



Solutions Portfolio

Diagnostic Imaging QA 2021

 Patient Safety Starts Here

 **SUN NUCLEAR**
corporation

Innovative Solutions for Diagnostic Imaging QA

Sun Nuclear offers a comprehensive suite of CT, Mammography, Ultrasound, and DR/CR/Fluoroscopy QA tools — leveraging proven technologies and backed by world-class support.

Review this catalog for highlights on key solutions available. Visit sunnuclear.com to request a quote, find your distributor, and explore our full portfolio of Quality Management solutions for Diagnostic Imaging and Radiation Therapy.



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DIAGNOSTIC



CT ACR 464 Phantom

Multi-Modality CT Accreditation

PN 804740, Stand (PN 804868) sold separately



Specifications

Material	Zero HU Solid Water®
Diameter	20.0 cm (7.9 in)
Length	16.0 cm (6.3 in)
Weight	5.3 kg (11.7 lbs)

Imbedded Test Objects

Water Equivalent Linearity Rod	Solid Water, Zero HU
Bone Equivalent Linearity Rod	Bone tissue equivalent material
Acrylic Linearity Rod	Cast Acrylic
Polyethylene Linearity Rod	Low Density Polyethylene
Low Contrast Rods	6 ±0.5 HU Contrast rods , in sizes ranging from 2 mm to 6 mm, plus 25 mm
Tungsten Carbide Beads	0.28 mm (0.011 in) in diameter grade 25 tungsten carbide beads
Line pair Material	6061 Aluminum and Polystyrene



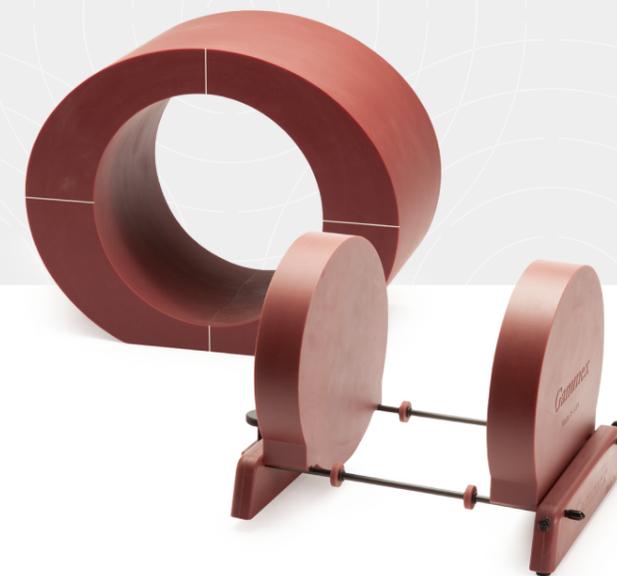
Soft Case for CT ACR 464 Phantom & Stand

PN 804867

CT ACR 464 Phantom Accessories & Cases

Body Ring, Extensions & Cases

PN 805384 (Body Ring), PN 805558 (Extension Kit)



CT ACR 464 Phantom Body Ring

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

CT ACR 464 Phantom Extension Kit

Material	Zero HU CT Solid Water®
Plate Thickness	4.0 cm (1.6 in)
Diameter	20 cm (7.9 in) (same as CT ACR 464 Phantom)



Soft Case for Extension Plate Kit

Fits Extension Stand & 2 End Plates/Advanced iqModules™

PN 805540



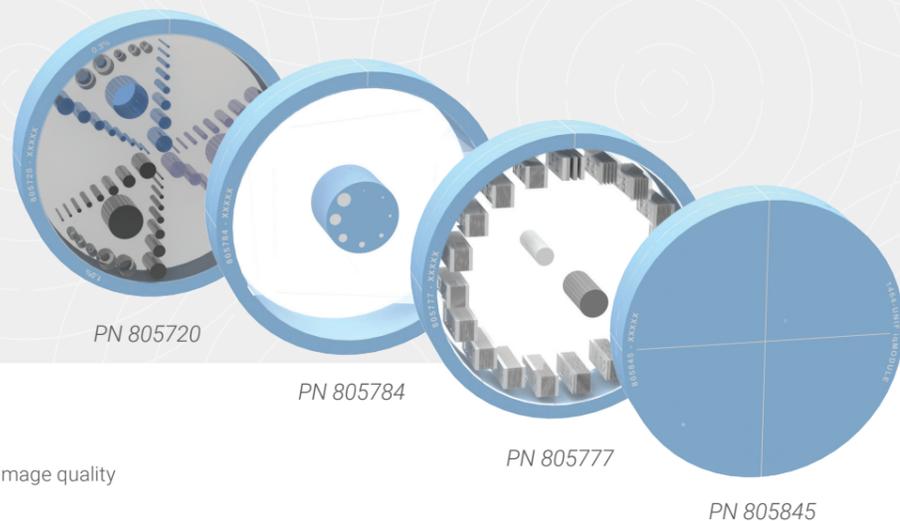
Soft Case for CT ACR 464 Phantom & Extension

Fits CT ACR 464 Phantom, Extension Stand & 2 End Plates/Advanced iqModules™ Plate Kit

PN 805541

Advanced iqModules™

Expanded Image Quality CT QA



Unmatched Image Quality Testing

Set of four modules for comprehensive CT image quality testing

- **Low-Contrast Detectability Module** tests performance across scanners and protocols with three different contrast levels
- **Slice Sensitivity & Geometric Evaluation Module** validates slice thickness, sensitivity profile and system geometry
- **High-Contrast Resolution Module** expands CT ACR 464 testing
- **Uniformity Module** assess CT number uniformity

Modular CT QA Support

- Can be combined with **CT ACR 464, Advanced Electron Density, or Multi-Energy CT Phantoms**

All Advanced iqModule Specifications

Materials	Epoxy and CT High Equivalency Solid Water® (Uniformity Module comprised solely of HE CT Solid Water)
Diameter	20.0 cm (7.9 in)
Length	4.0 cm (1.57 in)
Warranty	5 years

Low-Contrast Detectability Module Specifications

Contrast Levels	0.3 % (3 HU), 0.6 % (6 HU), 1.0 % (10 HU)
Sizes at Each Contrast Level	25 mm, and two 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

High-Contrast Detectability Module Specifications

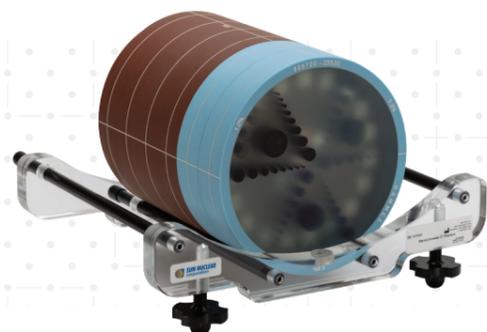
Resolution Pattern Size	1.5 cm x 1.0 cm x 4.0 cm
Resolutions Tested	2, 4, 5, 6, 7, 8, 9, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30 and 32 lp/cm
Automated Analysis Features	Solid material samples improve computational analysis. Large pattern sizes enable robust evaluation.
Contrast Material	Zinc

Slice Sensitivity & Geometric Evaluation Module Specifications

Wire Ramps	Tungsten wire, 0.05 mm diameter
Bead Ramps	One opposed set with 0.18 mm tungsten carbide BBs, and one with 0.28 mm tungsten carbide BBs
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

Uniformity Module Specifications

Tungsten Carbide Beads	0.28 mm (0.011 in) in diameter grade 25 Tungsten Carbide beads
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Deluxe Stand for Advanced iqModules & CT ACR 464 Phantom

PN 805964

Multi-Energy CT Phantom

Comprehensive Testing, Tissue Equivalence

PN 805754



Comprehensive Testing of Scanner Performance

- Test efficacy of clinical protocols for multi-energy analysis
- Compare consistency and stability across scanners

Automated Material Discrimination

- Solid rods represent iodine, calcium, blood, adipose, and more
- Patented rod markers enable automated analysis

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
Removable Head Section Diameter	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)
Wheeled Case	Included
Stand	Included



Modular Base

The Solid Water® HE base is compatible with two sets of rods for multi-energy CT QA as well as TPS calibration. See page 8 for details.

Advanced Electron Density Phantom

Tissue-Equivalent CT-to-Electron Density Calibration in a Single Workflow

PN 805810



Automated CT-to-Electron Density Analysis

- Patented rod markers* uniquely identify each material in a CT scan
- CT-to-density tables are automatically generated in the **RapidCHECK™** software

Sized for Wide-Beam Applications

- Larger phantom body diameter supports evaluation of cone-beam CT and wide-beam CT scanners
- Removable section for head and small body protocols

Superior Tissue Equivalence & Chamber Compatibility

- Meets medical standards ICRU-44 and ICRP for human tissue densities
- Compatible with any ion chamber

Specifications

Software Analysis	Automatically process CT-to-density tables using RapidCHECK, based on patented rod marker technology
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
Removable Head Section Diameter	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	Aluminum, Stainless Steel, Titanium
Available Upon Request	Extension plates, Ion Chamber conversion rod
Weight	15.5 kg (34.1 lbs)
Wheeled Case & Stand	Included

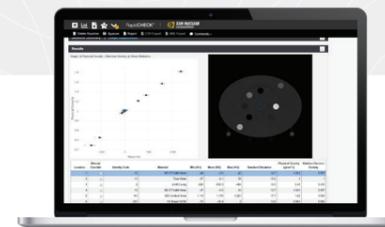
Standard Inserts

Material	Physical Density (g/cm ³)	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
1482 HE Liver	1.08	1.05
1456 HE Inner Bone	1.21	1.16
484 CB2 + 30% CaCO ₃	1.33	1.27
480 CB2 + 50% CaCO ₃	1.56	1.46
1450 HE Cortical Bone	1.93	1.78
2 - True Water Inserts	1.00	1.00

RapidCHECK™ Software

Automated CT-to-Density Calibration & CT Image Quality Analysis

PN 806017



Automate QA Workflows

- Use with **Advanced Electron Density Phantom** for faster, less-tedious calibration of CT-to-electron density tables
- Use with **CT ACR 464 Phantom** for automation of image quality analysis, trending reports, and an easily searchable permanent record

Browser-Based Software

- Use RapidCHECK software from any browser in your clinical network
- Get results immediately – load data, see analysis, print report, and track changes over time

Specifications

Current Device Compatibility	Advanced Electron Density Phantom, CT ACR 464 Phantom
Operating System	Windows 10 Pro with Creators Update (Version 1703) and Fall Creators Update (Version 1709, build 16299), Windows 10 Enterprise, or Windows 10 Educational
Regional Settings	US or International
Minimum Computer Specifications	Intel i3 processor; total RAM: 4 GB (8 GB recommended); 10 GB of drive space; Display resolution: 1280 x 1024; Color depth: 32-bit
Browser	Google Chrome® (recommended) or Microsoft Edge®

Mercury 4.0 Phantom

Advanced CT Performance Assessment

PN 805835



Characterize Advanced CT Features

- Address performance and effectiveness of Automatic Exposure Control/Tube Current Modulation
- Evaluate image quality for Iterative Reconstruction
- Meet AAPM TG-233 requirements

CT Protocol Optimization

- 5-tiered sections reflect range of patient sizes, and enable size-dependent image quality evaluation
- Software analysis, featuring ImQuest software licensed from Duke University

Specifications

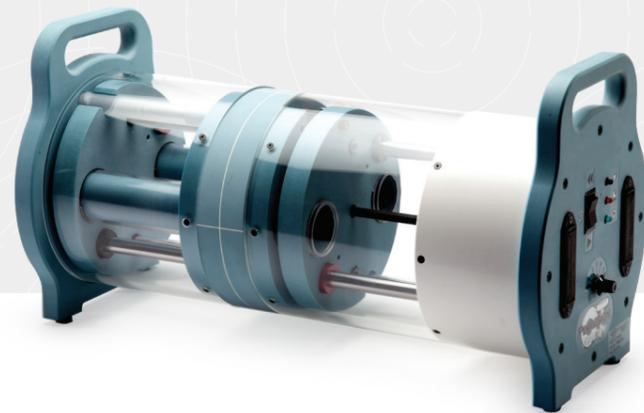
Material	Polyethylene
Diameter	16.0, 21.0, 26.0, 31.0, and 36.0 cm
Length	52.0 cm
Contrast Materials	HE CT Solid Water®, Bone Mimicking Material, Polystyrene, 10 mg/mL Iodine, and Air
Resolution Wedge	HE CT Solid Water®
Software Analysis	Works with ImQuest software, available from Duke
Included	Wheeled Case and Stand

*U.S. Patent No. 10,939,891

CT Perfusion Phantom

Optimize Imaging & Perfusion Protocols

PN 805607



Consistent, Optimized CT Perfusion Programs

- Ensure CT scanner and perfusion software are providing consistent results
- Benchmark perfusion rates and time-attenuation curves for each system
- Meet ACR CT Perfusion and FDA recommendations

Image Gently

- Use the dose port to optimize imaging and perfusion protocols
- Gain insights to image at the lowest possible dose

Specifications

Covers and housings	PVC, Acrylic
Dosimetry Port	Standard CT Pencil Chambers up to 12.7 mm (0.5in) diameter
Central Scan Disk	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)

CTDI Phantoms

Computed Tomography Dose Index Phantom

PN 805561 (Two-Piece), PN 805549 (Three-Piece)



Compliance Maintenance

- Measure absorbed dose and monitor scanner output for Dose Index QA
- Address specifications outlined by the FDA (FDA 21CFR 1020.33) and IEC (IEC 60601-2-44, IEC 61223-2-6 and IEC 61223-3-5IEC 60601-2-44)
- Meet AAPM TG-66 requirements

Configurable

- 2-piece configuration supports adult body and adult head/pediatric body sizes
- 3-piece configuration offers an additional pediatric head size
- Nested modules adapt the phantom to the size required by user protocol

Specifications

Material	Polymethyl-Methacrylate (PMMA/Acrylic)
Density	1.19 g/cm ³
Alignment Markings	Etched lines centered at the transverse, coronal and sagittal planes
Module	Dimensions (OD x Length)
Adult Body	32 cm x 14.5 cm
Adult Head/Pediatric Body	16 cm x 14.5 cm
Pediatric Head (Model 468-BHP only)	10 cm x 14.5 cm
Weight	19.9 kg (30.5 lbs)
Chamber Ports Diameter	1.31 cm

Electron Density Phantom

Legacy Electron Density Phantom

PN 802428



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	Aluminum, Titanium, Stainless Steel



CTDI Wheeled Case (included)

Doppler 403™ Flow & Mini-Doppler 1430™ Flow Phantoms

Reliable, Reproducible System Velocity Testing



PN 805660 (0.5 dB/cm/MHz),
PN 805661 (0.7)

PN 805204 (0.5 dB/cm/MHz),
PN 805206 (0.7)

Comprehensive QA & Testing

- Determine maximum signal penetration, channel isolation, and flow rate readout accuracy
- Doppler flow and B-Mode QA test systems
- Meet ACR, ECR, and AIUM QA requirements
- **Doppler 403™ Flow Phantom** ideal for abdominal flow measurements
- **Mini-Doppler 1430™ Flow Phantom** ideal for cardiology and musculoskeletal applications

Unparalleled Tissue Mimicking

- Blood-mimicking fluid ultrasonically similar to human tissue
- Patented High Equivalency Gel* (HE Gel™) offers tissue mimicking for evaluating image uniformity, detecting dead transducer elements, and assessing maximum penetration depth

Doppler 403™ Flow Phantom Specifications

HE Gel™ Multi-Frequency Tissue-Mimicking Material	Included
Patented Composite Film Scanning Surface	Included
Vessels (2)	5 mm inner diameter; 1 horizontal at 2 cm depth, 1 diagonal at 40° from 2 to 16 cm deep
Flow Rates	Customizable, constant and pulsatile
Blood Mimicking Fluid	Speed of Sound 1550 +/- 10 m/s
Targets	Strings, cysts, grey scale, resolution groups
Dimensions (Case)	28 H x 30.5 W x 22 cm (11 x 12 x 8.65 in.)
Weight	8.34 kg (18 lbs. 4 oz.)

Mini-Doppler 1430™ Flow Phantom Specifications

HE Gel™ Multi-Frequency Tissue-Mimicking Material	Included
Patented Composite Film Scanning Surface	Included
Vessels (2)	4 mm inner diameter; 1 horizontal at 2 cm depth, 1 diagonal at 35° from 2 to 9 cm deep
Flow Rates	Customizable, constant and pulsatile
Blood Mimicking Fluid	Speed of Sound 1550 +/- 10 m/s
Targets	Strings, cysts, grey scale, resolution groups
Dimensions (Case)	20 H x 23 W x 15.2 cm (7.87 x 9.06 x 5.94 in.)
Weight	4.6 kg (9 lbs. 15 oz.)

Sono403™ Phantom

Multi-Purpose
Ultrasound Phantom

PN 802259 (0.5 dB/cm/MHz), PN 802260 (0.7)



Multi-Purpose B-Mode Ultrasound QA

- Ensure accurate ultrasound system imaging
- Generally compatible with AIUM, ACR, AAPM, IEC 62736, IPEM 102, and EFSUMB TQA QA Guidelines
- Verify system settings and depth of penetration for small to very large patients
- Simulates typical depth through abdomen to the liver
- Precisely placed targets support grey scale and axial resolution system measurements

Unparalleled Tissue Mimicking

- Patented High Equivalency Gel* (HE Gel™) provides multi-frequency, high quality, reproducible images
- Test across the entire frequency range (2 - 18 MHz)

Included Warranty

- 5-year warranty, the longest warranty available for ultrasound QA phantoms

Specifications

Attenuation Coefficient ¹	0.5 or 0.7 dB/cm/MHz
Variation of Attenuation with Frequency ^{2,3}	f ^{1.08} at 0.5 dB/cm/MHz f ^{1.1} 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
Scanning Surface	Composite Film
Pin Target Material	Nylon monofilament
Cystic Targets Diameters & Placement	2, 4, 6, and 10 mm; 3, 7, 8, and 14 cm deep
Grey Scale Target Diameters & Placement	10 mm; 6 cm deep
Pin Targets Diameter & Placement	0.1 mm; 2 cm at 2 to 16 cm deep vertical spacing, and 3 cm at 2 and 12 cm deep horizontal spacing
Resolution Target Groups Depths	3, 8, and 14 cm deep
Case Material	Extruded ABS Plastic
Weight	~2.8 kg (6 lbs. 5 oz)
Dimensions	23.2 x 8.25 x 18.5 cm (9.25 x 3.25 x 7.25 in.)

*U.S. Patent No. 6,352,860

*U.S. Patent No. 6,352,860

Sono404™ Phantom

Small Parts
Ultrasound Phantom

PN 802261 (0.5 dB/cm/MHz), PN 802262 (0.7)



Small Parts B-Mode Ultrasound QA

- Ensure accurate ultrasound system imaging
- Generally compatible with AIUM, ACR, AAPM, IEC 62736, IPEM 102, and EFSUMB TQA QA Guidelines
- Supports Cardiology, Breast Care, Musculoskeletal and Vascular applications
- Closely spaced pin targets make it ideal for testing high frequency transducers
- Enables training and testing the most difficult cases, including small parts and intra-cavity ultrasound systems

Unparalleled Tissue Mimicking

- Patented High Equivalency Gel* (HE Gel™) provides multi-frequency, high quality, reproducible images
- Test across the entire frequency range (2 - 18 MHz)

Included Warranty

- 5-year warranty, the longest warranty available for ultrasound QA phantoms

Specifications

Attenuation Coefficient ¹	0.5 or 0.7 dB/cm/MHz
Variation of Attenuation with Frequency ^{2,3}	f ^{1.08} at 0.5 dB/cm/MHz f ^{1.1} 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
Scanning Surface	Composite Film
Pin Target Material	Nylon monofilament
Cystic Targets Diameters & Placement	1, 2, 4 and 7 mm; 1, 3, 3.5 and 6 cm deep
Grey Scale Target Diameters & Placement	7 mm; 3 cm deep
Pin Targets Diameter & Placement	0.1 mm; 5 mm at 1–9 cm deep vertical spacing, and 10 mm at 1 and 5 cm deep horizontal spacing
Resolution Target Groups Depths	1, 3.5 and 6 cm deep
Case Material	Extruded ABS Plastic
Weight	1.75 kg (3 lbs. 13 oz)
Dimensions	17 x 8.25 x 15.875 cm (6.75 x 3.25 x 6.25 in.)

*U.S. Patent No. 6,352,860

405 GSX Phantom

Troubleshooting Ultrasound
Phantom

PN 802267 (0.5 dB/cm/MHz), PN 802268 (0.7)



Troubleshooting B-Mode Ultrasound QA

- Ensure accurate ultrasound system imaging
- Generally compatible with AIUM, ACR, AAPM, IEC 62736, IPEM 102, and EFSUMB TQA QA Guidelines
- Supports Biomedics who need to troubleshoot ultrasound systems
- Two horizontal cross fibers in the middle of the phantom can be used for aligning the transducer and as reference markers to ensure consistent setup over time.
- Triangular grey scale targets support resolution testing of high-performance ultrasound scanners

Unparalleled Tissue Mimicking

- Patented High Equivalency Gel* (HE Gel™) provides multi-frequency, high quality, reproducible images
- Test across the entire frequency range (2 - 18 MHz)

Included Warranty

- 5-year warranty, the longest warranty available for ultrasound QA phantoms

Specifications

Attenuation Coefficient ¹	0.5 or 0.7 dB/cm/MHz
Variation of Attenuation with Frequency ^{2,3}	f ^{1.08} at 0.5 dB/cm/MHz f ^{1.1} 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
Scanning Surface	Composite Film
Pin Target Material	Nylon monofilament
Cystic Targets Diameters & Placement	2, 4 and 6 mm; 3, 8 and 14 cm deep
Grey Scale Target Diameters & Placement	9.5 x 9.5 x 13.4 mm; 4 cm deep
Pin Targets Diameter & Placements	0.1 mm; 2 cm at 2 to 16 cm deep vertical spacing, and 3 cm at 2 and 12 cm deep horizontal spacing
Resolution Target Groups Depth	3, 8, and 14 cm
Case Material	Extruded ABS Plastic
Weight	~2.8 kg (6 lbs. 5 oz)
Dimensions	23.2 x 8.25 x 18.5 cm (9.25 x 3.25 x 7.25 in)

*U.S. Patent No. 6,352,860

Sono406™ Phantom

Dual Attenuation Phantom

PN 802229



Dual Attenuation B-Mode Ultrasound QA

- Ensure accurate ultrasound system imaging
- Generally compatible with AIUM, ACR, AAPM, IEC 62736, IPEM 102, and EFSUMB TQA QA Guidelines
- Background attenuations simulate healthy and diseased tissue in a side-by-side configuration to aid characterizing pathological tissue structures
- Evaluation of high resolution ultrasound systems

Unparalleled Tissue Mimicking

- Patented High Equivalency Gel* (HE Gel™) provides multi-frequency, high quality, reproducible images
- Test across the entire frequency range (2 - 18 MHz)

Included Warranty

- 5-year warranty, the longest warranty available for ultrasound QA phantoms

Specifications

Attenuation Coefficient ¹	0.5 and 0.7 dB/cm/MHz
Variation of Attenuation with Frequency ^{2,3}	f ^{1.08} at 0.5 dB/cm/MHz f ^{1.1} 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
Scanning Surface	Composite Film
Pin Target Material	Nylon monofilament
Cystic Targets Diameters & Placement	2, 4 and 6 mm; 3, 8 and 14 cm deep
Pin Targets Diameter & Placements	0.1 mm; 10 mm at 2 to 4 cm deep and 20 mm at 4 to 16 cm deep vertical spacing; 30 mm at 2 and 12 cm deep horizontal spacing; Additional pin spaced at 10 mm in shallow set.
Resolution Target Groups Depth	3, 8, and 14 cm deep
Case Material	Extruded ABS Plastic
Weight	~2.8 kg (6 lbs. 5 oz)
Dimensions	23.2 x 8.25 x 18.5 cm (9.25 x 3.25 x 7.25 in)

*U.S. Patent No. 6,352,860

Sono408™ Phantom

Spherical Lesion Phantom

PN 802271 (0.5 dB/cm/MHz), PN 805157 (0.7)



Spherical Lesion B-Mode Ultrasound QA

- Ensure accurate ultrasound system imaging
- Generally compatible with AIUM, ACR, AAPM, IEC 62736, IPEM 102, and EFSUMB TQA QA Guidelines
- Ensure system presets are based image quality, not default settings, for optimal performance
- Ideal for spherical lesions that have negligible echogenicity and produce no distal enhancement or shadowing
- Supports testing high-frequency transducers used in echocardiography

Unparalleled Tissue Mimicking

- Patented High Equivalency Gel* (HE Gel™) provides multi-frequency, high quality, reproducible images
- Test across the entire frequency range (2 - 18 MHz)

Included Warranty

- 5-year warranty, the longest warranty available for ultrasound QA phantoms

Specifications

Attenuation Coefficient ¹	0.5 or 0.7 dB/cm/MHz
Variation of Attenuation with Frequency ^{2,3}	f ^{1.08} at 0.5 dB/cm/MHz f ^{1.1} 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
Scanning Surface	Composite Film
Cystic Targets Diameters & Placement	2 and 4 mm; 2 mm at 0.5 to 10.5 cm deep and 4 mm at 0.5 to 16 cm deep
Case Material	Extruded ABS Plastic
Weight	2.8 kg (6 lbs. 5 oz)
Dimensions	23.2 x 8.25 x 18.5 cm (9.25 x 3.25 x 7.25 in)

*U.S. Patent No. 6,352,860

Sono410™ Phantom

Full Contact™ Phantom

PN 805546 (0.5 dB/cm/MHz), PN 805547 (0.7)



Full Contact B-Mode Ultrasound QA

- Ensure accurate ultrasound system imaging
- Generally compatible with AIUM, ACR, AAPM, IEC 62736, IPEM 102, and EFSUMB TQA QA Guidelines
- Includes two patented scanning surfaces — curved and flat —for precise performance and uniformity testing of convex and linear transducers
- Patented curved surface improves coupling between convex transducers and phantom scanning window
- Ideal for compliance testing of image quality of high-resolution Ultrasound Systems in breast care centers and diagnostic ultrasound departments

Unparalleled Tissue Mimicking

- Patented High Equivalency Gel* (HE Gel™) provides multi-frequency, high quality, reproducible images
- Test across the entire frequency range (2 - 18 MHz)

Included Warranty

- 5-year warranty, the longest warranty available for ultrasound QA phantoms

Specifications

Attenuation Coefficient ¹	0.5 or 0.7 dB/cm/MHz
Variation of Attenuation with Frequency ^{2,3}	f ^{1.08} at 0.5 dB/cm/MHz f ^{1.1} 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
Scanning Surface	Composite Film
Pin Target Material	Nylon monofilament
Cystic Targets Diameters & Placement	1, 2 and 4 mm; 2, 4, 6, 8, 10, 12, 14 and 16 cm deep
Grey Scale Target Diameters & Placement	8 mm; 4 and 11 cm deep
String Targets Diameter & Placement	0.1 mm; 1, 2 and 4 cm from 1 to 15 cm deep vertical spacing; 2 cm at 2 cm deep, 4 cm at 7 and 13 cm deep horizontal spacing
Case Material	Extruded ABS Plastic
Weight	~2.8 kg (6 lbs. 5 oz)
Dimensions	21.8 x 9 x 19.2 cm (8.6 x 3.5 x 7.5 in)

SonoTE™ Phantoms

Uniformity Testing for Linear, Convex, & Intercavity Transducers

PN 805331



Transducer Evaluation

- Low-cost, high-value ultrasound transducer evaluation device
- Perform uniformity tests for linear, convex and intercavity transducers

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 Custom Carrying Case for Sono Phantoms

PN 800555



Sono Transducer Holder

PN 805331

*U.S. Patent No. 6,352,860

Mammo FFDM™ Phantom

Full Field Digital Mammography

PN 806022



Ensure Optimal FFDM Performance

- Evaluate artifacts over the entire detector with a single image
- Meet ACR, MSQA and EUREF requirements
- Test objects designed and located per ACR specifications, and reduced backscatter and equalized attenuation
- Meets ACR 2018 Digital Mammography Quality Control Manual requirements

Specifications

Materials	Wax and acrylic equivalent to 4.2 cm thick compressed breast tissue
Nylon Fibers	6
Specks	6 Groups, Glass Spheres
Masses	6
Dimensions (L x W x H)	31.0 ± 0.1 x 19 ± 0.1 x 4.1 ± 0.03 cm
Dimensions: Wax Insert (L x W x 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	2.0 ± 0.05 cm
Compensator	9 mil Polyvinylidene Chloride
Case	Soft case included; Optional custom hard-sided case, with 1-year warranty, available (PN 805772)

See sunnuclear.com for wax insert test object specifications.



FFDM Phantom & Hard Case

PN 805928

Mammo 3D™ Performance Kit

Digital Mammography System QC

PN 805857



Acceptance Testing for 3D Tomosynthesis Systems

- Includes PMMA plates, spacers, aluminum plates and foils, steel plates and customized test tools
- Meet IEC Protocol 601223-3-6, EUREF/EFOMP 1.03 (Tomosynthesis), & German DIN 6868-14 requirements

PMMA Plates, Spacers, & Phantoms

Standard Test Plate	1 - 320 x 260 x 45 mm
10 mm PMMA Plate	7 - 320 x 260 x 10 mm
15 mm PMMA Plate	1 - 320 x 260 x 5 mm
2 mm PMMA Plates	7 - 40 x 20 x 2 mm
10 mm PMMA Spacers	2 - 180 x 15 x 10 mm
30 mm PMMA Spacers	2 - 180 x 30 x 30 mm
Geometric Distortion & Z-Resolution Phantom	1 - 320 x 260 x 5 mm

Aluminum Plates & Foils

2 mm Aluminum Plate	1 - 100 x 100 x 2 mm
0.2 mm Aluminum Foil Sheet	1 - 10 x 10 x 0.2 mm
0.1 mm Aluminum Foil Sheets	8 - 100 x 100 x 0.1 mm

Steel Plates

3 mm Stainless Steel Plate	1 - 320 x 260 x 3 mm
MTF Edge Tool	1 - 120 x 60 x 0.6 mm

Wire, Spacers, X-ray Rulers

25 micron Tungsten Wire (cm)	100
Polystyrene Foam Spacers	5 - 240 x 180 x 20 mm
1mm scale X-ray Rulers	4 - +2.5 to -5 cm

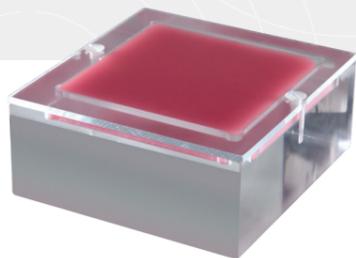
Case

Custom Hard Case	Included
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Mammo 156™ Phantom

Digital Mammography System QC

PN 800004



Measure & Monitor Digital Mammography Systems

- Meet ACR and MQSA requirements.
- Simulates radiographic characteristics of 4.2 cm compressed breast tissue
- Quickly detect objects from 0.16 to 2.0 mm
- Includes 4 mm acrylic disc included to establish and monitor density differences

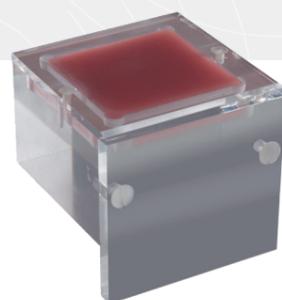
Specifications

Materials	Wax and acrylic equivalent to 4.2 cm thick compressed breast tissue. 50% adipose & 50% glandular. Fibers, specks and masses follow ACR specifications.
Nylon Fibers (monofilament) DIA (mm)	0.40, 0.54, 0.74, 0.93
Micro-calcifications (Aluminum Oxide) DIA (mm)	0.20, 0.24, 0.32, 0.54
Masses DIA (mm)	0.25, 0.50, 0.75, 1.00
Dimensions (L x W x H)	6.7 x 6.8 x 6.1 cm
Case (PN 805296)	Optional soft-sided case with foam insert, with 1-year warranty

Mammo 156D™ Phantom

Biopsy and Localization

PN 805298



Stereotactic Breast Biopsy QC

- Meet ACR and MQSA requirements.
- Quickly detect objects from 0.20 to 1.00 mm – visible on any system, but, by design, difficult to see on the best stereotactic mammography systems
- Can hang on the biopsy system detector during rotation

Specifications

Materials	Wax and acrylic equivalent to 4.2 cm thick compressed breast tissue. 50% adipose & 50% glandular
Nylon Fibers (Fibrils)	6
Micro-calcifications	5 Groups
Masses	5
Dimensions (L x W x H)	10.2 x 10.8 x 4.5 cm
Case (PN 805296)	Optional soft-sided case with foam insert, with 1-year warranty

Modular DBT™ Phantom

Thorough Tomosynthesis System Performance Testing

PN 805817



Comprehensive Digital Testing

- Stack of modules supports a variety of tests for digital breast tomosynthesis systems
- Meet AAPM developing TG-245 and IEC 61223-3-6 requirements

Specifications

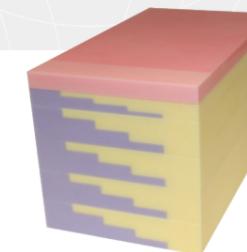
Module Name	Target Characteristics	Quantity & Thickness
Image Quality	Specks, masses, fibers. See specifications below.	1 - 15 mm
Missing Tissue Detection	Barium-filled grooves, 1 mm x 0.5 mm, sized from 0 mm to 15 mm	1 - 10 mm
MTF, LSF	2 tungsten wires, 25 micron DIA	1 - 10 mm
CNR	1100 aluminum alloy sheet, 0.1 mm thick, 45° angle	2 - 5 mm
2D and 3D Accuracy	14 tungsten BBs, 0.279 mm DIA, aligned in X, Y and Z-axis	1 - 15 mm
Breast Blank	No targets	1 - 5 mm; 2 - 10 mm
Breast-Glandular Blank	No targets	1 - 10 mm; 2 - 10 mm
Breast-Adipose Blank	No targets	1 - 10 mm; 1 - 20 mm

See sunnuclear.com for Image Quality Module specifications.

Mammo CESM™ Phantom

QC for Contrast Enhanced Spectral Mammography

PN 805929



Independently Verify Beam Qualities

- Stack of modules supports a variety of tests across a range of iodine concentrations and breast glandularity
- Blocks can be arranged to represent compressed breast for small to large patients

Specifications

Overall Weight	1.8 kg (4 lbs)		
Carrying Case Weight	1.4 kg (3 lbs)		
Overall Stack Dimensions (L x W x H)	181 x 100 x 100 mm (7-1/8 x 4 x 4 in)		
Hard Case	Included		
Warranty	5 years		
	Breast-Iodine Step Block Characteristics	GL/AD Step Block, 10 mm	GL/AD Step Block, 20 mm
Materials	1454 HE Breast 50/50, 1454 HE Breast 50/50 doped with 10 mg/ml Iodine (pink)	1453 HE Br. Adipose (yellow), 1466 HE Glandular (purple)	1453 HE Br. Adipose (yellow), 1466 HE Glandular (purple)
Quantity	1	1	4
Length x Width	181 x 100 mm	181 x 100 mm	181 x 100 mm
Thickness	10 mm	10 mm	10 mm
Step Increments	1 mm	2.5 mm	5 mm

Stereotactic Breast Biopsy Phantom

Easy-to-Use Mammography Training Tool

PN 800006



Needle Insertion Practice Phantom

- Multiple imbedded radiopaque gel lesions (sized 2 - 5 mm) for practicing core biopsies
- Liquid dye lesions for fine needle aspiration
- Made of clear gel encased in soft vinyl for easy compression and skin-like resistance to needle insertion

Specifications

Construction	Gel with attenuation properties similar to breast tissue
Outer Casing	Vinyl
Multiple Radiopaque Lesions	2 to 5 mm
Materials	Solid Gel for core biopsy; Liquid dye for fine needle aspiration
Storage Temperature	5 - 32° C (40 to 90° F)
Dimensions (L x W x H)	21 x 6 x 11 cm
Weight	1.06 kg (2.4 lb.)

Ultrasound Breast Biopsy Phantom

Easy-to-Use Mammography Training Tool

PN 800010



Lesion Location & Needle Insertion Practice

- 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 cysts, 12 to 15 mm diameter
High Contrast Lesions	Solid masses, 7 to 10 mm diameter
Low Contrast Lesions	4 solid masses, 7 to 10 mm diameter
Storage Temperature	0° to 40° C
Diameter	12.7 cm
Height	7.6 cm
Weight	625 g (1 lb. 6 oz.)

Mammo Digital Compression Device

Compression Force Measurement for Accuracy and Reproducibility

PN 805939



Specifications

Accuracy	±0.01 lb [0 - 2 lb], ±0.02 lb [2 - 75 lb] ±0.005 kg [0 - 1 kg], ±0.01 kg [1 - 34 kg]
Display Units	g, lb:oz, kg, lb, oz
Scale Dimensions	8.9 x 8.2 x 2.9 in (225 x 208 x 73 mm)
Foam Compression Block (included)	Polyethylene Foam 7.25 x 4.75 x 1 in (184 x 108 x 25.4 mm)
Scale Weight	2 lbs. (0.95 kg)
Power	Alkaline Batteries Size C (4x), not included
RoHS Compliant, CE Mark	Yes
Case (PN 805972)	Optional Soft Case not included



Mammo Film Screen Contact Test Tool

Early Artifact Detection

PN 800052

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

Test Automatic Exposure Control (AEC) Performance

PN 801811, PN 801810



Specifications

Construction	7 pieces of Acrylic (Phototimer Consistency Tools) 7 Pieces of Breast Tissue Equivalent Materials (Phototimer Consistency Tools-BR)
Phototimer Consistency Tools Sizes	3 each of 14 x 14 x 1.90 cm ± 2.0 mm; 2 each of 14 x 14 x .95 cm ± 1.5 mm; 2 each of 14 x 14 x 0.48 cm ± 1.0 mm
Phototimer Consistency Tools-BR Sizes	3 each of 14 x 14 x 2 cm ± 0.2 mm; 2 each of 14 x 14 x 1 cm ± 0.2 mm; 2 each of 14 x 14 x 0.5 cm ± 0.2 mm
Case	Phototimer Consistency Tools: 2.3 kg (4.3 lbs) Phototimer Consistency Tools -BR: 1.95 kg (4.3 lbs)

Key Mammography QA Resources

Go to sunnuclear.com for:

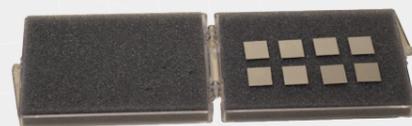
- Demos: Request One-on-One Presentations
- Webinar: Customer Experience with Mammo FFDM Phantom
- Datasheets: Mammography Phantoms

Density Control Function (DCF) Test Tool

PN 804964



Base Plate:	Aluminum
Exposure Plate	Stainless Steel
Overall	15.2 x 30.5 x 0.95 cm (HWD)
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
Notes	Tissue Equivalent Material sold separately



Signal Difference to Noise Ratio (SDNR) Set

PN 805760

Construction	Aluminum Alloy 99.0%
Size	10 cm x 10 cm
Thickness	0.2 mm

Aluminum Step Wedge

PN 800013



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



Beam Alignment Test Tool

PN 800423

Construction	Acrylic Cylinder
Height	16 cm (6.3 in)
Diameter	7 cm (2.8 in)
Weight	260 g (9.2 oz.)
Construction	Acrylic Cylinder
Warranty	5 Years

Grid Alignment Test Tool

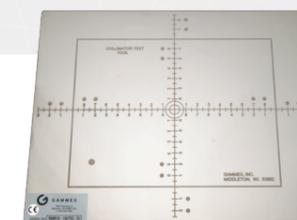
PN 800420



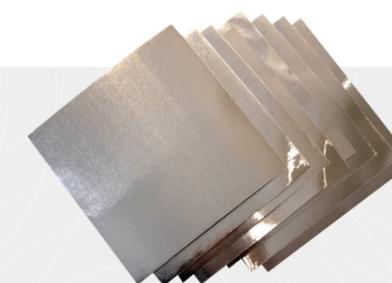
Construction	Three Lead Blockers with Precise Hole Locations
Dimensions	9 x 23.5 cm (3.5 x 9 in) - one large, two small
Weight	0.7 kg (1.5 lbs)
Warranty	1 Year

Collimator Alignment Test Tool

PN 805818



Construction	Etched Stainless Steel
Dimensions	20.0 x 25.0 cm (8.0 x 10.0 in)
Weight	200 g (6.2 oz.)
Warranty	5 Years



Half Value Layer (HVL) Attenuator Sets

PN 800012 (115A), PN 805755 (115B), PN 800051 (115H)

Construction	115A - 99.00% High Purity 1100 Aluminum Alloy; 115B - 99.00% High Purity 1100 Aluminum Alloy; 115H - 99.99% Ultra High Purity Aluminum
Quantity	115A - 9; 115B - 8; 115H - 6
Thickness/Quantity	115A - 0.1 mm (3), 0.2 mm (1), 0.5 mm (2), 1.0 mm (2), 2.0 mm (1) 115B - 0.1 mm (8) 115H - 0.1 mm (6)
Length	10 cm (4 in)
Width	10 cm (4 in)

Fluoroscopic Dose Rate & Low Contrast Resolution Test Tool Kit

PN 800421



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)
Warranty	5 Years

Lead Blocker

PN 800598

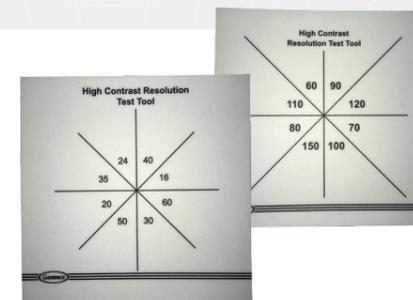


Construction	Lead
Dimensions	0.3 x 18 x 18cm
Weight	3 lbs
Warranty	5 Years

High Contrast Resolution Test Tool

(141H) – High-Res, 60-150 Mesh; (141) – Standard, 16-60 Mesh

PN 800417, PN 800416



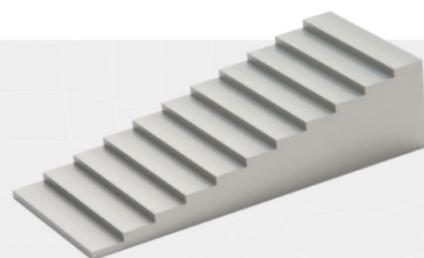
Geometric Progression	2 1/3
Construction	White Plastic (outside)
Wire Mesh Patterns (inside)	8 - 60 to 150 mesh (141H High-Res) 8 - 16 to 60 mesh (141 Standard)
Dimensions	18 x 18 x 1 cm (7 x 7 x 0.4 in)
Weight	113 g (4 oz)
Warranty	1 Year

Half Value Layer Attenuator Set, Copper Alloy 110

PN 805159



Construction	Copper Alloy 110
Dimensions	5 pieces, each 17 cm x 17 cm x 0.5 mm



Radiographic Aluminum Stepwedge, 11 Steps (117)

PN 800414

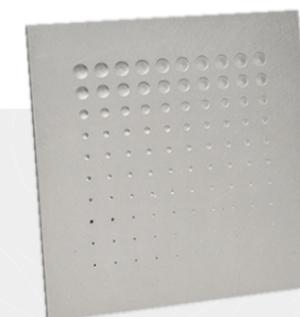
Construction	6061 Aluminum Alloy
Steps	Eleven (11) steps, 3.2 mm high and 12.7 mm deep
Dimensions	14 x 6 cm (5.5 x 2.4 in)
Weight	450 g



Half Value Layer Attenuator Set, Pure Copper (116)

PN 800413

Construction	Pure Copper
Dimensions	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



Contrast Detail Tool

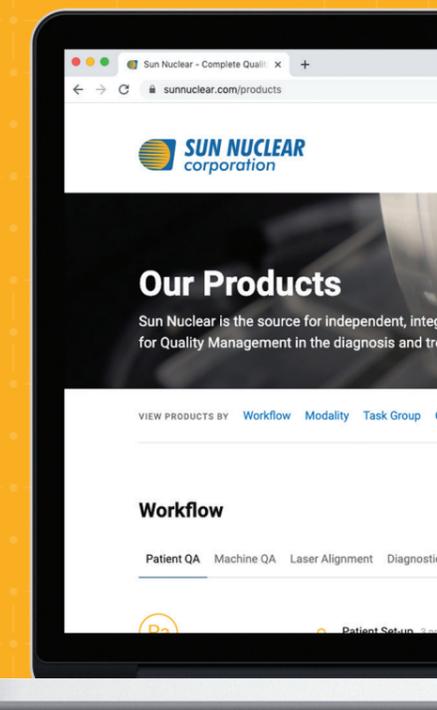
PN 801745

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 (7.1 in x 7.1 in x 0.5 in)
Weight	1.0 kg (2.2 lbs.)

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Ultra Star Test Pattern (1-360°) & Ultra Star Test Pattern (4-15°)

PN 800021, PN 800431



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°; 4-15°
Focal Spot Size Measured	0.1-0.3 mm
Warranty	5 Years

Anthropomorphic Neo-Natal Chest Phantom

PN 805248



Size	Approx. 100 x 100 x 54 mm
Weight	Approx. 500 grams
Composition	Tissue Equivalent Materials: Air, Muscle, Normal Lung, Hyaline Membrane Lung, Bone
Warranty	5 Years

Resolution Test Pattern, 5.0-20 LP/mm, 16 groups

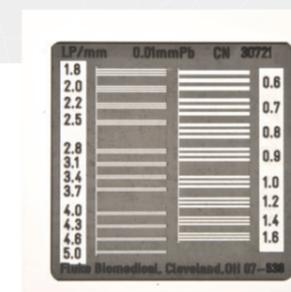
PN 800647



Resolution	5.0 - 20 lp/mm
Dimensions	8 x 28 mm (5/16x 1-7/16 in)
Thickness	0.03 mm

Resolution Test Pattern, 0.6-5.0 bar, 20 groups

PN 800438



Resolution	0.6 to 5.0 lp/mm
Dimensions	50 x 50 mm (1.9 x 1.9 in.)
Thickness	PN 800438 0.01 mm PN 800439 0.10 mm

Focal Spot Test Tool

PN 800428



Construction	Six-inch acrylic cylinder with a 12-group bar pattern target mounted on top
Dimensions	0.84 to 5.66 lp/mm
Warranty	5 Years

Universal Test Stand (175)

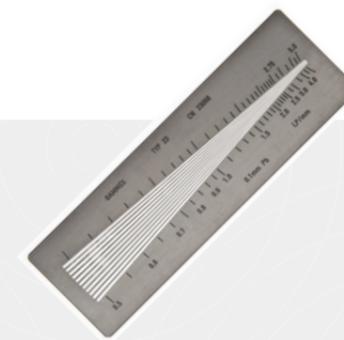
PN 802203



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)

Resolution Test Pattern, 1 sector

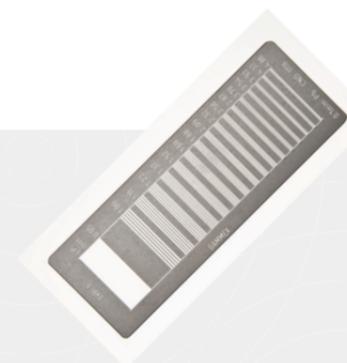
PN 800437



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

Resolution Test Pattern, 0.5-4.86 LP/mm bar, 16 groups

PN 800436



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

PATIENT

MACHINE

DOSIMETRY

LASER

DIAGNOSTIC

Pa

Ma

Do

La

Dx



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