2018 - 2019

Product Solutions

DIAGNOSTIC IMAGING QA & PATIENT ALIGNMENT

CT • Ultrasound • Mammography • DR/CR/Fluoro

Radiation Oncology • Patient Alignment

GAMMEX

A SUN NUCLEAR COMPANY

PROVIDING PROVEN SOLUTIONS

Gammex is a division of Sun Nuclear Corporation, the worldwide market leader in quality assurance solutions for radiation therapy. Our Gammex business develops solutions to help ensure accurate screening, diagnosis, monitoring and treatment preparation. Together, Gammex and Sun Nuclear aim to enable healthier lives by improving the detection and treatment of cancer.

Computed Tomography (CT)

As CT technologies advance, Gammex continues to develop tools for your evolving needs -- innovations to help ensure accurate screening, diagnosis, monitoring, and treatment planning. From meeting compliance requirements, to quality assurance for next-generation CT, to daily, monthly and annual CT QC, we support your efforts to improve patient safety.

Ultrasound

For decades, Gammex ultrasound QA solutions have been developed to address the changing needs of the industry. From the first portable Doppler Flow phantom to our patented HE Gel™, we enhance clinical confidence with consistent image quality for your clinical applications.

Mammography & Tomosynthesis

When the United States mandated requirements via the Mammography Quality Standards Act (MQSA), medical physicists and, Gammex developed the Mammo 156™ Phantom to achieve repeatability and reproducibility for the detection of breast cancer. Likewise, as Tomosynthesis becomes more prevalent, Gammex offers the first-to-market phantom in support of Tomosynthesis QC.

Digital Radiography (DR), Computed Radiography (CR) and Fluoroscopy

Gammex has over 45 years of experience designing and providing precise tools to test and measure the performance of Digital Radiography (DR), Computed Radiography (CR) and Fluoroscopy X-ray systems. We offer a full line of products to help evaluate new or existing X-ray equipment to maximize image quality while minimizing patient dose. Everything you need to ensure your systems meet acceptance and routine QA guidelines and requirements can be found at Gammex.

Radiation Oncology

Gammex's patented Solid Water® mimics the absorption characteristics of water over a wide range of energies. The innovations in this area continues with Solid Water® HE and Tissue Mimicking Material to support radiation oncology QA.

Patient Alignment

Gammex, the original innovator in patient alignment for CT simulation and radiation therapy, continues to innovate, with high-quality, diode-based laser positioning systems to fit your workflow. With more than 4,000 laser installations worldwide, Gammex is a leading producer of patient alignment solutions.

Gammex is certified as a medical device manufacturer to ISO 13485.

On the following pages, you will see a selection of key products focused on improving cancer detection and treatment. For more information on solutions from Gammex, visit sunnuclear.com/gammex.

RapidCHECK Software

Automate your diagnostic QA with the new software platform from Gammex. Leverage proven QA phantoms from Gammex and a user-friendly software interface from Sun Nuclear to enhance QA quality and consistency.

Highlights

- Software that provides a framework for simplifying your clinical workflow
- Automated solution to process, display and store CT ACR 464 Phantom analysis
- Generate a complete report of your CT ACR 464 Phantom in seconds
- Define a baseline with initial scan and evaluate each scan from your defined tolerances

Benefits

- Remove subjectivity from your evaluations with evidence-based metrics
- All images, analysis, trending and data are yours—scans are analyzed and stored locally
- Easily review prior scans, analyze trends and investigate anomalous results

Initial release includes support for the following CT tests for the CT ACR 464 Phantom:

- Slice Thickness
- Slice Offset
- Noise
- Air Hounsfield Units (HU)
- Acrylic HU
- Bone HU
- Water HU
- Polyethylene HU
- Contrast
- Low Contrast Detectability
- Uniformity
- Geometric Distortion
- Spatial Resolution

Additional RapidCHECK modules in development

Critical, Reliable Resources for

COMPUTED TOMOGRAPHY QA

For more than 40 years, Gammex CT QA tools have been used to ensure accurate screening, diagnosis and monitoring. From routine QA to multi-energy CT scanner performance, we are here help you meet your CT compliance and patient safety needs.

Multi-Energy CT Phantom

Ensure the performance and consistency of your multi-energy scans. Test material discrimination using solid rods representing iodine, calcium, blood, adipose, and more.

Highlights

- Test in both head (20 cm) and body (40 cm x 30 cm) configurations
- 19 removable rods
- Constructed from new HE CT Solid Water®

Benefits

- Ensure the efficacy of clinical protocols for multi-energy analysis
- Verify the quantitative accuracy of multi-energy scans
- Compare the consistency and stability across different scanners
- Check for artifacts in an extended field-of-view

Specifications

In-plane Dimensions:	40.0 cm (15.7 in) x 30.0 cm (11.8 in)
Depth:	16.5 cm (6.3 in), up to 26.5 cm (10.2 in) with extension plates
Diameter of Removable Head Section:	20.0 cm (7.87 in)
Material:	HE CT Solid Water®
Interchangeable Inserts:	18 solid inserts, plus 1 true water container , each tagged with a CT-visible rod identification code
4 Iodine Inserts with Variable Concentrations:	4 inserts with concentrations of 2.0, 5.0, 10.0, and 15.0 mg/mL
3 Iodine Inserts with Variable Diameters:	5.0 mg/mL concentration at diameters of 2.0, 5.0, and 10.0 mm
3 Calcium Inserts:	Calcium concentrations of 50, 100, and 300 mg/mL
3 Blood [Iron] Inserts:	Blood-mimicking material at relative electron densities of 1.03, 1.07, and 1.10
2 Blood [Iron] with Iodine Inserts:	Blood-mimicking material plus iodine at 2.0 and 4.0 mg/mL
3 Tissue-Mimicking Inserts:	High-Equivalency Brain, High-Equivalency Adipose, High-Equivalency CT Solid Water®
Weight:	15.5 kg (34.1 lbs.)
Case:	Wheeled case is included
Stand:	Stand is included
Warranty:	5 Years

Advanced Electron Density Phantom

Generate accurate IVDT calibrations with this phantom designed for Cone-Beam (CBCT) applications. Easy to use and exquisite adherence to ICRU-44.

Highlights

- Removable 20 cm head section
- Increased depth for cone-beam CT and wide-beam CT scanners
- Patent-pending rod markers uniquely identify each material in a CT scan
- 16 insert chambers designed to accommodate interchangeable rods of Tissue Mimicking Material (TMM)

Benefits

- Help ensure accurate calculations of dose distributions
- Automated software can process the IVDT and generate the density table

Specifications

In-plane Dimensions:	40.0 cm (15.7 in) x 30.0 cm (11.8 in)
Depth:	16.5 cm (6.3 in), up to 26.5 cm (10.2 in) with optional extension plates
Diameter of Removable Head Section:	20.0 cm (7.87 in)
Material:	HE Energy-Matched CT Solid Water®
Interchangeable Inserts:	14 solid inserts plus 2 true water containers
Optional Inserts include:	Aluminum, Stainless Steel, Titanium
Optional Accessories:	Extension plates Ion Chamber conversion rod
Weight:	15.5 kg (34.1 lbs.)
Case:	Wheeled case is included
Stand:	Stand is included
Warranty:	5 Years

Standard Inserts

Material	Physical Density (g/cm3)	Electron Density Relative to Water
455 Lung LN-300	0.29	0.28
485 Lung LN-450	0.45	0.44
1553 HE Gen Adipose	0.96	0.94
1454 HE Breast 50:50	0.98	0.97
4 - 1451 HE CT Solid Water® Inserts	1.02	1.00
1481 HE Brain	1.05	1.02

Material	Physical Density (g/cm3)	Electron Density Relative to Water
1482 HE Liver	1.08	1.05
1456 HE Inner Bone	1.21	1.16
484 CB2 + 30% CaCO3	1.33	1.27
480 CB2 + 50% CaCO3	1.56	1.46
1450 HE Cortical Bone	1.93	1.78
2 - True Water Inserts	-1.000-	-1.000-

CT **Electron Density** Phantom

Create CT-to-density tables with ease for consistent calibration of your IVDT. Configure tissue inserts in any orientation.

Highlights

- Materials developed to ICRU-44 specifications
- Zero HU Solid Water® base

Benefits

- 33 cm diameter
- Includes 16 insert chambers
- Includes 13 different materials
  - Lung (LN-300 & LN-450)
  - Adipose (AP6)
  - Breast
  - Zero HU Solid Water® (x4)
  - Brain
  - Liver (LV1)
  - Inner Bone
  - Bone (B200, CB2-30% Mineral & CB2-50% Mineral)
  - Cortical Bone (SB3)
  - True Water
  - Optional Aluminum (1100-H14)
  - Optional Titanium (Grade 2)
  - Optional Stainless Steel (Type 316)
- Optional rods extend density range to 8 g/cm3
- Includes scribe lines for alignment
- Includes bubble-free true water container
- Includes 7 cm rods

Specifications

Standard Inserts:	Lung, Adipose, Breast, CT Solid Water, Brain, Liver, Inner Bone, Bone B200, Bone CB2-30% Mineral, Bone CB2-50% Mineral, Cortical Bone SB3, True Water
Optional Inserts Include:	Aluminum Titanium Stainless Steel
Warranty:	5 Years

CT **ACR 464** Phantom

Perform CT image quality and performance evaluation that complies with ACR CT requirements. Testing options include positioning and alignment accuracy, CT number accuracy, slice thickness, low contrast detectability, image resolution and uniformity, spatial resolution, and inter- and intra-plane distance measurement accuracy.

Highlights

- Only phantom approved by ACR for CT certification guidelines
- The Original Solid Water™ Zero HU formulation
- Available extension plates and body ring

Benefits

- Single phantom permits checking multiple parameters
- Compact design
- Automated software allows for fast and simple reporting of results

Specifications

Material:	Zero HU Solid Water®
Diameter:	20 cm (7.9 in)
Length:	16 cm (6.3 in)
HU of Low Contrast Cylinders:	6
Low Contrast Range:	2-25 mm
Spatial Resolutions:	Up to 12 line pairs per cm
Warranty:	5 years

CT ACR 464 Phantom Stand

This is the stand for the ACR 464 CT Accreditation Phantom. This product includes a 5-year warranty.

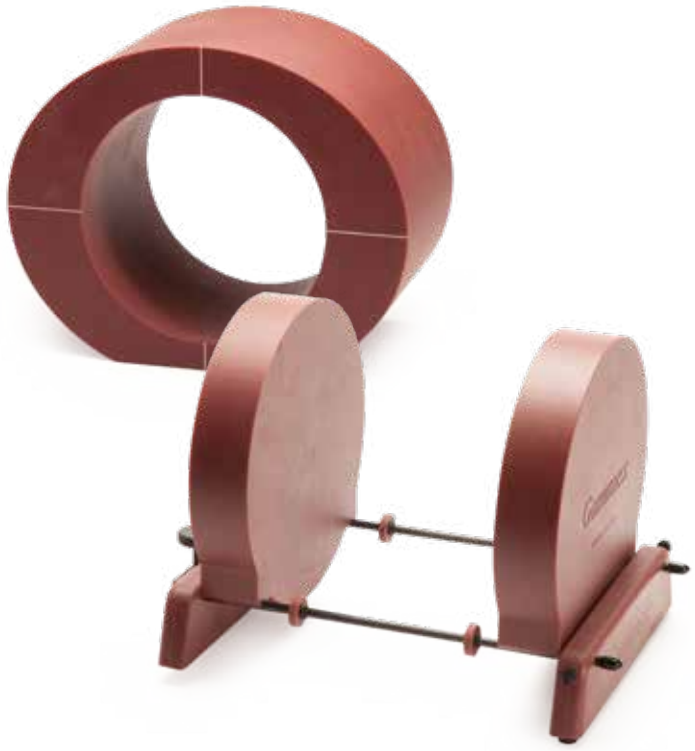
Cloth Case for CT ACR 464 Phantom

A lightweight cloth case for carrying the ACR 464 CT Phantom. This product includes a 1-year warranty.

CT **ACR 464** Phantom Accessories

Supplement your 464 for better evaluation:

- Body Ring supports better indication assessment of scanner performance with larger patients
- Extensions accurately represent scatter effects from widebeam CT scanners



CT ACR 464 Body Ring Highlights

- Test for uniformity and artifacts in peripheral field
- Monitor impact of a large field on image quality
- Torso-shaped
- Includes scribe lines
- Fits the CT ACR 464 Phantom

CT ACR 464 Phantom Extension Highlights

- Represents scatter effects of widebeam CT scanners
- Flexible configuration (i.e., same side, opposite sides)
- No tools or installation needed for use

CT ACR 464 Body Ring Specifications

Material:	Zero HU CT Solid Water®
Inner Diameter:	20 cm
Depth:	61 cm
Outer Diameter:	33 cm wide, 26.4 cm high
Warranty:	5 years

CT ACR 464 Phantom Extension Specifications

Material:	Zero HU CT Solid Water®
Diameter:	20 cm (7.9 in) (same as CT ACR 464 Phantom)
Warranty:	5 years

RapidCHECK Software

Automate your diagnostic QA with the new software platform from Gammex. See page 4 for more details.

Soft Case, Stand & Extender Plates for CT ACR 464 Phantom

Soft Case for 464 Phantom, Stand, and Extender Plates. This product includes a 1-year warranty.

High-Contrast Resolution Module

An Advanced iqModule™ to expand your CT ACR 464 testing. Line pairs up to 32 lp/cm (156 microns) can test even the most demanding scanners.

Benefits

- Incorporates all resolutions of the CT ACR 464 Phantom
- Includes high resolutions up to 32 lp/cm
- Large bar patterns (1.5 cm x 1.0 cm x 4.0 cm) for ease of visualization and analysis
- Designed for automation
  - Includes solid samples of resolution materials for accurate results during software analysis[1]
- Zinc high-contrast material provides visibility without over-ranging scanners

Specifications

Material:	Epoxy interior, with a shell of our new HE CT Solid Water®
Diameter:	20.0 cm (7.9 in)
Length:	4.0 cm (1.57 in)
Resolution Pattern Size:	1.5 cm x 1.0 cm x 4.0 cm
Resolutions Tested:	2, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30 and 32 lp/cm
Automated Analysis Features:	Solid material samples improve computational analysis Large pattern sizes enable robust evaluation
Contrast Material:	Zinc
Warranty:	5 years

High-Contrast Resolution Advanced iqModule™ shown with CT ACR 464 and extended stand.

[1] RapidCHECK software is available for the CT ACR 464 Phantom and in development for the Advanced iqModules.

Low-Contrast Detectability Module

An Advanced iqModule™ to expand the capabilities of your CT ACR 464 phantom. Test the low contrast detectability of even the most demanding CT scanners using three contrast levels, scientifically sized objects, and noise-robust redundancy.

Highlights

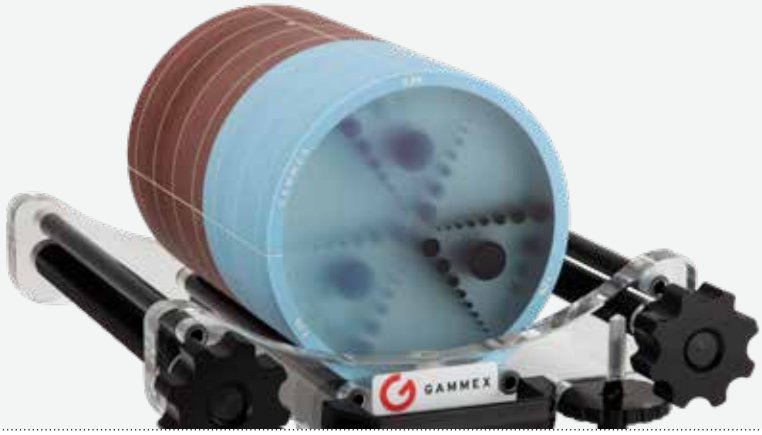
- Evaluate Low Contrast Detectability at 3 different contrast levels
  - 0.3%, 0.6%, and 1.0% (3 HU, 6 HU, and 10 HU)
- Sizes of each contrast object range from 1.5 to 25 mm
- Multiple contrast objects at each size for noise robustness

Benefits

- Three precisely formulated contrast levels test performance across a range of scanners and protocols
- Robust against noise with two objects at each contrast and size below 25 mm
- Tests full-slice and sub-slice detectability
- Fits perfectly with your 464 and/or extension plates

Specifications

Material:	Epoxy interior, with a shell of our new CT High Equivalency Solid Water®
Diameter:	20.0 cm (7.9 in)
Length:	4.0 cm (1.57 in)
Contrast Levels:	0.3 % (3 HU), 0.6 % (6 HU), 1.0 % (10 HU)
Sizes at Each Contrast Level:	25 mm, and 2 at each of 1.5, 2, 3, 4, 5, 7, 9, and 12 mm
Sizes of Sub-Slice Objects:	2, 3, 5, 7, and 10 mm (cylinder diameter and length), at each contrast level
Warranty:	5 years



Advanced iqModules™ shown with CT ACR 464 and stand.

Slice Sensitivity and Geometric Evaluation Module

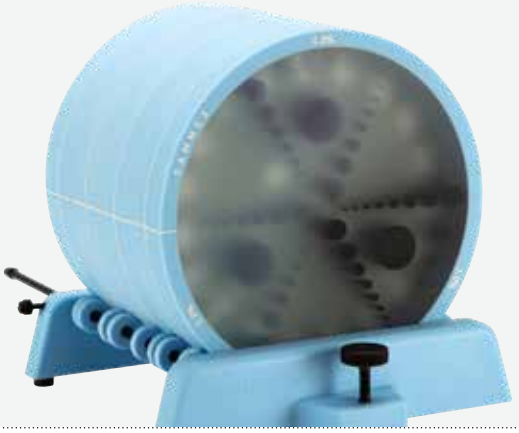
An Advanced iqModule™ to expand your CT ACR 464 testing. Validate slice thickness, slice sensitivity profile, and system geometry.

Benefits

- Measure slice thickness with an opposed pair of wire ramps
- Measure slice thickness and slice sensitivity profile with 2 opposed pairs of bead ramps
- Calculate Modulation Transfer Function with one-off vertical wire
- Check geometric accuracy with a set of 8 acrylic spheres
- Perform MTF measurements with BB's of two different sizes
- Easily visualize test objects with clear construction and modular design
- Designed for manual and automated analysis

Specifications

Material:	Epoxy interior, with a shell of our new HE CT Solid Water®
Diameter:	20.0 cm (7.9 in)
Length:	4.0 cm (1.57 in)
Wire Ramps:	Tungsten wire, 0.05 mm diameter
Bead Ramps:	One opposed set with 0.18 mm tungsten carbide BB's, and one with 0.28 mm tungsten carbide BB's
MTF BB's:	0.18 mm and 0.28 mm
MTF Wire:	Tungsten wire, 5 degrees off-vertical, 0.05 mm diameter
Acrylic Spheres:	1.0, 1.5, 2.0, 3.0, 4.0, 6.0, 8.0, and 10.0 mm diameter
Warranty:	5 years



Complete set of Advanced iqModules™ with stand. Low-Contrast Detectability Module shown in forefront.

Uniformity Module

Complete your advanced image quality testing with CT number uniformity assessment. Combine with your set of Advanced iqModules™ for a self-contained CT ACR 464 solution.

Benefits

- Measure uniformity and noise
- Measure distance and calibrate pixel size using 2 embedded BBs spaced 100 mm apart
- Supports calculations of MTF, NPS, and other noise-related metrics
- Constructed of HE CT Solid Water for unparalleled water equivalency across the energy spectrum
- Combine with other Gammex Advanced iq Modules for comprehensive image quality testing
- Doubles as an extension plate for use with the CT ACR 464 Phantom and other Advanced iq Module

Specifications

Material:	HE CT Solid Water®
Diameter:	20.0 cm (7.9 in)
Length:	4.0 cm (1.57 in)
Warranty:	5 years

Uniformity Advanced iqModule™ shown with CT ACR 464 and stand.

CT**DI** Phantoms

Measure absorbed dose and monitor scanner output for Dose Index quality assurance.

Highlights

- Designed to meet FDA 1CFR 1020.33, IEC 60601-2-44, IEC 61223-2-6 and IEC 61223-3-5
- No-drop design makes it easy to carry without pieces falling out
- Available in 2-piece and 3-piece (includes Pediatric head) configurations

Benefits

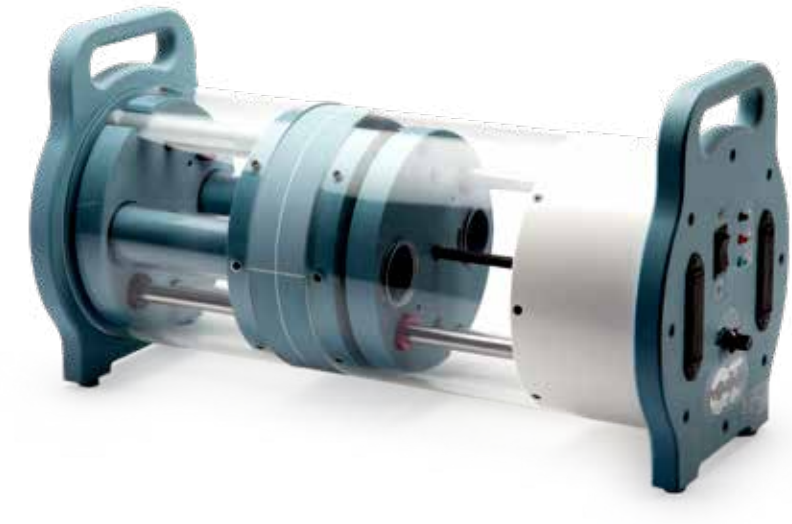
- Comes in nested configuration to reduce volume and weight
- Includes tongue and groove on sections for fast setup and alignment
- Includes tips on chamber plugs for fast alignment
- Includes water-tight custom wheeled case, as standard
- Includes scribe lines for efficient setup on all sections
- High quality acrylic - 1.19 g/cm^3 density
- Includes positioning tools

Specifications

Material:	Polymethyl methacrylate (PMMA / Acrylic)
Adult Body:	32 cm diameter x 14.5 cm thick
Adult Head/Pediatric Body:	16 cm diameter x 14.5 cm thick
Pediatric Head (468-BHP only):	10 cm diameter x 14.5 cm thick
Weight:	13.9 kg (30.5 lbs.)
Warranty:	5 years

CT **Perfusion** Phantom

Gain greater confidence in your perfusion studies with reproducible CT perfusion measurements.



Highlights

- Mimics iodine bolus injection
- Generates precise time-attenuation curves

Benefits

- Constructed of all solid materials
- No wires or cables required
- Highly reproducible
- Variable speed and direction
- Includes vein, artery and brain materials
- Includes ion chamber port for dose measurement
- Materials range from 0-400 HU
- Includes custom wheeled case

Specifications

Covers and housings:	PVC, Acrylic
Dosimetry Port:	Standard CT Pencil Chambers up to 12.7 mm (0.5 in) diameter
Central Scan Disk:	12.7 mm (0.5in) diameter High Equivalency (HE) Brain Mimicking Material
Artery Rod:	16 discrete sections of blood and contrast simulating materials to mimic arterial flow rates following a contrast bolus injection
Vein Rod:	16 discrete sections of blood and contrast simulating materials to mimic venous flow rates following a contrast bolus injection
Tissue Rods (Qty 2):	HE Brain Mimicking Material of 16 discrete sections of brain tissue to mimic tissue uptake rates following a contrast bolus injection
Velocity settings (mm/second):	1.31, 1.50, 1.75, 2.10, 2.63 +/- 2%
Rod Travel Distance:	10.5 cm (4.1 in)
Dimensions (L/ W/H):	55.5 x 25.4 x 30.5 cm (22 x 10 x 12 in)
Power:	8 AA batteries (included)
Weight:	13.6 kg (29.9 lbs.)

Mercury 4.0 Phantom

Get ready for TG-233. Next generation CT QA is here with easy solutions to perform QA for Automatic Exposure Control and Iterative Reconstruction.

Highlights

- Performance and effectiveness of Automatic Exposure Control / Tube Current Modulation
- Evaluation of image quality for Iterative Reconstruction
- Advanced quantitative metrics that reflect what clinicians see
- Size-dependent image quality evaluation

Benefits

- Meets all advanced CT testing recommended by AAPM TG-233:
  - Automatic Exposure Control
  - Noise Power Spectrum
  - Modulation Transfer Function
  - Task Transfer Function
  - Detectability (d')
  - Cone-Beam Artifacts
  - Superior-Inferior Resolution
- Clinical Applications:
  - Evaluate the dynamic range of a protocol.
  - Understand how changes in a scan parameter affect CTDIvol
  - Prediction of CTDIvol for a given patient size

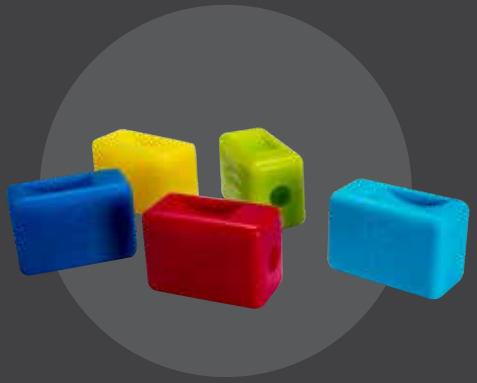
Specifications

Material:	Polyethylene
Diameters:	16.0, 21.0, 26.0, 31.0, and 36.0 cm
Length:	52.0 cm
Contrast Materials:	HE CT Solid Water®, Bone, Polypropylene, Iodine, and Air
Resolution Wedge:	HE CT Solid Water®
Software Analysis:	Phantom includes a license for the Duke ImQuest software
Included:	Wheeled Case and Stand
Weight (Phantom):	29 kg (64 lbs)
Weight (Case):	10 kg (22 lbs)

Innovations for
Advanced Techniques

ULTRASOUND QA

For decades, Gammex ultrasound QA solutions have been developed to address the changing needs of the industry. From the first portable Doppler Flow phantom to our patented HE Gel™, we enhance clinical confidence with consistent image quality for your clinical applications.



Doppler **403™** Flow Phantom

Gammex collaborated with clinical and academic thought leaders to develop the first portable Doppler Flow Phantoms in the world. The Doppler 403 Flow Phantom is a second-generation device based on the proven, original design and reference standard. Precision parabolic flow supports reliable, reproducible system velocity testing.

Highlights

- Exceed ACR-recommended tests using Doppler and B-Mode protocols
- Constant and pulsatile flow modes
- Proprietary blood mimicking fluid formulation matches acoustic properties of human blood
- Storage to use in < 10 seconds
- Patented HE Gel™ has superior longevity and provides multi-frequency, high quality, reproducible images

Benefits

- Self-contained, battery-operated, portable
- Acoustic properties of tubes match the background attenuation
- Transducer holder included

Specifications

Flow Rates:	Customizable, constant and pulsatile, 0-12.5 ml/sec
Targets:	Strings, cysts, grey scale, resolution groups
Vessels (2):	5 mm inner diameter; 1 horizontal at 2 cm depth, 1 diagonal at 40° from 2 to 16 cm deep
Blood Mimicking Fluid:	Speed of Sound 1550 +/- 10 m/s, total volume approx. 300 ml

HE Gel™

All Ultrasound QA products include Gammex's patented HE Gel™ for superior longevity and support of multi-frequency, high quality, reproducible images. Rejuvenation with HE Gel™ will protect your ultrasound QA investment for 10+ years.

Specifications

Attenuation Coefficient:	0.5 or 0.7 dB/cm/MHz
Variation of Attenuation with Frequency:	f1.08 at 0.5 dB/cm/MHz f1.1 at 0.7 dB/cm/MHz
HE Gel Freezing Point:	< 0°C
HE Gel Melting Point:	>100°C
Frequency Range:	2 - 18 MHz
Speed of Sound:	1540 m/s

Sono**403**™ Multi-Purpose Phantoms

Ensure accurate screening, diagnosis and monitoring of ultrasound systems and transducers for General Radiology, Musculoskeletal, Cardiology, Emergency, Pediatrics, Radiotherapy and Surgical applications.

Highlights

- Exceeds ACR, AIUM recommended tests:
  - Image uniformity
  - Artifact survey
  - Axial and lateral resolution
  - Horizontal and vertical distance
  - Dead zone
  - Depth of penetration
  - Signal-to-noise ratio
  - Anechoic and echogenic mass resolution
  - Gray scale contrast resolution
- Depth to 18 cm
- 3 grey scale targets: +6, -6, +12
- 10 anechoic targets, 4 sizes
- 3 axial and lateral resolution target groups, with axial resolution down to 0.25 mm, lateral resolution down to 0.5 mm
- 33 0.1 mm diameter nylon string targets, with spacing from 0.25 mm to 3.0 cm

Specifications

Cysts:	4 targets; 2, 4, 6, and 10 mm diameter at 3, 7, 8, and 14 cm spacing
Grey Scale Targets:	3 targets; 10 mm diameter at 6 cm spacing
Pin Targets:	33 pins; 0.1 mm diameter at 2 to 16 cm deep (vertical), 2 and 12 cm deep (horizontal)

Sono**404**™ Phantoms

Enhance the accuracy of QA measurements in vascular, cardiology and breast ultrasound. Test high-frequency transducers routinely to ensure accurate patient measurements.

Highlights

- Precisely designed to test and mimic small parts and high-frequency transducers up to 18 MHz
- Meets ACR, AIUM recommended tests:
  - Image uniformity
  - Artifact survey
  - Axial and lateral resolution
  - Horizontal and vertical distance
  - Dead zone
  - Depth of penetration
  - Signal-to-noise ratio
  - Anechoic and echogenic mass resolution
  - Gray scale contrast resolution
- 59 0.1 mm diameter nylon string targets with spacing from 0.1 to 10 mm at 1 to 9 cm deep
- 3 axial and lateral resolution target groups, with axial resolution down to 0.25 mm, lateral resolution down to 0.25 mm

Specifications

Anechoic Cysts:	10 Cysts, 1, 2, 3 and 7 mm diameter
Horizontal Geometry Groups:	7 mm diameter
Vertical Geometry Targets:	3 Groups, at 1, 3.5 and 6 cm deep
Horizontal Geometry Targets:	17 pins, 0.1 mm diameter at 1 to 9 cm deep at 5 mm spacing
Dead Zone Detection (Cross Targets):	12 pins, 0.1 mm diameter at 1 and 5 cm deep at 10 mm spacing 1 Group

405 GSX Precision Resolution Phantom

Unique to the 405 GSX are two horizontal cross fibers in the middle of the phantom. These fibers help the user align the transducer and can be used as a reference marker to ensure that QA tests are consistently performed on the same scan slice. Precision triangular grey scale targets test the resolution of the latest ultrasound technology. This product includes a 1-year warranty.

Sono406™ Dual Attenuation Phantom

Two phantoms in one with background attenuations of 0.5 and 0.7 dB/cm/MHz side by side. Patented HE (High Equivalency) Gel™ helps guarantee your transducers and system settings are fully tested across the entire frequency range from 2 to 18 Mhz. This product includes a 1-year warranty.

Sono**408**™ Spherical Lesion & Sono**410**™ Full Contact™ Phantom

Tailor your testing:

- The Sono408 enables testing specific to the unique qualities of spherical lesions.
- The Sono410 provides a Full Contact™ curved surface to improve coupling between convex transducers and the phantom scanning window.

Sono408 Spherical Lesion Phantom

Sono410 Full Contact Phantom

Sono408 Highlights

- Precisely and simultaneously measure spatial resolution in 3 dimensions – axial, lateral and elevational
- Test high frequency transducers used in echocardiography
- Objects precisely placed in single plane in center of phantom
- Resolution depths from 0.5-18 cm

Sono410 Highlights

- Invert the phantom 180 degrees, and use the patented flat scanning surface for linear arrays
- Multiple scanning surfaces
- Meets ACR, AIUM recommended tests:
  - Image uniformity
  - Artifact surveys
  - Lateral resolution
  - Horizontal and vertical distance
  - Depth of penetration
  - Signal-to-noise ratio
  - Anechoic and echogenic mass resolution
  - Gray scale contrast resolution
- Depth to 18 cm

Specifications

Anechoic Spherical Lesions:	211 4 mm diameter lesions in a plane, spaced vertically at 0.5 cm apart and horizontally at 0.75 cm apart; at depths of 0.5 to 16 cm 105 2 mm diameter lesions in a plane, spaced at 0.5 cm apart vertically and horizontally; at depths of 0.5 to 10.5 cm
Contrast:	≤25 dB

Specifications

Patented Curved Scanning Surface:	Full Contact
Anechoic Cysts/Depth of Visualization:	12 Cysts, 1, 2, 4 and 8 mm diameter
Grey Scale Targets:	6 Targets, 8 mm diameter
Horizontal Geometry Groups:	3
Vertical Geometry Targets:	7

Sono **TE**™ Phantoms

Economical uniformity testing for linear, convex, and intercavity transducers.

Custom branding and colors available

Highlights

- Test for element drop-out
- Training tool for sonographers and residents
- Low cost, high value uniformity testing for transducer evaluation
- Multiple scanning surfaces for linear, convex and inter-cavity transducers
- Small and durable
- Uniform grey scale
- Uniformity over multiple depths—mimics down to 16 centimeters when scanned

Specifications

Material:	Silicone base
Dimensions (L/W/H):	11.5 x 5.7 x 7.5 cm (4.63 x 2.25 x 3 in)
Weight:	580 +/- 5 g (1 lb. 4 oz.)

Soft Case for Ultrasound Phantoms

Soft-sided, custom carrying case is perfect for carrying your Gammex Ultrasound B-Mode phantoms to your facilities. It is lightweight, includes a shoulder strap, and has space for a bottle of gel and a User Guide. This product includes a 1-year warranty.

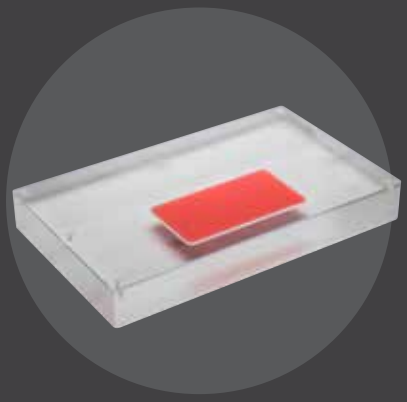
Sono Transducer Holder

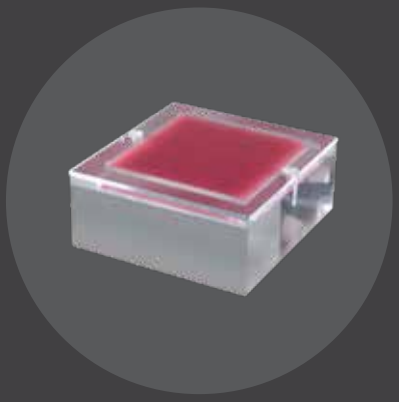
The Sono Transducer Holder is designed to stabilize a transducer in a precise location for reproducible tests over time. The Holder is compatible with most Gammex ultrasound phantoms. This product includes a 5-year warranty.

The Gold Standard
in Breast Health

MAMMOGRAPHY & TOMOSYNTHESIS QA

Gammex has a long history of providing quality assurance tools for the mammography field. Just as the Mammo 156™ Phantom was designed to meet mandated requirements, the Modular DBT™ Phantom is poised to become a go-to resource in addressing today's clinical and research needs.





Modular **DBT™** Phantom

Thoroughly test Tomosynthesis system performance. Evaluate image quality and quantify targets in reconstructed images.

Highlights

- Comply with developing protocols and standards, including EUREF, IEC and AAPM Task Group 245
- Modular design easily reconfigurable without tools
- Breast-shaped, 180 mm x 100 mm
- Configure with the Image Quality module for technologist (radiographer) QA
- Automatically aligns to detector chest wall for reproducibility
- Tissue-mimicking materials (TMM) for breast, breast-adipose and breast-glandular
- Hammerstein elemental composition
- Multiple configurations available
- Optional blank modules in each TMM, several thicknesses
- Expandable design to accommodate future modules
- Custom hard-sided water-proof case included

Module Name:	Target Characteristics
Image Quality:	Specks, masses, fibers
Missing Tissue Detection:	Barium-filled grooves, 1 mm x 0.5 mm, sized from 0 mm to 15 mm
MTF, LSF:	2 tungsten wires, 25 micron DIA
CNR:	1100 aluminum alloy sheet, 0.1 mm thick, 45° angle
2D and 3D Accuracy:	14 tungsten BBs, 0.279 mm DIA, aligned in X, Y and Z-axis

Case for Modular DBT Phantom

A wheeled case is included with the Modular DBT Phantom.

Mammo **FFDM™** Phantom

Test FFDM system performance, as required by the American College of Radiation (ACR). Detect microscopic objects that mimic small structures in the breast and evaluate artifacts over the entire detector with a single image.

Now approved for use with Tomosynthesis machines, per ACR

Highlights

- ACR Digital Mammography Phantom
- Reduce back scatter and equalize attenuation
- Comply with EUREF, MQSA and ACR
- Detect objects from 0.14 to 1 mm
- Simulates radiographic characteristics of compressed breast tissue
- Equivalent of 4.2 cm compressed breast
- ACR accreditation

Specifications according to the ACR

Nylon Fibers:	6
Specks:	6 Groups, Glass Spheres
Masses:	6
Dimensions (L/W/H):	31.0 ± 0.1 x 19 ± 0.1 x 4.1 ± 0.03 cm
Dimensions: Wax Insert (L/W/H):	12.98 (+ 0, - 0.04) x 6.98 (+0, -0.04) x 0.7 ± 0.02 cm
CNR Cavity Depth:	0.1 ± 0.005 cm
CNR Diameter:	± 0.05 cm
Compensator:	9 mil Polyvinylidene Chloride
Warranty:	5 years

Case for Mammo FFDM Phantom

Custom hard-sided case for Full Field Digital Mammography (FFDM) Phantom. This product includes a 5-year warranty.

Mammo **156**™ & **156D Stereo**™ Phantom

Measure and monitor signal to noise resolution and image quality. Maintain system quality and compliance with digital mammography and stereotactic biopsy systems.

Mammo 156D Stereo Phantom

Mammo 156 Phantom

Highlights

- ACR accreditation
- First MQSA-approved mammography phantom (156)
- Monitors mammography systems used for biopsy & localization (156D)
- Wax and acrylic equivalent to 4.2 cm thick compressed breast tissue (50% adipose & 50% glandular)

Mammo 156™ Specifications

Nylon Fibers:	6
Specks:	5 Groups
Masses:	5
Dimensions (L/W/H):	10.2 x 10.8 x 4.5 cm
Warranty:	5 years

Mammo 156 Stereo™ Specifications

Nylon Fibers:	4
Specks:	4 Groups
Masses:	4
Dimensions (L/W/H):	6.7 x 6.8 x 6.1 cm
Warranty:	5 years

Ultrasound Breast Biopsy Phantom

Use ultrasound to dynamically locate lesions and practice needle placement. Train residents on mammography needle insertion for stereotactic breast biopsy procedures.

Highlights

- Scan the phantom using clinical settings, and watch the ultrasound display as the needle is inserted into cysts and lesions
- Skin-like resistance to needle insertion
- Ultrasound appearance simulates soft tissue
- Supports multiple needle punctures over time (when stored per manufacturer guidelines)

Specifications

Fluid-Filled Cysts:	3
High-Contrast Lesions:	4
Low-Contrast Lesions:	4
Diameter:	12.7 cm
Height:	7.6 cm

Stereotactic Breast Biopsy Phantom

Sharpen your skills in mammography needle insertion for stereotactic breast biopsy procedures.

Highlights

- Solid gel lesions for practicing core biopsies
- Liquid dye mimics fluid in fine needle aspiration
- Skin-like resistance to needle insertion
- Compressible within a biopsy instrument

Specifications

Construction:	Gel with attenuation properties similar to breast tissue
Outer casing:	Vinyl
Multiple Radiopaque Lesions:	2 to 5 mm
Lesion Material:	Solid gel, liquid dye

Breast Compression QC Device

Measure compression force to assure accuracy and reproducibility.

Highlights

- Analog readout easily legible from multiple viewpoints
- Maximum force reading memory
- 1 button reset

Specifications

Force Range:	3-18 kg (6 - 40 lbs)
Accuracy:	± 0.45 kg
Contact Area:	8.5 cm diameter
Size:	11.5 x 9 x 5 cm (4.5 x 3.5 x 2 in)
Weight:	0.91 kg (2 lbs.)

Case for Breast Compression QC Device

Custom Case for Breast Compression QC Device. This product includes a 1-year warranty.

Case for Phantoms

Case for phantoms, soft-sided with foam insert. This product includes a 1-year warranty

Density Control Function (DCF) Test Tool

Mammographic Density Control Function Test Tool enables a quick and accurate assessment of a film-screen mammography unit's Automatic Exposure Control (AEC) accuracy. Records up to eleven exposures on one piece of film. The resulting density readout can be used to perform ACR Density Control Function Tests. Saves time and film cost. This product includes a 5-year warranty.

Specifications

Base Plate:	Aluminum
Exposure Plate:	Stainless Steel
Overall:	15.2 x 30.5 x 0.95 cm (HWD) (6 x 12 x 0.375 in)
Exposure Window:	12 x 18.6 mm (0.47 x 1.12 in)
Weight:	0.8 kg (1.75 lbs)
File Size:	7 x 9.5 in
Exposure Steps:	11 (-1 to -5, zero, +1 to +5)
Compatibility:	Tissue Equivalent Breast material and acrylic (Gammex 159, 159A, 159BR and 159A-BR Phantoms)
Notes:	Tissue Equivalent Material sold separately

Mammo Film Screen Contact Test Tool

Early artifact detection in screen film systems. This product includes a 5-year warranty.

Specifications

Screen Size:	24 x 30 cm (9.4 x 11.8 in)
Mesh:	#40 Mesh - Copper
Size:	25.8 x 31.5 cm (10.2 x 12.4 in)
Weight:	0.4 kg (0.9 lbs)

Phototimer Consistency Tools

These easy-to-use, economical tools are designed to test Automatic Exposure Control (AEC) performance. Test tools include seven pieces of acrylic (model 159A) material. This product includes a 5-year warranty.

Specifications

Model:	159A
Sizes:	• Three pieces 14 cm x 14 cm x 2 cm • Two pieces 14 cm x 14 cm x 1 cm • Two pieces 14 cm x 14 cm x 0.5 cm
Total Weight:	3.8 lbs (1.7 kg)

Phototimer Consistency Tools – BR

These easy-to-use, economical tools are designed to test Automatic Exposure Control (AEC) performance. Test tools include seven pieces of breast tissue equivalent material. This product includes a 5-year warranty.

Specifications

Model:	159A-BR
Sizes:	• Three pieces 14 cm x 14 cm x 2 cm • Two pieces 14 cm x 14 cm x 1 cm • Two pieces 14 cm x 14 cm x 0.5 cm
Total Weight:	3.8 lbs (1.7 kg)

Mammographic Aluminum Stepwedge

High purity aluminum; 9 steps ranging in thickness from 0.3 mm to 2.27 mm. Provides graduated exposure steps to the image receptor. This product includes a 5-year warranty.

Specifications

Construction:	High Purity Aluminum Alloy and Copper; 9 steps 0.3 mm high, and 1.4 cm deep
Size:	14.2 x 4 cm (5.6 x 1.9 in)
Weight:	10 g (0.4 oz)

Ultra-High Purity Half Value Layer Attenuator Set-Mammo, 115H

Ultra-thin and ultra-high purity; 99.99% aluminum sheets are ideal for HVL measurements for mammographic systems. This set complies with the MQSA, and includes six sheets, 10 cm x 10 cm x 0.1 mm pure aluminum and a storage case. This product includes a 5-year warranty.

Specifications

Construction:	99.99% Pure Aluminum
Sizes:	10 x 10cm (4 x 4 inches)
Weight:	0.09 kg (0.2 lbs)
Thickness:	0.1 mm
Slices:	6

Half Value Layer (HVL) Attenuator Set

1100 Aluminum Alloy 99.0%, Model 115B, Quantity of 8 sheets, Size: 10 cm x 10 cm, Thickness: 0.1 mm

Signal Difference to Noise Ratio (SDNR) Set

1100 Aluminum Alloy 99.0%, Model 115C, Quantity of 8 sheets. Size: 10 mm x 10 mm, Thickness 0.2 mm

Routine Digital Mammography QC Kits

Ensure your digital mammography images contain complete, detailed information for the delivered dose. Combine proven, high quality phantoms and tools with reproducible quality control techniques to detect changes and subtle degradation in image quality.

Products included with Routine Digital Mammography QC Kit

Benefits

- Perform the following tests on your digital mammography system:
  - Image quality
  - Automatic Exposure Control (AEC) reproducibility
  - Timer accuracy
  - Half value layer
  - Focal spot size
  - Output reproducibility and linearity
- Includes custom case, user manual and 5-year warranty

Routine Digital Mammography QC Kit includes:

- Mammo 156™ Phantom
- Breast Compression QC Device
- Phototimer Consistency Tools
- Collimator Alignment QC
- Beam Alignment QC
- Artifact Identification Phantom
- Half Value Layer Set
- Hard-sided Case with Custom Insert
- User Guide

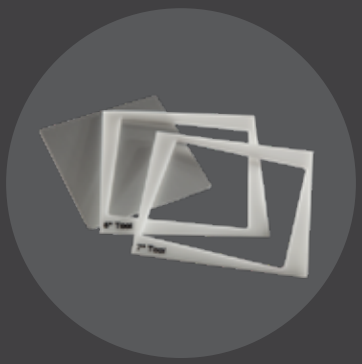
Routine Digital Mammography QC Kit with Radcal Meter includes:

- Radcal Rapid-Gold+ Meter Kit*
- Mammo 156™ Phantom
- Breast Compression QC Device
- Phototimer Consistency Tools
- Collimator Alignment QC
- Beam Alignment QC
- Artifact Identification Phantom
- Half Value Layer Set
- Hard-sided Case with Custom Insert
- User Guide

**The Rapid-Gold+ Digitizer is a comprehensive solution equipped with the smallest Mammography solid-state multi-sensor. Accurate measurements include dose, dose-rate, time, kVp, Flash HVL (single shot), and beam filtration for all beam qualities across the mammography kV range (20-50 kV). Flexible data collection and export software are complimentary including web-based updates. The system includes a sensor positioner and custom hard-sided case. A Radcal 1-year warranty is included for all items within the kit.*

DIGITAL RADIOGRAPHY (DR), COMPUTED RADIOGRAPHY (CR) & FLUOROSCOPY

Gammex offers a full line of products to help evaluate new or existing X-ray equipment to maximize image quality while minimizing patient dose. Everything you need to ensure your systems meet acceptance and routine QA guidelines and requirements can be found at Gammex.



Anthropomorphic Neo-Natal Chest Phantom

This phantom represents a 1-2 kg neonate in its transmission characteristics, histogram, physical size and structure. It can be imaged using clinical parameters to provide a measure of image consistency over time. The phantom contains clinically relevant image quality challenges for resolution and noise in the form of a lung with simulated pneumothorax with pleural thickening, and a lung with simulated hyaline membrane disease. This product includes a 5-year warranty.

Specifications

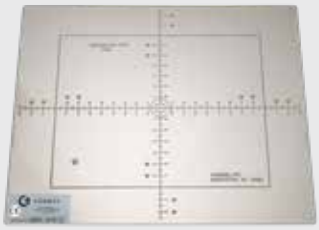
Size:	Approx. 100 x 100 x 54 mm
Weight:	Approx. 500 grams
Composition:	Tissue Equivalent Materials: Air, Muscle, Normal Lung, Hyaline Membrane Lung, Bone

Beam Alignment QC

This is the beam alignment acrylic cylinder portion of the Collimator Alignment Test Tool. The beam alignment QC tool evaluates the x-ray field congruence and ensures accurate x-ray beam alignment. This is typically used with the Collimator alignment tool, item #800422, to easily visualize 1 to 2% x-ray beam misalignments without measuring or calculating. This product includes a 5-year warranty.

Specifications

Construction:	Acrylic Cylinder
Height:	16 cm (6.3 in)
Diameter:	7 cm (2.8 in)
Weight:	260 g (9.2 oz.)



Collimator Alignment QC

This is the etched stainless steel baseplate of the Collimator Alignment Test Tool. This tool evaluates the collimator light field congruence. When used with the beam alignment tool, item # 800423, x-ray beam misalignments of 1 to 2% can be accurately visualized without calculating. This product includes a 5-year warranty.

Specifications

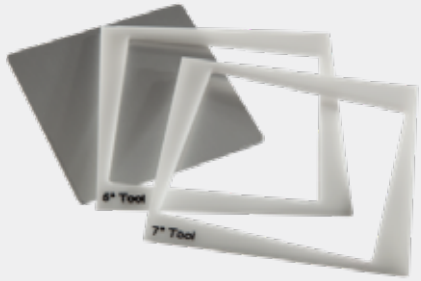
Construction:	Etched Stainless Steel
Dimensions:	20.0 x 25.0 cm (8.0 x 10.0 in)
Weight:	200 g (6.2 oz.)

Contrast Detail QC Tool

Monitor performance and determine contrast-detail characteristics of radiographic and fluoroscopic systems. This product includes a 5-year warranty.

Specifications

Material:	6061 Aluminum
Hole Depths:	0.13 to 2.29 mm
Hole Diameters:	0.58 to 7.93 mm
Dimensions (L/W/H):	18.0 x 18.0 x 1.3 cm (7.1in x 7.1 in x 0.5 in)
Weight:	1.0 kg (2.2 lbs.)

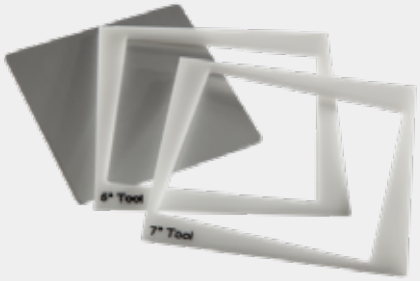


Edge Tool/Insert, Holder, and Filters (617)

Edge Tool/Insert, Holder, and Filters (617). This product includes a 5-year warranty and a protective case.

Specifications

Tungsten Edge Tool:	75 mm x 75 mm x 1 mm Two adjacent polished edges. Two edges with fiducial marks, not polished.
Two White Acrylic Alignment Templates:	Outer Dimensions: 94 mm x 94 mm x 3mm Inner Dimensions: 75.25 mm x 75.25mm Angulation of inner square: 5 degrees
Copper Filter:	100 mm x 100 mm x 0.5 mm
Aluminum Filter:	100 mm x 100 mm x 1 mm



Edge Tool/MTF and NPS Imaging System (617)

Edge Tool/MTF and NPS Imaging System (617). This product includes a 5-year warranty.

Specifications

Construction:	Etched Brass
Dimensions:	20.0 x 25.0 cm (8.0 x 10.0 in)
Weight:	200 g (6.2 oz.)

Film/Screen Contrast Test Tool – Perforated Brass (143D)

The Film/Screen Contact Test Tool (143D) tests the quality of the film/screen contact in film cassettes up to 14x17 inches. The 143D is constructed from perforated brass and is enclosed in a protective case. This product includes a 1-year warranty.

Specifications

Construction:	Perforated Brass with 2.4 mm (3/32 in) holes spaced 4 mm (5/32 in) center to center
Dimensions:	37 x 44.5 cm (14.5 x 17.5 inches)
Weight:	2.8 kg (6.2 lbs)

Film/Screen Contact Test Tool – Wire Mesh (142D)

The Film/Screen Contact Test Tool (142D) tests the quality of the film/screen contact in film cassettes up to 14x17 inches. The 142D is constructed from wire mesh and is enclosed in a protective case. This product includes a 1-year warranty.

Specifications

Construction:	Wire Mesh Screen (3 lines/cm) enclosed in plastic
Dimensions:	37 x 44.5 cm (14.5 x 17.5 inches)
Weight:	2.2 kg (4.9 lbs)

Fluoroscopic Dose Rate and Low Contrast Resolution Test Tool Kit (151)

Comply with regulatory requirements for QA testing of radiographic and fluoroscopic systems. Measure the automatic brightness stabilizer, maximum entrance exposure and the photo-timer performance. Includes two aluminum blocks, 1 lead blocker and 1 aluminum resolution plate. When used with the High Contrast Resolution tool, item # 800416, this ensures your fluoroscopic system is optimized. This product includes a 5-year warranty.

Specifications

Construction:	2 Aluminum Blocks, 1 Lead Blocker, 1 Aluminum Resolution Plate
Dimensions:	18 x 18 x 4.5 cm (7 x 7 x 1.8 in)
Weight:	4 kg (8.8 lbs)

Grid Alignment Test Tool (144)

The Gammex 144 Grid Alignment Test Tool is designed to test proper grid alignment with respect to the central ray of the X-ray tube. It consists of 3 lead blockers with precise hole locations. This product includes a 1-year warranty.

Specifications

Construction:	Three Lead Blockers with Precise Hole Locations
Dimensions:	9 x 23.5 cm (3.5 x 9 in) - one large, two small
Weight:	0.7 kg (1.5 lbs)

Focal Spot Test Tool (112B)

The Focal Spot Test Tool is an acrylic cylinder housing a range of bar patterns that can be used at assess focal spot size. The patterns range from 0.84 lp/mmm to 5.66 lp/mm. The visually observed limiting resolution can be simply converted into an effective focal spot size. This process is simpler than the use of an IEC slit camera and can be easier to interpret than a star pattern. This product includes a 5-year warranty.

Specifications

Construction:	Six inch acrylic cylinder with a 12-group bar pattern target mounted on top
Dimensions:	0.84 to 5.66 lp/mm
Weight:	329 g (11.6 oz)

Half Value Layer Attenuator Set, Pure Copper (116)

The Half Value Layer (HVL) Attenuator Set is used to determine the HVL of the x-ray beam to specify the quality of the x-ray beam. Pure copper. Set contains 9 sheets, 10 x 10 cm, of various thicknesses ranging from 0.1 to 2.0 mm. This product includes a 5-year warranty.

Specifications

Construction:	Pure Copper
Dimension:	10 x 10 cm (4 x 4 in)
Weight:	0.55 kg (1.1 lbs)
Sheet Count:	9 individual copper sheets
Thickness:	1 - 2.0 mm 2 - 1.0 mm 1 - 0.5 mm 1 - 0.25 mm 4 - 0.1 mm

High Purity Aluminum HVL Attenuator Set

This set is used to determine the Half Value Layer (HVL) of the x-ray beam to specify the quality of the x-ray beam. 1100 Alloy Aluminum (99.0%). Set contains 9 sheets of various thicknesses ranging from 0.1 to 2.0 mm. This product includes a 5-year warranty.

Construction:	99.0% Pure 1100 Aluminum Alloy
Quantity:	9
Length:	10.0 cm (4.0 in)
Width:	10.0 cm (4.0 in)
Thickness and Quantity:	0.1 (3), 0.2 (1), 0.5 (2), 1.0 (2). 2.0 (1)
Weight:	0.09 kg (0.2 lbs.)

Half Value Layer Attenuator Set, Copper Alloy 110, 5 pieces, each 17 cm x 17 cm x 0.5 mm

Half Value Layer Attenuator Set, Copper Alloy 110, 5 pieces, each 17 cm x 17 cm x 0.5 mm. This product includes a 5-year warranty.

Specifications

Construction:	Copper Alloy 100
Dimensions:	5 pieces, each 17 cm x 17 cm x 0.5 mm

Lead Blocker 0.3 x 18 x 18 cm, 3Lb

Lead Blocker for Fluoroscopic Dose Rate and Low Contrast Resolution Test Tool Kit (151), 0.3X18X18cm, 3Lb. This product includes a 5-year warranty.

Specifications

Construction:	Lead
Dimensions:	0.3 x 18 x 18cm
Weight:	3 lbs

Light Field Ruler Set (622)

Light Field Ruler Set. This product includes a 1-year warranty.

Specifications

Size/Range of Light Field to Measure:	2 x 2 cm --> 25 x 30 cm with markings for 10 x 10, 15 x 15 & 20 x 20 cm and 25 x 25 cm
Size/Range of Circular Fields:	1 cm – 25 cm diameter
Read Out Accuracy:	0.5 mm
Size:	13.75 x 11 x 1/8 inches thick
Weight:	938 g (2 lbs.)

Light Field Cassette

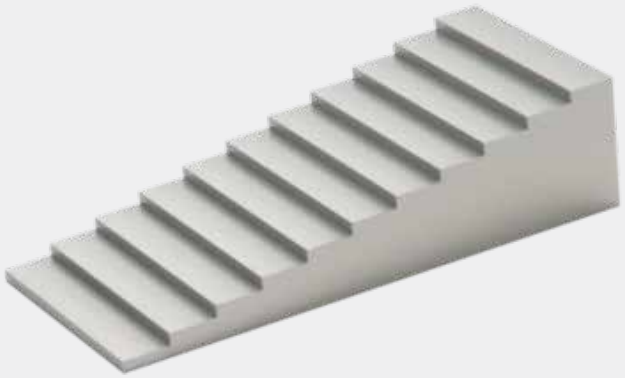
The Light Field Cassette (Model 1622) is a fast, convenient way to measure the coincidence of the light and radiation fields for film or digital flat plate X-Ray, fluoroscopy, mammography and radiation therapy systems.

Specifications

Size/Range of Light Field to Measure:	2 x 2 cm to 25 cm x 25 cm with markings for 10 cm x 10 cm, 15 cm x 15 cm, 20 cm x 20 cm, 25 cm x 25 cm
Accuracy:	0.5 mm
Dimensions (H/W/L):	13.75 in. x 18 in. x 11 in.
Weight:	938 g (2 lbs.)

Radiographic Aluminum Stepwedge, 11 Steps (117)

The aluminum stepwedge is the standard tool for evaluating the dynamic range (latitude) of a digital or film-screen imaging system. This wedge provides 11 steps in 3.2 mm increments. This product includes a 5-year warranty.



Specifications

Construction:	6061 Aluminum Alloy
Steps:	Eleven (11) steps, 3.2 mm high and 12.7 mm deep
Dimensions:	14 x 6 cm (5.5 x 2.4 in)
Weight:	450 g

Resolution Test Pattern, 0.6-5.0 bar, 20 groups (0.1 mmPb)

Provides an easy method for measuring resolution and modulation transfer functions of x-ray systems. This product includes a 5-year warranty.

Specifications

Dimensions:	50 x 50 mm (1.9 x 1.9 in)
Weight:	9 g (0.3 oz)

Resolution Test Pattern, 1 sector

Provides an easy method for measuring resolution and modulation transfer functions of x-ray systems. This product includes a 5-year warranty.

Specifications

Dimensions:	157 x 50 mm (6.2 x 1.9 in)
Weight:	9 g (0.3 oz)

Resolution Test Pattern, 5.0 Bar, 20 groups (0.01 mmPb)

Provides an easy method for measuring resolution and modulation transfer functions of x-ray systems. This product includes a 5-year warranty.

Specifications

Resolution:	0.6 to 5.0 lp/mm
Dimensions:	50 x 50 mm (1.9 x 1.9 in.)
Weight:	9 g (0.3 oz.)

Resolution Test Pattern, 0.5-5.0 LP/mm bar, 16 groups

Provides an easy method for measuring resolution and modulation transfer functions of x-ray systems. This product includes a 5-year warranty.

Specifications

Dimensions:	110 x 40 mm (4.3 x 1.6 in)
Weight:	9 g (0.3 oz)

Ultra Star Test Pattern, 1-360º

Helps determine focal spot size by observing regions of blurring. This product includes a 5-year warranty.

Specifications

Lead Foil Thickness:	0.05 mm
Diameter:	55 mm
Angle of Single Line within a Sector:	0.5°
Number and Size of Patterned Sector:	1-360°
Focal Spot Size Measured:	0.1-0.3 mm

Ultra Star Test Pattern, 4-15º

Helps determine focal spot size by observing regions of blurring. This product includes a 5-year warranty.

Specifications

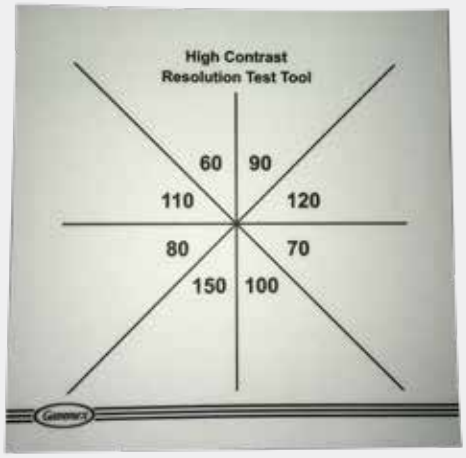
Lead Foil Thickness:	0.05 mm
Diameter:	55 mm
Angle of Single Line within a Sector:	0.5°
Number and Size of Patterned Sector:	4-15°
Focal Spot Size Measured:	0.1-0.3 mm

High Contrast Resolution Test Tool (141H) – High-Res, 60-150 Mesh

Measure high contrast resolution of radiographic and fluoroscopic systems. This high-resolution configuration includes eight patterns of copper mesh for systems with resolutions from 60 to 150 mesh. Mesh values are labeled with lead for easy identification. This product includes a 1-year warranty.

Specifications

Geometric Progression:	2 1/3
Construction:	White Plastic (outside)
Wire Mesh Patterns (inside):	8 - 60 to 150 mesh
Dimensions:	18 x 18 x 1 cm (7 x 7 x 0.4 in)
Weight:	113 g (4 oz)

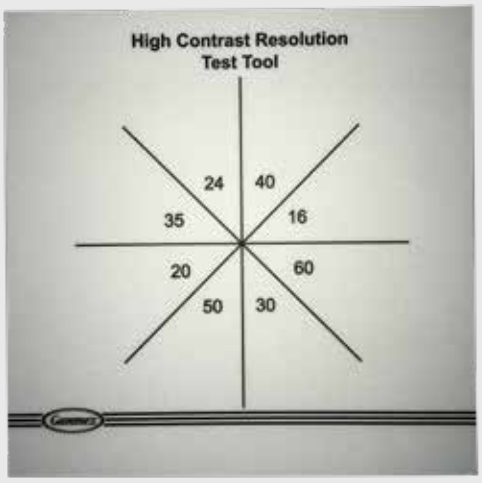


High Contrast Resolution Test Tool (141) – Standard, 16-60 Mesh

Measure high contrast resolution of radiographic and fluoroscopic systems. This standard configuration includes eight patterns of copper mesh for systems with resolutions from 16 to 60 mesh. Mesh values are labeled with lead for easy identification. This product includes a 1-year warranty.

Specifications

Geometric Progression:	2 1/3
Construction:	White Plastic (outside)
Wire Mesh Patterns (inside):	8 - 16 to 60 mesh
Dimensions:	18 x 18 x 1 cm (7 x 7 x 0.4 in)
Weight:	113 g (4 oz)



Universal Test Stand (175)

The Gammex 175 Universal Test Stand simplifies radiographic and mammographic testing. The height easily adjusts and the cassette holder accommodates a variety of film cassette sizes. Ideal for measuring focal spot size with a slit camera or star resolution pattern, the Universal Test Stand also includes a number of inserts used to define magnification and simplify alignment of the x-ray system. Half Value Layer measurements can also be performed. The kit includes the base, telescoping platform, shim tool, slit camera mounting insert, gunsight alignment tool insert, magnification insert, HVL top plate, intensifying screen, vinyl/rubber face shield, and carrying case. This product includes a 5-year warranty.

Specifications

Dimensions:	26.7 x 22.2 cm at base (10.5 x 8.75 in) 11.1 x 11.1 cm at top (4.4 x 4.4 in)
Height:	Adjustable from 36.2 cm to 66.0 cm(14.3 to 20 in)
Weight:	4.2 kg (9.3 lbs)

Sensitometer, Portable Blue/Green (MA5034)

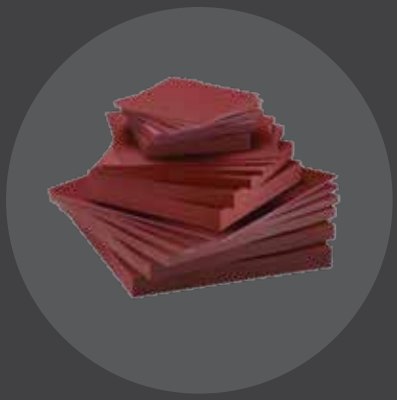
The Gammex MA5034 Sensitometer facilitates routine processor QC by applying a 21 step light modulator to a single piece of film. The Gammex MA5034 is useful for all types of film, from sensitive x-ray film to roll or cine film. It can test either blue sensitive or green sensitive film. To expose the film simply close the cover and listen for the tone. This product includes a 1-year warranty.

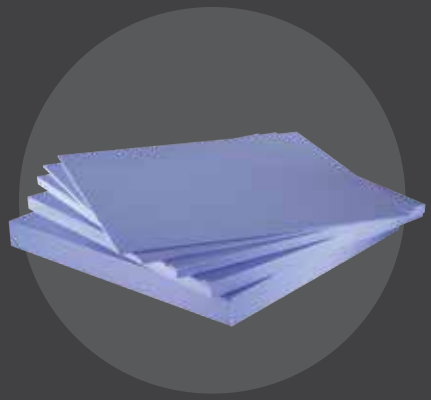
Specifications

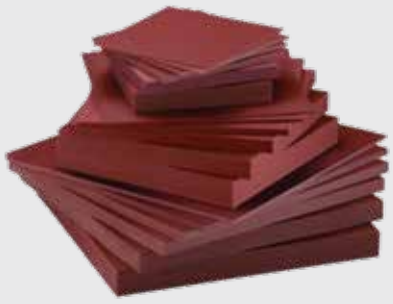
Time Stability:	±0.02 Log Exposure per Year
Reproducibility:	±0.04 Log Exposure
Power:	9 V Alkaline Battery (included)
Warm-up Time:	None
Blue Color Peak Wavelength:	460 nm ±10 nm
Green Color Peak Wavelength:	510 nm ±10 nm
Dimension:	3.8 x 7.6 x 17.8 cm (1.5 x 3 x 7 in)
Weight:	0.57 kg (1.25 lbs)

The Pioneer of Solid Water® and Tissue-Mimicking Material for RADIATION ONCOLOGY

Gammex's patented Solid Water® mimics the absorption characteristics of water over a wide range of energies. The innovations in this area continues with Solid Water® HE and Tissue Mimicking Material to support radiation oncology QA.







Original Solid Water

THE Original Solid Water: proven as the industry standard in scientific publications. Solid Water® mimics the absorption characteristics of water over a wide range of energies. Designed to scatter and attenuate radiation in the same way as water. Supports calibrations within 1% of the true water dose. Custom sizes available for unique applications. This product includes a 5-year warranty.

Solid Water® **HE**

Measure photon and electron energies. Patented technology provides enhanced uniformity and durability.

Highlights

- Water equivalence within 0.5% for therapeutic and diagnostic energy ranges
- Patent-pending process using nanosphere technology for improved uniformity and variation
- Each manufactured slab is CT scanned for verification of consistency
- Variety of dimensions and thickness available

Benefits

- Longer lifespan and scratch resistance compared to conventional solid water
- Enhanced water equivalency
- Depth ionization relative to water

Specifications

Depth Ionization Relative-to-water	
Photons:	1.000 +/- 0.005
Electrons:	1.000 +/- 0.005
Density	
Mass Density (g/cm^3):	1.032 +/- 0.005
Electron Density (e- / cm^{3NA}):	0.557 +/- 0.001
Solid Water HE / Water Electron Density Ratio:	1.0 00 +/- 0.005
Warranty:	5 years

Tissue Mimicking Materials

Tissue Mimicking Materials (TMM) play a key role in the dose calculations for Treatment Planning Systems (TPS) and for absorbed dose estimates. For routine QA and QC in diagnostic and therapeutic imaging. A full line of Bone, Breast, Muscle, Brain, Fat, Lung and other TMM for all clinical and research needs. This product includes a 5-year warranty.

Specifications

Dimensions (L/W)	Thickness
20 x 20 cm	0.2 cm – 6.0 cm[1]
30 x 30 cm	0.2 cm – 6.0 cm[1]
40 x 40 cm	0.2 cm – 5.0 cm[1]

Solid Water® HE Slab Phantom Kits

Measure output with a wide range of energies with Gammex's patented Solid Water® HE.

Benefits

- Measure photon and electron energies for routine output QC
- Water equivalence within 0.5% for therapeutic and diagnostic energy ranges
- Custom designed wheeled case ensures safe storage and easy transport
- Watertight case is perfect for housing 30 cm x 30 cm slabs of Solid Water® HE
- Case accommodates up to 34 individual slabs

Specifications

Depth Ionization Relative-to-water	
Photons:	1.000 +/- 0.005
Electrons:	1.000 +/- 0.005

Density	
Mass Density (g/cm³):	1.032 +/- 0.005
Electron Density (e- /cm³ N_A):	0.557 +/- 0.001
Solid Water HE / Water Electron Density Ratio:	1.000 +/- 0.005
Warranty:	5 years

Kit Options

30 CM Slab Phantom Kit	
Quantity	**Thickness**
1	0.1 cm
2	0.2 cm
1	0.5 cm
1	1.0 cm
3	2.0 cm
1	3.0 cm
1	4.0 cm
3	5.0 cm
Total	**30.0 cm**

20 CM Slab Phantom Kit	
Quantity	**Thickness**
1	0.1 cm
2	0.2 cm
1	0.5 cm
1	1.0 cm
2	2.0 cm
1	4.0 cm
2	4.0 cm
-	-
Total	**20.0 cm**

The Next Generation of

PATIENT ALIGNMENT LASERS

With more than 4,000 laser installations worldwide, Gammex offers user-friendly and accurate alignment systems for your CT simulation and radiation therapy needs.

CT **SIM+**™ with RapidSIM™ Software

Ensure accurate patient marking with a simplified approach that works effortlessly within the CT Simulation room.

Highlights

- Includes the new RapidSIM™ software interface with the Complete Connectivity Suite
- Complete Connectivity Suite includes:
  - Handheld Wireless Tablet for in-room control
  - Touchscreen Control Monitor for convenient patient workflow
  - DICOM and Text file interconnectivity
- Sub-millimeter accuracy
- Bright diode lasers available in red, green, and blue
- Multiple installation configurations including wall/ceiling, bridge, and floor mounted posts
- Available in 3- or 5-arm configurations

Benefits

- Choice of red, green or blue lasers – each available at the same price
- Touchscreen control reduces control area clutter and provides a convenient patient workflow
- In-room wireless tablet provides complete control and freedom for workflow efficiency
- Supports all major CT Simulation packages and Treatment Planning Systems

THREE LASER WAVELENGTH OPTIONS—ONE PRICE

BLUE **RED** **GREEN**

Laser Output

Power (mW):	<1.0
Range (m):	Up to 6
Line Width:	≤0.5 mm @ 4 m
Line Length:	≥2 meter @ 4 m
Available Colors:	Wavelength 635 nm Red Wavelength 515 nm Green Wavelength 450 nm Blue

Mechanical

Length of travel:	70 cm
Mechanical Resolution:	0.02 mm
Projected Laser Accuracy:	±0.5 mm at 3.0 m

Dimensions

Length (cm):	113
Width (cm):	19.1
Depth (cm):	10.2
Bridge Width x Height (m):	3.2 x 2.6 (custom available upon request)

Construction

Laser Structure:	Reinforced Steel backplate
Cover:	Shatter-Resistant Polycarbonate
Window:	Transparent and impact resistant medical grade polymer

MICRO+™ & MICRO+™ MR

Remote Adjustable Fixed Lasers

Enhance patient alignment workflow and accuracy with an elegant, all-in-one platform. Remotely control laser positioning with ease — to an accuracy of 0.15 mm.

Highlights

- Designed for radiotherapy applications
- Backlit remote control for easy operation
- MR-compatible system up to 3 Tesla (MICRO+ MR)
- Integrated Bluetooth receiver
- Sub-millimeter accuracy
- Bright and crisp light in sagittal or crosshair projections
- Blue (450 nm), red (635 nm) and low wavelength green (515 nm) for the same price
- Compact and lightweight
- Easy to install and maintain

Specifications

Adjustment Type:	Handheld remote control
Degrees of Movement/Freedom:	6
Left - Right; Up - Down:	≥ ± 15 mm
Rotation; Horizontal Tilt (yaw); Vertical Tilt (pitch):	≥ ± 5°
Focus Range:	1.5 m - 4 m
Adjustment Accuracy:	0.15 mm
Adjustments Speed:	Slow – 0.15 mm steps for each touch of control Medium – Hold the control for continuous motion Fast – Continue to hold the control for faster speeds and larger movements
Remote Technology:	Integrated Bluetooth & infrared
Remote Operational Range:	> 10 m
Laser Selection:	OneTouch™ automatic laser/ remote pairing up to 6 lasers
Line Width (All Colors):	≤ 0.5 mm @ 3 m
Line Length:	4 m @ 3 m
Line Projections:	Crosshair, Vertical or Horizontal
Laser Type:	Diode (all colors)
Laser Output:	< 1 mW
Dimensions HxWxD:	216 mm × 134 mm × 80 mm
Installation Options:	Wall mount ± 45 (with optional tilt and adapter bracket)

THREE LASER WAVELENGTH OPTIONS—ONE PRICE

BLUE **RED** **GREEN**

MICRO™
Fixed Lasers for Radiotherapy

Make the right choice for your patient alignment needs. Diode-based system from the leader in high-quality lasers. Compact dimensions and low-weight design allow easy installation.

Highlights

- Offers red, green or blue color choices at the same price
  - All color options utilize diode laser modules and not diode-pumped solid-state (DPSS) modules for any color
- Sub-millimeter accuracy
- Bright and crisp light in sagittal or crosshair projections

THREE LASER WAVELENGTH OPTIONS—ONE PRICE

BLUE RED GREEN

Laser Output

Power (mW):	<1.0
Range (m):	Up to 6
Line Width:	≤0.5 mm @ 4 meters
Line Length:	≥2 meter @ 4 m
Wavelength Red (nm):	635
Wavelength Green (nm):	515
Wavelength Blue (nm):	450

Laser Beam Adjustment

Coarse Planar (mm):	±7.6 horizontal and vertical
Coarse Angular:	±25° horizontal
Fine Angular:	±3.5° horizontal and vertical
Line Rotation:	±180°

Laser Dimensions

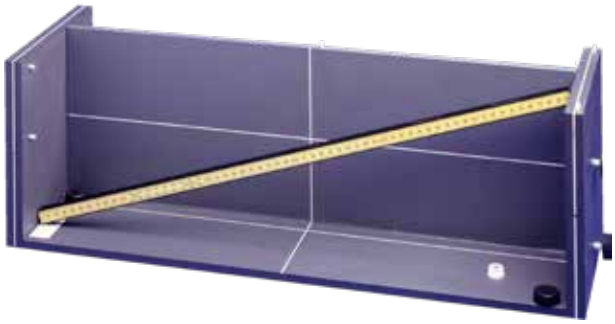
Length (mm):	164
Width (mm):	110
Depth (mm):	76
Weight (g):	725

Universal Power Supply

Voltage:	110/240 VAC (auto-select)

Certifications

Complies with Center for Devices and Radiological Health regulations for Class II lasers and all CE requirements. (21 CFR 1040) (IEC 60825-1) (MDD 93/42/EEC)

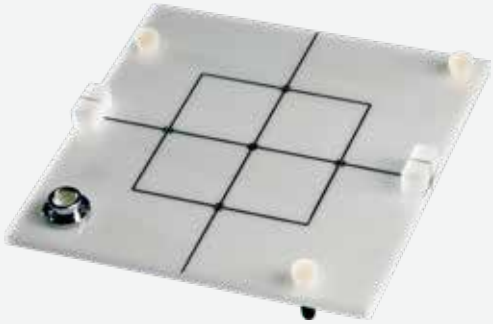


Couch & Laser Alignment Tool

The couch & laser alignment tool can be used with all fixed laser systems to assure proper beam alignment. Daily QC of CT or MRI systems can be performed quickly using recessed scribe lines and alignment holes. This product includes a 5-year warranty.

Specifications

Material:	Precision machined PVC
Dimensions (L/W/H):	58.4 x 20 x 20 cm (23 x 7.875 x 7.875 in)
Weight:	5.3 g (11 lb. 12 o z.)

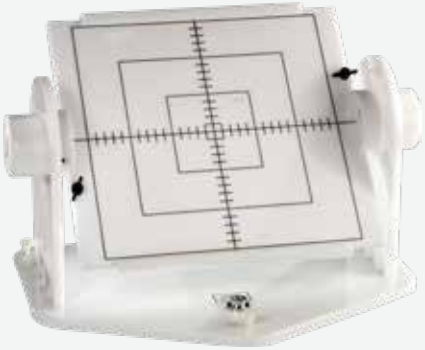


Laser and Light Field Alignment Plate

The Laser and Light Field Plate verifies your lasers are straight, level, sharp and in focus. This tool provides a daily, accuracy verification of the field size, Crosshair wander due to collimator rotation along with ceiling and wall laser alignment. This product includes a 5-year warranty.

Specifications

Dimensions:	20.3 x 20.3 x 3.6 cm (8 x 8 x 1.42 in)
Thickness Tool:	3.18 cm (1.25 in)
Main Plate:	0.64 cm (0.25 in) Side blocks extend 1.3 cm (0.5 in) above plate
Weight:	0.31 kg (0.7 lbs)



Isocenter Rotation Plate

The Isocentric Rotation Plate takes only minutes to set up and can perform routine QA tests such as Light/Radiation Field Coincidence, Symmetry and Flatness, Accuracy of Optical Distance Indicators and Laser Alignment plus Gantry and Collimator Isocentricity. This product includes a 5-year warranty.

Specifications

Dimensions:	45.7 x 31.8 x 34.9 cm (18 x 1 2.5 x 13.75 inches)
Weight:	4.4 kg (10 lbs)
Ion Chamber Holder:	Optional RO5138 Inner diameter 1.27 cm (0.5 in)
Film Used:	10 x 12 in ready-pack

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