internal X-ray tube cooling
Max. voltage / power	180 kV / 20 W	
Target	Tungsten on beryllium (optional tungsten on CVD diamond)	Tungsten on CVD diamond for up to 2 times faster data acquisition at the same high image quality level
	Transmission target type, rotatable for multiple use (other target materials, e.g. molybdenum on request)	
Filament	Tungsten hairpin, pre-adjusted plug-in cartridges for fast and easy exchange	
Geom. magnification (3D)	1.7 x - 250 x	1.5 x - 300 x
Detail detectability	Down to 200 nm (0.2 microns)	Down to 200 nm (0.2 microns)
Min. voxel size	Down to 500 nm (0.5 microns)	Down to 300 nm (0.3 microns)
Detector type	High-Contrast|Detector HCD 120-50, 12 bit, 3 x virtual detector enlargement (max. 6,900 pixel detector width)	Temperature-stabilized high dynamic GE DXR, 14 bit, 1.5 x detector enlargement (max. 4,600 pixel detector width)
Pixels	2,300 x 2,300	3,072 x 2,400
Pixel size	50 µm	100 µm
Manipulation	Granite based 5-axes manipulator with vibration insulation, precision rotation table on air bearings	
Variable focus detector distance	from 200 mm to 500 mm	from 220 mm to 600 mm
Max. sample diameter	< 1 mm to 120 mm	< 1 mm to 240 mm
Max. sample height / weight	150 mm / 2 kg (4.4 lbs.)	250 mm / 3 kg (6.6 lbs.)
Sample travel length Y / Z	150 mm / 300 mm	250 mm / 400 mm
Rotation	0° - 360° x n	
System dimensions	1,630 mm x 1,432 mm x 740 mm (64.2" x 56.3" x 29.1")	1,980 mm x 1,600 mm x 925 mm (78" x 63" x 36.4")
System weight	Appr. 1,300 kg / 2,870 lbs.	Appr. 1,900 kg / 4,190 lbs.
Optional 3D metrology bundle		Temperature stabilized cabinet, high accuracy direct measuring system, calibration|object, datos|x module packages "metrology" and "click & measure|CT"
Software	phoenix datos|x 3D computed tomography acquisition and reconstruction software. Different 3D evaluation software packages for 3D metrology, failure or structure analysis on request.	
CT reconstruction	phoenix datos velo|CT speed (2 GPUs)	phoenix datos velo|CT high-speed (5 GPUs)
Basic datos|x modules	auto|ROI, sector|scan, fast|scan, multi|scan, multi|volume reconstruction, agc|module - automatic geometry calibration, bhc+|module - automatic beam hardening correction, rar|module - ring artefact reduction,	
Optional modules	datos|x module package 3D "metrology", datos|x module package "click & measure|CT"	
Optional advanced sample manipulation	Manual XY highly accurate positioning table, tensile & compression testing stage system, coolstage specimen cooling unit	
		Motorized XY-table with two linear axes
Radiation protection	The radiation safety cabinet is a full protective installation without type approval according to the German RöV. complies with French NFC 74 100 and the US Performance Standard 21 CFR Subchapter J. For system operation, other official licenses may be necessary	

www.ge-mcs.com/phoenix

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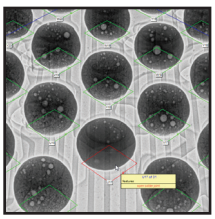
GEIT-31344EN (09/14)

GE
Measurement & Control

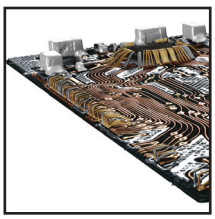
Now with non-destructive planarCT board inspection

phoenix microme|x / nanome|x

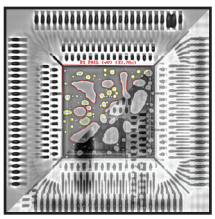
High resolution 180 kV micro- / nanofocus X-ray inspection systems with 3D CT option



Open BGA ball with live CAD data overlay and Flash! Filters™ image optimization



3D Computed Tomography of an USB flash drive



Advanced planarCT evaluation (left) without overlaying features in the X-ray image

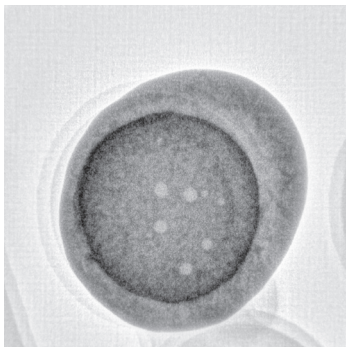
Unique features

- Temperature stabilized digital DXR detector with active cooling for high dynamic live imaging
- 180 kV / 20 W high-power micro- /nanofocus tube with up to 0.5 µm or 0.2 µm detail detectability
- x|act package for CAD based µAXI programming and automatic inspection
- diamond|window for up to 2 times faster data acquisition at the same high image quality level
- Optionally 3D computed tomography scans within 10 seconds

phoenix microme|x / nanome|x

The high performance X-ray inspection solution

The phoenix microme|x and nanome|x series combines high-resolution 2D X-ray technology and 3D CT in one system. Innovative and unique features and an extreme high positioning accuracy make both systems the effective and reliable solution for a wide spectrum of 2D and 3D offline inspection tasks: R&D, failure analysis, process and quality control.
The phoenix|x-ray x|act technology offers easy to program CAD based µAXI ensuring automated inspection in the micrometer range. Another unique benefit is GE´s highly dynamic DXR flat panel detector with active cooling. Offering up to 30 frames per second, it provides outstanding brilliant live imaging and fast data acquisition for 3D CT.



Flash! filtered voids in an open µBGA ball: 1,970x geometric zoom for extreme high magnification

Brilliant DXR-*HD* live imaging

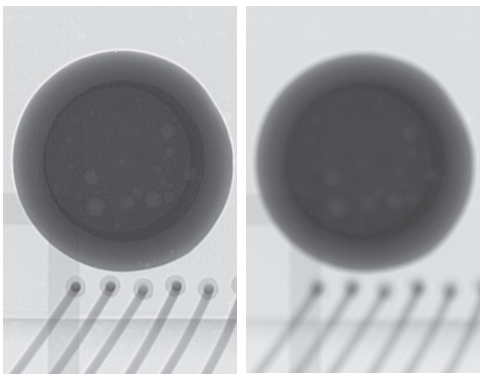
With GE´s proprietary high dynamic DXR detector with enhanced scintillator technology phoenix|x-ray introduces a new industry standard for efficient live inspection:

- Full frame rate of 30 frames per second at 1000x1000 pixels offers low noise coupled with brilliant image quality ensuring fast and detailed live inspection
- Active temperature stabilization for precise and reliable inspection results
- Extremely fast data acquisition in 3D CT mode
- Detail detectability down to 0.5 µm / 0.2 µm for high performance failure analysis

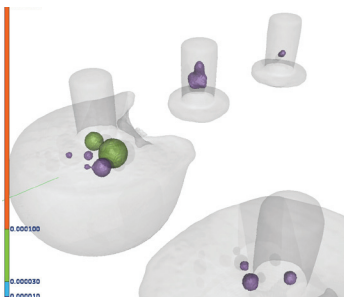
High output with high-resolution: diamond|window

Compared to conventional beryllium targets, the diamond|window allows higher power at a smaller focal spot. This ensures high-resolution even at a high output.

- Up to 2 times faster CT data acquisition at the same high image quality level
- High output with high-resolution
- Non-toxic target
- Improved focal spot position stability within long term measurements
- Increased target lifetime due to less degradation with higher power density



diamond|window beryllium window
(same X-ray tube parameter: 130 kV, 11.4 W)



nanoCT® of TSVs in an electronic package. The voids in the copper filling are clearly visible.

High-resolution 3D computed tomography

For advanced inspection and 3D analysis of smaller samples, phoenix|x-ray's proprietary 3D CT technology is optionally available.

- 180 kV high power X-ray technology, fast image acquisition with DXR detector and diamond window combined with phoenix|x-ray's fast reconstruction software deliver high quality inspection results
- Maximum voxel resolution down to 2 microns; the nanoCT® capability of the nanome|x allows even a higher image sharpness

x|act - CAD based inspection:

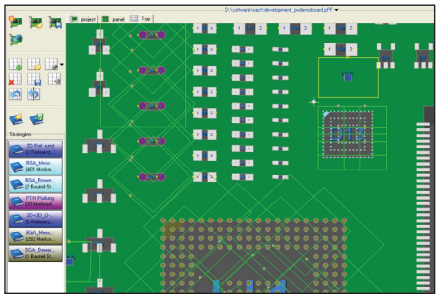
high resolution µAXI for extremely high defect coverage

As a solution for µAXI with extremely high defect coverage, phoenix|x-ray provides its high precision systems microme|x and nanome|x including the unique x|act software package for fast and easy offline CAD programming. Outstanding precision and repeatability, small views with resolutions of only a few micrometers, 360° rotation and oblique viewing up to 70° ensures meeting highest quality standards - even for inspection of components with a pitch of just 100 microns. Besides automated inspection, x|act ensures an easy pad identification by its live CAD data overlay function even in manual inspection while Flash! Filters™ image optimization ensures high defect coverage.

Efficient CAD programming

x|act provides not only a minimal setup time compared with conventional view based AXI - once programmed, the inspection program is portable to all x|act compatible systems.

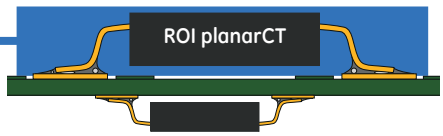
- Easy pad-based offline programming
- Specific inspection strategies for different pad types
- Fully automated inspection program generation
- Extremely high positioning accuracy even at oblique viewing and rotation
- Easy pad identification in manual X-ray inspection
- High reproducibility on large PCBs



Fast and easy programming: just assign the inspection strategies and let x|act generate the automated inspection program

Virtual board slicing with planarCT

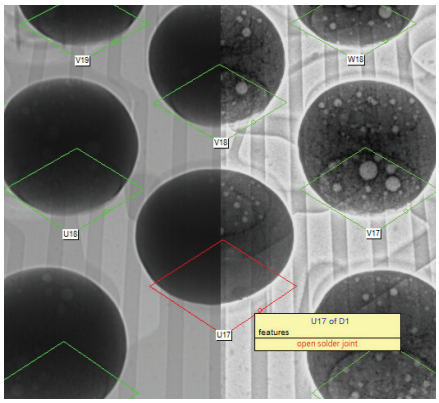
- Easy 2D slice or 3D volume evaluation of large complex boards
- No board cutting, no overlaying structures as in X-ray images



planarCT slice or multislice views allow exact inspection results of a single plane or a whole package

micro- / nanome|x – Your Advantages

- **Brilliant live inspection images due to high dynamic GE DXR digital detector array**
- **Unique high power 180 kV / 20 W submicron or nanofocus* tube for even high absorbing electronic samples**
- **Minimized setup time due to highly efficient automated CAD programming**
- **Live overlay of CAD and inspection results even in rotated oblique inspection views**
- **Extremely high defect coverage and repeatability**
- **Detail detectability down to 0.5 µm or even 0.2 µm**
- **Optional Flash! Filters™ image optimization technology**
- **Optional advanced failure analysis with high resolution 3D micro- or nanoCT® or large board planarCT**
- **Optional 3D CT scans up to 10 seconds**



x|act provides live CAD overlay and inspection results in the X-ray live image - at any time, at any viewing angle. GE's exclusive Flash! Filters technology option enables faster, more reliable failure detection (right)

* Nanofocus 20 W only with diamond window, otherwise 15 W

Technical Specifications & Configurations

System magnification and resolution

Geometric magnification:	DXR max. 1,970 x; max. 2,130 x with image intensifier
Total magnification:	DXR max. 2,660 x; max. 22,150 x with image intensifier
Detail detectability:	up to 0.5 µm; nanome|x up to 0.2 µm

180 kV microfocus or nanofocus X-ray tube

Type	Low maintenance open microfocus tube with unlimited lifetime, transmission type, 170° cone angle, collimated
Maximal tube voltage	180 kV
Maximal tube output	20 W (15 W nanofocus tube without diamond window)
Target:	Optional non-toxic diamond|window (tungsten on CVD support) for up to 2 times faster data acquisition at the same high image quality level
Filament:	Tungsten hairpin, pre-adjusted in plug-in cartridges for fast and easy exchange

X-ray detector

Type:	High dynamic GE DXR250RT, temperature stabilized with active cooling for brilliant live imaging and extremely fast CT data acquisition. (Image intensifier and for nanome|x dual|detector configuration also available.)
Pixels:	1000 x 1000 pixels
Resolution (pixel size):	200 x 200 micrometer
Frame grabbing rate:	Up to 30 fps at full frame

Precise manipulation

General construction:	high-precision vibration-free synchronised 5-axes manipulation
Max. inspection area:	460 mm x 360 mm (18" x 14") 610 mm x 510 mm (24" x 20") without rotation table
Max. sample size/weight:	680 mm x 635 mm (27" x 25") / 10 kg (22 lbs.)
ovhm – oblique view at highest magnification :	continuously adjustable view angle up to 70°, rotation 0° - 360°
Control:	Joystick or mouse control (manual mode) and CNC (automatic mode)
Manipulation aids:	sample X-ray mapping, click'n-move-to function, click'n-zoom-to function, automatic isocentric manipulator movement, laser crosshair
Anti-Collision System:	may be deactivated for maximum magnification (tube touching the sample)

System dimensions

Dimensions (W x H x D):	2,020 mm x 1,920 mm x 1,860 mm (79.5" x 75.6" x 73.2"); (D with console: 2,160 mm (85")
Min. transportation width:	1,560 mm (61.4")
Weight:	appr. 2,600 kg / 5,732 lbs.

Radiation Protection

The radiation safety cabinet is a full protective installation without type approval according to the German RöV and the US Performance Standard 21 CFR Subchapter J. For operation, other official licenses may be necessary

Advanced image processing

phoenix x|act:	comprehensive CAD based X-ray inspection software comprising image enhancement functions, measuring functions and fast and easy automated CAD based programming for automatic inspection
bga|module (standard):	Intuitive automatic view based BGA solder-joint evaluation incl. automatic wetting analysis
vc|module (standard):	Intuitive automatic view based voiding calculation software package incl. capability of multiple die attach voiding evaluation

Software Configuration (Option)

x|act BGA check strategy:	automated CAD based analysis of BGA solder joints
x|act PTH check strategy:	automated CAD based analysis of PTH solder joints
qfp|module:	automated QFP solder joint evaluation
qfn|module:	automated inspection of QFN / MLF solder joints
pth|module:	automated pin-through-hole solder joint evaluation
c4|module:	view based evaluation of round solder joints with background structure, such as C4 bumps
ml|module:	view based registration of multilayer printed circuit boards
quality|review:	visual interface for rework and failure indication
Flash! Filters™:	GE's exclusive image optimization technology
planarCT module:	Non destructive 2D slice and 3D volume board evaluation incl. 3D|viewer software

Hardware Configuration (Option)

Tilt / rotate unit:	tilt ± 45° and rotation n x 360° for samples up to 2 kg
Manual bar code reader:	for product identification

Computed Tomography (Option)

Upgrade package for combined 2D / 3D (computed tomography) operation

CT-unit:	precision rotation axis
Volume acquisition / reconstruction software:	phoenix datos|x
Max. geom. magnification:	100 x (CT)
Max. voxel resolution:	down to 2 µm, resolution depending on the sample size. The nanoCT® function of the nanome|x allows a higher image sharpness.

www.gemeasurement.com/x-ray

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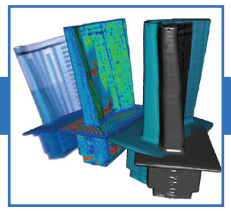
GEIT-31343EN (11/15)

GE
Measurement & Control

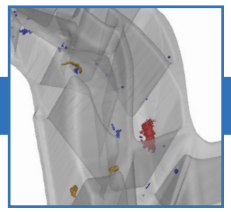
First industrial microCT system with advanced scatter|correct technology

phoenix v|tome|x m

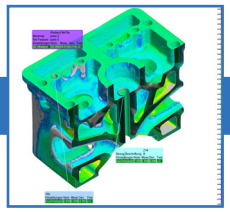
Powerful versatile X-ray microfocus CT system for 3D metrology and analysis with up to 300 kV / 500 W



3D analyses of a scanned turbine blade.



Automatic pore volume analysis in an aluminum casting.



3D measurements and nominal-actual CAD comparison on an aluminum cylinder head.

Key features & benefits

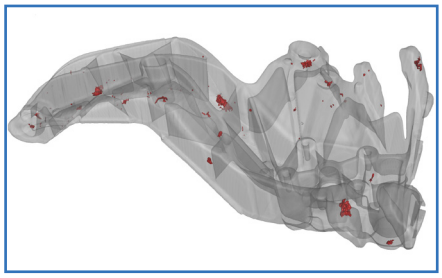
- scatter|correct: highly improved CT quality level compared to conventional mikrofocus cone beam CT
- Industry leading magnification and power at 300 kV for high absorbing samples on a wide application range
- Unique dual|tube configuration for high power µCT as well as high resolution nanoCT®
- First compact 300 kV microfocus CT system with < 1 µm detail detectability
- metrology|edition for precision measurements with up to 4+L/100 µm referring to VDI 2630 guideline*
- Max. sample size up to 500 mm Ø x 600 mm in height; 3D scanning area max. 290 mm Ø x 400 mm; up to 50 kg (110 lbs.)

phoenix v|tome|x m

High-end tool for 3D industrial and scientific analysis tasks

Within the phoenix v|tome|x m, GE's unique 300 kV microfocus X-ray tube is for the first time available in a compact CT system for industrial process control as well as for scientific research applications. Beyond down to < 1 µm detail detectability, the system offers industry leading magnification and power at 300 kV. GE's high dynamic DXR digital detector array and the click & measure|CT automatization functionality make it an efficient 3D tool for industrial inspection and scientific research. Due to its dual|tube configuration, detailed 3D information for an extremely wide sample range is provided: from high resolution nanoCT® of low absorbing samples up to high power µCT applications such as turbine blade inspection.

Industrial non-destructive 3D testing

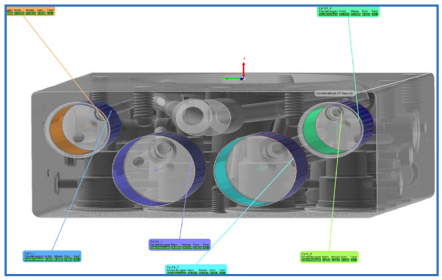


Automated 3D porosity analysis in an automotive control arm

Beyond high-resolution 3D analysis in R&D and failure analysis labs, the phoenix v|tome|x m allows even 3D production control due to its powerful 300 kV tube and high dynamic detector technology for fast CT acquisition, fast velo|CT volume reconstruction and its high automation grade. Applications are, e.g., in light metal casting, electronics assembly, plastics molding as well as in turbine blade inspection:

- Internal defect analysis / 3D quantitative porosity analysis
- Assembly control
- Materials structure analysis

Reproducible precision 3D metrology with CT

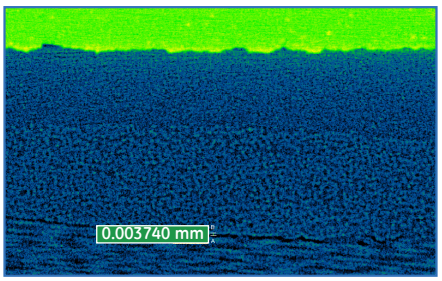


3D metrology of internal features of a valve block made of high grade aircraft aluminum

Especially if complex parts with hidden or difficult accessible surfaces have to be measured, 3D CT offers big advantages in comparison with conventional tactile or optical coordinate measuring machines (CMMs) e.g. for work piece qualification and fast first article inspection. Optimized for long term stability and equipped with its specific 3D metrology package and advanced scatter|correct technology, the phoenix v|tome|x m includes all essential features for CT with extremely high accuracy and reproducibility:

- Accuracy specification of 4+L/100 µm referring to VDI 2630 guideline*
- Nominal-actual CAD comparison
- Dimensional measurements / wall thickness analysis
- Reverse engineering / tool compensation

Explore the 3rd dimension of science



nanoCT® of an aluminium plate (green) welded with carbon fibers in polyamide matrix

With it's high resolution 180 kV nanoCT® option, the new phoenix v|tome|x m opens a non destructive third dimension for scientific research down to the submicron scale - with no required preparation, slicing, coating or vacuum treatment. Analyze biomedical, materials science, composite, electronics or geological samples with down to < 1 micron voxel size.

Compact CT system with unique dual|tube combination

phoenix datos|x CT software

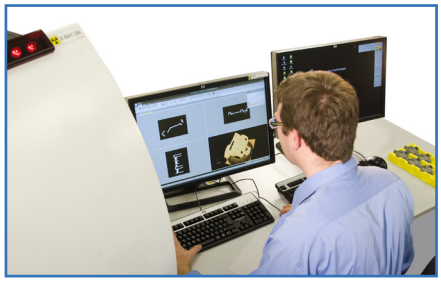
Fully automated data acquisition and volume processing

With datos|x, the entire CT process chain can be fully automated. Once the appropriate setup is programmed, the whole scan and reconstruction process as well as 3D failure analysis or metrology evaluations like generation of first article inspection reports can be executed automatically.

Precise, reliable and fast CT results

By using phoenix datos|x CT software, 3D metrology and failure analysis with phoenix|x-ray CT systems becomes as fast and easy as never before.

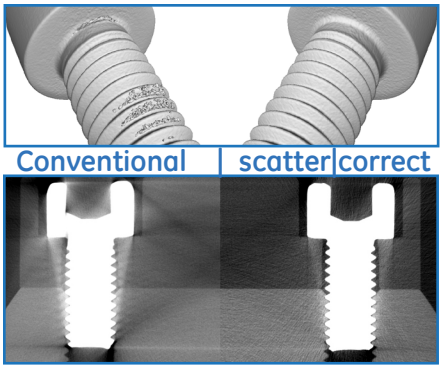
- click & measure|CT: Fully automated data acquisition and volume processing – insert sample, start CT scan, check results
- Reproducible high precision 3D metrology and failure analysis tasks performed with a minimum of operator training
- Significant reduction of required operator time by factor of up to 5
- Wide spectrum of modules for ease of use and accurate CT results



Easy and user friendly CT operation and evaluation.

Unique scatter|correct technology

GE's breakthrough scatter|correct technology innovation is exclusively available in industrial microCT for the v|tome|x m system. This technological advancement automatically removes scatter artifacts from the CT volume, allowing users to gain significant improved CT results compared to conventional cone beam microCT.



Compared with conventional cone beam CT, scatter|correct significantly improves the result quality of CT

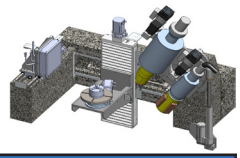
phoenix v|tome|x m - Your Advantages

- **Reduced CT artifacts by up to 300 kV X-ray radiation and advanced, high quality scatter|correct option**
- **High precision 3D metrology referring to VDI standard 2630 and non destructive testing tasks performed with minimal operator training**
- **Increased 3D inspection throughput due to high power X-ray tube, efficient, fast detector technology and a high grade of automation**
- **Very high image quality due to unique GE DXR detector array with an extremely high dynamic range**
- **All major hardware and CT software components of the system are proprietary GE technology optimally compatible with one another**
- **Significant reduction of required operator time by using the click & measure|CT functionality**
- **Stability optimized CT acquisition conditions due to temperature stabilized X-ray tube, digital detector array and cabinet**

The unique 300 kV microfocus X-ray tube allows 3D scans even of large or high absorbing work pieces.

CT - measure and control with insight

Technical Specifications & Configurations



	phoenix v|tome|x s	phoenix v|tome|x m**
X-ray tube type	Open directional high-power microfocus X-ray tube, closed cooling water circuit. Optional additional (open) transmission high power nanofocus X-ray tube	
Max. voltage / power	240 kV / 320 W	300 kV / 500 W. Alternatively available with 240 kV / 320 W microfocus X-ray tube
	Optional additional 180 kV / 15 W in dual|tube configuration. Easy tube exchange just by a push of a button	
Geometrical magnification (3D)	1.46 x to 100 x; up to 200 x with nanofocus tube	1.3 x to 100 x at 800 mm FDD (min. sample Ø 2 mm), up to 200 x with nanofocus tube
Detail detectability	Down to < 1 micron (microfocus tube); optional down to < 0.5 micron (nanofocus tube)	
Min. voxel size	Down to 2 microns (microfocus tube)	Down to 1 micron (microfocus tube)
	Optional down to <1 micron (nanofocus tube)	
Measurement accuracy		4+L/100 µm referring to VDI 2630-1.3 guideline* /**
Detector type (all according US ASTM E2597-07 standard)	Temperature stabilized digital GE DXR detector array, 200 µm pixel size, 1,000 x 1,000 pixels, 200 x 200 mm, extremely high dynamic range > 10000:1, 2x detector enlargement	Temperature stabilized digital GE DXR detector array, 200 µm pixel size, 2000 x 2000 pixels, 400 x 400 mm, extremely high dynamic range > 10000:1
	Optional 400 x 400 mm large 4 MPixel DXR detector (without detector enlargement)	
Manipulation	6-axes metal precision manipulator	Granite based precision 5-axes manipulator (6-axes with detector shift)
Focus-detector-distance	800 mm	800 mm fixed
Max. sample diameter x height	max. 3D scanning size up to 260 mm x 420 mm	360 mm x 600 mm; up to 500 x 600 mm with limited travel range, max. 3D scanning size up to 290 mm x 400 mm
Max. sample weight	max. up to 10 kg (220 lbs.)	High accuracy CT up to 20 kg (44 lbs.); max. up to 50 kg (110 lbs.)
Focus object distance (microfocus tube)	7 mm to 545 mm	8 mm to 600 mm at FDD 800 (min. sample Ø 2 mm)
System dimensions W x H x D	2,170 mm x 1,690 mm x 1,500 mm (85.4" x 66.5" 59")	2,620 mm x 2,060 mm x 2,980 mm (103" x 81" x 117.3) D 1,570 mm (62") without user panel and generators
System weight (without ext. components)	Appr. 2,900 kg / 6,400 lbs.	Appr. 7,960 kg / 17,550 lbs. (300 kV configuration) Appr. 6,410 kg / 14,150 lbs. (240 kV configuration)
Temperature stabilization	Active X-ray tube cooling | temperature stabilized detector	Active X-ray tube cooling | temperature controlled cabinet | temperature stabilized detector
Optional scatter|correct hard-/software bundle (also uprade option)		CT quality like 2D fan beam CT with minimized scatter radiation artifacts. Max. scan diameter: 260 mm, geom. magnification 1,51x - 100x
Opt. 2D inspection bundle	Tilt and rotation axes for tilted 2D inspection of samples up to 10 kg (22 lbs.) | 2D inspection software	
Opt. 3D metrology bundle** (also uprade option)	High accuracy direct measuring system | 2 calibration objects | phoenix datos|x CT software package "metrology"	
Opt. nanoCT® bundle	180 kV / 15 W high power nanofocus tube | Precision rotation unit with air bearings | diamond|window	
Opt. click&measure|CT	Optional fully automated CT process chain	included
Software	phoenix datos|x 3D computed tomography acquisition and reconstruction software. Different 3D evaluation software packages for 3D metrology, failure or structure analysis on request	
Radiation protection	The radiation safety cabinet is a full protective installation without type approval according to the German RöV. It complies with French NFC 74 100 and the US Performance Standard 21 CFR Subchapter J. For operation, other official licenses may be necessary.	

* Measured as deviation of sphere distance in tomographic static mode SD(TS), method details referring to VDI 2630-1.3 guideline on request, valid only for phoenix v|tome|x m metrology edition

** phoenix v|tome|x m metrology|edition only available in specific countries at present, more information on request

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GEIT-31319EN 01/16)

www.gemeasurement.com/x-ray

GE
Measurement & Control

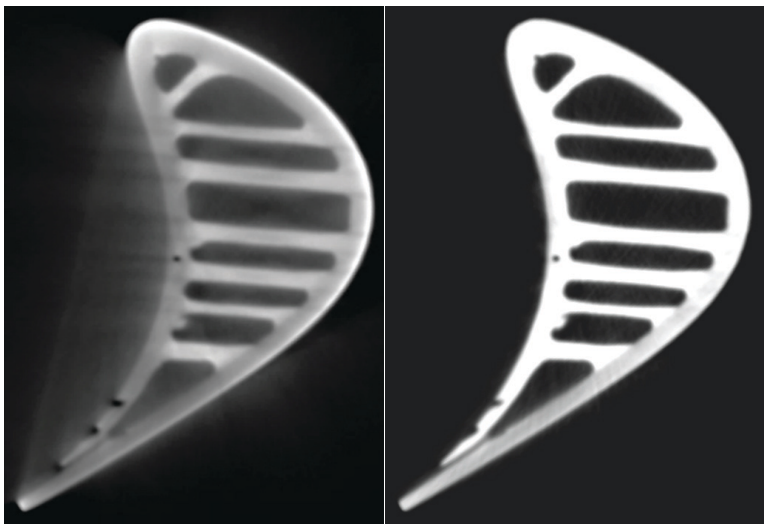
Boosting CT inspection speed and precision

scatter|correct

Unique tool for high quality scatter reduced industrial CT scans acquired in significantly shorter scan time

Key features & benefits

- **Low artifact high precision performance of fan beam CT combined with up to 100 times faster* inspection speed of cone beam CT**
- **Provides significant quality improvement not only for high scattering materials such as steel and aluminium, but also for composites and multi material samples**
- **Proprietary GE technology - exclusively available as option for the industrial mini- and microCT scanner phoenix v|tome|x c and m as well as upgrade package for installed m systems**



Conventional cone beam CT with scatter radiation artifacts

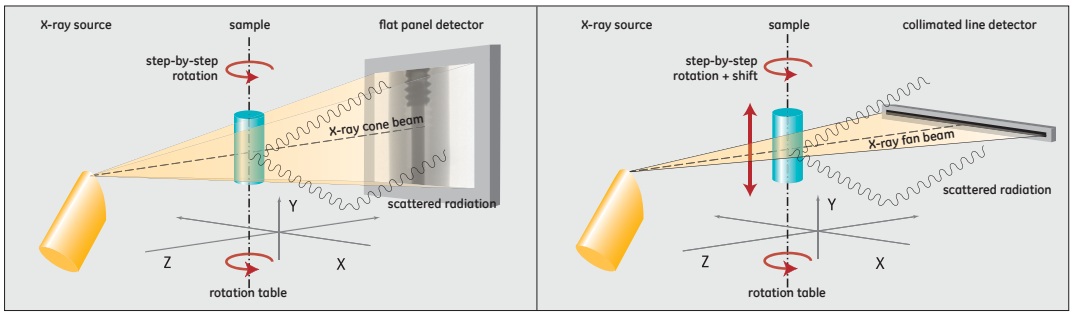
Advanced scatter|correct cone beam CT

*) While a typical fan beam CT scan of 1000 slices requires 1 minute per slice = 1000 minutes, a cone beam CT scan requires only 10 minutes.

The problem: scattered radiation decreasing CT speed or quality

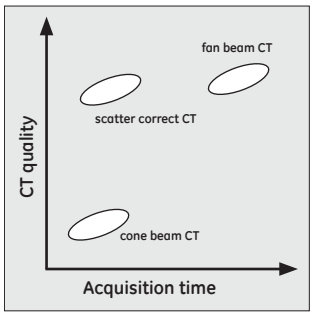
At industrial **cone beam CT**, a high dynamic flat panel detector capturing thousands of slices parallel is being used for generating volumetric data of the whole scan part comparatively fast in just one 360^0 rotation. Until now, X-ray scatter resulting in spurious X-rays meeting the detector array from directions not along the source-detector path **negatively impacts the CT quality**.

To significantly reduce scattering artifacts at high X-ray energy, **fan beam CT** with collimated line detector arrays has been the ultimate solution for decades. Due to acquiring data for only one CT slice at a time and vertically shifting the sample in the fan beam to repeat the procedure few hundred times, this CT technique **requires hours instead of minutes per CT scan**.



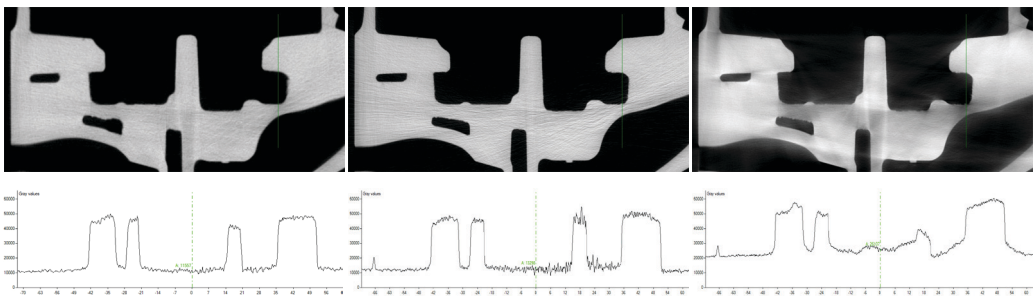
Conventional **cone beam CT** with scattered radiation hitting the detector

Scatter artifact reduced slice-by-slice **fan beam CT**



Relation between acquisition time and CT quality

The solution: scatter|correct for high speed, high quality CT scans



Conventional fan beam CT
2 hrs. scan time

scatter|correct optimized
9 min. scan time*

Conventional cone beam CT
9 min. scan time

*) scatter|correct requires one initial correction scan per part type

For industrial process control, excellent CT quality at high sample througput is evident.

GE's proprietary scatter|correct option is a combination of hard- and software advances allowing users to scan large sample batches in reasonable time as well as significantly reducing scattering artifacts to improve the precision of failure analysis and 3D metrology inspection tasks.

scatter|correct - Your Advantages

- GE's proprietary scatter|correct functionality allows customers to gain CT quality never before reached with industrial flat panel based cone beam CT
- Combining high precision fan beam CT quality with high throughput of fully automated cone beam CT
- Clearly improved quantitative volume evaluation, e.g. automatic defect recognition or precise 3D metrology of difficult to penetrate multimaterial objects
- Significantly increased inspection productivity allowing CT to migrate from R&D applications to serial inspection on the production floor

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