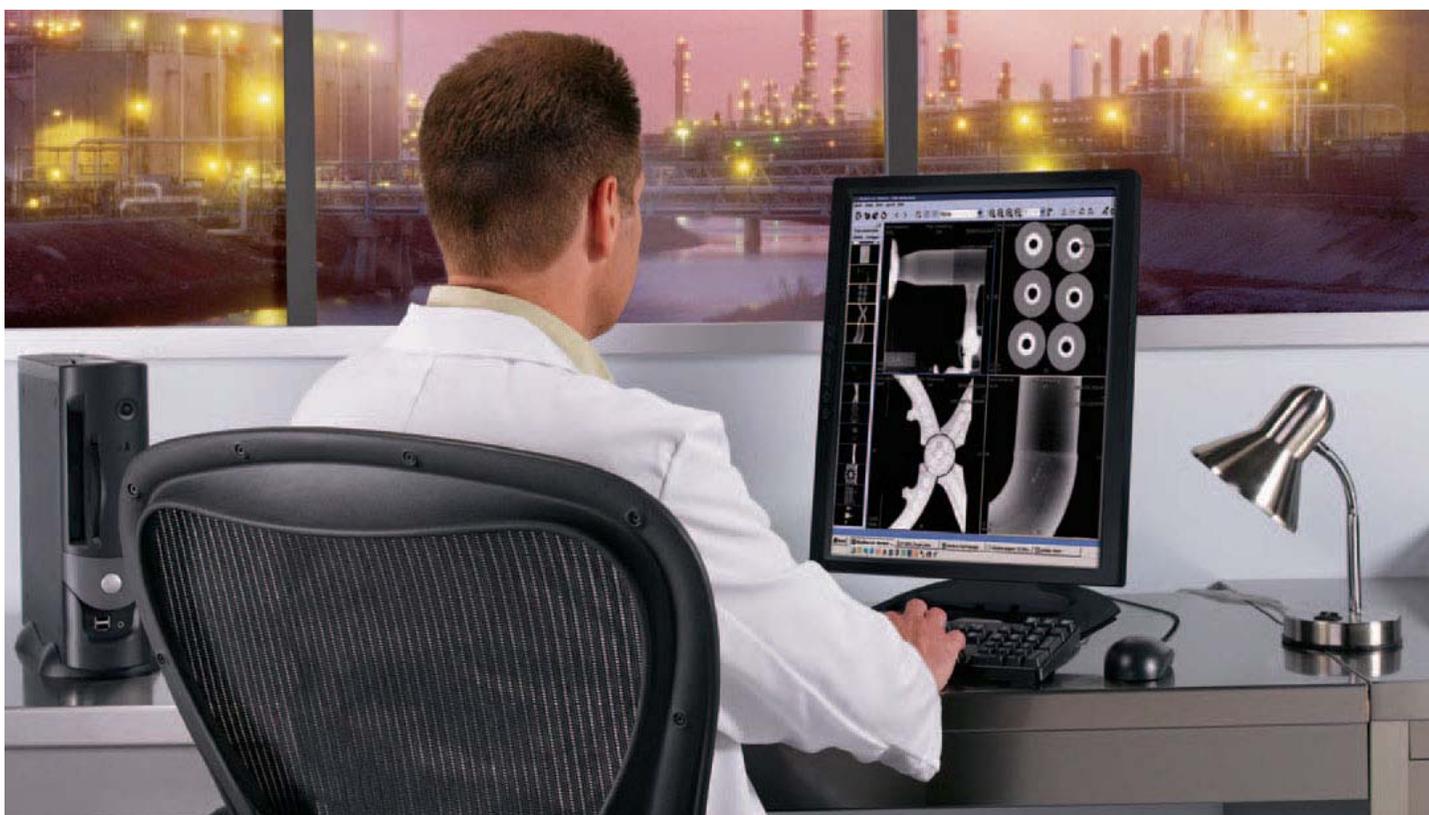


GE  
Inspection Technologies

# Rhythm<sup>®</sup>

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

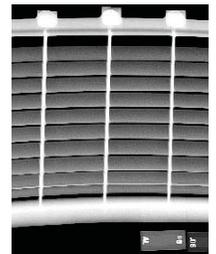
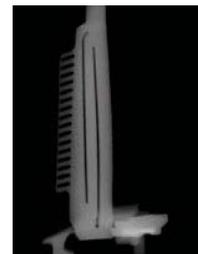
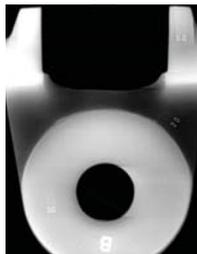
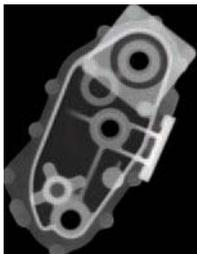
Scalable architecture allows the solution to grow with your needs. DICOM/DICONDE compliance ensures your data will not become obsolete.

### 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

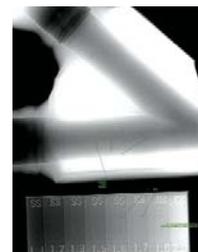
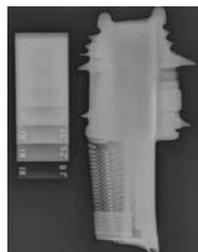
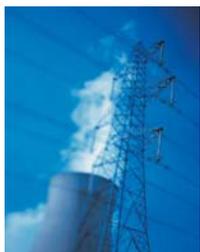
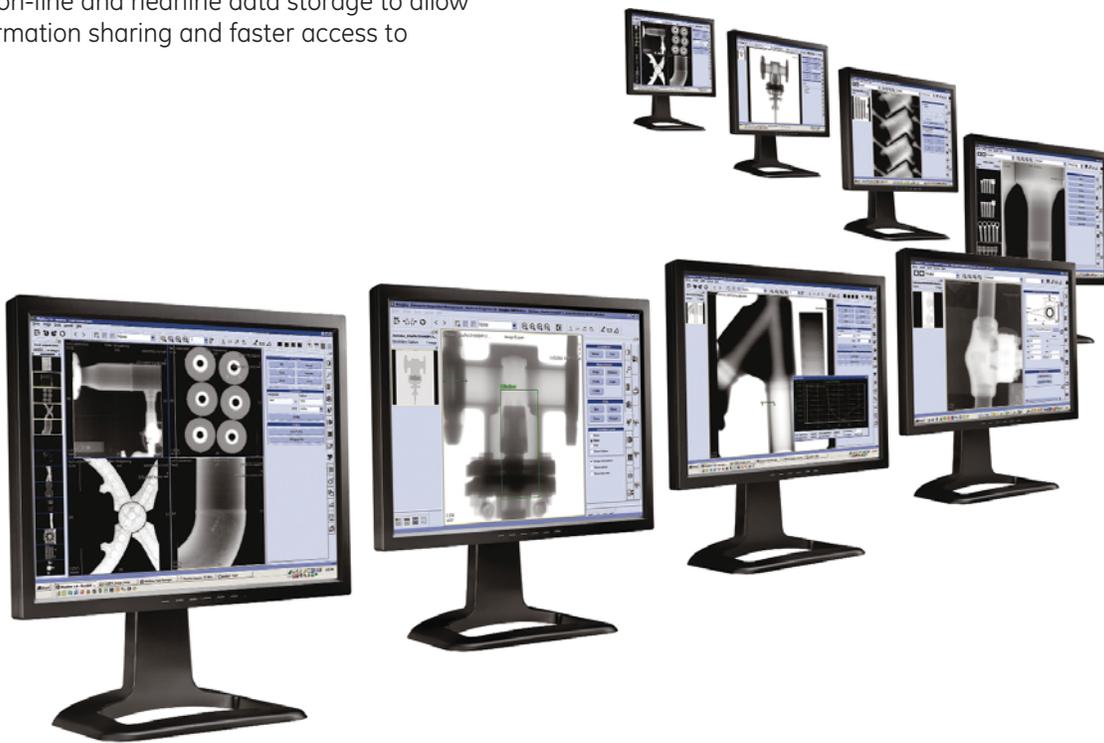
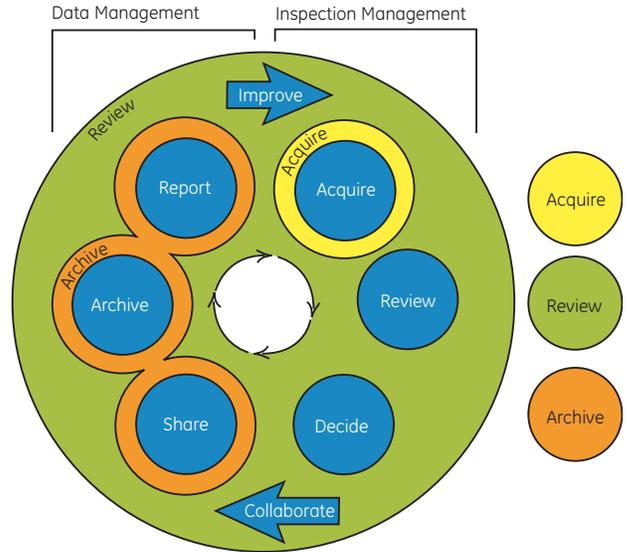
Allows creation of reports of findings with Rhythm with standardized templates or easily configured customized formats. Rhythm Report increases your productivity by allowing you to generate reports right at the inspection site.

## 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

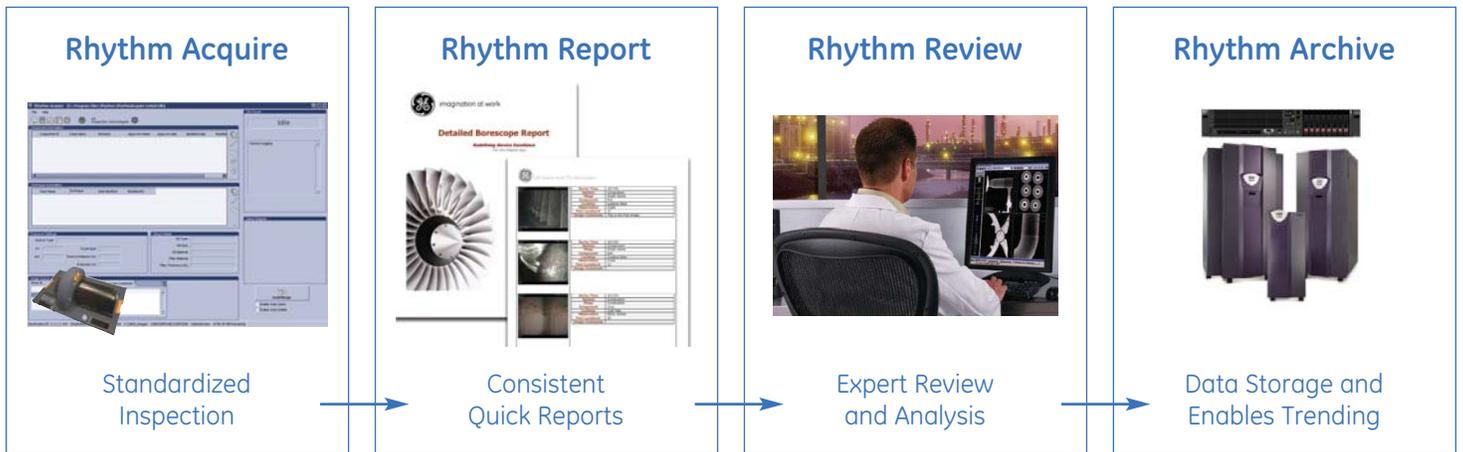
Provides both on-line and nearline data storage to allow simplified information sharing and faster access to information.



Power Generation

Oil and Gas

# Rhythm Modules



## Rhythm Acquire

**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 can 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.



## 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.



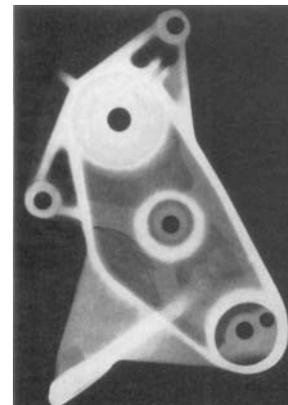
## Rhythm Multi-Monitor/Mixed Monitor Module

- 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.



## Rhythm DICOM Print Module

- The DICOM 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

<b>Processor</b>	Intel Core i7 Duo E6700 2.67 GHz/MB 1066
<b>Operating System</b>	Windows® XP Professional, 32-bit US
<b>Chassis Configuration</b>	Mini-Tower
<b>Memory</b>	4GB (4x1GB) DDR2-667 ECC
<b>Hard Drive</b>	80GB WD Raptor SATA NCQ 10K
<b>2nd Hard Drive</b>	80GB WD Raptor SATA NCQ 10K
<b>DVD</b>	16x DVD± RW SuperMulti SATA (1st)



Plasmon Ultra Density Optical (UDO) data storage



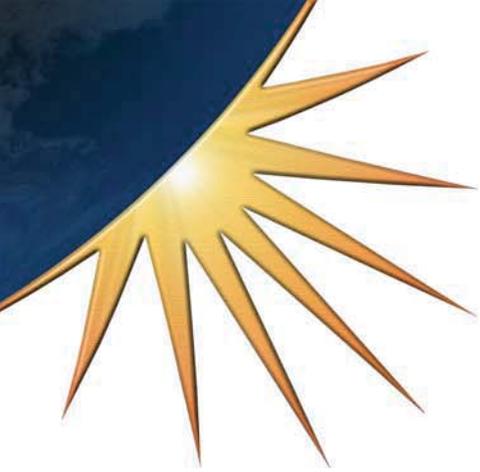
## New Base Features

- ✦ 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 (Rol)
- Irregular Rol\*
- 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\*

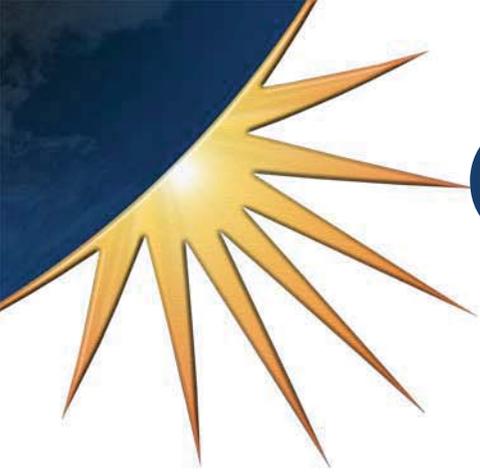
**\*Enhanced features are not included in Logos base software upgrades**



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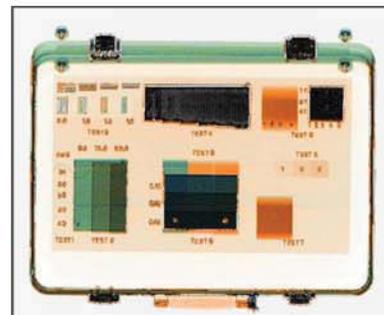


# CHRÓMA

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.



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