

ISIS QA-1 GEOMETRIC QA PHANTOM



Geometric Accuracy for all QA Steps

- Room Lasers
- Patient Marking Laser
- CT Simulator Conventional
- Simulator
- Treatment Delivery System

Ensure Data Transfer

- From Scanned Images
- Density Checks
- Anatomical Structures
- Isocenter + Central Axis
- Planned Beams for Patient Marking

The ISIS QA-1 Phantom provides “Machine to Machine” geometric QA for Treatment Machines, CT Simulator, and Conventional Simulators.

The ISIS QA-1 Phantom was designed to provide an easy low cost approach to the daily, monthly, and annual QA tasks for the Physicist and Therapists. The ISIS QA-1 phantom will aid in verifying the geometric laser position accuracies with multiple laser systems within your department. Further the ISIS QA-1 provides the Physicist and Dosimetrist the ability to verify electron beam density values produced by your CT / CT-Simulator. Your staff scans the four unique density value inserts then transfer this image to the RTP system for verification of the electron density values of the Bone, Water, Inhale and Exhale Lung density inserts. Comparing the individual value for each known density value the user can quickly verify CT image electron density values for treatment planning image QA.

Additionally, the ISIS QA-1 provides an internal known object insert that is scanned with the CT / CT-Simulator. With this multiple image slice set you can create a Treatment Plan / Virtual Simulation plan of the known object for size and location verification through your RTP and Virtual Simulation system. Then the ISIS QA-1 goes one step further to use these known geometric phantom positions for verification of the laser positions as verified with the scanned ISIS QA-1 phantom. This QA process provides a geometric QA of the processed RT Plan for use with IMRT treatment machine lasers and mechanical treatment field setup verifications.

The dose chamber insert provided will provide the physicists the ability to quickly measure single point expected dose values without using additional phantom devices.

CT Simulation RT Field Marking Verification QA

The ISIS QA-1 provides the user the ability to scan, plan, and verify the exported RTP beam designs of the intended treatment field to the laser marking system for laser point position verification. Additionally this process can be accomplished on the intended treatment machine.

A sample generic QA process is described as follows

Scan the phantom after you have verified the position of the ISIS QA-1 phantom is centered in the X and Y position of the scan plane. This is accomplished by physically moving the ISIS QA-1 phantom and verifying the placement position with the tool set supplied with the scanner.

Additionally, verify the tilt of gantry is at a “0” degree tilt in respect to center of the ISIS QA-1 phantom. Once alignment is verified correctly you scan the ISIS QA-1 phantom at 1 mm increments throughout the entire phantom body. Then create three 10 cm x 10 cm RTP / Virtual Simulation plans for export to the laser marking system for laser position verification. You then compare the expected field positions with the actual laser field illuminated positions. These positions are viewed on three of the external sides of the ISIS QA-1 phantom.

Additionally the internal object insert positioned in the exact center axis of the ISIS QA-1 phantom provides laser position RTP field verification. When the ISIS QA-1 is setup on your treatment machine table you can verify lasers / field lights and the expected treatment dose by using an electrometer chamber with the ISIS QA-1 dose chamber insert.

General Benefits of the ISIS QA-1

- Two millimeter wide alignment verification grooves on the surfaces of the ISIS QA-1 provides for easy viewing and quick alignment checks of laser beam positions.
- Multiuse QA machine programs within the therapy department can use the ISIS QA-1 phantom.
- Provides the ability to verify scanned image set position alignment from the radiology department to the radiation therapy department for geometric verifications prior to the laser marking process.
- Precision 10 cm x 10 cm and 5 cm x 5 cm fixed fields on three surfaces of the ISIS QA-1 phantom provide for exact image and beam geometric design QA verification.
- Easy leveling base for setting up an exact level plane for the QA process from machine to machine.
- Single slice check for laser -offset verification with standard CT Scanner and / or CT Simulator. Treatment machine QA for lasers, mechanicals, and beam geometry.

Electron Density Verification Inserts

The four ISIS QA-1 electron density inserts provide the user with the ability to easily verify the electron density values produced on the CT / CT Simulator. This is of particular benefit when determining the consistency of electron density values from week to week. The four inserts are: Bone (+800), H2O (0.0), Inhale Lung (-800), Exhale Lung (-500), and Water (0). This verification is useful in providing a repeatable and dependable QA program for inhouse machine to machine transfer of images. This QA task can be accomplished on a daily, weekly, monthly, and annual by normal radiotherapy staff members.

Item 681-110 ISIS QA-1 Geometric Phantom Package Includes

- Item 681-100 Phantom Cube with Bone, Water, Lung Inhale and Lung Exhale density plugs
- Item 681-159 Leveling Platform with 20 cm Field
- Item 681-150 Alignment Bar
- Item 681-104 Insert for Farmer Style Chamber - Customer must specify manufacturer, model number and description of ion chamber
- Item 681-101 2.54 cm Object Insert
- Item 681-112 Tungsten Pins, 20/Pkg
- Item 681-120 50 cm Ruler
- Item 352-234 Magnetic Gantry Level with Light, batteries not included
- Item 681-121 Round Bubble Level
- Item 681-193 Protective Rolling Case

Specifications

Phantom Size: 5.5" L x 5.5" W x 5.5" H (14 x 14 x 14 cm)

Electron Density of Acrylic: 3.847 x 10²³

Phantom Surface Tolerance: .005

Phantom Weight: 8 Lb (3.6 kg)

Rolling Case Size: 32.5" L x 21.5" W x 11.5" D (82.6 x 54.6 x 29.2 cm)

Total Shipping Weight: 45 lb (20.5 kg)

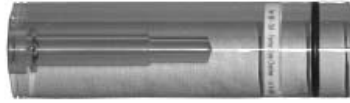
Item #	Description
681-110	ISIS QA-1 Geometric Phantom Package

Specify Ion Chamber: Manufacturer, Model Number and Description

QUALITY ASSURANCE DEVICES

INSERTS FOR ISIS PHANTOM CUBE

- All inserts are 4 cm in diameter and 14 cm long.
- They are made of clear acrylic with a rubber o-ring at one end to keep the insert snug in the phantom cube.
- Each insert is labeled with the item number, description and density.



INSERT, FARMER STYLE CHAMBER

This insert holds a farmer style chamber (without build-up cap) with the center of the collection volume at the center of the phantom cube.

The Farmer Chamber Insert accommodates the following chambers:

PTW: 23333, 30001, 30002, 30004, 30006, 30010, 30011, 30012, 30013

Bicron/NE 2571, 2581, 2505/3 (A or B)

Nuclear Associates 30-351

Capintec PR-06G, PR-06C

Victoreen 580-006

Exradin A19, RMI 448

Item #	Description
681-104	Insert, Farmer Style Chamber

INSERT WITH 2.54 CM DIAMETER TEFLON BALL

This insert has a 2.54 cm Teflon ball centered in the insert. The teflon ball is used as tumor value to verify measurement accuracy on the CT/CT Simulator and treatment planning system.

Specifications

Density: 2.13 - 2.2 g/cm³

Item #	Description
681-101	Insert with 2.54 cm Diameter Teflon Ball

INSERT, PTW 31006 CHAMBER

Item #	Description
681-104-31006	Insert, PTW 31006 Chamber

INSERT, EXRADIN A12 CHAMBER

Item #	Description
681-104-A12	Insert, Exradin A12 Chamber

INSERT, EXRADIN A12S CHAMBER

Item #	Description
681-104-A12S	Insert, Exradin A12S Chamber

INSERT, EXRADIN A14SL CHAMBER

Item #	Description
681-104-A14SL	Insert, Exradin A14SL Chamber

INSERT, EXRADIN A1SL CHAMBER

Item #	Description
681-104-A1SL	Insert, Exradin A1SL Chamber

Photo
Unavailable



Photo
Unavailable



QUALITY ASSURANCE DEVICES

INSERT, STEREOTACTIC TUNGSTEN BALL



This insert has a tungsten ball with a diameter of 5.5 mm (7/32") in the center of the insert.

Item #	Description
681-106	Insert, Stereotactic Tungsten Ball

INSERT, MULTI-DENSITY HOLDER



The Multi-Density holder insert accommodates 8 density plugs (2.5 cm diameter x 1.5 cm thick). An acrylic end plug and o-ring on each end of the insert holds the density plugs in place. This insert is custom made. The customer must specify material densities needed and the order of placement in the insert when ordering. **Density plugs are sold separately.**

Item #	Description	Physical Density gm/cm ³	Electron Density cc x 10 ²³	Electron Density Relativeto H ₂ O
681-107	Insert, Multi-Density Holder ONLY			
681-107-6	Lung Inhale	0.195 ± 0.20	0.634	0.190
681-107-7	Lung Exhale	0.495 ± 0.20	1.632	0.489
681-107-8	Bone 800 mg/cc	1.609 ± 0.01	4.862	1.456
681-107-9	Water	1.008 ± 0.01	3.346	1.002
681-107-10	Adipose (Fat)	0.967 ± 0.01	3.170	0.949
681-107-11	Breast (50% Gland / 50% Adipose)	0.991 ± 0.01	3.261	0.976
681-107-12	Muscle	1.062 ± 0.01	3.483	1.043
681-107-13	Liver	1.071 ± 0.01	3.516	1.052
681-107-14	*Trabecular Bone - 200 mg/cc	1.161 ± 0.01	3.730	1.117
681-107-15	*Dense Bone - 1000 mg/cc	1.660 ± 0.01	5.243	1.570
681-107-16	*Dense Bone - 1250 mg/cc	1.830 ± 0.01	5.718	1.712
681-107-17	*Dense Bone - 1500 mg/cc	2.000 ± 0.01	6.209	1.859
681-107-18	*Dense Bone - 1750 mg/cc	2.170 ± 0.01	6.698	2.005
681-107-19	*Coritcal Bone	1.930 ± 0.01	5.956	1.780
681-107-20	**Titanium	4.507 ± 0.01	12.475	3.735
681-107-21	***Aluminum	2.718 ± 0.01	-	-

* All Bone references 10 mm diameter in H₂O insert. ** Titanium references 6 mm diameter in H₂O insert. *** Aluminum references 9.5 mm diameter in H₂O insert.

INSERT, LIQUID FILLABLE



This insert has a 2.5 cm diameter hollow space in the center of the insert. There are two fill holes drilled at an angle into the hollow space. Each fill hole has an o-ring and screw to hold the liquid in the space. The Customer fills the space with a liquid of their choice.

Item #	Description
681-108	Insert, Liquid Fillable

INSERT, HOLDS ISOTOPE PIN IN CENTER



This insert accommodates a holder the NA-22 Isotope is placed into. The holder of the insert keeps the NA-22 in the center of the insert.

Item #	Description
681-109	Insert, Holds Isotope Pin In Center
681-114	Holder for NA-22 Isotope
710-045-3	NA-22 Isotope

INSERT, SEED CALIBRATION



This insert has five (5) aluminum pins which are spaced at different levels laterally and longitudinally at specified angles within the insert.

Specifications

Aluminum Pin Size: 1 mm Diameter x 5 mm Long

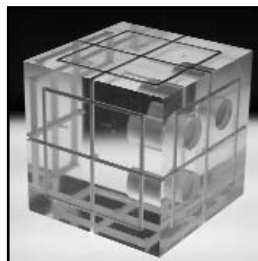
Item #	Description
681-119	Insert, Seed Calibration

Custom chamber inserts available. Specify the ion chamber manufacturer, model number and description that the insert is to be drilled for.

QUALITY ASSURANCE DEVICES

ISIS QA-1 GEOMETRIC PHANTOM ACCESSORIES

ISIS PHANTOM CUBE



This is a 14 cm cube made of clear acrylic with a 10 cm square scribed on three sides of the cube. The scribes are 2 mm wide and painted in white. Four of the six sides of the cube have nine holes per side for use of tungsten pins. One side has a slot to hold the 50 cm ruler. Crosshair markings are on five sides of the cube. A 4 cm wide hole is drilled through the middle of the cube to accommodate the inserts. The cube also has four fixed density inserts. The density inserts are 2.5 cm in diameter x 1.5 cm thick and correspond in density to water, bone, lung inhale and lung exhale. The inserts are labeled with the material and density.

Density Plug	Physical Density	Electron Density Per cc x 10 ²³	Electron Density Relative to H ₂ O
Lung Inhale	0.20	0.634	0.190
Lung Exhale	0.50	1.632	0.489
Dense Bone 800 mg/cc	1.53	4.862	1.456
Water	1.01	3.346	1.002

Item #	Description
681-100	ISIS Phantom Cube

LEVELING PLATFORM WITH 20CM FIELD



The leveling platform is 1 cm thick black acrylic plate topped with white engraving material and is 22.9 cm wide and 23.2 cm long. The leveling platform has three leveling screws and is engraved with crosshair dashes, a dashed 7 cm square rotated 45° to intersect with a non-rotated dashed 10 cm square, a dashed 20 cm square and a dashed 20 cm diameter circle. The dashes are etched deep and long enough to lay the tungsten pins in the dashes. There is also a 14 cm square for placement of the phantom cube and an adjustable corner guide with two screws at one corner to prevent rotation of the phantom cube. To set corner guide loosen the screws, adjust the corner guide to be snug to the phantom cube when in the correct position then tighten the screws. To connect the leveling platform to the alignment bar or adjustable table centering bar, fit the pin in either bar into a groove on the leveling platform. Two sides of the leveling platform have three alignment grooves, one at center and one on either side at 7 cm from center.

Item #	Description
681-159	Leveling Platform with 20 cm Field

ALIGNMENT BAR



681-150

The Alignment Bar fits on the couchtop for proper alignment of the ISIS Phantom Cube (Item 681-100). The Alignment Bar is white with engraved black dash lines on the top and all four sides for central axis/laser location. Each end has a 1.5 mm diameter x 12.7 mm tungsten pin in the center. There are seven aluminum balls across the top of the bar, one in the center and three on either side at 13, 14 and 15 cm from center. The three balls on each side are 1/32", 1/16", and 3/32" (0.08, 0.16, and 0.24 cm) in diameter with the smallest ball closest to the center. The overall size of the bar is 56.52 cm wide, 4.47 cm long and 2 cm thick. A pin centered on one side of the alignment bar is used to connect the Alignment Bar to the leveling platform (Item 681-159) for center alignment on the couchtop.

Item #	Alignment Bar
681-150	Varian ETR Couch
681-151	Varian ETR and G.E. Discovery Couch
681-152	With Snap-On Ends

TUNGSTEN PINS



The tungsten pins fit into the 9 holes on 4 sides of the phantom cube or they can be placed in the dashes on the leveling platform.

Item #	Tungsten Pins	Quantity
681-112	1/16" Dia. x 1/2" L (0.16 x 1.27 cm)	20
681-113	3/32" Dia. x 1/2" L (0.24 x 1.27 cm)	20

50 CM ALUMINUM RULER



This 50 cm aluminum ruler with mm and cm markings is 3.5 cm wide and 2 mm thick.

Item #	Description
681-120	50 cm Ruler

QUALITY ASSURANCE DEVICES

ISIS QA-1 GEOMETRIC PHANTOM ACCESSORIES

MAGNETIC GANTRY LEVEL WITH LIGHT



Torpedo level with three lighted vials and a magnetic strip. **Batteries not included.**

Item #	Description
352-234	Magnetic Gantry Level with Light

ROUND BUBBLE LEVEL



Item #	Description
681-121	Round Bubble Level

PROTECTIVE ROLLING CASE



This black case has rigid wall construction and reinforced rounded bumper corners. For ease in transport there are two heavy duty urethane wheels and a 7" (17.8 cm) extension handle. The case has seven latches, an o-ring seal and an atmospheric purge valve. The case is airtight, watertight and corrosion proof. The inside has foam padding with cutouts for the components.

Specifications

Outside Dimensions: 32.5" L x 21.5" W x 11.5" D (82.6 x 54.6 x 29.2 cm)

Weight: 30 lb (13.6 kg)

Item #	Description
681-193	Protective Rolling Case with Cut-Outs

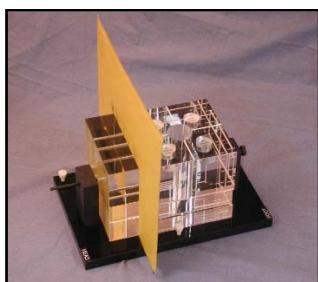
HOLDERS FOR MARKUS OR ROOS CHAMBER



This holder allows a Farmer Style, Markus or Roos chamber to be held in place with the nylon thumb screw. Different density plugs are placed on top of the chamber and exposed to radiation. This holder works in conjunction with Item 681-107 Multi-Density Insert.

Item #	Description
681-170	Holder, Farmer Chamber / Density
681-171	Holder, Markus Chamber
681-172	Holder, Roos Chamber

FILM PHANTOM ASSEMBLY



The film phantom unit includes a film phantom base, 1.5 cm and 5.0 cm acrylic phantom blocks and a steel marker pin. The phantom cube and the 1.5 cm and 5.0 cm phantom blocks are placed on the film phantom base. A ready pack film is placed between the 1.5 cm and 5.0 cm phantom blocks and the steel marker pin is used to mark film for orientation. Once in the correct position, the film is exposed several times at different gantry angles which produces a star pattern on the film for verification of the machine isocenter.

Item #	Description
681-130	Film Phantom Assembly

ALIGNMENT PATTERN IN TUNGSTEN



Place the alignment pattern over film to check multileaf and field sizes. Circles can be used on simulator tv monitor to set horizontal or vertical adjustments.

Item #	Description
681-158	Alignment Pattern in Tungsten

ISIS QA-1 GEOMETRIC PHANTOM ACCESSORIES

ADJUSTABLE TABLE CENTERING BAR



This bar is used to properly align the ISIS Phantom Cube (681-100) on a table. The bar is adjustable from 37 cm to 68 cm wide. There is a scale on the bar with zero at center. The scale has mm and cm markings on both sides of zero. T-squares at each end of the bar are placed on the side of the couch and adjusted so each side is equal distance from zero on the scale. Knobs at both ends of the bar are loosened and tightened to make adjustments. There is an alignment pin on one side of the bar to connect it to the leveling plate (681-159). An alignment groove on the other side bar is to connect the Alignment Bar (681-150) to the Adjustable Centering Bar.

Item #	Description
681-162	Adjustable Centering Bar for Tables w/Alignment Bumps

ADAPTER FOR THE CIVCO LOK-BAR



The Adapter for the CIVCO Lok-Bar is designed to be used on the CIVCO Lok-Bar to allow using the ISIS QA-1 Alignment Bar (681-150) and/or the Leveling Platform (681-159) with the CIVCO Lok-Bar. The Adapter has a circular hole on one side and an oval hole on the other which fit on the Lok-Bar pins. The underside of the Adapter has a cutout groove so it hugs the Lok-Bar which allows the Adapter to sit on the couch top, so it is not just sitting on top of the Lok-Bar. The Adapter has an alignment pin and a pin cutout to allow the Alignment Bar and/or Leveling Platform to fit to the Adapter. The centers of the Adapter's Lok-Bar pin holes are 1" (2.54 cm) from the ends of the Adapter.

Specifications

Adapter Size: 1 5/8" W x 11" L x 3/4" Thick (4.13 x 27.94 x 2 cm)

Item #	Description
681-169	Adapter for the CIVCO Lok-Bar

MINI PHANTOM



This **Optional** Mini Phantom can be used with the Alignment Bar or the Adjustable Table-Centering Bar to verify the coincidence of the lasers and the crosshairs and to check for gantry sag and optical back pointer position when the gantry is rotated $\pm 90^\circ$. The phantom can be used in the flat or vertical position. It has a "L-shaped" pin groove that sits on the alignment pin on either bar. It is scribed on four sides with 2 mm white painted lines. There are holes for tungsten pins on four sides of the phantom. Four 1.5 mm dia tungsten pins are included.

Specifications:

Material: Clear Acrylic

Dimensions: 15cm x 15cm x 5cm thick

Item #	Description
681-180	Mini Phantom

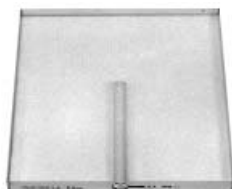
HIGH PRECISION GANTRY LEVEL



The four-sided Gantry Level is used to check the gantry angle indicators at four locations: 0, 90, 180, and 270 degrees, with accuracy to 1/40 of a degree. Vinyl Case is not included.

Item #	Description
352-200	High Precision Four-Sided Gantry Level
352-201	Vinyl Case for High Precision Gantry Level

MINI PHANTOM



This is an acrylic phantom with a cavity for a PTW 23333 Ion chamber with a build-up cap.

Specifications:

Material: Acrylic

Dimensions: 5.5" L x 5.5" W x 1" T (14 x 14 x 2.54 cm)

Cavity Depth: 1.5 cm from top surface to center of cavity

Item #	Description
681-202	Phantom, Constancy, PTW N23333 w/Build-up Cap

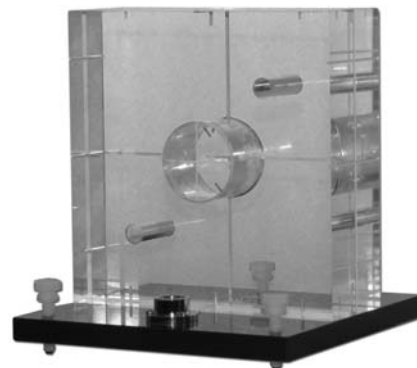
MINI PHANTOM WITH LEVELING PLATFORM



**Tungsten Ball Mini Phantom
Item 710-188**



**Mini Phantom
Item 710-186**



**5 Seed Calibration Mini Phantom
Item 710-190**

The Mini-Phantom can be used to check the alignment of the internal and external lasers to the radiographic center of CT and PET/CT units and to verify lateral gantry angle. It can also be used with accelerator units to check vertical and lateral gantry angles, laser alignment and vertical table movement.

The Mini-Phantom is made of clear acrylic measuring 15 cm x 15 cm x 5 cm thick. One 15 cm x 15 cm side has centering scribe lines that go all the way across the phantom. All four of the 5 cm x 15cm sides are scribed through the center and two opposite sides are also scribed at 5 cm from center. The scribe lines are 1.3mm wide and white for ease of viewing the lasers. All four 5 cm x 15 cm sides have three pinholes, one at center and two at 5 cm from center. The center pinholes are 1.5 mm dia to hold a tungsten pin and the other pinholes are 1.0 mm. Four 1.5 mm dia tungsten pins are included with the mini-phantom.

The two large holes are 9.5 mm in diameter and are 10.6 cm apart from center to center. Each hole is in the exact center of a quadrant of the phantom.

Tungsten Ball Mini Phantom (Item 710-188)

The Mini Phantom, for stereotactic collimator verification, has a 5.5mm diameter tungsten ball in the center. The ball is removable for CT applications.

5 Seed Calibration Mini Phantom with Leveling Platform (Item 710-190)

The Mini Phantom CT 5 Seed Calibration has 5 aluminum seeds 1mm diameter x 5mm with a chart indicating center to center spacing between all seeds.

Leveling Platform for Mini-Phantom

The Leveling Platform for the Mini-Phantom is made of black acrylic that is 15 cm square x 1.0 cm thick. A hole in the center of the Mini-Phantom is for a tungsten pin that goes into the Mini-Phantom. A bubble level and three leveling screws with rubber tips are used to level the platform. The rubber tips help prevent the platform from moving.

Item #	Description
710-186	Mini Phantom with Leveling Platform
710-188	Tungsten Ball Mini Phantom with Leveling Platform
710-190	5 Seed Calibration Mini Phantom with Leveling Platform

Directions for use in CT or PET/CT

Place the Mini- Phantom on the leveling platform with the pinholes towards the lateral lasers and the 15 cm side with scribe lines towards the foot of the couch. Align the Mini-Phantom to the center of the couch using the sagittal or overhead lasers. Level the platform using the bubble level and three leveling screws. Align the phantom to the CA of the beam by raising or lowering the couch to align the Mini-Phantom with the lateral lasers. A scan through the center of the Mini-Phantom should show the eight 1mm dia pinholes and four 1.5mm dia pinholes. Verify that the CT lasers are on the center scribe line around the phantom. Move the couch out so the lateral and ceiling lasers project onto the phantom. Check the couch movement distance. Verify that the lateral and ceiling lasers are on the center scribe line on the phantom. The movement of the lateral or ceiling lasers can also be checked by raising and lowering the lasers to the scribe lines 5 cm from the center. If present, the sagittal laser should align with the scribe lines on the 15 cm side of the phantom. The couch vertical movement can also be verified by raising and lowering the couch to the 5cm off- center scribe lines on the phantom.

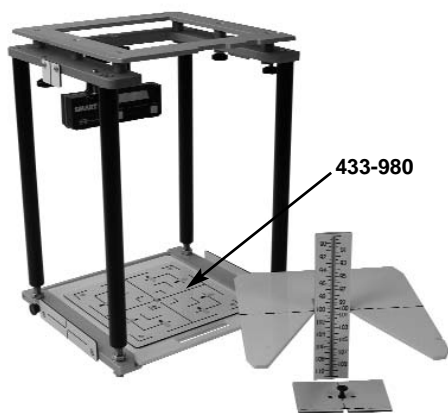
Directions for use in Accelerators or Conventional Simulators

Insert the four tungsten pins into the four 1.5 mm dia holes in the Mini-Phantom. Place the Mini- Phantom on the leveling platform with the pinholes towards the lateral lasers and the 15 cm side with scribe lines towards the foot of the couch. Align the Mini-Phantom to the center of the couch using the sagittal or overhead lasers. Level the platform using the bubble level and three leveling screws. Align the phantom to the CA of the beam by raising or lowering the couch to align the Mini-Phantom with the lateral lasers and by moving the couch in to align with CA crosshairs. To verify vertical and lateral gantry angles take a radiograph with the gantry in the vertical position and in the lateral position. The tungsten pins should be on top of each other on the radiographs. The lateral lasers should align with the center scribe lines and the sagittal laser should align with the scribed line on the 15 cm side of the mini-phantom. To check the overhead laser rotate the gantry so the overhead laser shows upon the mini-phantom. The overhead laser should align with the center scribed line on the top of the mini-phantom. Raising and lowering the couch to the scribes at 5 cm from center and checking the couch vertical movement indicator can check the couch vertical movement. To check lateral couch movements rotate the mini-phantom so a side with the scribes 5 cm off-center is facing up towards the gantry. Then move the couch left and right to align with the scribes that are 5 cm off-center and check the lateral couch movement indicator.

QUALITY ASSURANCE DEVICES

GARD™

Designed to Verify Geometric Accuracy of Linear Accelerators and Simulators



Optical Distance Indicator and Laser Alignment

An acrylic tray with a distance scale is supplied with the GARD™. Simply slide the tray into the accessory mount of the GARD™ and turn on the machine distance indicator. The distance markers from the machine will be visible on the GARD's™ distance indicator and should coincide. The sides of the GARD™ have white acrylic plates on which black vertical and horizontal lines have been engraved. When aligned, the field lasers should coincide with the etched black lines.

Light and Radiation Field Coincidence

An optional film cassette (8" x 10" or 20.32 x 25.4 cm) is available which fits into the accessory mount of the GARD™. The top is etched with markings of four field sizes. Field size and crosshair position accuracy, as well as light and radiation field coincidence, can be verified.

Specifications

Goniometer Accuracy/Resolution: 0.2°

Optical Distance Indicator Resolution: 1.0 mm

Field Size Indicators: 5 x 5 cm, 10 x 10 cm, 15 x 15 cm, 20 x 20 cm

Size: 13.5" x 13.5" x 14.5" H (34.3 x 34.3 x 36.8 cm)

Weight: 9.5 lb (4.4 kg)

- Easy to use
- Provides quick visual verifications
- Helps eliminate errors

The GARD™ is designed to fit into the shadow tray of the therapy machine, providing a fixed reference point for all measurements. This helps to eliminate errors associated with using independent devices for each geometric parameter.

Gantry and Collimator Angle Indicators

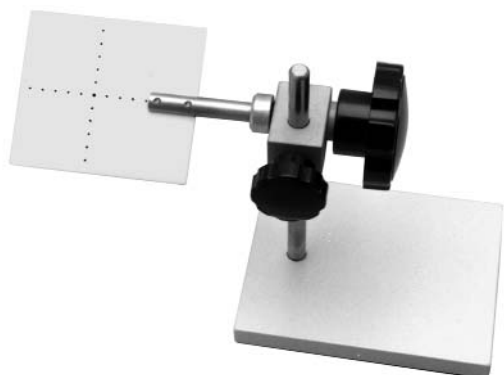
By using a smart tool level, indicators of gantry and collimator angle can be visually verified to 1/16" (0.16 cm) of a degree. The level is mounted so that it can check any gantry or collimator angle.

Item	GARD™
433-100	AECL Theratron 780C
433-300	CGR Saturn
433-343	GE Saturn 43
433-400	All Siemens with Coding By-Pass
433-514	6/100 Varian II, with Standard 11 3/4" Tray
433-515	600C Varian II, with Standard 11 3/4" Tray
433-518	Varian II - 65.4cm, with Standard 11 3/4" Tray

Item	GARD™
433-522	Varian II - 61.6cm, with Standard 11 3/4" Tray
433-535	Varian III-61.6cm, w/Opt. Coded Tray
433-536	Varian III-65.4cm, w/Optical Coded Tray
433-537	Varian III-65.4cm, MLC w/Optical Tray
433-700	Elekta, SL25, SL 75, Precise, 31.9cm
433-801	Toshiba LMR-18A
433-980	Optional Film Cassette

Please call regarding other manufacturers

ROTATING ALIGNMENT PLATE AND STAND



The Rotating Alignment Plate and Stand will allow an easy check of isocenter using the collimator light and lasers. A 1.3 mm diameter tungsten ball located in the center will show up on x-ray or under fluoroscopy.

Specifications

Size

White Acrylic Plate: 2.5" x 3" (6.35 x 7.62 cm)

Steel Base: 4" x 5" x 0.5" (10.16 x 12.7 x 1.27 cm)

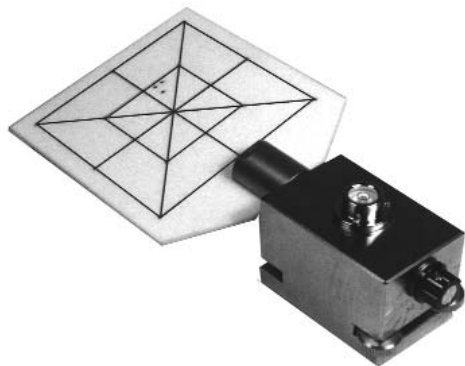
Stainless Steel Post: 5.5" (14 cm)

Color: Beige base

Weight: 3.6 lb (1.64 kg)

Item	Description
710-005	Rotating Alignment Plate and Stand

ISOCENTRIC BEAM CHECKER I



The Isocentric Beam Checker I (IBC I) is used to precisely find the isocenter of any radiation therapy machine. It checks the alignment of side lights or laser beams used for patient set-ups in radiation therapy, conventional tomography and CT scanning.

The Isocentric Beam Checker consists of stainless steel base containing three adjustable rubber-tipped legs and built-in bubble level. Attached to the base is a translucent screen plate which can be rotated 360° in 15° steps. Inscribed on the plate are 3 field sizes; 2 mm x 2 mm, 5 cm x 5 cm and 10 cm x 10 cm. The field sizes are outlined with parallel and diagonal lines. The center of the field and all corners are provided with tungsten markers to project a sharp image of the field on verification films.

- Radiation and light-field congruence
- Collimator isocentricity
- Collimator field size accuracy
- Compact and easy to carry
- Laser alignments
- No assembly required
- Gantry isocentricity
- Rugged construction

Specifications

Material: Stainless Steel and Lucite

Size: 9.5" L x 4.7" W x 2.5" H (24.13 x 11.94 x 6.35 cm)

Weight: 3 lb (1.4 kg)

Item	Description
710-020	Isocentric Beam Checker I

ISOCENTER/LASER ALIGNMENT DEVICE



710-030



352-104



352-108

The Isocenter Alignment Device is a simple quality assurance device for testing alignment of isocentric beams. It allows for adjustments to be made by one person. One set-up will permit alignment of the side, overhead and sagittal lasers. It is usable with dot or line lasers.

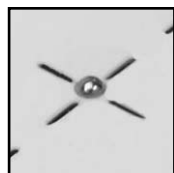
Specifications

Size: 2" L x 2.25" W x 2" H (5.08 x 5.72 x 5.08 cm)

Weight: 0.2 lb (.01 kg)

Item	Description
710-030	Isocenter/Laser Alignment Device
352-104	Bulls Eye Circular Level
352-108	6 cm Level

ISOCENTER/LASER ALIGNMENT DEVICE WITH TUNGSTEN BALL



2 mm
Tungsten Ball



The Isocenter / Laser Alignment Device with Tungsten Ball is a simple quality assurance device for testing alignment of isocentric beams and room lasers. The addition of the 2 mm Tungsten Ball at central axis is to allow film verification of isocenter with a set orthogonal film exposures. This device allows for laser adjustments to be made by one person. One set-up will permit alignment of the side, overhead and sagittal lasers and isocenter verification on film. It is usable with dot or line lasers.

Specifications

Marker: 2 mm Tungsten Ball

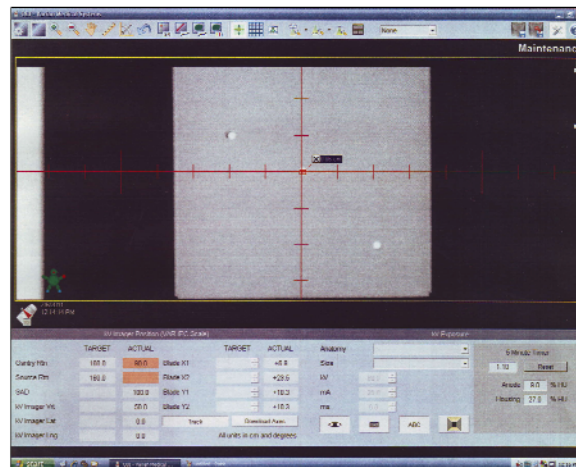
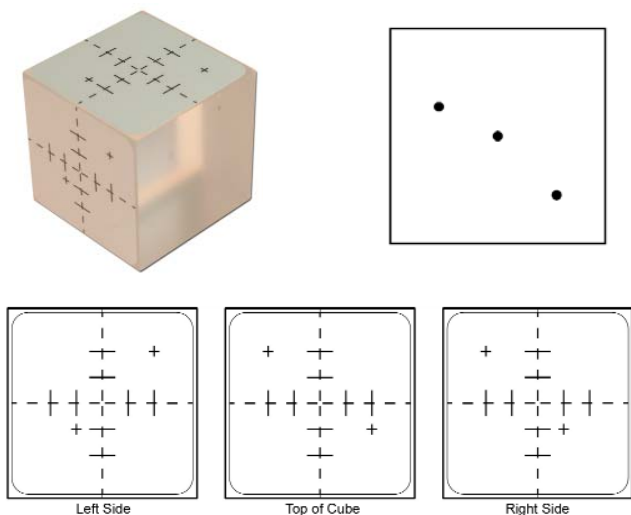
Size: 2" L x 2.25" W x 2" H (5.08 x 5.72 x 5.08 cm)

Weight: 0.2 lb (.01 kg)

Item	Description
710-031	Isocenter/Laser Alignment Device with Tungsten Ball

QUALITY ASSURANCE DEVICES

73mm CUBE Acrylic Cube with Three 2mm Tungsten Markers



Sample Left Lateral kv Image: Displacement of 1mm is noted from the crosshair to center of phantom

The accuracy of CBCT alignment and couch shift process is of fundamental importance in the accuracy of delivered dose in Image Guided Radiation Therapy (IGRT). Item 710-039, the 73mm Cube, has one (1) Central axis tungsten marker and two (2) offset tungsten markers for the testing and verification of predetermined measurable couch shifts. This phantom can be used to test the accuracy of CBCT alignment and couch shift in a simple and efficient manner. Images can be transferred to the treatment planning system to check coincidence of treatment planning system to couch shifts.

General Operation for Daily CBCT Shift Verification

Place the phantom cube on the CT couch. Align the phantom utilizing the positioning lasers on the CT machine and the laser alignment markings on the phantom. An axial CT scan of the phantom is acquired. The reference images are imported into the TPS and a simple plan is generated where the tungsten marker is aligned to the isocenter described by the TPS.

Normally one would place the phantom on the Linac couch in a known offset position from isocenter with the use of inscribed markings on the phantom. Then a CBCT scan is acquired in the offset position and the therapist aligns the phantom as one would align the patient using tools on the OBI workstation. The necessary couch shift is applied to move the phantom to the isocenter. After the couch shift is performed, the user can verify the location of the isocenter after the shift and document the deviation from the true isocenter. This test will ensure the CBCT alignment process is performing as intended within the tolerance levels established by the physicist.

Monthly OBI Gantry Rotation and Isocenter Accuracy Test

Place the phantom in the isocenter position (on the center tungsten marker) with the aid of the Linac crosshairs. Then acquire a kv image at the four cardinal angles. Using the OBI graticule tool, the displacement of the tungsten marker from the graticule crosshair can be tabulated as shown in the worksheet below (this process can also be applied to the MV imaging):

Date	kV Image	Measured displacement (mm)			Limit (cm)	Results
		Sup-Inf	Ant-Post	Lt-Rt		
OBI Gantry Rotation and Isocenter Accuracy	Rt Lat			N/A	1.5	
	AP		N/A		1.5	
	Lt Lat			N/A	1.5	
	PA		N/A		1.5	

Specifications

Tungsten Marker Locations in Cube

One (1) at isocenter: X;Y;Z=0

One (1) located from isocenter: X: -2cm; Y: -2cm; Z: +2cm

One (1) located from isocenter: X: +2cm; Y: +1cm; Z: -1cm

Tungsten Marker Diameter: 2 mm

Scribed Lines

Central axis: 1 cm dashes

X, Y, and Z: 2 cm and 4 cm from central axis, 2 cm long scribe lines

Offset marker locations: + scribe

Material: Acrylic, White Vinyl

Size: 2.875 x 2.875 x 2.875 cm (73 x 73 x 73 mm)

Item	Description
710-039	73mm Cube, Acrylic w/Three 2 mm Tungsten Markers

ELECTRONIC SELF-LEVELING 5-BEAM LASER



- Check lasers
- Five beams at 90°
- Fast laser installation
- Flashing beam out-of-level sensor

This unit has 5 self-leveling, orthogonal (90°) beams that provide simultaneous plumb, level and square reference points.

Electronic Self-Leveling

Place the laser on any surface and it's electronic servo mechanism does the rest. The electronic self-leveling technology combined with out-of-level detection, eliminates tool status checks, costly errors and set-up time.

Automatic Out of Level Sensing

The laser has a built-in level sensor which causes all five lasers beams to immediately begin blinking if it is out of level. If the unit goes out of level for any reason, the user will know right away. Blinking stops when laser completes electronic self-leveling.

Item 710-850 Electronic Self-Leveling 5 Beam laser Includes

- Unit
- Multipurpose Attachment Accessory
- Targets
- Laser
- Enhancement Glasses
- Kitbox

Specifications

Accuracy: ±1/4" over 100'

Self-Leveling: Level range: ±4° roll (side to side)
±6° pitch (forward to backward)

Recalibration: End user

Tripod Mount: 5/8" x 11 thread (can be used without tripod)

Laser Diode: Class II, 635nm, less than 1mW

Power Supply: 4 "AA" batteries (not included)

Storage Temperature: -20°C to 70°C

Range: Laser visibility: Up to 100'

Low Battery Indicator: Slow blinking of all 5 beams
1 blink per every 10 seconds
5 hours of use left

Size: 5.5" x 4.0" x 2.5" (13.9 x 10.2 x 6.4 cm)

Weight: Approx. 1.2 lb (0.6 kg)

Item	Description
710-850	Electronic Self-Leveling 5 Beam Laser

O

T.A.D. THERAPY ALIGNMENT DEVICE



One simple device can align your Linac, ODI, CT, Lasers and Couch.

Perform the following tests with just one tool:

- Optical Distance Check Over 20 cm Range
- Collimator 90° Rotation Test
- Lasers Test: Side, Overhead and Sagittal
- Couch Height Test Over 20 cm Range
- Couch Vertical Travel Wander
- Couch 90° Left or Right Rotation
- CT Test Cut for Couch Center Alignment and Height
- CT Side Laser Height Check Over 20 cm
- CT Laser Height Test Over 20 cm
- CT Couch Height Vertical Travel
- CT Couch Height, Vertical Travel, CT Cut Stays on Same Spot to Indicate Gantry Vertical
- Gantry 90° Right and Left Test with Radiation and Gantry Vertical Test Using Film or Image Receptor
- Light Field vs. Radiation Field 10 cm x 10 cm and 20 cm x 20 cm with divergent tungsten pins
- CT Distance Alignment Check Over 0 cm, 8 cm, 13 cm and 21 cm Viewing 0.75 mm Aluminum Balls (Inside Balls 5 cm apart and Outside Balls 21 cm apart)

Therapy Alignment Device Specifications

Leveling Plate Base

- 8.5" x 8.5" x 3/4" thick (21.6 x 21.6 x 1.9 cm) black acrylic with a 1/16" (0.16 cm) white engraving material top
- Three leveling screws with rubber tips to prevent movement
- One bubble level attached to top with screws
- Two half-moon side plates, scribed with black dashes that align to top of leveling plate and center markings on leveling plate

Scribing on Leveling Plate

- Central axis to 20 cm
- 10 cm x 10 cm field
- 20 cm x 20 cm field

Accelerator Markers in Leveling Plate

- Eight 1.6 mm diameter x 12.5 mm tungsten pins mounted divergently at the four corners of the 10 cm and 20 cm fields
- One removable tungsten pin in the center
- Two 1.6 mm diameter tungsten pins are horizontally half-way embedded in the scribe lines 3 mm from the side plates

CT Markers in Leveling Plate

- Four 1/32" (0.08 cm) diameter aluminum balls imbedded flush with surface at 2.5 cm and 10.5 cm from central axis in one plane

Note: Tungsten pin must not be in the center hole for CT

ODI Scale Specifications

Base

- 2" x 2" x 0.875" thick (5.08 x 5.08 x 2.22 cm) black acrylic base
- 2" W x 8.125" H x 1/8" thick (5.08 x 20.64 x 0.32 cm) white/black/white engraving material attached to base

Scribing on ODI Scale

- Vertical dashed line
- Horizontal lines at 5.0 cm, 10.0 cm, 15.0 cm and 20.0 cm from bottom of scale

Item #	Description
710-040	T.A.D. Therapy Alignment Device

TEL-ALIGN TELETHERAPY ALIGNMENT GAUGE



Permits check of:

- Optical distance indicator (over a 15 cm range)
- Collimator and central crosshair
- Head rotation and pitch
- Isocenter variation
- Side lights and optical back pointer
- Light field vs radiation field

Tel-Align consists of a rectangular plastic base with a removable vertical scale. The top surface of the base contains lead markers that form a square (10 cm x 10 cm) for visualization on film. A crosshair in the center of the square lines up with two additional sets of crosshairs, one on each outer edge of the base.

After the machine field size (10 x 10 cm) has been set, the table height should be adjusted until the base surface is at the isocenter distance. The collimator rotation angle is set at 0°. When positioned properly, the edges of the light field should coincide with the inscribed square. The field center should intersect the center crosshair and the side lights should agree with the corresponding crosshairs at the edges of the base.

The vertical scale is placed on the base to check the optical distance indicator, or a film can be placed under the base to check the light field versus the radiation field. By rotating the gantry angle at ±90°, the isocenter variation and optical back pointer are also checked.

Specifications

Base: 5.51" W x 7.09" D x 0.79" H (14 x 18 x 2 cm)

Vertical Scale: 7.09" H (18 cm)

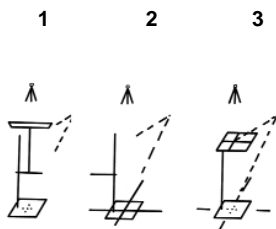
Weight: 2 lb (0.9 kg)

Item #	Description
710-037	Tel-Align Teletherapy Alignment Gauge

QUALITY ASSURANCE DEVICES

OPTICAL DISTANCE VERIFICATION AND ALIGNMENT TOOL

With Isocentric Ball Pointer



Step 2

Figure 2 - rotate the white plastic tray around 180° out of the field and adjust the alignment tool so crosshairs align with the black dots on the base plate.

Step 3

Figure 3 - raise the white plastic tray up 20 cm. This tray would show field light crosshairs intersecting with 80 cm. The black dots on the base represents the crosshairs and will intersect with 120 cm.

Step 4

Adjust the Optical Distance Indicator so that 80 cm and 120 cm are obtained at the same time. When both points are precisely on, linearity can be checked in 5 cm steps by moving the plastic tray down the rod.

This system will calibrate optical distance indicators on accelerators, cobalt units and simulators. The ball pointer is used to determine the rotational isocenter of the treatment machine collimator head and gantry. The ball pointer is also visible in fluoroscopy on simulators.

Instructions

Step 1

Determine the most useful range (40 cm or less) of the Optical Distance Indicator (ie. 80 cm to 120 cm range with a 100 cm isocenter). Figure 1 - set the white plastic tray five steps (20 cm) down from the top. Use an Accurate Mechanical Distance Rod adjusted for 100 cm isocenter and adjust the couch height until the distance rod just touches the white plastic tray.

Specifications

Optical Distances: 5 cm steps to 40 cm

Material: White plastic w/mat finish and black dots

Ball Pointer: 1/16" dia. ball on 12" long rod

Rod Clamp

Base: 10 cm W x 13 cm L x 1/2" T zinc plated steel w/rubber feet

Height: 43 cm

Weight: 4 lbs

Item #	Description
710-000	Optical Distance Verification and Alignment Tool

MAGNETIC FRONT POINTER



The Magnetic Front Pointer provides a mechanical SSD Check, and verification of the Optical Distance Indicator (ODI).

The tray for the magnetic front pointer slides into the block tray slot. The rod is held to the tray by a magnet. Each rod has a 10 cm range with an engraved scale in 2 mm increments. The scale on the Magnetic Front Pointer has an adjustment range of 3.8 mm.

One rod of the customers choice is included with the magnetic front pointer.

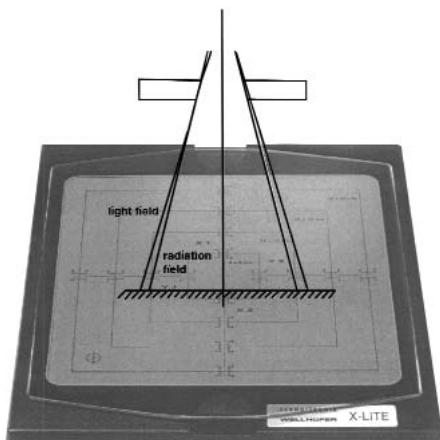
When ordering please specify manufacturer and model of machine, tray size, and rod to be included.

Item	Magnetic Front Pointer
701-401	for Varian Clinac 4/80
701-402	for Varian Type II Accessory Mount
701-403	for Varian Type III Accessory Mount
701-407	for Siemens with Coding By-Pass
701-408	for Siemens with Screw Coding
701-409	for Siemens with Digital Coding Plug
701-410	for Siemens with MLC - Digital Coding
701-411	for Siemens Primus with MLC, 56.6 cm
701-420	for Philips SL25
701-426	for GE Saturne 40, 41, 42 or 43
701-428	for ACEL Theratron 780C
701-429	for AECL Theratron Elite 80
701-430	for MDS Nordion / BEST
701-431	for Mitsubishi ML-6M, ML 20M
701-432	for Mitsubishi
701-433	for Siddharth 6MeV Linear Accelerator

Item	Rods
701-400-30	70 to 80 cm
701-400-31	80 to 90 cm
701-400-32	90 to 100 cm
701-400-33	100 to 110 cm
701-400-34	110 to 120 cm

X-LITE

QA Device for Radiation / Light Field Alignment



Correct alignment of the light field with the radiation field is essential for reliable set-up and treatment. It is recommended to do this alignment check at least once a week. The Radiation / Light field should correspond to within ± 2 mm at SSD.

The X-Lite is a fluorescent plate that allows visualization of accelerator radiation fields quickly and directly. The plate is activated by ionizing radiation, producing a green fluorescence which is clearly visible for a few minutes after the radiation stops. The 5 x 5, 10 x 10, 15 x 15 and 20 x 20 cm active areas are permanently marked with field scales in centimeters.

A protective red filter prevents activation of the phosphor by the light field from the gantry head or by ambient light. Irradiation photons and electrons penetrate the filter to activate the plate.

Using X-Lite is easy and alignment checks can be part of the daily routine. With the filter in place, align the X-Lite with the light field according to the scale on X-Lite. Put any required build-up material on the plate and irradiate. Remove the filter from X-Lite and check the radiation field alignment to the field light alignment.

It is not necessary to wait for the afterglow to fade between irradiations, since the contrast is high as long as the following irradiation uses the same dose or higher

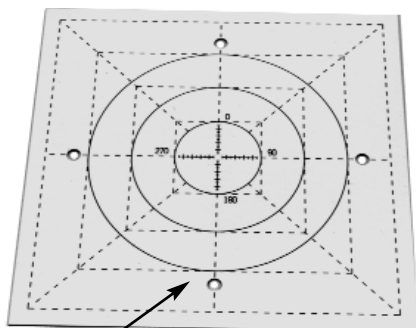
Specifications

- Active Area:** 23 x 23 cm
- Deviation Scale:** ± 5 mm in steps of 1 mm from each field scale.
- Scale Accuracy:** ± 0.1 mm
- Fluorescence:** Green (max 530 nm)
- Fluorescence Lifetime:** Readable 2-4 minutes after radiation
- Fluorescence Intensity:** 240 mcd/m² 1 min after irradiation
150 mcd/m² 2 min after irradiation (irradiation with 6 MV at 100 cm SSD, 2 Gy dose, 13 mm build-up)
- Energy Range:** > 1 MeV
- Maximum Dose:** 6 Gy/exposure
- Radiation Type:** Photons, electrons
- Daylight Filter:** Red, removable
- Material:** Plexiglass / polycarbonate
- Operating Temperature:** 15 - 45° C
- Dimensions:** 32 x 27.6 x 1.4 cm
- Weight:** 3.1 lbs

Item #	Description
710-705	X-Lite

TUNGSTEN ALIGNMENT PATTERN PLATE

For Accelerators and Simulators



4 Posterior Crosshair Line Viewers

Film Verification of light field to radiation field is accomplished by placing a Ready Pack film under the tungsten pattern plate. Tests include the following: collimator zero and rotation verification, field size, gantry sag, collimator filament sag, light field to radiation field with film or image tube, fluoroscopy horizontal and vertical linearity check.

Specifications

- Sizes:** 10 cm, 20cm, 30cm, and 40cm squares and circles
- Overall Size:** 16 5/8" sq. x 1/8" T

Item #	Description
710-713	Tungsten Alignment Pattern Plate

PLUMB BOB

NICKEL-PLATED WITH LINE



The Plumb Bob can be used to align gantries, couches, laser lights and more. Gantry vertical alignment can be accomplished by marking the cross hair projection spot on the ceiling and floor, then dropping the Plumb Bob line from the ceiling spot to the floor spot. The machine alignment is vertical when the Plumb Bob line intersects with the ceiling and floor spots.

Item #	Description
352-120	Plumb Bob, Nickel-Plated with Line

QUALITY ASSURANCE DEVICES

TUNGSTEN ROTATING ALIGNMENT PATTERN DEVICE

With Film Holder For Accelerators and Simulators



- Radiation / field-light congruence
- Collimator field size accuracy
- Isocenter rotation accuracy
- Collimator, gantry, and table isocentricity
- ODI accuracy
- Laser alignment
- Uses 10" x 12" Ready-Pack Film

The Tungsten Rotating Alignment Pattern (TRAP) Device is an easy to use multi-purpose QA test tool for daily, weekly, monthly, or annual checks of the mechanical and geometric parameters of linear accelerators and simulators.

The TRAP has a 33.7 cm W x 40.5 cm L black acrylic base with a 25 cm W x 30 cm L cutout. The cutout allows for viewing of the central axis on the plate with the gantry at 0°. The base has 3 rubber tipped leveling screws.

The vertical supports are black acrylic with 1 3/4" delrin knobs for rotating the plate. The knobs have spring plunger dedents every 45° for accurate positioning when rotating the plate.

The rotating plate is two white plates sandwiched together and a 10" x 12" ready pack film can be placed between them. A clamp between the plates holds the film so you don't have to do anything else to secure the film. Two half-moon cutouts on the plates allow for grasping the film to pull it out.

The top plate has 1.6 mm tungsten balls and 1.6 mm dia x 1.3 mm long tungsten rods embedded with gray epoxy which give a sharper film image. The dark markings allow for easy viewing of the field-light and central axis on the plate surface. 10 cm² and 20 cm² fields are defined by the tungsten balls and rods. The tungsten balls are used to make arrows so film orientation is easily seen and no film pricking is necessary. Tungsten balls are also placed at central axis and every cm from 2 cm to 13 cm and at 15 cm. Device orientation is accomplished with 0, 90, 180 and 270 markings. There are two bubble levels on the top plate which ensures level accuracy of the rotating plate.

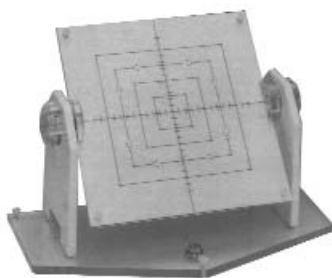
The bottom plate has dashed lines to correspond to central axis. This allows for verification of lasers to central axis.

Specifications

- Field Sizes:** 10 cm and 20 cm
- Rotation:** 360° in 45° increments
- Positioning:** Self-seating dedents
- Markers:** 1.6 mm tungsten rods and balls
- Leveling:** 3-point with 2 bubble levels
- Maximum Size:** 33.7 cm W x 40.5 cm L x 36.7 cm H
- Screen Size:** 33.7 cm W x 30.5 cm L
- Weight:** 6 lbs
- Materials:** Black acrylic; White and clear engraving material
- Shipping:** Fully assembled

Item #	Description
710-720	Tungsten Rotating Alignment Pattern Device

ISOCENTRIC BEAM CHECKER II



- Radiation / light-field congruence
- Collimator isocentricity
- Collimator field size accuracy
- Isocenter rotational stability
- Accepts 10" x 12" Ready Pack Films
- Laser alignments
- ODI accuracy
- Gantry isocentricity
- Table isocentricity

The IBC II, a "multi-purpose" precision quality assurance tool, is an easy to use test device for daily, weekly or monthly quality assessments of all mechanical and geometrical treatment parameters of linear accelerators or teletherapy units.

The Multifunctional Isocentric Beam Checker, IBC II, consists of a large opaque acrylic screen backed by a secondary plate, both supported by two lateral uprights. The screen is inscribed with lines precisely defining corners, edges and center of the screen's 2 mm square, 5 cm square, 10 cm square, 15 cm square and 20 cm square fields. Intersecting center lines are inscribed with short lines spaced 1 cm apart. The screen can rotate about its axis in increments of 45°.

Tungsten markers of 2 mm diameter are embedded in the center and corners of the fields. A 10" x 12" ready-pack film can be sandwiched between the two plates. When exposed, the tungsten markers project a sharp image on the film. The necessity of pricking holes into the film is therefore eliminated.

Caution: Although provided with non-slip rubber-tipped adjustment thumb screws, care must be taken not to displace the IBC during rotation of the screen plate. The screen plate can be rotated in 45° increments. To rotate the screen plate it is best to grab both left and right knobs together while turning them simultaneously. When turned 45°, the screen seats itself accurately and automatically thus repositioning is accomplished easily and quickly.

Specifications

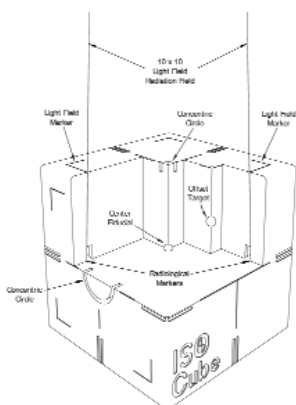
- Field Sizes:** 2 mm, 5 cm, 10 cm, 15 cm and 20 cm
- Rotation:** 360° in 45° increments
- Positioning:** Self-Seating
- Markers:** All intersecting corners: 2 mm O.D. dia. tungsten balls
- Leveling:** 3-point w/bubble level
- Size:** 20.3 cm W x 45.7 cm L x 33 cm H
- Screen Size:** 30.5 cm x 30.5 cm
- Materials:** White and clear plexi and tungsten
- Weight:** 6.1 lbs
- Shipping:** Fully assembled

Item #	Description
710-730	Isocentric Beam Checker II

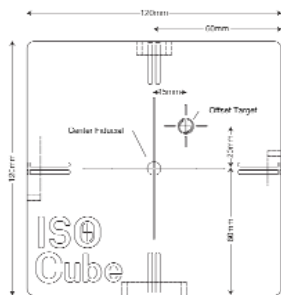
ISO CUBE™ DAILY QA PHANTOM



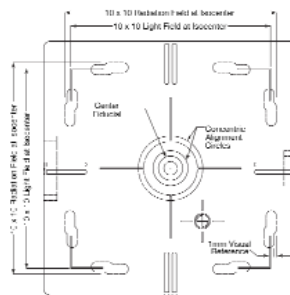
ISO Cube™ Shown with Optional ISO Align



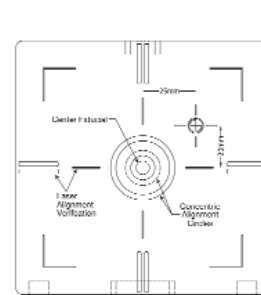
Internal View



Inferior / Superior View



Anterior / Posterior View



Lateral View

- **Fast and easy to use**
- **Unique shell fiducials produce sharp clear images in EPID, kV and CBCT imaging**
- **Offset fiducial to check accuracy of couch corrections**
- **Check**
 - Laser alignment
 - Light field size verification
 - kV and MV imager coincidence
 - CBCT process accuracy
 - ODI accuracy
 - Table height accuracy
 - Radiation field/light field alignment

Target positioning through imaging localization is critical for the accurate delivery of radiation treatment. Verifying that all of the imaging, localization and targeting systems are aligned with the true radiation isocenter is crucial. The ISO Cube™ provides a cost-effective, quick and accurate means of testing radiation isocenter coincidence with the isocenters of the image guidance systems.

The ISO Cube™ was designed specifically for daily system checks. The lasers and light field can be tuned to the true radiation isocenter using the engraved markings on the exterior of the ISO Cube™. The light field and radiation field alignment can be checked using integral radiographic markers. More importantly the isocenters of both the ODI and the EPID can be checked for true spatial alignment and coincidence with that of the treatment beam.

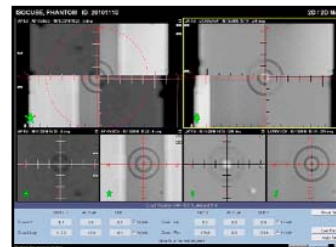


Figure 1. 2D/2D match of kV and DRB

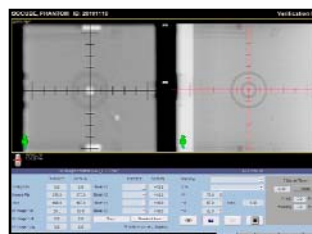


Figure 2. Concentric circles verify accurate alignment of ISO Cube and establish true position of the kV radiation isocenter

The ISO Cube™ contains a unique center point fiducial and an offset target. The offset target is used to insure the table offset coordinates generated by kV/MV imaging are accurate by locating the target, moving the table the determined amounts and verifying that the offset target has been positioned at the isocenter. The exterior is machined with concentric circle targets to allow user to objectively assess all setup errors, including rotations, and to easily align the phantom to the true radiation isocenter.

Item 710-323 ISO Cube Daily QA Phantom Includes

- ISO Cube™ Daily QA Phantom
- User Guide
- 48 month Warranty

Optional Accessories

- Item 710-325 ISO Cube™ Stereotactic Target Frame Adapter
- Item 710-327 ISO Align Altazimuth Alignment Platform

Specifications

Material: Plastic Water®

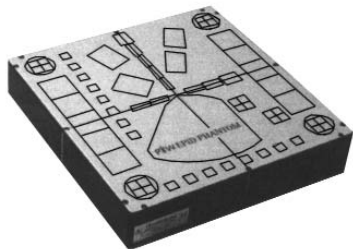
Size: 4.75" x 4.75" x 4.75" (12 x 12 x 12 cm)

Weight: 3.9 lb (1.7 kg)

Item #	Description
710-323	ISO Cube™ Daily QA Phantom
710-325	ISO Cube™ Stereotactic Target Frame Adapter
710-327	ISO Align Altazimuth Alignment Platform

QUALITY ASSURANCE DEVICES

EPID QC PHANTOM



Test object for quality control of Electronic Portal Imaging Devices used in high-energy photon beams

Features

- Suitable for conventional EPIDs and flat Panel Imagers
- Checks linearity, isotropy, noise, low and high contrast resolution, focal spot geometry
- All parameters, including resolution in horizontal and vertical direction, are measured by a single image
- Software localizes test elements automatically, and evaluates images without user interference

Electronic Portal Imaging Devices (EPID) are used in radiation therapy to verify the patient's position in the radiation beam during treatment. EPIDs are intended to detect physiological structures of the patient and to refer them to the photon beam's coordinate system. Regular quality checks of the EPIDs are therefore crucial to ensure constant image quality and thus a high safety level for the patient.

The EPID QC Phantom¹ is easy to use. Baseline images and subsequent test images are taken by irradiating the phantom with a suitable dose, depending on the type of EPID.

The EPID QC software package automatically detects the location of the test elements, performs all evaluations without further interference of the user, and displays the results by comparison with the baseline values.

The EPID QC Phantom includes a wide range of high-contrast test patterns to perform tests of even the most advanced EPIDs available. The analysis includes a separation of quantum noise caused by the detected photons, and noise generated in the EPID. The low-contrast device enables service personnel to adjust EPID brightness and contrast using well-established procedures, and without the need of additional test devices. The wide-range copper step wedges provide data to create absorption correction tables for dosimetry purposes.

¹ The EPID QC Phantom was designed by Schmidt, Decker, Winkes, Rittler, Kretner and Herbig, Westpfalzlinikum Kaiserslautern, Germany.

Specifications

Application: EPID test with 4 to 25 MV Photons

Focus Distance: 100 cm

Linearity and Noise Test: Copper steps of (2/4.1/6.3/8.6 mm and 11.1/13.5/16.6/19.6/26.7) mm

High-Contrast Spatial Resolution: 0.5 to 3.33 lp/mm, bidirectional, and 0.15 to 0.33 lp/mm

Low-Contrast Recesses: Depths (0.5/1/2/3.2/4.8) mm
Ø (1.1/2/4/7/10/15) mm

Outer Dimensions: 9.84" W x 9.84" L x 1.65" H

Weight: Approx 8.4 lbs

Item #	Description
710-300	EPID QC Phantom
710-305	EPID QC Software

LARGE FIELD FLUOROSCOPIC BEAM ALIGNMENT DEVICE

- Reduces exposure to the patient.

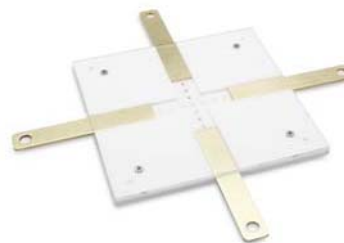
In misaligned fluoroscopic image intensifier systems, the portion of the field that falls outside the visible area of the image receptor does not contribute to the useful fluoroscopic image and can result in unnecessary exposure to the patient.

If corrective measures are required, the Large Field Fluoroscopic Beam Alignment Device will provide a measurement of optimum beam alignment. The device consists of an aluminum plate with four sliding brass strips set in recessed channels. The strips define the visible area of the image receptor and are adjustable with respect to the center of the measurement plate. A transparent plastic overlay on the aluminum plate prevents the vertical displacement of the brass strips. Holes drilled at 1/2" intervals through the center of each channel are filled with high-density plugs. The visibility of the plugs in the fluoroscopic image permits their use as a means of centering the device.

Specifications

Dimensions: 9" x 9" x .625" thick

Weight: 5 lbs



Item #	Description
710-110	Large Field Fluoroscopic Beam Alignment Device

BEAM SENTRY 2 DAILY OUTPUT CONSTANCY MONITOR

Model 105 A



The detector assembly contains a sealed plane-parallel plate ion chamber, requiring no corrections for barometric pressure and temperature changes. The detector assembly is reversible, having two entrance windows, each with a 10 cm field markings. One entrance window has a buildup optimized for 6MV and electron beams, and the opposite entrance window has a buildup optimized for 18MV.

Specifications

Electrometer

Display: 3 1/2 digit LCD

Range: 19.99 and 199.9

Units: Factory set: R, cGy, or nC

Accuracy: $\pm 0.1\%$ of reading + 1 digit

Linearity: $\pm 0.1\%$, +1 digit or precision of reading, whichever is greater

Leakage: <60 fA

Temperature Stability: 20ppm/ $^{\circ}$ C

Input Connector: BNC-F triax w/cap and chain

Bias Supply: Static, 300V, 100%, 50% off

Power: 9V battery, NEDA 1604A

Size: 6" x 6" x 3.5" (15.24 x 15.24 x 8.89 cm)

Weight: 2 lb (1 kg)

505A Ion Chamber Assembly

Chamber Type: Plane-parallel

Sensitive Volume: 2cc, nominal

Collector: 31 mm diameter

Electrode Spacing: 2.6 mm

Sensitivity: 0.7 nC/cGy, nominal

Top Buildup: 1.4 g/cm² (4-10 MV, 5-12 MeV)

Bottom Buildup: 2.6 g/cm² (10-25 MV, 12-25 MeV)

Cable: 6.5' (2 m) integral

Connector: Triaxial BNC (TNC optional)

Size: 6" x 6" x 1.5" (15 x 15 x 3.8 cm)

Weight: 2.4 lb (1.1 kg)

Optional Acrylic Build-Up Plate Set Includes

(1) 15 cm² x 0.63 cm (1/4")

(1) 15 cm² x 1.27 cm (1/2")

(1) 15 cm² x 1.90 cm (3/4")

- Sealed ion chamber - no air density correction necessary
- Reversible detector - dual entrance windows, 6 & 18 MV
- Electrometer protected from radiation
- Remote operation using a standard triax extension cable
- Powered by a single 9V battery - no bias batteries to replace
- Electronic bias - full and half voltage

Beam Sentry 2 provides a convenient and economical means of performing daily radiation output constancy checks. It is a light-weight, portable unit with remote readout featuring the accuracy of a digital display. The unique design, featuring a separate ion chamber, eliminates radiation damage to the electronics while allowing both the dosimeter and the ion chamber to be used independently for other purposes.

Beam Sentry 2 is easy to use. Simply connect the electrometer to the ion chamber assembly, place the electrometer at the foot of the treatment table, collimate the beam to the 10 cm field markings on the ion chamber, make the exposure and collect the reading.

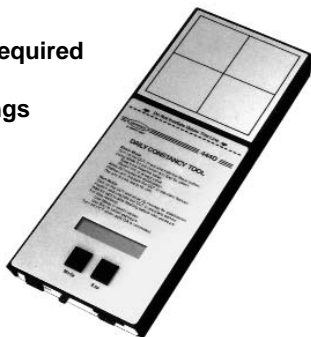
The electrometer offers high accuracy, precision and repeatability, and is suitable as a stand-by or a back-up dosimeter. The connectors are triaxial BNC, permitting use with a standard triaxial extension cable for reading successive doses from outside of the treatment room and providing interchangeability with other dosimetry ion chambers and electrometers.

Item #	Description
321-031	Beam Sentry 2 Daily Output Constancy Monitor
321-041	Acrylic Build-Up Plate Set
323-1303	10 Meter Triax Cable BNC-F to BNC-M

QUALITY ASSURANCE DEVICES

444D DAILY CONSTANCY TOOL

- **Easy setup and control**
- **No pressure corrections required**
- **RS-232 port**
- **Stores 10 complete readings**



The 444D Daily Constancy Tool (DCT) is a single channel device to measure photon and electron beam constancy every day of the year. Measuring relative beam output is quick, easy, and reliable with the 444D. The DCT has a single diode detector embedded in a uniform density plastic phantom for measuring radiation output. The device is battery operated and completely portable. It only requires an initial set up and then there is no need for preparation when doing routine radiation output tests on linear accelerators. This DCT can store up to 10 exposures that show relative dose, relative dose rate, and irradiation time. Multiple exposures can be taken without having to reset the device. An indicator light will blink to let you know that the 444D is ready for the next exposure. By having this auto reset function, you only have to enter the treatment room a second time to retrieve the DCT and acquire the

necessary data. With features like these, and automatic pressure correction, you can see why this device is one of the most time saving devices you'll ever use in the treatment room.

Options

Gantry Holders for Varian or Siemens machines
Laser Alignment Cap to align tool with side-wall lasers

Specifications

Dose Rate Range: 1 to 2000 cGy/min

Beam Energy: Photons: 1.25 to 25MV; Electrons: 3 to 25MeV

Field Size: 10 cm sq.

Temperature Dependence: 1% of reading per °C

Long Term Stability: ±1.5% of reading over 60,000 Rads
(approximately 6 months of use)

Readings: Relative Dose (machine output) - Relative Dose Rate - Time

Detector: Diode

Power Supply: 4AA alkaline batteries (20 hours approximate lifetime)

Dimensions: 4.7" W x 12.6" L x 1.1" H

Weight: 2 lbs. 5 oz.

Item #	Description
345-100	444D Daily Constancy Tool
345-127	Laser Alignment Cap

THERAPRO DAILY OUTPUT AND SYMMETRY MONITOR



- Consistency, flatness, symmetry and energy monitoring
- Five ion chamber array with sixth chamber for energy constancy
- Automatically corrects for temperature and pressure
- No electronics near beam
- Controller runs on Windows®
- Touchscreen display (with optional mouse and keyboard included)
- 32 MB internal flash memory
- Includes 64 MB CompactFlash™ card and USB CompactFlash card reader for exporting data
- Flexible data transfer to any Windows application for charting, reporting, etc.
- Expandable to a five-channel diode dose monitor

The TheraPro is designed for daily output/symmetry/flatness/energy checks of radiation therapy treatment machines. High quality, ease-of-use and versatility are the prime objectives in the TheraPro design.

A Windows®-based control panel digitally controls the instrument. The TheraPro guides the user through setup, measurement and data management. The user proceeds through measurement sequences easily by using either the touchscreen interface or by clicking the mouse. The TheraPro stores a virtually-unlimited number of calibrations and measurements. Years of measurements can be stored on multiple machines using the internal 32 MB flash memory. Stored beam information includes date, time, machine name, energy, chamber readings, flatness and symmetry. Data files can be transferred via the supplied 64 MB CompactFlash™ card and USB card reader to standard spreadsheet or word processor applications.

When compared to similar devices, the TheraPro is unique because it is expandable. With the optional Diode Dosimetry Software, diode input module and diode detectors, the TheraPro can be economically upgraded to perform as a five-channel diode dosimeter, with the same data collection and storage power as mentioned above. As such, the TheraPro does not sit idle after the daily beam output checks are done.

Components

Chamber Array

The chamber array contains six ion chambers that are automatically corrected for temperature and pressure. One chamber is located in the center of the 20 cm x 20 cm field and four chambers are each located 8 cm off the central axis on the X and Y axes. The signals are sent through a custom made, molded-jacket, shielded multi-coax cable to the Data Acquisition Module located inside the treatment room. The sixth ion chamber, in a separate location, provides energy constancy information.

Data Acquisition Module

The data acquisition module contains a six-channel electrometer that sends data to the controller located outside the treatment room via inexpensive, readily available 49' (15 m) cable. Longer cable lengths are available on request.

Controller

The controller provides control and data storage for the TheraPro. This controller runs the TheraPro software under Windows® using either touchscreen or keyboard & mouse for operation. Data can be exported to standard spreadsheet and word processing programs for more extensive plotting, charting, and reporting of data.

Diode Dosimetry Software (optional)

The TheraPro can be used as a one-to-five channel dose verification monitor by using optional software and simply replacing the ion chamber array with a diode input module that accepts up to five diode detectors of either polarity.

Equidose® II Diode Detector

Items 322-862 to 322-879. Sold Separately.

Item 347-950 TheraPro Daily Output and Symmetry Monitor

Includes:

- Chamber Array
- Data Acquisition Module
- Controller
- 64 MB CompactFlash™ Card
- USB CompactFlash™ Card Reader
- Mouse
- Keyboard
- Acrylic Buildup Plates
- Gantry Mounting Bracket
- Interconnecting Cables

Specifications

Repeatability: Within 0.5% of reading

Detectors: Six ion chambers, one on central axis, four chambers spaced at ±8cm off central axis on X-Y axes, one energy check chamber

Chamber size: ~ 0.6 cc, 1.2 cm diameter

Buildup: 0.60 g/cm² (0.481 acrylic + 0.084 polystyrene + 0.035 Mylar®)

Range: ~ 500 cGy (6 MV photons)

Rate Limitation: 1000 cGy/min

Deviation Limit: User selected low and high alarm

Data Link: 15 m cable transmits data from the Data Acquisition Module to the controller

Data Storage: 32 MB internal flash memory. 64 MB CompactFlash™ and USB CompactFlash™ card reader for exporting data included.

Temp. Accuracy: ±1°C

Pressure Accuracy: ±1.5 mmHg

Power: 100-240 AC, 50-60 Hz, 2 A fuse

Dim./weight:

Chamber Array Size: 9.1" x 11.2" x 1.2" (23.1 x 28.5 x 3.0 cm)

Chamber Array Weight: 3.75 lb (1.7 kg)

Data Acquisition Module Size: 10" x 5.3" x 3.7" (25.4 x 13.5 x 9.5 cm)

Data Acquisition Module Weight: 3.1 lb (1.4 kg)

Controller Size: 8.2" x 8.2" x 5.8" (20.8 x 20.7 x 14.8 cm)

Controller Weight: 4 lb (1.8 kg)

Item #	Description
347-950	TheraPro Daily Output and Symmetry Monitor
347-952	TheraPro Dose Verification Software and Diode Input Module

QUALITY ASSURANCE DEVICES

TRACKER™ THERAPY BEAM EVALUATION SYSTEM



- Measurement values from peripheral ion chambers displayed in either absolute dose measurement units or as percentage of center ion chamber's measurement value
- Microprocessor-controlled, 4-line by 20-character VFD displays measurement results directly in user's choice of radiological units corrected for air density
- Precision five channel electrometer provides $\pm 0.03\%$ linearity
- High performance rechargeable system allows eight hours of continuous operation from a three-hour charge
- Low battery annunciator indicates when < 30 minutes of operation remains
- Levels of internal 300 V electronic bias supply and rechargeable battery supply are continuously monitored
- Annunciators indicate abnormal bias or low battery voltage

The TRACKER™ Therapy Beam Evaluation System is a quality assurance system that measures high energy accelerators and ^{60}Co dose and dose rate, enabling user calculation of beam constancy, flatness, and symmetry. The system consists of a detector and a display. The TRACKER™ detector array incorporates four orthogonally placed ion chambers on a 10 cm radius from a fifth isocentrally-located ion chamber allowing ratio-to-center dose measurement. Each ion chamber, which is identical to the others and vented to the atmosphere, is a circular, parallel-plate configuration and is fully guarded for low leakage. The entrance surface indicates ion chamber locations for alignment with a therapy beam light field system. The TRACKER™ display contains five electrometers and a microprocessor-controlled, 4-line by 20-character, vacuum fluorescent display (VFD) that provides excellent readability of dose and dose rate measurements in virtually any lighting condition.

The TRACKER™ Therapy Beam Evaluation System performs quality assurance tests for linear accelerators and ^{60}Co . The system's quick setup and operational ease make it ideal for daily checks of beam constancy, symmetry, and flatness. A five-channel electrometer enables measurement of dose or dose rate in either absolute or ratio-to-center. Dose measurement values may be displayed in units of R, rad, Sv, or Gy. Dose rate measurement values may be displayed in units of R/min, rad/min, Sv/min, or Gy/min. The TRACKER™ System may be operated from either AC line power or from its high capacity internal battery. The battery

is charged automatically when the unit is connected to AC line power, either during use or when idle. Consulting physicists and service engineers will appreciate the TRACKER™ System's portability. An optional carrying case eases transport and storage. Other optional accessories include buildup plates and a buildup retaining hardware kit.

Item 348-070 TRACKER™ Includes

- Display
- Detector
- Detector to Display Interface Cable, 49' (15 m)
- Instruction Manual
- Customization Kit

Optional Accessory Items

- 348-072 Carrying Case
- 348-075 Buildup Plate
- 348-075 Buildup Retainer Kit

Specifications

Electrometer

- Accuracy:** 1% of reading (1 count)
- Stability:** <0.25 % of reading per year
- Zero Drift:** (1 count 10 °C to 35 °C)

Nominal Ion Chamber Characteristics

- Window Area Density:** 600 mg/sq cm (0.5 cm acrylic plastic)
- Sensitivity:** 3.52 R/nC at 22 °C and 760 mmHg
- Active Cross-Sectional Area:** 1.06 sq cm
- Collection Efficiency:** > 99 % at 500 rads/min pulsed
> 99.9 % at 500 rads/min continuous

Ion Chamber Factory Calibration Method: Each of the five ion chambers within the detector array is calibrated by comparison with a reference standard ion chamber in a ^{60}Co beam. The comparison is performed in free air and results in a R/nC calibration factor for each of the five ion chambers

Source Modes and Energies

- Photons:** 300 keV to 25 MeV, with suitable buildup material
- Electrons:** 2 MeV to 25 MeV, with suitable buildup material

Recommended Operation Conditions

- Source Distance:** 100 cm
- Collimated Field Size:** 25 cm x 25 cm
- Source Dose Rate Range:** 50 rads/min to 500 rads/min

RS-232 Receptacle (RJ-45 Style): User customization and field calibration via supplied MS-DOS® Customization Program. Fully remote and automated operation

AC Line Power Receptacle: AC line input range of 100 Vac to 240 Vac without operator switching. IEC 320/C13 style receptacle enables worldwide operation by simply switching line cords

Physical

- Detector Size:** 13.25" W x 17.25" D x 0.875" H
(33.7 x 48.8 x 2.2 cm)
- Display Size:** 10" W x 4" D x 9.4" H (21.6 x 26 x 8.9 cm)
- Total Weight:** 26 lb (11.7 kg)

Item #	Description
348-070	TRACKER™ Therapy Beam Evaluation System
348-072	Carrying Case for Tracker™
348-075	Buildup Plate for Tracker™, Acrylic, 0.5 cm Thick
348-076	Buildup Retainer Kit for Tracker™

TRACKER™ SYSTEM HOLDER



The TRACKER™ Holder slides into the treatment tray slot and supports the TRACKER™ detector at the customer's specified distance. This item is custom made per customers specifications. Please specify accelerator, bottom of tray slot distance, contact person, and phone number. The Tracker Holder can be made for any Linac manufacturer. Build-up plates are available for the Tracker and the Tracker Holder.

Item #	Description
348-081	1/32" (0.8 mm) Acrylic Build-up Plate for TRACKER™
348-082	1/16" (1.6 mm) Acrylic Build-up Plate for TRACKER™
348-083	1/8" (3.2 mm) Acrylic Build-up Plate for TRACKER™
348-084	1/4" (6.4 mm) Acrylic Build-up Plate for TRACKER™
348-085	3/8" (9.5 mm) Acrylic Build-up Plate for TRACKER™
348-086	1/2" (12.7 mm) Acrylic Build-up Plate for TRACKER™
348-087	3/4" (19.05 mm) Acrylic Build-up Plate for TRACKER™
348-088	1" (25.4 mm) Acrylic Build-up Plate for TRACKER™
348-071-240	Build-up Plate 1/32" (0.8mm) for TRACKER™ Holder
348-071-241	Build-up Plate 1/16" (1.6mm) for TRACKER™ Holder
348-071-242	Build-up Plate 1/8" (3.2mm) for TRACKER™ Holder
348-071-243	Build-up Plate 1/4" (6.4mm) for TRACKER™ Holder

Item #	Description
348-071-244	Build-up Plate 3/8" (9.5mm) for TRACKER™ Holder
348-071-245	Build-up Plate 1/2" (12.7mm) for TRACKER™ Holder
348-071-246	Build-up Plate 1.0" (25.4mm) for TRACKER™ Holder
348-071-20	TRACKER™ Holder for Siemens w/ Coding Bypass
348-071-21	TRACKER™ Holder for Siemens w/ Screw Coding
348-071-22	TRACKER™ Holder for Siemens w/ Digital Coding
348-071-31	TRACKER™ Holder for Varian II, 61.6cm Tray Slot
348-071-32	TRACKER™ Holder for Varian II, 65.4cm Tray Slot
348-071-33	TRACKER™ Holder for Varian III, 61.6cm
348-071-34	TRACKER™ Isocenter Holder for Varian III, MLC, 65.4cm
348-071-50	TRACKER™ Holder for Elekta/Philips Machine

O

QUALITY ASSURANCE DEVICES

DAILY QA 3™ AND rf-DAILY QA 3™



The Daily QA 3™ raises the bar for routine QA of therapeutic linear accelerators. Data collection is automated, and the Daily QA 3 user routine is guaranteed to be the easiest, most user friendly system

available. Accepted data is automatically written to a trend-analysis database in REAL TIME, where it is available for review and analysis. Simple “two step” operation and quick analysis position the Daily QA 3 as the new leader in daily QA.

Features

- Guaranteed easiest interface available
- Works seamlessly with the ATLAS QA database solution
- Data storage is automatic
- Automatic T & P corrections

Applications

- Radiation Field Size
- Electron & Photon Energy Drift (no flipping or extra buildup required)
- Available Real-Time Wireless Data Transfer
- Axial Symmetry
- Transverse Symmetry
- Flatness Measurement
- Dose Measurement

Using both diodes and ion chambers, the Daily QA 3 simultaneously checks output, flatness, symmetry, field size and energy without the need to add build-up. Data is stored in ATLAS for real time trending, statistical analysis and reporting.

The Daily QA 3 uses a total of 25 specially designed detectors, both ion chamber and diode, to obtain the best possible results in real time:

- 12 precision diodes
- 5 rectangular and circular ion chambers
- 4 curved ion chambers
- 4 circular ion chambers

The Daily QA 3 offers real-time wireless operation, eliminating cable clutter. The instrument functions the same as if the cable were attached, and will continue to work with the power/data cable, even if it is equipped with the wireless option.

Single Measurement gives:

- Light/Radiation field coincidence for a 20 x 20cm field
- Output, flatness, axial symmetry, and transverse symmetry
- Electron energy or Photon energy

Use lasers or cross hairs to align, then connect the single cable or use the wireless option. Temperature and pressure corrections are automatically applied.

The optional IMF (Isocentric Mounting Fixture) holds the device at 100cm SDD, enabling measurement at any gantry angle.

The Daily QA 3, combined with the included ATLAS “Base” software, stores test results for real time trending. Daily use is easy, yet sophisticated analysis options are available with the click of a mouse.

The ATLAS Base software allows the definition of custom QA requirements. Once the Daily QA 3 is setup, daily measurements are efficiently automated.

After measurement, a status bar will turn green or red indicating if a test passed or failed. Press ‘Record’ and all collected data will be saved for statistical analysis & reporting. Recording the data will also initiate the next test. Users can conduct a new test, scheduled or unscheduled, at any time and the data will be saved in the database.

ATLAS provides a graphical presentation of data for each template. The user has the option to choose which data parameters to view, and over what period of time to view them. A single measurement instance can be examined by clicking on a data point which corresponds to a particular day.

Specifications

Detector Array

Type:

Primary – vented ionization chambers, fully guarded;
Secondary – diode detectors.

Quantity:

13 ionization chambers:

- One center detector
- 4 primary detectors on X and Y axes, 8cm from center
- 4 photon energy detectors, 11.3cm from center on diagonals
- 4 electron energy detectors, 5.6cm from center on diagonals
- 12 diode detectors (5mm spacing):
 - A row of 3 detectors on X axis centered at +20cm
 - A row of 3 detectors on X axis centered at -20cm
 - A row of 3 detectors on Y axis centered at +20cm
 - A row of 3 detectors on Y axis centered at -20cm

Ionization chambers:

Volume of 9 center, primary, and photon energy chambers 0.3cm³

Volume of 4 electron energy check chambers – 0.6cm³

Parallel separation plate – 4mm

Collection electrode – 1.38cm diameter, carbon

Diodes:

Active size – 0.8 x 0.8mm

Type – n-type, radiation hardened

Inherent buildup:

Actual – acrylic, 0.737cm; polycarbonate, 0.038cm

Effective – 1.0 ± 0.1g/cm²

Inherent backscatter: Acrylic 2.3cm

Radiation measured:

Photons – Co-60 to 25 MV

Electrons – 5 MeV to 25 MeV

Beam limits:

Dose range – unlimited

Maximum dose per accelerator pulse – 5.5cGy/pulse

Maximum average dose rate – 250cGy/s

Temperature:

Sensor – 1 integrated circuit plus 5 thermistors

Range – 0°C to +50°C

Accuracy – ±2.0°C without user calibration

Measurement resolution – 0.015°C

Display resolution – 0.1°C

Pressure:

Sensor – temperature compensated on-chip bipolar operational amplifier and thin film resistor network

Measurement – slope transfer function between output voltage & supply voltage

Range – 15 to 115kPa (112 to 862mmHg) (1atm +101.33kPa)

Non-linearity – ±1.5% over measurement range

Accuracy – ±2kPa without user calibration

Measurement resolution – 0.0035kPa

Display resolution – 0.01kPa

Alignment Template:

• Light field alignment – 20 x 20cm

• Tolerance marks – ±2mm at the light field corners

• Cross hair rotation – 2mm diameter circle in the center detector

• Detectors – located by blue circle with letter identifier

Calibration

• Array - patented wide field calibration utility to determine relative correction factors for each detector at any energy and store in PC files

• QA field - central axis output calibration on each QA field in database

• Temperature- internal temp measurement adjusted to user stated value

• Pressure- internal pressure measurement adjusted to user stated value

Item #	Description
345-220	Daily QA3
345-225	rf-Daily QA3
345-230	Additional Wireless Vault Pkg for Daily QA3
345-232	Isocentric Mounting Fixture for Varian
345-233	Isocentric Mounting Fixture for Elekta
345-234	Isocentric Mounting Fixture for Siemens

QUALITY ASSURANCE DEVICES

DOUBLE CHECK® PRO GANTRY HOLDER AND ACRYLIC BUILD-UP PLATES



348-205



348-205-35



348-249

The Double Check® Pro Gantry Holder slides into the treatment tray slot and supports the Double Check® Pro detector at the customer's specified distance. Please specify accelerator, bottom of tray slot distance, contact person, and phone number. The Double Check® Pro Gantry Holder can be made for any Linac manufacturer. Build-up plates are available for the Double Check® and the Double Check® Pro Gantry Holder.

Item #	Double Check® Pro Gantry Holder
348-205-20	Siemens Coding By-Pass
348-205-21	Siemens Mevatron with Screw Coding
348-205-22	Siemens Mevatron with Digital Coding
348-205-30	Varian II, 61.6cm - Photons ONLY
348-205-31	Varian II, 65.4cm - Photons ONLY
348-205-32	Varian II, 61.6cm - Photons and Electrons
348-205-33	Varian II, 65.4cm - Photons and Electrons
348-205-34	Varian III, 61.6cm, Coding By-Pass
348-205-35	Varian III, 65.4cm, with Electronics
348-205-36	Varian III, 61.6cm, with Electronics
348-205-37	Varian III, 65.4cm, MLC, Coding By-pass
348-205-50	Philips Treatment Machine

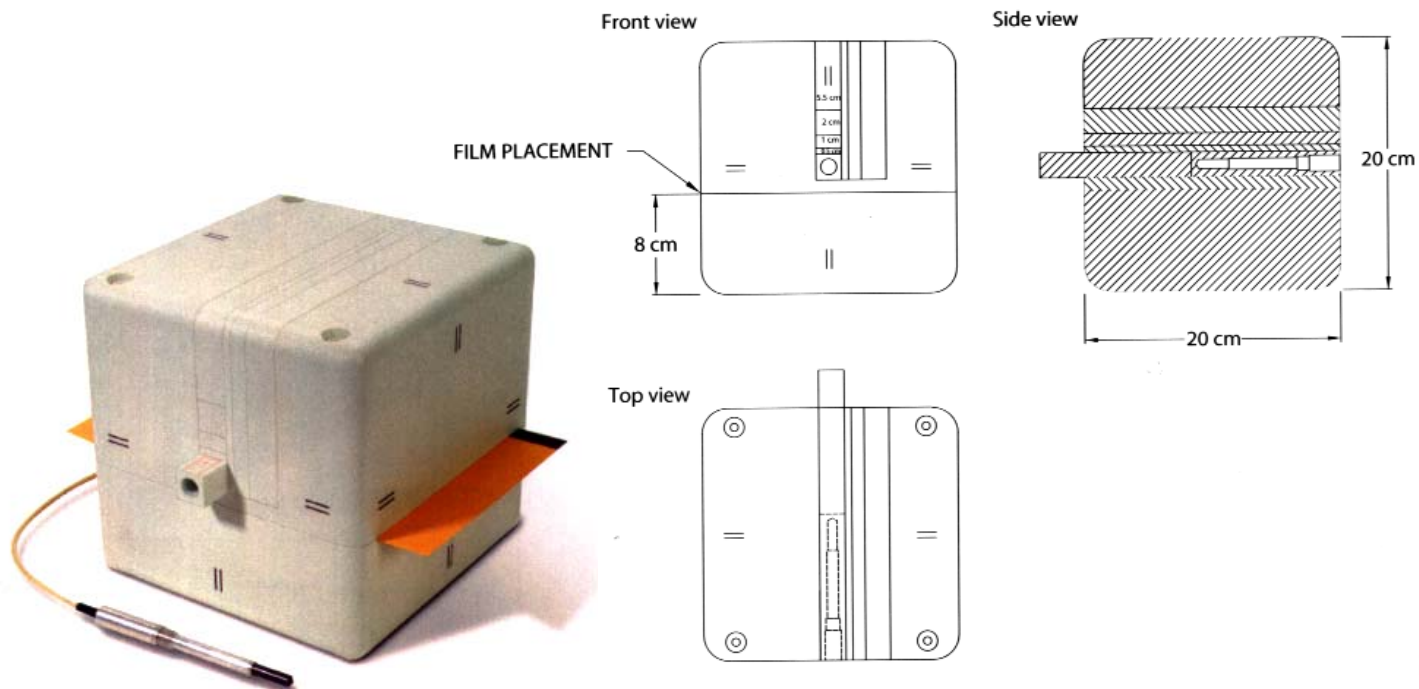
Item #	Double Check® Pro 7600 Gantry Holder
348-205-60	Varian III, 61.6cm, Coding By-Pass
348-205-61	Varian III, 65.4cm, Coding By-Pass

Item #	Acrylic Build-Up Plates
348-240	1/32" (.8 mm)
348-241	1/16" (1.6 mm)
348-242	1/8" (3.2 mm)
348-243	1/4" (6.4 mm)
348-244	3/8" (9.5 mm)
348-245	1/2" (12.7 mm)
348-246	1" (25.4 mm)
348-249	3/8" (9.5 mm) with Hole

QUALITY ASSURANCE DEVICES

CUBE 20 PHANTOM

The most convenient device for routine QA and IMRT applications



Features

- Routine patient QA
- Beam constancy checks
- MLC QA
- User friendly set-up and positioning
- Suitable for head/neck and torso treatments
- Mimics water within 1%

The Cube 20 Phantom was designed for routine QA in RT and IMRT applications where ease of use and quick set-up are important. The Cube 20 phantom is manufactured from Plastic Water® DT which faithfully mimics water within 1% from 50 keV to 25 MeV. This enables complete QA from CT image acquisitions to therapy dose verifications. The 20 cm cubic dimension was chosen as a suitable approximation for both head/neck and torso treatments. All the edges are rounded to avoid CT artifacts.

Chamber, diode or MOSFET detectors are easily positioned at isocenter of the cube and laser alignment marks on all sides facilitate precise positioning of the phantom. Detector position can be adjusted in 1mm increments longitudinally and 5mm increments for lateral and elevational adjustments.

Ready-Pac film can be inserted in the cube. By rotating the cube, the film is easily set in sagittal, coronal or transverse orientations. Stainless steel fiducial points are clearly resolvable on CT images and leave small indentations on the film for precise film to plan registration.

Specifications

Size: 20 cm x 20 cm x 20 cm

Lateral Spacers: 0.5 cm, 1 cm, 2 cm

Elevational Spacers: 0.5 cm, 1 cm, 2 cm

Please specify chamber to be used

Item #	Description
682-400	Cube 20 Phantom

CHECKMATE 2™



Specifications

Detector Array

Type: Vented ion chamber, fully guarded
 Quantity: 1, located for CAX measurements
 Volume: 0.6cm³
 Parallel plate separation: 4mm
 Detector bias: 350 volts
 Collection electrode: 1.4cm diameter, carbon
 Inherent build-up: Effective 1.0 ± 0.1 g/cm²
 Radiation measured:
 Photons: C0-60 to 25 MV
 Electrons: 5 MeV to 25 MeV

Construction

Dimensions: 25.5 cm wide x 40 cm long x 5.5 cm thick
 Weight: 4.9 kg (10.8 lbs)

Alignment Template

Light field alignment: 10 x 10, 20 x 20 cm²

Measurement Performance

Display units: Percentage of dose calibration set by user
 Display range: 0.1% to 999.9%

Measurement performance uncertainties:

Reproducibility: 0.2%, (100 cGy)
 Long-term stability: 0.5% per year

Beam limits for measurement performance

Max dose rate per accelerator pulse: 3.6 cGy
 Max average dose rate: 3400 cGy/min
 Max dose: 133 cGy
 Min dose rate: 20 cGy/min

Environmental

Recommended ranges

Operating temperature: 15°C to 35°C
 Storage temperature: 0°C to 50°C
 Relative humidity: < 90% non-condensing

CHECKMATE 2™ is a therapy beam constancy meter intended for output checks on central axis. The CHECKMATE 2™ is ideal for these applications”

- Central axis dose constancy for daily measurements
- Output checks that require quick setup
- Other special applications including repeatability, monitor chamber linearity, and output factors

CHECKMATE 2™ uses a single vented ionization chamber located in the center of a precision template, with light field markings at 10 x 10cm² and 20 x 20cm². The ion chamber is located at a nominal depth of 1.0g/cm². Measured values appear on a large display which is easily viewed at the control station bunker monitor.

Calibration is performed by the user for up to 15 calibration values. The calibrated memory positions automatically advance to the next position each time the beam turns off.

Setting-up the CHECKMATE 2™ is quick and easy. Position the unit on the treatment couch and align with the crosshairs. CHECKMATE 2™ uses rechargeable batteries which eliminate the need for cables during the measurement process. Battery condition can be seen immediately after turning on the unit by looking at the battery level indicator on the end panel display. CHECKMATE 2™ automatically corrects measurements for air density using built-in temperature and pressure transducers.

Item #	Description
345-050	Checkmate 2™