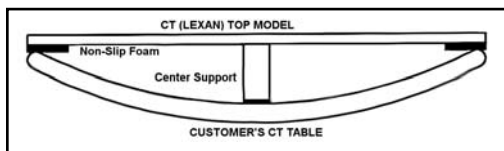


CT / PET TABLE INSERT For Radiation Therapy Treatment Planning



The ideal CT Image for radiation therapy treatment planning should have the patient on a flat table, magnification indicators, and density markers.

The RPDinc CT/PET Table Insert is made of 3/8" (0.97 cm) clear polycarbonate. The insert measures 84" (213.5 cm) long and the width is custom made to fit the CT or PET Table. A center support runs the length of the insert to prevent any sag.

The CT/PET Table Insert is made with foam rubber edges and will sit on top of the edges of the curved CT bed.

Optional Magnification and Density Rods

The bottom of the CT/PET Table Insert has two 1/8" (3.31 mm) diameter aluminum rods, spaced 30 cm apart that run the length of the insert and are used for magnification measurements.

A 1" (2.54 cm) diameter polystyrene rod and a 1" (2.54 cm) diameter acrylic rod are placed on either side of the center support. Both these rods run 72" (183 cm) along the bottom of the insert. These rods provide a reference for density checks.

Specifications

Table Density: Polycarbonate - 1.2 g/cm³

Rod Density: Acrylic - 1.185 g/cm³ and Polystyrene - 1.05 g/cm³

Size: 84" L x 3/8" T (213.4 x 0.97 cm)

Weight: 55 lb (25 kg)

Item #	Table Manufacturer	Magnification and Density Rods
683-310	GE	Included
683-320	Siemens	Included
683-330	Philips	Included
683-410	GE	Not Included
683-420	Siemens	Not Included
683-430	Philips	Not Included

GE LIGHTSPEED PHANTOM HOLDER FOR FLAT TABLE TOP 50 CM WIDE



The GE LightSpeed Phantom Holder attaches to a 50 cm wide flat top CT table. The GE LightSpeed Phantom Holder is an easy on, easy off unit for a flat top CT table. The bottom of the front mounting plate references the holder to the front edge of the CT table and the top is where the GE LightSpeed Phantom hooks on to the holder. A small thumb screw allows for leveling of the phantom. The two lock bars are spring loaded upward to be out of the way while securing to the CT table. The large adjustment range allows for different thicknesses of CT table tops. The phantom holder has a built-in handle for easy carrying.

Specifications

Material: Black Anodized Aluminum

Overall Size: 20.8" W x 4.5" L x 6.5" H (52.8 x 11.4 x 16.5 cm)

Mounting Plate Size: 8.45" W x 4.67" H x 0.335" T
(21.5 x 11.8 x 0.8 cm)

Item	Description
018-250	GE LightSpeed Phantom Holder f/FlatTable Top 50cm W

CT PRODUCTS-SIMULATION, CHAMBERS, PHANTOMS, LASERS

CT/MR SLESSINGER BOARD V2.0 FOR HDR BRACHYTHERAPY



- CT and/or MR Compatible
- Easy to Clean

The Slessinger Board is a padded sliding board that is CT and MR compatible. It is designed to facilitate HDR brachytherapy, specifically for pelvic treatments. The patient can be transferred onto the board from the operating room couch and remain on the board in recovery, during imaging for planning and until the HDR treatment is given. The intent is to minimize patient movement to ensure that the imaging for planning is not compromised by patient leg movement prior to treatment and thus delivering the treatment plan faithfully. The legs are slightly elevated, affording ready access to the perineum and preventing applicators from resting against anything. Leg elevation is maintained with the use of two (2) tightening knobs at the end of the elevation panels. Transfers on and off CT/MR/simulator couches are relatively easy due to the smooth plastic bottom surface and side handles. The board is also very useful when a patient is transferred via ambulance from the surgical facility to the treatment facility.

The CT/MR Slessinger Board V2.0 for HDR Brachytherapy has the additional benefit of having a hinged flexi-split to allow raising the head when on a stretcher. This version also includes heel cushions for additional patient comfort.

Image guided HDR brachytherapy is gaining in prominence. Prostate and gynecological applications are reliant on patient stability and comfort between the acquisition of imaging for planning and treatment. Although the Slessinger Board was devised to facilitate precise prostate HDR brachytherapy its application for image guided GYN HDR is also very significant with increasing reliance on DVH analyses. The concept of limiting rotation of a multichannel APBI balloon is yet another possible application, by avoiding the patient walking between imaging and treatment prior to each treatment fraction. The rationale and description of the Slessinger Board has also been described in the Brachytherapy Journal article by Slessinger, entitled "Practical considerations for prostate HDR brachytherapy", published early in 2010.

The Slessinger Board can be easily cleaned with non-caustic germicidal cloths or sprays. Patients may not be carried on the Slessinger Board, but rather are transferred directly from one support to another.

MR Safe

Specifications

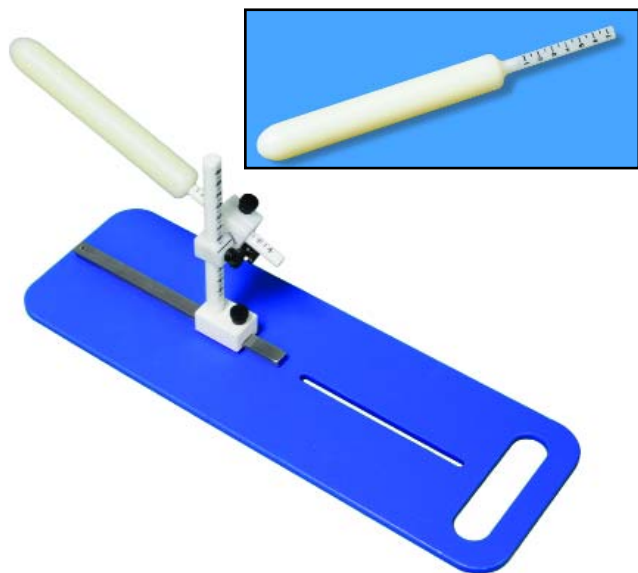
- Base Dimensions:** 21" W x 72" L x 0.75" T (53.3 x 183 x 1.9 cm)
- Base Material:** Corrugated polypropylene
- Pad Dimensions:** 20.5" W x 69" L x 1.5" T (52.3 x 175 x 3.8 cm)
- Pad Material:** Vinyl coated closed cell foam
- Assembled Board Weight:** 26 lb (11.8kg)
- Weight Limit:** 350 lb (159 kg)



Item	Description
946-004	CT/MR Slessinger Board V2.0 for HDR Brachytherapy

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ADJUSTABLE HOLDER WITH SLESSINGER COMPATIBLE BOARD FOR DILATORS WITH STEM SCALE



This item is compatible with the Slessinger Board System (Item # 946-004).

Item 946-210 includes only the Holder and board.

Specifications

Item 946-210

Vertical Post Scale: from 4.5 cm to 16 cm with black markings every 0.5 cm and whole numbers every centimeter starting at 5.0 cm

Angle Scale: Marked every 5° to 45°

Material: Ertalyte

Clamp: Dual clamps with thumb screws allow for vertical and anterior-posterior angle adjustment of the dilator

Post Assembly Material: Ertalyte

Board Size: 5.5" W x 16" L x 0.25" Thick (13.8 x 40.6 x 0.6cm)

Handle Cutout: 4" W x 1" L (10.1 x 2.5 cm)

Board Material: HDPE Blue Polyethylene Colorboard

Sterilization: Autoclave or gas

CT/MR Conditional

Items 946-220 to 946-235

Material: Nylon

Overall Length: 10" (25.4 cm)

Dilator Length: 6.5" (16.5 cm), not including stem

CT/MRI Safe

Item #	Description
946-210	Adjustable Holder & Slessinger Compatible Board for Dilators with Stem Scale
946-220	20 mm Dia. Nylon Dilator with Stem Scale
946-225	25 mm Dia. Nylon Dilator with Stem Scale
946-230	30 mm Dia. Nylon Dilator with Stem Scale
946-235	35 mm Dia. Nylon Dilator with Stem Scale

The Adjustable Holder with Slessinger Compatible Board for Dilators with Stem Scale was designed to be used when treating anal cancer in females with chemoradiation. The dilator is used to delineate and displace the vulva and lower vagina away from the primary tumor with the intention of decreasing dose to these areas.

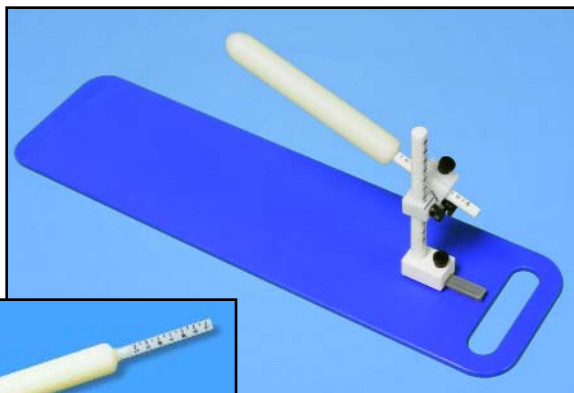
The vertical post scale on the holder ranges from 4.5cm to 16cm and allows for reproducing from day to day the vertical position of the dilator. The dilator can also be angled up or down in the anterior - posterior position with a scale marked every 5° to 45° and a locking thumb screw. All dilators are 6.5" (16.5cm) long not including the stem. The dilators have a scale on the stem that ranges from 1cm to 7cm which is used for depth.

This holder board included is made from HDPE Blue Polyethylene Colorboard and has a 6" titanium rail. A rail block allows the dilator holder to slide forward and backward when positioning as well as being removable from the rail itself.

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CT PRODUCTS-SIMULATION, CHAMBERS, PHANTOMS, LASERS

ADJUSTABLE HOLDER WITH BOARD FOR DILATORS AND DILATORS WITH STEM SCALE



The holder board included is made from HDPE Blue Polyethylene Colorboard and has a 3" titanium rail. A rail block allows the dilator holder to slide forward and backward when positioning as well as being removable from the rail itself.

Item 946-610 includes only the Holder and board.

Specifications

Item 978-610

Vertical Post Scale: From 4.5 cm to 16 cm with black markings every 5 mm and whole numbers every centimeter starting at 3.0 cm

Angle Scale: Marked every 5° to 45°

Clamp: Dual clamps with thumb screws allow for vertical and anterior-posterior angle adjustment of the dilator

Post Assembly Material: Ertalyte

Board Size: 5.5" W x 20.5" L x 0.25" Thick (13.8 x 52.1 x 0.6 cm)

Handle Cutout: 4" W x 1" L (10.1 x 2.5 cm)

Board Material: HDPE Blue Polyethylene Colorboard

Sterilization: Autoclave or gas

CT/MRI Conditional

Items 946-220 to 946-235

Material: Nylon

Overall Length: 10" (25.4 cm)

Dilator Length: 6.5" (16.5 cm), not including stem

CT/MRI Safe

The Adjustable Holder with Board for Dilators with Stem Scale was designed to be used when treating anal cancer in females with chemoradiation. The dilator is used to delineate and displace the vulva and lower vagina away from the primary tumor with the intention of decreasing dose to these areas.

The vertical post scale on the holder ranges from 4.5cm to 16cm and allows for reproducing from day to day the vertical position of the dilator. The dilator can also be angled up or down in the anterior - posterior position with a scale marked every 5° to 45° and a locking thumb screw. All dilators are 6.5" (16.5cm) long, not including the stem. The dilators have a scale on the stem that ranges from 1cm to 7cm which is used for depth.

Item #	Nylon Dilator
978-610	Adjustable Holder with Board for Dilators with Stem Scale
946-220	20mm Dia. Nylon Dilator with Stem Scale
946-225	25mm Dia. Nylon Dilator with Stem Scale
946-230	30mm Dia. Nylon Dilator with Stem Scale
946-235	35mm Dia. Nylon Dilator with Stem Scale

CT PRODUCTS-SIMULATION, CHAMBERS, PHANTOMS, LASERS

VISIONMARK™



The Visionmark™ is the next generation in general use skin markers. These specially formulated NON-METALLIC markers perform consistently and accurately in a variety of applications. An excellent tool for distinguishing between nipple shadow and lesion, the Visionmark™ reduces the need for repeat examinations.

CE

Item	Visionmark™	Quantity
680-305	2.0 mm Ball	50
680-310	2.5 mm Ball	50
680-312	3.0 mm Ball	50
680-314	4.0 mm Ball	50
680-316	5.0 mm Ball	50

CT Mark Wire and Dots



This specially formulated non-metallic material is the result of years of research and development, resulting in a virtually artifact-free opaque marker that is perfect for nearly all CT marking applications.

CE

Item	Description	Quantity
680-349	CT Mark Wire, 1.0 mm	330 cm
680-350	CT Mark Wire, 2.0 mm	300 cm
680-352	CT Mark, 2.3 mm	110
680-354	CT Mark, 4.0 mm	50

INDICATOR® RADIOPAQUE MARKERS - CT AND X-RAY



- Creates precise reference points without artifacts
- Works for CT, X-Ray, fluoroscopy, angiography
- Disposable
- Flat design

Indicator® Radiopaque Markers can be used in a variety of imaging procedures to identify any point of interest, including: Masses, Scar tissue, Moles, Isocenter, Points of Pain

The markers provide a clear, accurate reference point that is free of spray artifacts. The flat design prevents tissue indentation and the clear adhesive backing aids in precise marker placement. In addition to enhancing accuracy, they promote procedural efficiency with double pulls tabs that permit easy application and removal.

NOT for use in MRI

CE

Item #	Indicator® Radiopaque Markers-CT/X-Ray	Quantity
680-401	Crosses, 10 mm	130
680-402	Crosses, 20 mm	130
680-403	Dots, 1.5 mm	115
680-404	Dots, 2.0 mm	115
680-405	Dots, 2.5 mm	115

Item #	Indicator® Radiopaque Markers-CT/X-Ray	Quantity
680-406	Dots, 3.0 mm	115
680-408	Dots, 4.0 mm	115
680-410	Line, 0.5 mm	69 Lines (138")
680-411	Line, 1.0 mm	66 Lines (132")
680-412	Line, 1.5 mm	62 Lines (125")

CT PRODUCTS-SIMULATION, CHAMBERS, PHANTOMS, LASERS

X-LINE™ PRECISION RADIOTHERAPY TAPE FOR CT SIMULATION



X-Line™ allows accurate contouring within distorted regions of the CT image, improving radiotherapy outcomes.

Obese patients must be imaged with the extended field of view (eFOV), often resulting in distorted body contours. X-Line™ provides a series of reliable dots within the distorted sections of the eFOV, allowing for easy identification of the true body contour. The radiopaque lines on X-Line™ show up as hyperdense in CT simulation. Connect underneath the dots to get an accurate body contour - it's that easy!

Body contour distortion from large patients in the eFOV

- GE Discovery CT590 RT, Optima CT580 RT and LightSpeed RT have a scan FOV (sFOV) of 50cm and a 65cm extended FOV (eFOV) option
- Siemens Somatom models have a 50cm sFOV and eFOV up to 80cm
- Body regions within the eFOV is distorted and contains artifact, resulting in an inaccurate body contour
- Body contour inaccuracies can lead to incorrect SSD and dosage calculations

X-Line™ General Instructions

- Apply X-Line™ to all body regions that might fall outside of the scan field of view
- Tear a strip length that fully encompasses the region of interest
- Expect to use 3-5 strips per patient, depending on their size

Step 1 - Peel

- Peel away the protective backing
- X-Line™ is kiss cut to make for easier removal

Step 2 - Apply

- Apply X-Line™ to the region of interest
- Orient the radiopaque lines perpendicular to the direction of the CT cross section
- Space the X-line™ strips approximately 1 inch apart
- Only apply each X-Line™ strip once

Step 3 - Scan

- Then, perform the CT scan as usual
- Remove and discard the X-Line™ strips after the scan

Step 4 - Connect

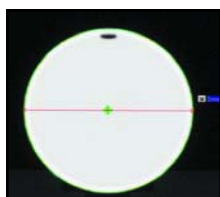
- Finally, connect just underneath the bright, hyperdense dots in the resulting CT images
- Connecting underneath the dots avoids including these hyperdense regions in the radiation dose planning

Specifications

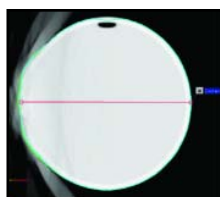
Size: 2" wide (5.08 cm) with three equally spaced radiopaque lines 1" apart (2.54 cm)

Quantity: Rolls are 50' long (15.24 m) with perforations spaced every 2" (5.08 cm).

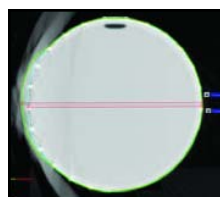
Item	Description
680-470	X-Line Tape, Full Adhesive
680-475	X-Line Tape, Partial Adhesive



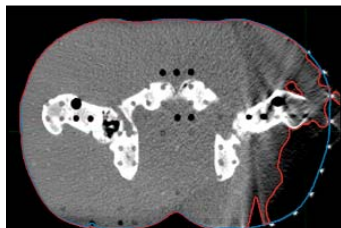
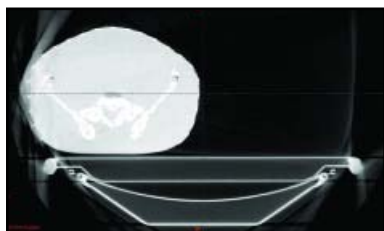
Clear scan within sFOV



Distorted image in 65cm eFOV



X-Line™ connect-the-dots body contour



Siemens HDFOV PRO Phantom

A Solution to CT Simulation Image Distortion in Obese Patients

- More Accurate
- Fast and Simple
- Low-Cost
- Optimal Dosage
- Latex Free

MULTI-MODALITY MARKERS



- No tissue indentation
- No artifacts
- Clear, accurate reference point identification
- Visible in all modalities
- Does not melt or leak
- Size and shape are ideal for small area
- Disposable

The Multi-Modality Markers provide a clear and accurate reference point on any type of scan. Made of a hydrogel component with a medical grade adhesive, they appear as a bright object on CT, MRI, nuclear medicine, PET and x-Ray scans and can be seen on all MRI sequences. These versatile markers attach securely and detach easily. Our Radiology/Radiation Therapy Marker has an inner center hole that permits hypodermic needle passage, while our Nuclear Med/PET Marker has a well-used for injecting a radionuclide with a conventional hypodermic needle.

Item 462-029 Multi-Modality Markers, Radiation/Radiology have a 2 mm inner center hole for hypodermic needle passage.

Item 462-030 MultiModality Markers for NucMed/PET have a Liquid-containing center well for injection of short-life radionuclide.

Item 462-031 MultiModality Markers for MRI/CT are a 15mm disc shaped marker.

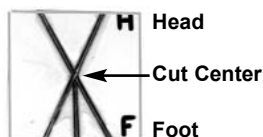
Specifications

15mm outer diameter
3.5mm thick
50 markers per jar

Item #	Description	Quantity
462-029	Multi-Modality Markers, Radiation/Radiology	50
462-030	Multi-Modality Markers, Nuc Med/PET	50
462-031	Multi-Modality Markers, MRI/CT	50

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CT MARKER



Material: Aluminum Wire
Size: 1" (2.54 cm) Square

Item #	Description
680-125	CT Marker

CT MARKING WIRE



Item	Description	Length
682-080	Aluminum Wire 0.080" (2.03 mm) Diameter	42' (12.8 m)
682-090	Aluminum Wire 0.040" (1.02 mm) Diameter	165' (50.3 m)
682-100	Aluminum Wire 0.064" (1.63 mm) Diameter	67' (20.4 m)

PROBE COVER, STERILE and LATEX FREE



These high-quality rolled covers are sterile and latex free. All packs include elastic bands. Gel packet not included.

Item #	Description
460-007	Probe Cover, Sterile & Latex Free, 1" x 11.8", 24/pkg

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CT RECTAL MARKER

Rectal - Vaginal - External



The Rectal Marker can be used as a vaginal marker or an external marker.

Specifications

Sterilization: Gas

Tubing: 5/16" (8 mm) Dia. x 30 cm Flexible

Balls: 3/16" (5 mm) Dia. Spaced Every cm

Anus Locator: Adjustable Delrin

Latex Cover: 2.0 cm Dia. x 30 cm L

The **NON-METALLIC** CT Rectal Marker is a flexible tube packed with teflon balls spaced at 1 cm intervals from center to center.

The Rectal Marker is used to accurately obtain both the rectum position and magnification by counting the balls. This determines the rectum location relative to the radiation field.

An adjustable anus marker can be utilized during CT simulation.

Item #	Description
460-010	CT Rectal Marker with Anus Marker
460-007	Probe Cover, Sterile & Latex Free, 1" x 11.8", 24/pkg

SHADOWFORM MARKERS



460-501



460-502



460-503

- T-Bar handle which can be removed for insertion of barium
- Disposable
- Rectal markers are available in two lengths and are marked at 1 cm intervals
- No cross contamination
- Outlines the soft tissue of the pelvic region
- Latex-free
- Markers are made from a soft, smooth, flexible plastic
- Used for Simulation and CT Planning
- Provides excellent localization of pelvic structures

CE

Item	Shadowform Markers	Quantity
460-501	18 cm Vaginal Marker	10
460-502	38 cm Rectal Marker	10
460-503	10 cm Rectal Marker	10

CT VAGINAL DEPTH SCALE



The **NON-METALLIC** CT Vaginal Depth Scale is 1.6 cm in diameter and 26 cm long and has teflon balls which are spaced 1 cm apart and are 5 mm diameter. A delrin introitus marker is included with the 1.6 cm diameter vaginal scale (Item 707-145). A thumb screw holds the introitus marker in position.

The Vaginal Depth Scale Holder (Item 707-020) can be used in CT if the area to be scanned does not include the holder.

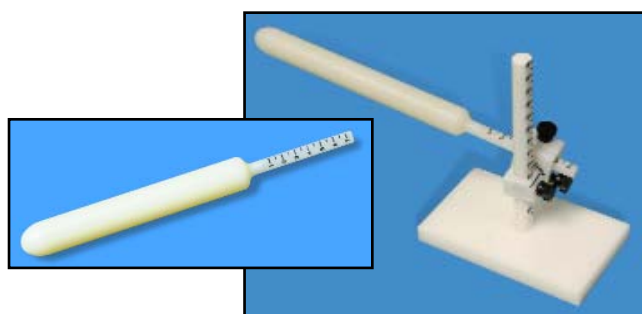
Specifications

Material: Acrylic
Density: 1.1859 g/cm³

Material: Teflon
Density: 2.16 g/cm³

Item #	Description
707-145	CT Vaginal Depth Scale with Introitus Marker
707-020	Vaginal Depth Scale Holder
460-007	Probe Cover, Sterile & Latex Free, 1" x 11.8", 24/pkg

ADJUSTABLE HOLDER WITH BASE FOR DILATOR WITH STEM SCALE



This CT/MR Safe Adjustable Holder with Base for Dilators with Stem Scale was designed to be used when treating anal cancer in females with chemoradiation. The use of a dilator is used to delineate and displace the vulva and lower vagina away from the primary tumor with the intention of decreasing dose to these areas.

The verticle post scale on the holder ranges from 2.5cm to 15cm and allows for reproducing from day to day the vertical position of the dilator. The dilator can also be angled up or down in the anterior - posterior position with a scale marked every 5° to 45° and a locking thumb screw. All dilators are 6.5" (16.5cm) long, not including stem. The dilators have a scale on the stem that ranges from 1cm to 7cm which is used for depth.

Because the base that this item includes is made entirely from ertalyte plastic, it is completely CT/MR safe. The base can be set into position in the vacuum cushion that is used for positioning the patient legs. This will give a reproducible base location on a daily basis.

Item 946-200 includes only the Holder and base.

Specifications

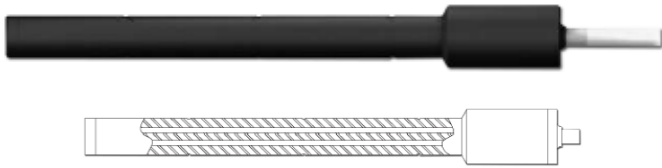
Item 946-200
Base Size: 3" x 5" x 0.5" Thick (7.6 x 12.7 x 1.27 cm)
Vertical Post Scale: From 2.5 cm to 15 cm with black markings every 5 mm and whole numbers every centimeter starting at 3.0 cm
Angle Scale: Marked every 5° to 45°
Clamp: Dual clamps with thumb screws allow for vertical and anterior-posterior angle adjustment of the dilator
Post Assembly and Base Material: Ertalyte
Sterilization: Autoclave or gas
CT/MRI Conditional

Items 946-220 to 946-235

Material: Nylon
Overall Length: 10" (25.4 cm)
Dilator Length: 6.5" (16.5 cm), not including stem
CT/MRI Safe

Item #	Description
946-200	Adjustable Holder w/Base for Dilator with Stem Scale
946-220	20mm Dia. Nylon Dilator with Stem Scale
946-225	25mm Dia. Nylon Dilator with Stem Scale
946-230	30mm Dia. Nylon Dilator with Stem Scale
946-235	35mm Dia. Nylon Dilator with Stem Scale

EXRADIN A17 CT ION CHAMBER 1.91 cc SLICE THERAPY



Exradin A17 Schematic

- Fiducial markers identify the center and both ends of the collecting volume for easy setup in relation to the beam
- Air-equivalent conductive plastic eliminates fragility or flaking of painted conductive layers
- Proven guard design yields stable, precise measurements and minimizes settling time by creating uniform field lines
- Shell and guard are made of durable, long lasting Shonka conductive plastic
- Use of homogeneous material throughout the chamber minimizes perturbation of the beam due to the presence of the chamber and optimizes measurements
- Axially symmetric design of the chamber provides a uniform, isotropic response
- Inherent waterproof construction eliminates need for additional protective coverings
- The Model A17 Exradin Slice Therapy Chamber has an inherent ⁶⁰Co buildup cap built into its wall thickness for air calibrations and measurements
- Ionization collection efficiency is 99.9% or better
- Collecting volume is 1.91 cc

Exradin CT Chambers are durable detectors for performing the measurements necessary in the Computed Tomography Dose Index (CTDI) calculations described in TG-74.

The A17 is tailored for MV and tomotherapy applications such as weekly QA checks or patient dose verification with phantoms and water tanks. It has excellent response uniformity over the chamber length with variation less than ±1.5%.

Fast, Precise Measurements

Its waterproof construction makes it ideal for checking the consistency of beams at various jaw widths. The chamber vents through a flexible tube that surrounds the triaxial cable, ensuring the collecting volume is in pressure equilibrium with the surroundings. The design assures there are no stem or voltage soakage effects, providing precise and reliable measurements.

Durable Construction, Built to Last

The Model A17 Exradin Slice Therapy Chamber is constructed of rugged C552 Shonka air-equivalent plastic, providing excellent conductivity and years of reliable use.

Specifications

- Active Collecting Volume:** 2.65 cc
- Active Collecting Volume Length:** 11.11 cm
- Nominal Volume:** 1.91 cm³
- Outside Diameter of Shell:** 12.7 mm
- Inside Diameter of Shell:** 6.0 mm
- Shell Wall Thickness:** 3.3 mm
- Collector Diameter:** 2.5 mm
- Collector Length:** 2.5 mm
- Overall Chamber Length:** 17.0 cm
- Nominal Length:** 80 mm
- Shell, Collector and Guard Material:** A, Shonka air-equivalent C552 plastic
- Nominal Air Kerma Calibration Factor:** 1.5E+7Gy/C
- Response Uniformity Over the Nominal Length:** ±1.5%
- Collector Material:** Carbon fiber
- Electrical Power Requirements:** Operates at ±300 VDC
- Nominal Collection Efficiency:** 100%
- Maximum Polarizing Potential:** 1000 V
- Nominal Inherent Leakage Currents:** 10⁻¹⁵ A
- Low-Noise Triaxial Cable:** 1.5m long, 50 ohms, 29 pF/ft
- Connector:** Triaxial BNC plug (2-Lug, male pin) and protective cap connected by chain (standard); others available upon request
- Waterproof:** Yes
- Operating Parameters**
 - Humidity:** 20 to 80%, non-condensing
 - Temperature:** 50° to 104° F (10° to 40° C)
 - Pressure:** 680 to 770 mm Hg
- Integral ⁶⁰Co Buildup in Shell Wall**

Product Standards: CE₀₄₁₃, IEC 60601-1, IEC 61674



Item	Description
300-540	Exradin A17 CT Ion Chamber, 1.91cc Slice Therapy

EXRADIN A101 CT ION CHAMBER, 4.54 cc



Exradin A101 Schematic

- Fiducial markers identify the center and both ends of the collecting volume for easy setup in relation to the beam
- Air-equivalent conductive plastic eliminates fragility or flaking of painted conductive layers
- Proven guard design yields stable, precise measurements and minimizes settling time by creating uniform field lines
- Shell and guard are made of durable, long lasting Shonka conductive plastic
- Use of homogeneous material throughout the chamber minimizes perturbation of the beam due to the presence of the chamber and optimizes measurements
- Axially symmetric design of the chamber provides a uniform, isotropic response
- Ionization collection efficiency is 99.9% or better
- Collecting volume is 4.54 cc

The Exradin Model A101 CT Ion Chamber performs the measurements necessary for calculating the CTDI (computed tomography dose index) as described in the AAPM TG 74. It has excellent response uniformity over the chamber length with variation less than $\pm 3\%$.

Fast, Precise Measurements

Model A101 is ideal for checking the consistency of beams at various jaw widths. The chamber is vented to the ambient, ensuring the collecting volume is in pressure equilibrium with the surroundings. The design assures there are no stem or voltage soakage effects, providing precise and reliable measurements.

Durable Construction, Built to Last

The Model A101 CT Chamber is constructed of rugged C552 Shonka air-equivalent plastic, providing excellent conductivity and years of reliable use.

Specifications

- Active Collecting Volume:** 5.48 cc
- Active Collecting Volume Length:** 12.08 cm
- Nominal Volume:** 4.54 cm³
- Nominal Length:** 10.0 cm
- Collector Diameter:** 2.5 mm
- Outside Diameter of Shell:** 10.0 mm
- Inside Diameter of Shell:** 8.0 mm
- Shell Wall Thickness:** 1.0 mm
- Overall Chamber Length:** 164.3 mm
- Shell, Collector and Guard Material:** A, Shonka air-equivalent C552 plastic
- Nominal Air Kerma Calibration Factor:** 16.2E+6Gy/C
- Response Uniformity Over the Nominal Length:** $\pm 3\%$
- Energy Response:** 80 kVp to 150 kVp $\pm 4\%$
- Collector Material:** Carbon fiber
- Electrical Power Requirements:** Operates at ± 300 VDC
- Nominal Collection Efficiency:** 100%
- Maximum Polarizing Potential:** 1000 V
- Nominal Inherent Leakage Currents:** 10^{-15} A
- Low-Noise Triaxial Cable:** 1.5 m long, 50 ohms, 29 pF/ft
- Included Adapter Sleeve:** PMMA sleeve to adapt chamber for 0.50" (12.7mm) phantom holes
- Connector:** Triaxial BNC plug (2-Lug, male pin) and protective cap connected by chain (standard); others available upon request
- Waterproof:** No
- Operating Parameters**
 - Humidity:** 20 to 80%, non-condensing
 - Temperature:** 50° to 104° F (10° to 40° C)
 - Pressure:** 680 to 770 mm Hg
- Product Standards:** CE₀₄₁₃, IEC 60601-1, IEC 61674



Item #	Description
300-550	Exradin A101 CT Ion Chamber, 4.54 cc

PTW CT CHAMBERS

PTW 30009 CT CHAMBER



Vented cylindrical pencil chamber for dose length product measurements in computed tomography

- Pencil type chamber for measurements within a CT head or body phantom or free in air
- Provides a sensitive measuring length of 10 cm
- Shows a homogeneous response over the whole chamber length

The CT chamber is a vented cylinder chamber designed for dose length product and dose length product rate measurements in computed tomography. The chamber allows the determination of the $CTDI_{100}^1$, $CTDI_W^2$ and $CTDI_{Vol}^3$ according to IEC 61223-2-6 and IEC 61223-3-5.

¹ $CTDI_{100}$ = Computed Tomography Dose Index 100

² $CTDI_W$ = Weighted $CTDI_{100}$

³ $CTDI_{Vol}$ = Volume $CTDI_W$

Item	Description
300-560	PTW 30009 CT Chamber, 3.14 cc

PTW 30017 CT CHAMBER



Vented cylindrical pencil chamber for dose length product measurements in computed tomography

- Pencil type chamber for measurements free in air
- Provides a sensitive measuring length of 30 cm
- Shows a homogeneous response over the whole chamber length

The CT chamber is a vented cylinder chamber designed for dose length product and dose length product rate measurements in computed tomography according to the amendment to IEC 60601-2-44.

Item	Description
300-565	PTW 30017 CT Chamber, 9.3 cc

Specifications	Item 300-560	Item 300-565
PTW Model	30009	30017
Type of Product	Vented pencil type chamber	
Application	Dosimetry in computed tomography	
Measuring Quantity	Air kerma length product, exposure length product	
Reference Radiation Quality	120 kV, HVL 8.4 mm Al (RQT9)	
Nominal Sensitive Volume	3.14 cm ³	9.3 cm ³
Design	Not waterproof, vented, pencil type	
Reference Point	Chamber center	
Direction of Incidence	Radial	
Nominal Response	14 nC/(Gycm)	13 nC/(Gycm)
Chamber Voltage	-100 V nominal ± 500 V maximal high voltage to be connected only with active current-limiting device ($I_{max} < 0.5$ mA)	
Energy Response	≤ ± 5% for 70 - 150 kV	≤ ± 5% for 50 - 150 kV
Leakage Current	≤ ± 10 fA	
Cable Leakage	≤ 1pC/(Gycm)	
Materials and Measures		
Wall Material	1 mm PMMA, graphite coated	
Wall Area Density	119 mg/cm ²	
Dimension of Sensitive Volume	Radius 3.5 mm Length 100 mm	Radius 3.5 mm Length 300 mm
Electrode	Al tube, graphited outer diameter 3 mm	
Ion Collection Efficiency at Nominal Voltage		
Ion Collection Time	274 μs	
Max. Dose Rate for ≥ 95.0% saturation	12.4 Gy/s	
Max. Dose Per Pulse for ≥ 95.0% saturation	2.26 mGy	
Useful Ranges		
Chamber Voltage	± 100 - 400 V	
Radiation Quality	50 - 150 kV	
Temperature	10° to 40° C, 50° to 104° F	
Humidity	10 to 80%, max 20 g/m ³	
Air Pressure	700 - 1060 hPa	

MINI CT QC PHANTOM



- **Lightweight, compact and extremely portable, ideal for field service use**
- **Can be used with any CT scanner**
- **For measurement and analysis of all major CT scanner functions and radiation dose**
- **For making inhomogeneity corrections in radiation oncology**

The Mini CT QC Phantom, Item 682-300 is a highly-versatile phantom designed for routine monitoring of the consistency of all the major parameters of CT image quality and radiation dose. Its unique, compact design allows for unparalleled portability, easy setup and reliable parameter determinations. It is perfect for use by physicists, technologists and service engineers.

The disc section consists of a 1 in thick acrylic disc with a 6" diameter. Five of the six large holes are for the placement of inserts for the evaluation of CT number consistency. The sixth hole is for a high-contrast resolution insert or an optional low contrast resolution insert. The seven small holes are for inserting an ion chamber at differing locations within the phantom. Six acrylic inserts are provided to fill these holes, leaving one hole to accommodate an ion chamber during a given measurement.

The disc section is attached to a rectangular acrylic bar containing a thin copper wire embedded along a central groove. This section of the phantom is used to evaluate laser beam alignment and accuracy of the slice thickness, slice spacing, slice contiguity and pilot scan to transverse; or longitudinal scan correspondence. This is achieved by exposing a nonscreen film placed underneath the phantom and making several cuts while the phantom is advanced along the gantry in a pre-programmed manner.

Teflon® is a registered trademark of E.I. DuPont de Nemours & Co.

The low-cost, all-in-one QC phantom accurately evaluates

- Laser beam alignment
- Slice thickness, spacing and contiguity
- Table movement
- CT numbers and noise level
- CT number uniformity
- Relative radiation dose
- Video monitor and image processing equipment
- Scout and axial scan correspondence
- High-contrast resolution
- Low-contrast resolution (optional insert)

Optional Inserts

- Item 682-305: Low-contrast resolution insert
- Item 682-307: Teflon® insert
- Item 682-309: Lung insert
- Item 682-311: Teflon®-Bone 270° semi-ring for evaluation of beam hardening correction software

Specifications

BODY

- Material:** acrylic (PMMA)
- Dimensions:** 6" dia. x 1" thick (15.25 cm dia. 2.54 cm thick)
- Holes:** six(6) - 1.125" dia. and seven(7)- 0.50" dia. through holes
- Weight:** 1.35 kg (3 lbs)

INSERTS

- Material:** One (1) - 1.125" dia. plug of each: Plastic Water™, nylon, bone-equivalent, polyethylene, polystyrene, polycarbonate, and acrylic.
- Six(6) - 0.50" dia. acrylic plugs, for chamber holes

BASE

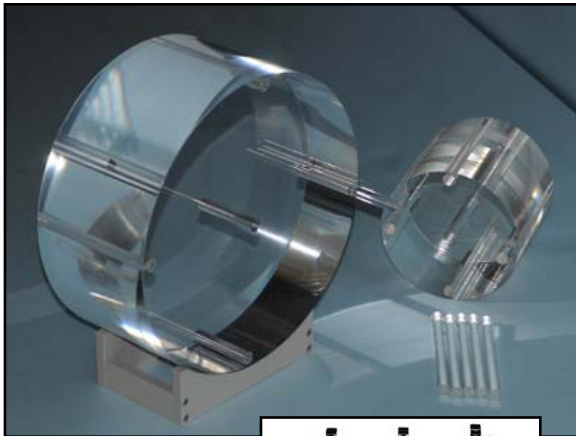
- Material:** acrylic
- Construction:** copper wire approx. 0.02" dia., fixed into a 0.02" deep groove centered along base, disc is attached to the side of the body with 2 removable nylon slotted screws
- Dimensions:** 30.3 cm L x 4.6 cm W x 1.75 cm thick

Item #	Description
682-300	Mini CT QC Phantom
682-305	Low-contrast resolution insert
682-307	Teflon® insert
682-309	Lung insert
682-311	Teflon®-Bone 270° semi-ring Insert

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CT DOSE PHANTOM

Acrylic and Carry Case



- Usable on all CT scanners
- Head and abdominal configurations included
- Made from acrylic with a density of 1.19 gm/cc
- Includes 10 PMMA plugs
- 1.31 cm inside hole dia. sized for standard CT Dose probes
- Rugged foam lined carrying case included

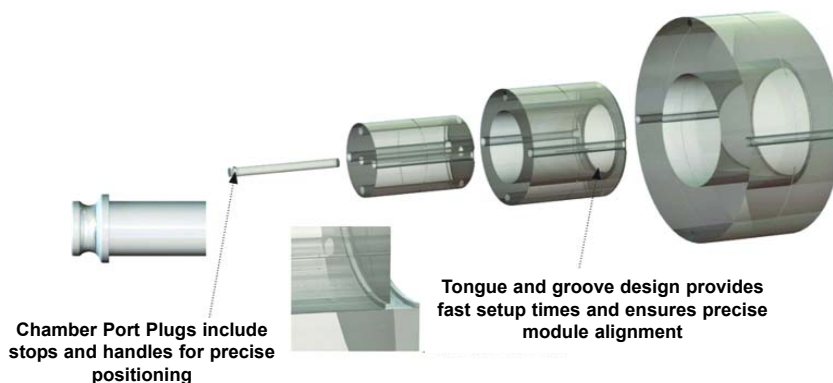
The CT Dose Phantom consists of two 15 cm thick Solid PMMA disks measuring 16 cm (head) and 32 cm (body) in diameter.

The disks have five through-holes with an inside diameter of 1.31 cm to accommodate standard CT dose probes and five acrylic rods to plug the holes not in use. One hole is at center and four are around the perimeter, 90° apart and 1 cm from hole center to the outside edge of the phantom.

The head and body phantoms along with the ten acrylic rod plugs are packaged in an extremely rugged foam lined carrying case.

Item	Description
682-005	CT Dose Phantom, Acrylic and Carry Case

CTDI PHANTOM



- Gain greater efficiency for a key part of your CT quality assurance program.
- Measure absorbed dose and monitor scanner output
- New, easy-to-use design available in two models
- Customized case with built-in wedges for use as a phantom holder

Computed Tomography Dose Index (CTDI) is a key part of your CT Quality Control Program.

The CTDI Phantom addresses specifications outlined by the FDA (FDA 21CFR 1020.33) and IEC (IEC 60601-2-44, IEC 61223-2-6 and IEC 61223-3-5/IEC 60601-2-44)..

The phantom is offered as a 2-piece (Item 682-040) or 3-piece (Item 862-045) telescopic configuration with each configuration consisting of nested modules, allowing the user to adapt the phantom to the desired size required by the protocol in use.

Central & Periphery Measurements

Each module allows dose measurements on the central axis of the phantom or at periphery positions located every 90 degrees at 1.0-cm depth from the surface.

TG-66 Compliance

CTDI Phantoms supports CT Dose Index measurements recommended by AAPM Task Group-66.

User-Friendly

Smart design features like tips on chamber plugs and scribe lines support fast and accurate setup.

Custom Wheeled Case

Included is a water-tight hard case that includes built-in wedges to hold and protect the phantom during transport.

Specifications

Material: Polymethyl-Methacrylate (PMMA/Acrylic)

Density: 1.19 g/cm²

Alignment Markings: Etched lines centered at the transverse, coronal and sagittal planes

Chamber Ports Diameter: 1.31 cm

Dimensions (OD X Length)

Adult Body: 32 cm x 14.5 cm

Adult Head/Pediatric Body: 16 cm x 14.5 cm

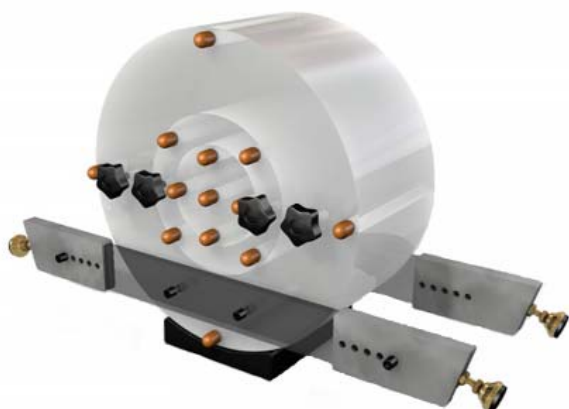
Pediatric Head (Item 682-045 only): 10 cm x 14.5 cm

Weight: 30.5 lb (19.9 kg)

Item #	Description
682-040	CTDI Phantom - Adult, 2 -Piece
682-045	CTDI Phantom - Adult & Pediatric, 3-Piece

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CT DOSE PHANTOM COMPLY WITH FDA PERFORMANCE STANDARD



682-008 shown with 682-009 Optional support bracket



682-007-14, 682-007-15 and 682-007-16

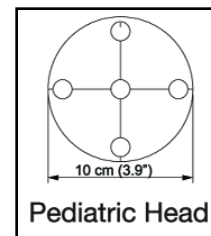
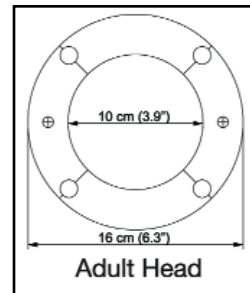
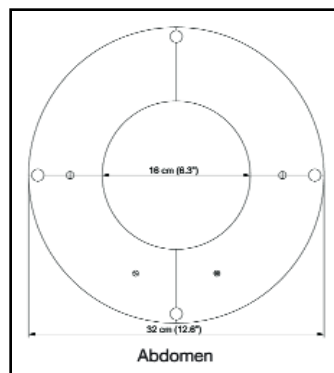
- **Abdominal, Adult Head, Pediatric Head configurations**
- **PMMA disks and plugs with density of 1.19 g/cc**
- **1.31 cm diameter holes sized for standard CT Dose probes**
- **Nesting PMMA disks minimize storage space**
- **Compatible with all CT scanners**

For all computed tomography systems, the FDA recommends measuring the CT Dose Index (CTDI). With this in mind, each section of the CIRS CT Dose Phantom can provide separate dose information. The user can also measure maximum, minimum and mid-range values of the nominal tomographic section thickness when performing dose profile measurements.

The phantom consists of a set of nesting 15 cm thick solid PMMA disks measuring 16 cm (head) and 32 cm (body) in diameter. The adult head disk is also suitable for pediatric body measurements. Model 007A additionally includes a third nesting disk measuring 10 cm in diameter for pediatric head measurements. Handles on the body and head are provided for ease in handling and maneuverability.

Through holes measuring 1.31 cm in diameter will accommodate standard CT probes, and acrylic rods are provided to plug the holes when not in use. The acrylic rods are machined to receive 1 mm diameter TLD rods.

The Model 007A is manufactured to comply with the FDA's performance standard, 21 CFR 1020.33 that details measurement requirements.



Item 682-009 is an optional Support Bracket can be used to suspend the CT Dose Phantom above the imaging couch and align it along the axis of X-ray tube rotation. This enables the phantom to be used to assess CT dose in helical mode or any mode that requires the extended travel of the imaging couch or a wide beam. This set-up might be used to address the dosimetry approach described in TG111. An additional application of the support bracket is to provide a body to simulate continuous scatter radiation from the patient during helical CT for dose safety measurements inside and outside the exam room.

Replacement acrylic rods are available in 14, 15 or 16 cm long.

Item 682-007 CT Dose Phantom Includes

- (1) Abdominal Cylinder
- (1) Adult Head Cylinder
- (1) Pediatric Head Cylinder
- (13) Acrylic Rods
- (1) Foam Lined Carry Case
- (1) User Guide
- (1) 48 Month Warranty

Specifications

Overall Dimensions: 12.6" x 12.6" x 5.9" (32 x 32 x 15 cm)

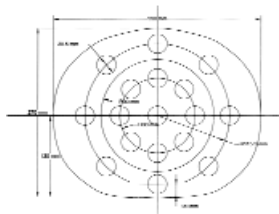
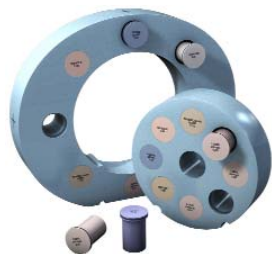
Materials: PMMA

Weight: 29 lb (13 kg)

Item #	Description
682-008	CT Dose Phantom
682-009	CT Dose Phantom Support Bracket, Optional
682-007-14	Acrylic Rod CT Probe, 1.31cm Dia. x 14cm Long
682-007-15	Acrylic Rod CT Probe, 1.31cm Dia. x 15cm Long
682-007-16	Acrylic Rod CT Probe, 1.31cm Dia. x 16cm Long

ELECTRON DENSITY PHANTOM

Correlate CT Number and Tissue Electron Density



The Electron Density Phantom consists of two nested disks made from Plastic Water®-LR. They can represent both head and abdomen configurations. Nine (9) different tissue equivalent electron density plugs can be positioned at 17 different locations within the scan field. Included is a water vial plug that can be filled with any fluid. Optional distance marker plugs enable quick assessment of the CT scanner's distance measurement accuracy

- Evaluate CT scan data
- Correct for inhomogeneities
- Document relationship between CT number and tissue electron density
- Simulate indicated tissue within the diagnostic energy range
- Quick assessment of distance registration

Because CT scans are used to correct for tissue inhomogeneities in radiotherapy treatment planning, it is important to obtain a precise relationship between CT number (in Hounsfield units) and electron densities. The Electron Density Phantom enables precise correlation of CT data to electron density of various tissues. The phantom is manufactured from CIRS Tissue Equivalent Materials.

Specifications

Overall Dimensions

Electron Density Head Insert: 7" Dia x 1.97" D (180 x 50 mm)

Electron Density Body without Head Insert:
12" W x 10.7" H x 1.97" D (330 x 270 x 50 mm)

Weights

Electron Density Head Insert: approx 2 lb (0.950 kg)

Electron Density Body without Head Insert: approx 4.7 lb (2.1 kg)

Materials: Water and Tissue Equivalent Epoxy Materials

Item #	Description
682-062	Electron Density Phantom

ELECTRON DENSITY PHANTOM ITEM 682-062 INCLUDES

Qty	Description	*Physical Density, (g/cc)	Electron Density x 10 ²³ Electrons/cc	RED (Relative to H ₂ O)
1	Electron Density Head Insert	1.029	3.333	0.998
1	Electron Density Body without Head Insert	1.029	3.333	0.998
2	Lung (Inhale) Equivalent Electron Density Plug	0.205	0.668	0.200
2	Lung (Exhale) Equivalent Electron Density Plug	0.507	1.658	0.496
2	Breast (50% Gland / 50% Adipose) Equivalent Electron Density Plug	0.99	3.261	0.976
2	Solid Trabecular Bone (200 mg/cc HA) Equivalent Electron Density Plug	1.16	3.730	1.117
2	Liver Equivalent Electron Density Plug	1.07	3.516	1.052
2	Muscle Equivalent Electron Density Plug	1.06	3.483	1.043
2	Adipose Equivalent Electron Density Plug	0.96	3.171	0.949
2	Solid Dense Bone (800mg/cc HA) Equivalent Electron Density Plug	1.53	4.862	1.456
1	Solid Dense Bone (1250mg/cc HA) Equivalent Electron Density Plug	1.82	5.663	1.695
1	Water-fillable Electronic Density Plug (Real water data provided)	1.00	3.340	1.000
1	Set of 2 Feet for 682-062			
1	Soft Carry Case			
1	User Guide			
1	60 Month Warranty			

CUSTOMERS ARE ENCOURAGED TO COMPLETE THEIR ORDER WITH THE PURCHASE OF THE INSERT OPTION LISTED BELOW

Item	Description	*Physical Density, (g/cc)	Electron Density x 10 ²³ Electrons/cc	RED (Relative to H ₂ O)
682-214	†Water Equivalent Chamber Rod with Cavity for Ion Chamber	1.029	3.333	0.998

†Refer to Appendix A for the CIRS cavity and plug code list of available chamber cavities.
If the ion chamber cavity is not specified by customer, phantom is supplied with cavity that accommodates a Farmer type ion chamber.

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CT PRODUCTS-SIMULATION, CHAMBERS, PHANTOMS, LASERS

ELCTRON DENSITY PHANTOM OPTIONAL ACCESSORIES

Item	Description	*Physical Density, (g/cc)	Electron Density x 10 ²³ Electrons/cc	RED (Relative to H ₂ O)
682-207	**800 mg/cc HA in Water Equivalent - Core Insert	1.53	4.862	1.456
682-212	**Titanium Rod Core Insert	4.51	12.475	3.735
682-213	Distance Marker Insert	1.029	3.333	0.998
682-216	Water Equivalent Insert	1.029	3.333	0.998
682-217	**1000 mg/cc HA in Water Equivalent - Core Insert	1.66	5.243	1.570
682-218	**1250 mg/cc HA in Water Equivalent - Core Insert	1.82	5.663	1.695
682-219	**ICRU Cortical Bone Equivalent Core Insert***	1.91	5.915	1.771
682-220	**1500 mg/cc HA in Water Equivalent - Core Insert	1.99	6.134	1.837
682-221	**1750 mg/cc HA in Water Equivalent - Core Insert	2.15	6.600	1.976
682-226	Solid Dense Bone (1000 mg/cc HA) Equivalent Electron Density Plug	1.66	5.243	1.570
682-228	Solid Dense Bone (1500 mg/cc HA) Equivalent Electron Density Plug	1.99	6.134	1.837
682-229	Solid Dense Bone (1750 mg/cc HA) Equivalent Electron Density Plug	2.15	6.600	1.976
682-230	Water Equivalent Material Surrounding 6.4mm Diameter Stainless Steel (Alloy 20) Rod Core Electron Density Plug	8.03	23.101	6.917
682-231	Water Equivalent Material Surrounding 6.4mm Diameter Aluminum Rod Core Electron Density Plug	2.70	8.008	2.398

* Physical Density - The actual physical density of the insert can vary within $\pm 1\%$ of the manufacturing target density.

Note: CIRS strongly recommends that the user inputs the electron density whenever prompted for material data by the TPS.

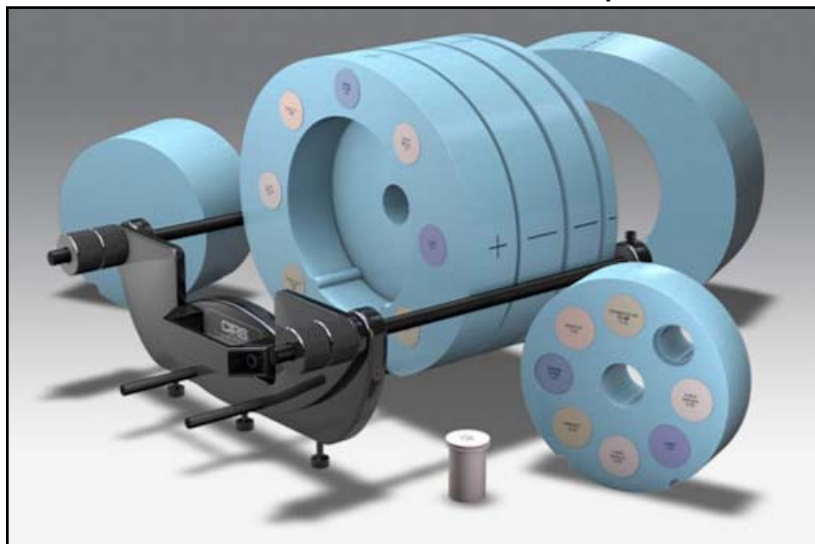
** These inserts have a standard 30 mm diameter and contain a 10 mm diameter core of the indicated reference surrounded by H₂O-equivalent background. Hydroxyapatite (unit mg/cc) in H₂O background Plugs to accommodate chambers, TLD's and film available upon special request. The titanium reference has a unique diameter of 6.35 mm.

*** CIRS Cortical bone reference is based on ICRU Report No.44, and represents approximately 12.2% H₂O, 24.6% protein, 58% mineral (assumed to be Calcium Hydroxyapatite (HA)), and 5.2% monosaccharides. CIRS further offers a series of mineral density references that mimic various HA concentrations in a pure water-equivalent epoxy background matrix.

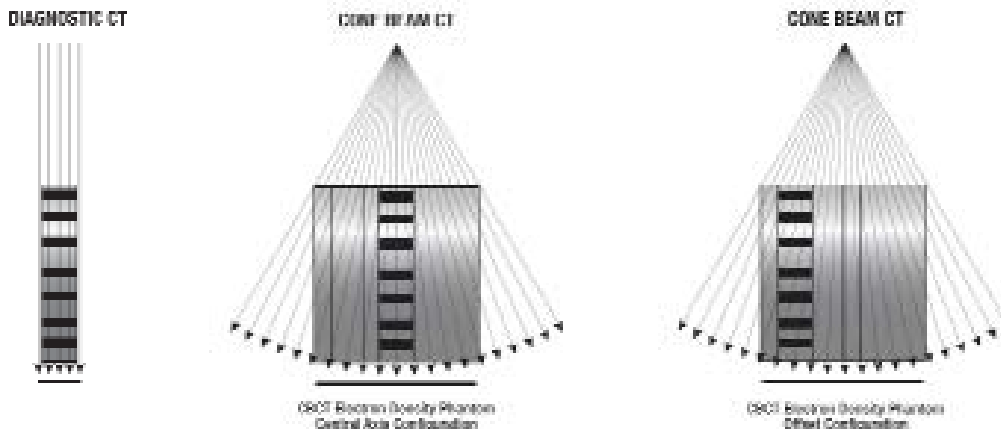
† Refer to Appendix A for the CIRS cavity and plug code list of available chamber cavities

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CBCT ELCTRON DENSITY PHANTOM Increase HU Value Confidence for Adaptive RT



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A large number of HU readings can be obtained by placing the electron density plugs in different positions both in central axis and offset configurations. Using the equation of curve fitting for collected values, a CBCT to electron density calibration curve can be calculated.

- Evaluate CT scan data
- Correct for inhomogeneities
- Document relationship between CT number and tissue electron density
- Simulate indicated tissue within the diagnostic and therapeutic energy range
- Quick assessment of distance registration (optional)

The Cone Beam (CBCT) Electron Density Phantom is an extended version of Item 682-062 Electron Density Phantom specifically designed for Cone Beam CT Imaging systems. Preliminary data shows that there may be differences between the HU readings for Diagnostic CT and Cone Beam CT. The geometry of the Cone Beam CT requires additional material and suggests that off central axis measurements should be taken.

The phantom was designed in collaboration with Dr. Peter H. Cossmann, PhD to provide a reliable tool for CT number to electron density calibration in volumetric imaging. Reliable CT

calibration curves help enable treatment plan adaptation directly from Cone Beam CT data. Additionally, the phantom can accommodate any ion chamber for dose measurements and validation of heterogeneity correction based on the corrected CT calibration curve.

The CBCT Electron Density Phantom's size covers geometries for imagers with dimensions of up to 40 cm x 40 cm. It is made of Plastic Water®-LR and contains the same set of tissue equivalent electron density inserts as the standard Item 682-062. Additional interchangeable slabs allow for repositioning of the electron density section off axis.

Specifications

Overall Dimensions: 13" W x 10.6" H x 9.8" D (33 x 27 x 5 cm)

Weight: 40 lb (18 kg)

Materials: Water and Tissue Equivalent Epoxy Resin

Item #	Description
682-200	CBCT Electron Density Phantom

CT PRODUCTS-SIMULATION, CHAMBERS, PHANTOMS, LASERS

CBCT ELECTRON DENSITY PHANTOM ITEM 682-200 INCLUDES

Qty	Description	Physical Density (g/cc)	Electron Density Per cc x 10 ²³	RED (Relative to H ₂ O)
1	Electron Density Head Insert	1.029	3.333	0.998
1	Electron Density Body without Head Insert	1.029	3.333	0.998
2	Lung (Inhale) Equivalent Electron Density Plug	0.205	0.668	0.200
2	Lung (Exhale) Equivalent Electron Density Plug	0.507	1.658	0.496
2	Breast (50% Gland / 50% Adipose) Equivalent Electron Density Plug	0.99	3.261	0.976
2	Solid Trabecular Bone (200 mg/cc HA) Equivalent Electron Density Plug	1.16	3.730	1.117
2	Liver Equivalent Electron Density Plug	1.07	3.516	1.052
2	Muscle Equivalent Electron Density Plug	1.06	3.483	1.043
2	Adipose Equivalent Electron Density Plug	0.96	3.171	0.949
2	Solid Dense Bone (800 mg/cc HA) Equivalent Electron Density Plug	1.53	4.862	1.456
1	Solid Dense Bone (1250 mg/cc HA) Equivalent Electron Density Plug	1.82	5.663	1.695
1	Water-fillable Electronic Density Plug (Real water data provided)	1.00	3.34	1.00
1	Set of 2 Feet for 682-062			
1	Soft Carry Case for 680-062			
1	50 mm Thick Bolus Slab	1.029	3.333	0.998
2	100 mm L x 30 mm dia Background Equivalent Plug	1.029	3.333	0.998
1	12.5 mm Thick Bolus Slab	1.029	3.333	0.998
1	37.5 mm Thick Bolus Slab	1.029	3.333	0.998
1	CBCT Electron Density Phantom -Annulus (100 mm Thick)	1.029	3.333	0.998
1	CBCT Electron Density Phantom-Annulus Solid Insert (100 mm Thick)	1.029	3.333	0.998
1	Holder/Support set for 682-200 & Model 062MQA			
1	Soft Carry Case for 682-200			
1	User Guide			
1	48 Month Warranty			

CUSTOMERS ARE ENCOURAGED TO COMPLETE THEIR ORDER WITH THE PURCHASE OF THE INSERT OPTION LISTED BELOW

Item	Description	*Physical Density, (g/cc)	Electron Density x 10 ²³ Electrons/cc	RED (Relative to H ₂ O)
682-214	†Water Equivalent Chamber Rod with Cavity for Ion Chamber	1.029	3.333	0.998

†Refer to Appendix A for the CIRS cavity and plug code list of available chamber cavities.
If the ion chamber cavity is not specified by customer, phantom is supplied with cavity that accommodates a Farmer type ion chamber.

CBCT ELECTRON DENSITY PHANTOM OPTIONAL ACCESSORIES

Item	Description	*Physical Density, (g/cc)	Electron Density x 10 ²³ Electrons/cc	RED (Relative to H ₂ O)
682-207	**800 mg/cc HA in Water Equivalent - Core Insert	1.53	4.862	1.456
682-212	**Titanium Rod Core Insert	4.51	12.475	3.735
682-213	Distance Marker Insert	1.029	3.333	0.998
682-216	Water Equivalent Insert	1.029	3.333	0.998
682-217	**1000 mg/cc HA in Water Equivalent - Core Insert	1.66	5.243	1.570
682-218	**1250 mg/cc HA in Water Equivalent - Core Insert	1.82	5.663	1.695
682-219	**ICRU Cortical Bone Equivalent Core Insert***	1.91	5.915	1.771
682-220	**1500 mg/cc HA in Water Equivalent - Core Insert	1.99	6.134	1.837
682-221	**1750 mg/cc HA in Water Equivalent - Core Insert	2.15	6.600	1.976
682-226	Solid Dense Bone (1000 mg/cc HA) Equivalent Electron Density Plug	1.66	5.243	1.570
682-228	Solid Dense Bone (1500 mg/cc HA) Equivalent Electron Density Plug	1.99	6.134	1.837
682-229	Solid Dense Bone (1750 mg/cc HA) Equivalent Electron Density Plug	2.15	6.600	1.976
682-230	Water Equivalent Material Surrounding 6.4mm Diameter Stainless Steel (Alloy 20) Rod Core Electron Density Plug	8.03	23.101	6.917
682-231	Water Equivalent Material Surrounding 6.4mm Diameter Aluminum Rod Core Electron Density Plug	2.70	8.008	2.398

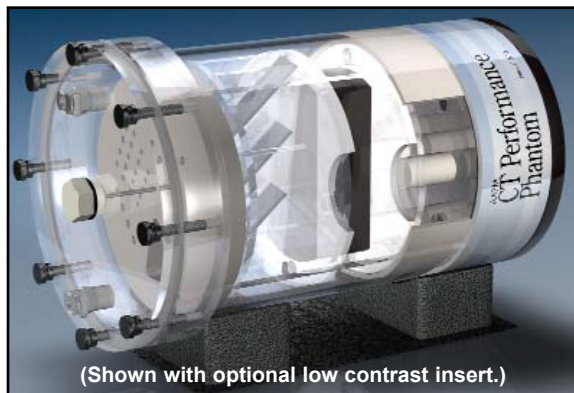
* Physical Density - The actual physical density of the insert can vary within ±1% of the manufacturing target density.
Note: CIRS strongly recommends that the user inputs the electron density whenever prompted for material data by the TPS.

** These inserts have a standard 30 mm diameter and contain a 10 mm diameter core of the indicated reference surrounded by H₂O-equivalent background. Hydroxyapatite (unit mg/cc) in H₂O background Plugs to accommodate chambers, TLD's and film available upon special request. The titanium reference has a unique diameter of 6.35 mm.

*** CIRS Cortical bone reference is based on ICRU Report No.44, and represents approximately 12.2% H₂O, 24.6% protein, 58% mineral (assumed to be Calcium Hydroxyapatite (HA)), and 5.2% monosaccharides. CIRS further offers a series of mineral density references that mimic various HA concentrations in a pure water-equivalent epoxy background matrix.

AAPM CT PERFORMANCE PHANTOM

Meets guidelines in AAPM Report #1 "Performance Evaluation and Quality Assurance of CT Scanners"



(Shown with optional low contrast insert.)

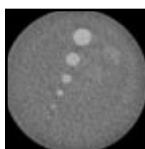
Specifications

Overall Dimensions: 8.5" OD x 15.5" L (21.6 x 39.4 cm)

Empty Weight: 17.25 lb (7.9 kg)

Materials: PMMA cast tubing 8.5" OD, 8" ID x 12.75" L (21.6 OD, 20.3 ID x 32.4 cm) with removable lid

Item 682-010 Includes



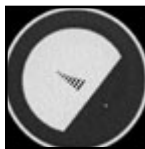
Contrast Test Object

(This option is only available with purchase of the phantom body)
8.5" OD x 2.5" L (21.6 x 6.35 cm) solid acrylic equivalent disk block with 12 fillable cavities 2.25" deep (5.72 cm). Two of each cavity with diameters: 1, 0.75", 0.50", 0.375", 0.25", and 0.125" (2.54, 1.9, 1.27, 0.95, 0.64, 0.32 cm), spaced twice their diameter apart from a center line. Cavities can be easily filled from the outside with dextrose or sodium chloride solutions of various concentration.



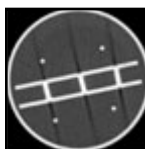
CT Number Linearity Insert

7.5" OD x 2.5" L (19.05 x 6.35 cm) includes 1" diameter (2.54 cm) rods of polyethylene, PMMA (acrylic), polycarbonate, polystyrene, and nylon. Density values (g/cc): polyethylene - 0.95, polystyrene - 1.05, nylon - 1.1, acrylic - 1.19, polycarbonate - 1.20.



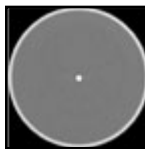
Resolution Insert

7.5" OD x 2.5" L (19.05 x 6.35 cm) with acrylic equivalent test object with 8 sets of air thru holes (five holes per set): Diameter of holes is 1.75, 1.5, 1.25, 1.00, 0.75, 0.61, 0.50, and 0.40 mm. Distance between each hole equal to hole diameter. Each row is 5 mm apart. Insert also contains a 0.009" (0.023 cm) stainless steel wire positioned longitudinally for calculation of line-spread function.



Slice Thickness Insert

7.5" OD x 3.5" L (19.05 x 8.89 cm) Contains three 0.02 x 1" (0.064 x 2.54 cm) aluminum strips angled at 45°, positioned on center and aligned vertically.



Alignment Pin

0.25" diameter x 3" L (0.64 x 7.62 cm) aluminum pin with threaded attachment to housing cover plate.



Bone Ring

7.65" ID x 0.2" wall thickness x 2.8" L (19.43 x 0.5 x 7.1 cm) cortical bone ring. Fits over linearity, resolution and slice thickness insert to harden the beam.

User Guide

48 month warranty

Measurement Capability

- Noise
- Sensitivity / Detectability
- Mechanical Alignment
- Beam Hardening
- Slice Thickness
- Size Independence
- Radiation Dose
- Spatial Uniformity
- HU Linearity
- Spatial Resolution & line spread function

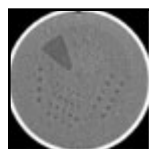
The AAPM CT Performance Phantom offers the user a single test object that measures ten distinct CT performance parameters. The phantom design is based on the guidelines presented in Report #1 of the American Association of Physicists in Medicine Task Force on CT Scanner Phantoms. The goals of report #1 were to "(1) define 'performance' of a CT scanner and (2) describe methods of performance testing through utilization of particular phantoms."

A CT number linearity insert, high contrast resolution insert and slice width insert are housed in an 8.5" diameter (21.6 cm) PMMA water tank with quick disconnect valves for ease of filling and draining between use. Also included is a 0.25" (0.64 cm) bone equivalent ring that can be fit over the inserts to evaluate the effects of beam hardening.

A contrast test object is adhered to the bottom of the tank that includes two rows of cavities from 1 to 0.125" diameter (2.54 to 0.32 cm). The cavities can be filled with various solutions for contrast evaluation. An aluminum alignment insert is incorporated in the lid of the tank and can be interchangeable with a polystyrene TLD insert for dose measurements.

A user's manual, holding cradle, filling tubes and other accessories are included. Optional items: Low Contrast Insert, Whole Body Resolution and Noise Ring, TLD Insert, Low Contrast Insert - Spherical Targets or Carrying Case.

Optional Accessories



Item 682-012 Low Contrast Insert

8" OD x 1.18" L (20.3 x 3 cm) proprietary epoxy with CT density 6-10 HU above water. The test object contains a series of water-filled holes from 2.5 to 7.5 mm in diameter, in 0.5 mm steps. For each target size the center-to-center distance between holes is twice the hole diameter.



Item 682-013 Whole Body Resolution and Noise Ring

12" OD x 8.5" ID x 2" L (30.5 x 21.6 x 5.1 cm) fits over phantom housing and contains the same test object as the Resolution Insert, at two locations 90° apart.



Item 682-014 TLD Insert

0.5" dia. x 3.5" L (1.3 x 8.9 cm) PMMA rod drilled 3" deep (7.6 cm) to accept TLD's. Can be swapped with Alignment pin in housing cover without removing the cover.



Item 682-015 Low Contrast Insert- Spherical Targets

8" OD x 1.18" L (20.3 x 3 cm) Plastic Water® LR equivalent background. The test object contains spheres 5, 10 & 20 CTU above background and 3 reference plugs for each material used as spheres.

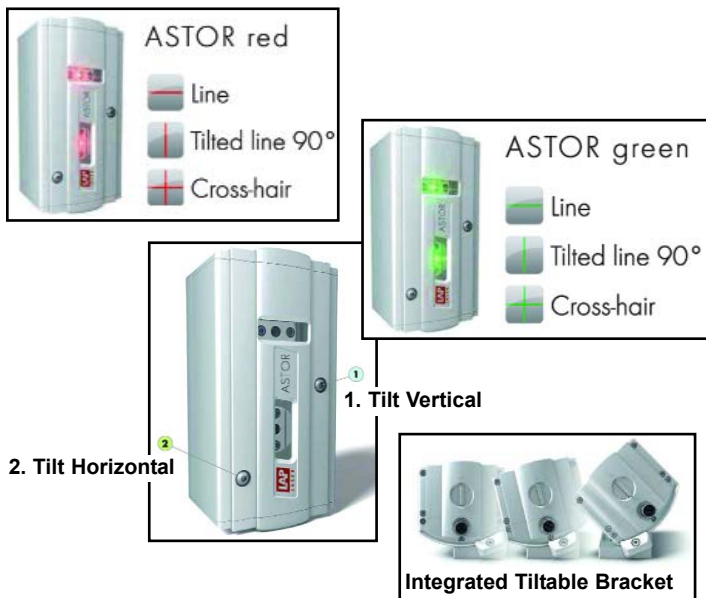
Item 682-021 Carrying Case for 682-010

Custom carry case for easy storage and handling of complete Model 610.

Item #	Description
682-010	AAPM CT Performance Phantom
682-012	Low Contrast Insert
682-013	Whole Body Resolution & Noise Ring

Item #	Description
682-014	TLD Insert
682-015	Low Contrast Insert - Spherical Targets
682-021	Carrying Case

LAP ASTOR LASERS Laser Systems for Patient Alignment



Cost-conscious positioning precision

The ASTOR room lasers allow precisely reproducible positioning of the patient on the linear accelerator. The finest laser lines, with a max. 1 mm width, project the isocenter for highly precise patient positioning. Room lasers are also a fundamental element of phantom alignment for quality assurance.

The ASTOR system has three (optionally four) lasers for alignment with skin markings. You can choose laser color, design variant, and line or cross lasers, all individually adapted to your room situation and workflow. A fourth laser can be used to prevent potential shadowing from the gantry.

Ultra-precise laser lines in red or green are made possible by state-of-the-art precision mechanics and optics. ASTOR room lasers are reduced to the maximum, so even a modest budget can achieve the highest degree of precision.

Precise

Even at a distance of 4 meters, the maximum laser line width is 1 mm. The line straightness within the line shows barely any deviations, even at a distance of 3 meters. You can always be sure of the precision of our lasers.

Optimally visible

The optical room laser components are designed and manufactured with extreme accuracy. Plane parallel glass with anti-reflective coating prevents any interference with the red or green laser beam. The brightness distribution remains constant at all times. Benefit from optimal visibility for precise patient positioning.

Robust

A high-quality aluminum housing reliably protects the fine mechanics and optical components inside. You don't need to fear damage even from gentle impacts. Highly shatterproof glass stands up to all the rigors of clinical daily life.

Flexible

Adapt the room laser design to the circumstances of your space. Direct wall mounting or on a freestanding floor support are both possible. In addition, the room laser can be inclined up to 45°. This gives you flexibility even in tight spaces.

Resistant to radiation

Scattered radiation occurs in environments surrounding linear accelerators. The components in our room lasers have been tested under extreme exposure conditions and optimized for these conditions. The many years of availability without compromising on quality is an exceptional track record that speaks for itself.

Durable

The quality of our products is also reflected in their service life

The ASTOR laser's horizontal and vertical tilt can be easily adjust without removing the cover. Translation, rotation and focus are adjusted after removing the cover via the convenient quick lock mechanism.

- 1 Tilt vertical plane
- 2 Tilt horizontal plane

ASTOR lasers are equipped with adjustable tilting brackets allowing for rotation up to 45°. The ASTOR's compact design makes it an ideal solution for tight mounting locations.

Specifications

Laser Colour (Typical Wave Length):

- Red: 638 nm
- Green: 520 nm,

Laser Class: 2

Focusable Range: 1 - 4 m

Line Width Up to 4 m Distance: < 1mm

Line Length at 3 m Distance: > 3 m

Max. Laser Output Power: < 1mW

External Power Supply: 100 - 240 VAC, 50-60 Hz

Internal Voltage: 24 V DC

Operating Temperature: 59°-86° F (15°-30°C)

Ambient conditions: 35 - 80 % rel. humidity, non-condensing

Dimensions: 7.2" H x 3.4" W x 3.5" D (182 x 86 x 90 mm)

Weight: 3.3 lb (1.4 kg)

Swivel Angle: 45°

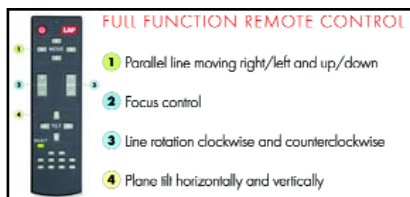
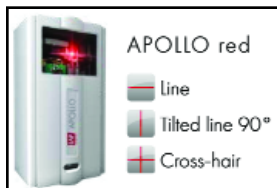
International Protection Rating: IP20



Item	LAP Lasers
711-001	ASTOR Red - Crosshair
711-002	ASTOR Red - Line
711-010	ASTOR Green - Crosshair
711-012	ASTOR Green - Line

LAP APOLLO LASERS

Advanced Laser Systems for Patient Alignment



High precision, remotely adjustable room lasers for patient alignment at LINAC isocenter

Highest precision you can rely on

APOLLO room lasers are used for precise and repeatable positioning of radiotherapy patients. After imaging-based planning via CT or MRI, the patient is positioned at the linear accelerator. The finest laser lines project the LINAC isocenter coordinates onto the patient's skin, allowing for precise alignment to millimeter accuracy with the CT/MRI. In addition, the room lasers are a fundamental component of quality assurance. They aid in the precise orientation of the phantom, to achieve measurement accuracy.

The APOLLO system has three (optionally four) lasers for the coronal, sagittal and transversal body planes. You can choose the laser color, line and/or cross laser, and mounting option, all adapted to your individual room situation. An optional fourth laser prevents possible shadowing from the LINAC gantry.

Precise

Even at a distance of 4 meters, the maximum laser line width is 1 mm. The line straightness within the line shows barely any deviations, even at a distance of 3 meters. You can always be sure of the precision of our lasers.

Optimally visible

The different red, green, and blue diode colors, the optical room laser components are designed and manufactured with extreme accuracy. Plane parallel glass with anti-reflective coating prevents any interference with the laser beam. The brightness distribution remains constant at all times. Benefit from optimal visibility for precise patient positioning.

Stable

A high-quality aluminum housing reliably protects the fine mechanics and optical components inside. You don't need to fear damage even from gentle impacts. Highly shatterproof glass stands up to all the rigors of clinical daily life.

Flexible

Adapt the room laser mounting according to your individual room situation. Direct wall mounting or mounting on a freestanding support are both possible. In addition, the room laser can be inclined up to 45°. This gives you flexibility even in small rooms.

Easily adjustable

Laser adjustment is convenient via remote control. The remote control offers 6 degrees of freedom. The remote control performs all laser positioning for the ultrafine lines including focus

Resistant to radiation

In environments surrounding linear accelerators, scattered radiation occurs. The components in our room lasers have been tested under extreme exposure conditions and optimized for these conditions. The many years of availability without compromising on quality is an exceptional track record that speaks for itself.

Specifications

Laser Colour (Typical Wave Length):

- Red: 638 nm
- Green: 520 nm
- Blue: 450 nm

Laser Class: 2

Focusable Range: 1 - 4 m

Line Width Up to 4 m Distance:

- Red/Green: < 1 mm
- Blue: < 0.5 mm

Line Length at 3 m Distance: > 3 m

Max. Laser Output Power: <1mW

External Power Supply : 100 - 240 VAC, 50 - 60 Hz

Internal Voltage: 24 V DC

Operating Temperature: 59°-86° F (15°-30°C)

Ambient conditions: 35 - 90 % rel. humidity, non-condensing

Dimensions: 8.7" H x 4.3" W x 3.9" D (221 x 110 x 100 mm)

Weight: 5.7 lb (2.6 kg)

Swivel Angle: 45°

International Protection Rating: IP20

Remote Control

Dimensions: 6.4" H x 2.5" W x 0.8" D (163 x 63 x 21 mm)

Weight: 0.28 lb (130 gm)

Power Supply: 6 V DC (4 batteries type AAA/LR 03/Micro, 1.5 V)

International Protection Rating: IP40



Item	LAP Lasers
711-015	APOLLO Red - Crosshair
711-017	APOLLO Red - Line
711-020	APOLLO Green - Crosshair
711-022	APOLLO Green - Line
711-027	APOLLO Blue - Crosshair
711-028	APOLLO Blue - Line