

Phantom Patient for Stereotactic End-to-End Verification



STEEVTM
STEREOTACTIC END-TO-END VERIFICATION

MACHINE QA • PATIENT QA • ALIGNMENT QA

CIRS

900 Asbury Ave • Norfolk, Virginia 23513 • USA • Tel: 757-855-2765 • WWW.CIRSINC.COM

Phantom Capabilities

Perform End-to-End testing for commissioning as directed by AAPM TG-101

Verify patient positioning using frame/frameless systems, head and shoulder masks or other positioning fixation devices

Verify patient treatment plan in critical regions

Perform geometric machine QA- Winston-Lutz isocenter verification tests and localization/ repositioning with couch shift

Perform IGRT QA procedures for X-ray onboard kV and MV imagers including CBCT

Assess image fusion, image transfer QA, accuracy verification, TPS testing with multi-modality imaging capabilities (CT, MRI, and PET)

Confirm TPS deformable image registration algorithm accuracy



Stereotactic Radiosurgery (SRS) necessitates a high degree of accuracy in target localization and dose delivery. Small errors can result in significant under treatment of portions of the tumor volume or overdose of nearby healthy tissues. Whether commissioning a new system, verifying patient-specific treatment plans, or performing daily radiation alignment systems checks, intense attention to detail is required. The Stereotactic End-to-End Verification Phantom “STEEV”, CIRS Model 038, is the only phantom that provides a means to perform machine, patient and radiation alignment QA with system checks as challenging as a real patient.

With STEEV, users can commission SRS systems following AAPM TG-101. After commissioning, STEEV is suitable for use in diagnostic energy ranges for treatment planning in single or multiple modalities. Its anthropomorphic, tissue-equivalent design makes it the only phantom available to account for the challenging effects of tissue heterogeneity. Geometric and organic target inserts allow for comprehensive image QA, geometric machine QA, and TPS QA for increased confidence in system performance.

STEEV accommodates a multitude of dosimeters for dose verification. When used in concert with the various imaging inserts, STEEV provides our most comprehensive end-to-end testing and QA solution for SRS systems.

“...cumulative system accuracy for the procedure can be significant and needs to be characterized through an end-to-end test using phantoms with measurement detectors and imaging”

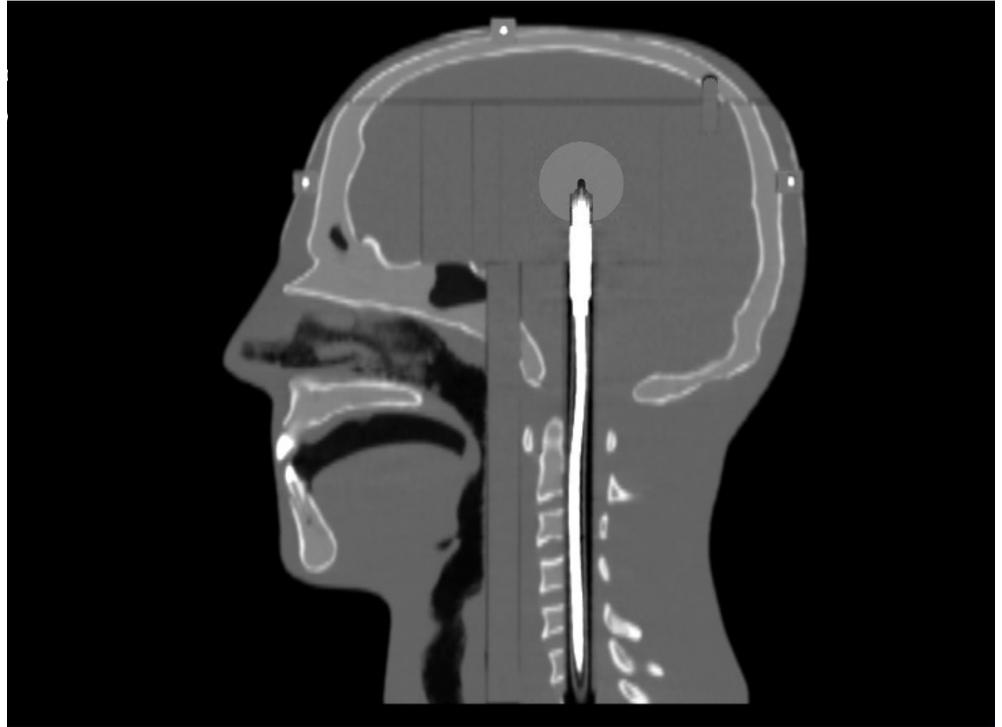
AAPM TG-101 report
Stereotactic Body Radiation Therapy

CIRS

Computerized Imaging Reference Systems, Inc is recognized world wide for tissue simulation technology and is the leader in the manufacture of phantoms and simulators for medical imaging and radiotherapy.

www.cirsinc.com

Proven Tissue-Equivalent Technology



STEER is constructed of CIRS' proprietary tissue-equivalent materials. Linear attenuations of the simulated tissues are within 1% of actual attenuation for soft tissue and bone from 50keV to 15MeV. CIRS tissue simulation technology has been validated through specific testing, continuous monitoring of manufacturing applications and worldwide use and acceptance of CIRS products for over 30 years.

Linear Attenuation Coefficients To Reference Tissues ^{(1) (2)}					
	Trabecular Bone	Soft Tissue	Brain	Spinal Cord	Cortical Bone
En, MeV	Ratio, %	Ratio, %	Ratio, %	Ratio, %	Ratio, %
0.04	99.8	100.0	100.0	100.0	99.3
0.06	100.1	100.2	100.1	100.0	99.7
0.08	100.3	100.3	100.3	100.0	99.8
0.10	100.3	100.3	100.3	99.9	100.0
0.20	100.5	100.4	100.3	99.9	99.8
0.40	100.5	100.4	100.4	100.0	100.0
0.60	100.5	100.3	100.3	100.0	100.1
0.80	100.4	100.4	100.4	99.9	100.1
1.00	100.5	100.3	100.4	99.9	100.1
2.00	100.5	100.4	100.4	100.0	100.1
4.00	100.5	100.3	100.0	99.7	99.7
6.00	100.3	100.0	100.0	100.0	99.6
8.00	100.0	100.0	99.6	100.0	99.6
10.0	100.0	100.0	99.6	100.0	99.3
20.0	99.5	99.5	99.5	100.0	98.5
30.0	99.5	99.4	98.9	100.0	98.2
Density, g/cc	1.20	1.06	1.07	1.07	1.93
Electron Density x 10 ²³ , per cc	3.863	3.434	3.470	3.488	5.956

1. ICRP 23, Report of the Task Group on Reference Man (1975).

2. Woodard, H.Q., White, D.R., *The Composition of Body Tissues*, The British Journal of Radiology (1986) 59: 1209-1219

High-Fidelity Simulation

Verify TPS corrections for heterogeneities

Intuitive patient positioning means no special set-up required

Measure dose at high-dose gradient areas and within critical structures

Compatible with any frame-based, head-and-shoulder mask or frameless positioning system

True End-to-End testing along entire treatment chain from Diagnostic Scanning and Treatment Planning to Dose Delivery

The Model 038 approximates the average male human head in both size and structure. STEEV includes detailed 3D anthropomorphic anatomy such as: skull, brain, vertebrae, larynx, trachea, sinus, nasal and oral cavities, spinal cord and teeth. The bones feature cortical and trabecular separation. C1-C7 vertebrae are present and include spinal disks. The teeth include distinct dentine, enamel and root structure. The maxillary and mandibular nerves are present. The sinus cavities are fully open and include sphenoid, frontal, and maxillary sinuses.

These internal details provide a most realistic clinical simulation to evaluate the challenging effects of complex intra- and extra-cranial anatomies. Two cylindrical holes in the neck provide ion chamber access to the rectangular brain cavity. The detailed internal structure and location of these access holes enable users to verify dose within critical structures and high dose-gradient regions of interest, such as the bone/soft tissue interface.



A removable skull vertex provides access to a rectangular brain cavity that receives interchangeable QA and dosimetry inserts. The phantom may remain set up on the treatment couch in either the positioning cradle or any patient fixation device while interchanging inserts (above: STEEV shown with positioning cradle)



Model 038-29, Adapter for Model 038 STEEV and Leksell® Frame G shown above. Model 038-29 is compatible with all optional components of the Leksell Coordinate Frame G, including MRI Indicators and various adapters including the Gamma Knife Adapter.

Model 038-29 is MRI Safe.



*Leksell® Coordinate Frame G is a registered trademark of Elekta (Stockholm, SE)

Intuitive Setup

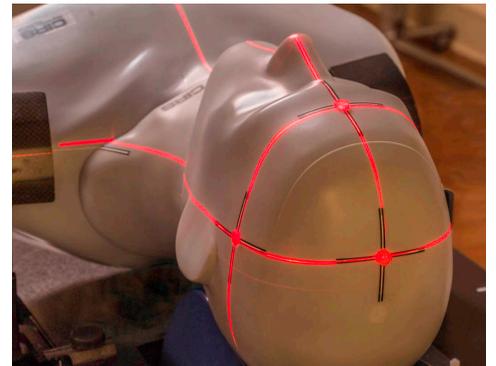
ALIGNMENT

Both the head and neck have laser alignment marks to position the isocenter of the rectangular brain cavity with the system lasers, including when the Model 038 is used with an SRS mask. Additionally, there are four MRI/CT fiducials positioned at cross-hair centers in an axial plane and one at the vertex of the head. Another fiducial is embedded in a rod insert that aligns with the vertex fiducial when positioned in one of two access holes. Together all six fiducials create an orthogonal, three-axis system of coordinates with the coordinate origin

matching a target location in the rectangular brain cavity.

MRI/CT fiducials contain ceramic BB encapsulated in proprietary gel that provides MRI signal for any sequence, including fat saturated.

The rectangular brain cavity is positioned parallel to the clinically relevant Frankfort Plane (FP). When STEEV is aligned with the machine lasers, the FP matches with the axial plane inside the gantry.

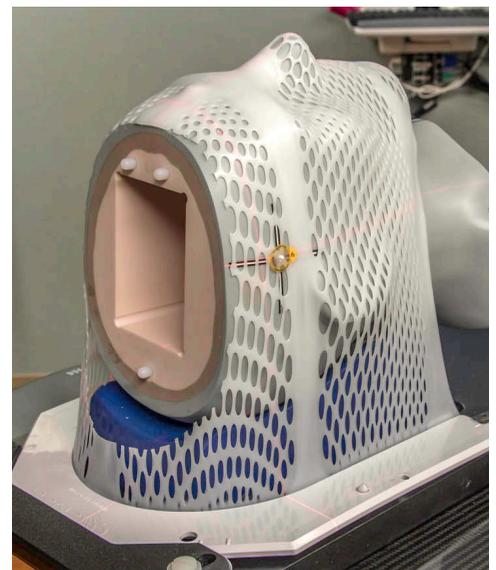


FIXATION WITHOUT EXTRANEIOUS INTERFACES

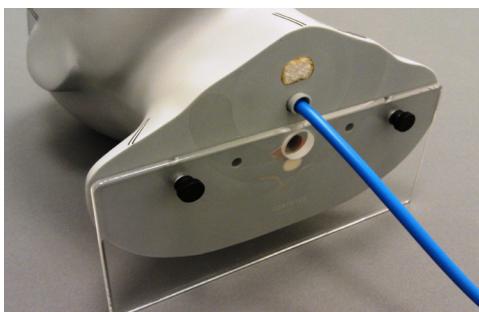
STEEV's anthropomorphic exterior allows for use of multiple positioning and fixation devices as used in clinical applications, including intuitive patient positioning with stereotactic frames, frameless systems, and head and neck masks. STEEV does not require any additional mechanical interfaces between the phantom and the positioning

systems that would not be used in a clinical setting.

The removable skull vertex provides access to the rectangular brain cavity that receives interchangeable QA and dosimetry inserts. The phantom may remain set up on the treatment couch while interchanging inserts.



Optional shoulders allow use of various masks and shoulder brackets. They attach via nylon rods and allow for inferior insertion of ion chambers. The shoulderes are made of homogeneous, soft-tissue equivalent material and do not include internal anatomy.



An Alignment Plate is included with every phantom to stabilize phantom on the treatment couch for ease of positioning and alignment with lasers independent of any immobilization devices.



An optional cradle allows easy access to the brain cavity for exchanging inserts without compromising phantom set-up.

Interchangeable Inserts

STEEV allows users to perform three essential QA applications for SRS systems: End-to-end machine QA, patient QA and radiation alignment QA. In order to facilitate required system checks for each of these applications, STEEV accommodates fourteen interchangeable inserts. Cubic brain equivalent inserts enable measurement of

dose delivered at ISO center and off-ISO center positions using micro- and pinpoint ion chambers, film, MOSFET, TLD, OSL (nanoDOT) and 3D gel. When used in concert with the various imaging inserts for CT, MRI and PET, STEEV provides the most comprehensive end-to-end testing and QA solution for SRS systems.

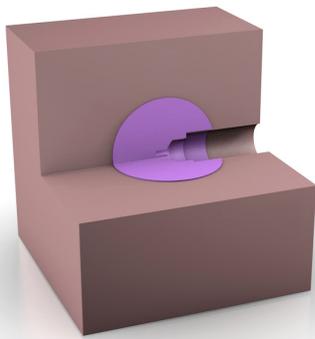
ION CHAMBER TARGET DOSIMETRY KIT

MODEL 038-03-CVXX-XX*

The Ion Chamber Dosimetry Kit includes a brain-equivalent insert containing a tissue-equivalent, 30 mm diameter spherical target. The insert is machined to receive an ion chamber at the center of the target for final dosimetry measurements during end-to-end

testing. The Model 038-03 allows ion chamber dosimetry in a tissue-equivalent spherical target that matches the MRI/PET/CT Spherical Target Insert (038-11) both in location and dimension. This insert may be used in two positions within the brain cavity that space the

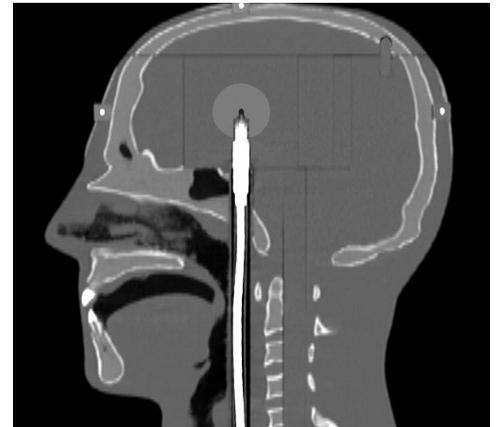
target isocenter 30mm in the anterior-posterior direction. A solid cavity plug with ceramic BB at ISO center allows for chamber localization during treatment planning. A soft-tissue equivalent sleeve helps minimize air gaps around the ion chamber stem.



Features:

- Ø30 mm Spherical target with +5% contrast
- Receives user selected small-volume ion chambers
- Includes brain-equivalent cavity plug with Ø2.5 mm point fiducial

*When ordering, specify cavity code. For complete list of ion chamber cavity codes, please refer to www.cirsinc.com/support.



CT of ion chamber in anterior position.

VARIABLE POSITION ION CHAMBER DOSIMETRY KIT

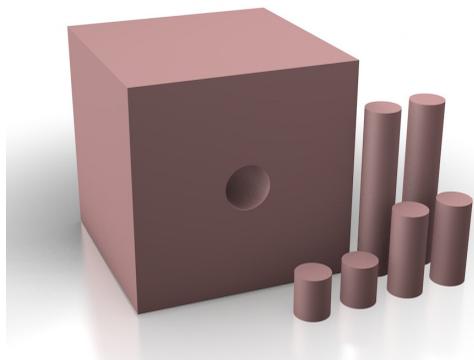
MODEL 038-04-CVXX-XX*

Kit allows for dosimetry measurements at different locations through the brain and neck during patient treatment plan QA. This can be achieved using two parallel channels that are drilled through the phantom 30mm apart in the Inferior-Superior direction. The Posterior channel runs through the spinal cord and anterior hole is drilled in the challenging, heterogeneous, high dose-gradient region between the spine and trachea. The central hole in the included brain-equivalent cube can be aligned with anterior or posterior channels by positioning accordingly in the brain cavity. Dosimeters can be placed in

one channel through the neck and brain and inside the other channel through the neck only. In this configuration, two dosimeters could be used simultaneously for tumor and organ-at-risk dosimetry. A set of the brain-equivalent spacers, designed to fit through the channels, helps to minimize air influence during the dosimetry measurements. Spacers measure between 50mm and 5mm long to allow 5mm incremental detector positioning. The set of spacers includes one spacer with tip drilled for customer-specified chamber to provide the best measurements conditions around detector's sensitive volume.

Two dosimeters could be used simultaneously for tumor and spare organ dosimetry. See CT reconstruction picture.

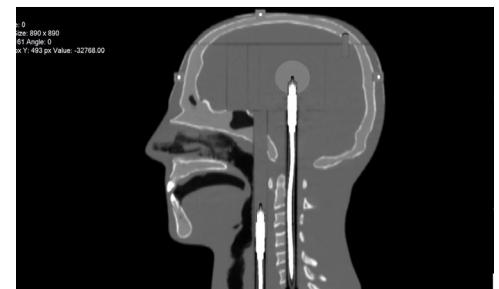
A cavity plug with a ceramic BB in ISO center, which can be identified by a black ring around the tip of the plug, allows for chamber localization during treatment planning. Two soft-tissue-equivalent sleeves also help to minimize air gaps around the ion chamber stem and cable for measurements outside the brain. A solid cavity plug can be used to fill the cavity if BB in the ISO center not needed.



Features:

- Incremental ion chamber positioning through trachea and spinal cord
- Accommodates small-volume ion chambers
- May be used with 038-03 for simultaneous dose measurements within brain and neck

*When ordering, specify cavity code. For complete list of ion chamber cavity codes, please refer to www.cirsinc.com/support.



Included with 038-04-CVXX-xx:

1. Spacer Plugs, 2. Drilled cavity spacer,
3. Cavity plug with BB, 4. Solid Cavity plug.

Interchangeable Inserts

GEL DOSIMETRY CASSETTE INSERT

MODEL 038-22



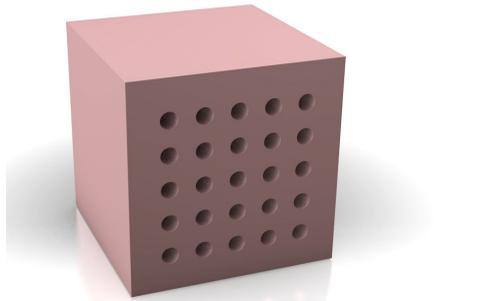
Features:

- Assess 3D dose distribution
- Barex® container contains no oxygen

The Gel Cassette Insert comprises a brain-equivalent cube that receives a disposable gel container (CIRS Model B6) designed for small volume 3D dosimetry. The container is approximately 5cm diameter x 5cm long.

TLD DOSIMETRY INSERT

MODEL 038-06



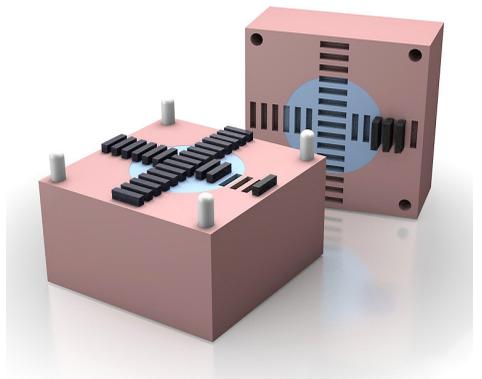
Features:

- Provides 2D or 3D dose verification
- Receives TLD chips, rods, bars cubes and disks
- Ø5 mm through holes in a 1cm x 1cm grid pattern

The TLD Dosimetry Insert allows 2D and 3D dose verification using TLDs. The insert consists of a brain-equivalent cube drilled in a 1 cm X 1cm grid pattern of 5mm diameter through holes. Each hole is filled with a 5mm diameter brain-equivalent solid plug for use for TLDs placement. TLD can be positioned between plugs at the desired depth within each hole. Tissue-equivalent plugs cast to precisely receive TLD chips, rods, bars and cubes are available separately.

MULTIPLE OSL DOSIMETRY TARGET INSERT

MODEL 038-08



Features:

- Drilled for nanoDot™ OSL spaced 4.1 mm apart in two orthogonal directions
- Allows 3D measurements by rotating
- Measurements in embedded soft-tissue target and penumbra
- Easy insertion and removal of nanoDot™ OSL Dosimeters with no air gaps

The Multiple-OSL Dosimetry Target Insert enables 2D point-to-point dosimetry in two orthogonal directions both inside the target and penumbra using Landauer nanoDots™. By rotating the insert in 3 orthogonal directions, it also enables 3D dosimetry.

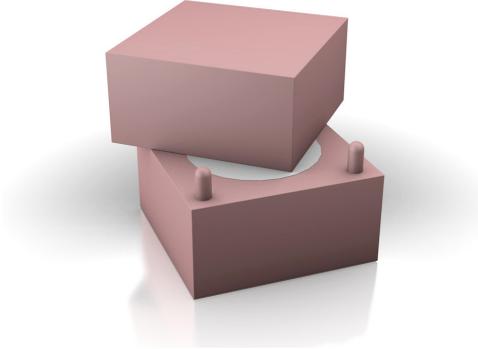
Model 038-08 consists of a brain-equivalent cubic insert with a 30 mm diameter spherical target with +5% contrast. The insert receives 27 OSL dosimeters through the center plane of the sphere. Cube is assembled using four pinholes with an off-set arrangement that allows for consistent assembly. External marks machined outside both halves make it easy to align when assembled.

*NanoDot™ is a trademark of Landauer (Glenwood, IL)

SINGLE FILM DOSIMETRY TARGET INSERT

MODEL 038-05

The brain-equivalent cubic insert includes a 30 mm diameter spherical target with +5% contrast. It receives a single piece of radiochromic film through the center plane of the sphere. CIRS Precision Cut EBT3 Film is available in kits of 20 (Model 158200-09-20)

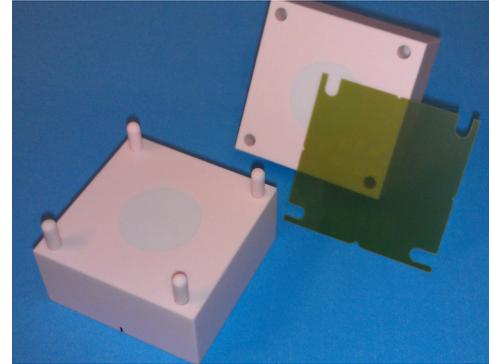


and 50 (Model 158200-09-50) to save valuable time. The film can be positioned in the axial, sagittal or coronal orientation and allows for the presence of a target volume through all stages of the treatment process. Cube is assembled using four pinholes with an off-set

Features:

- Ø30 mm Spherical target with +5% contrast
- Receives a single film through center plane
- Orient film in axial, sagittal or coronal planes

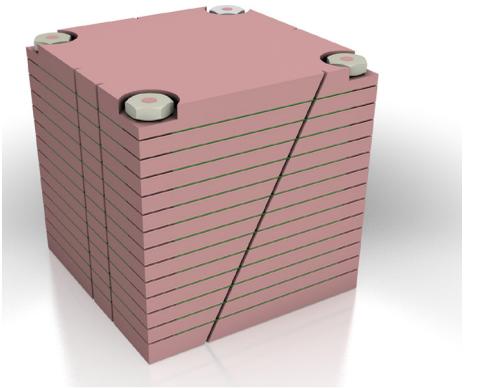
arrangement that allows for consistent assembly. External grooves machined outside both halves make it easy to mark film for accurate image registration. This also helps for easy assembly.



FILM STACK DOSIMETRY INSERT

MODEL 038-21

The Film Stack Insert is a brain-equivalent cube for use in small-volume dose mapping with film. The Film Stack can be used for treatment plan verification of targets in different shapes and sizes, including multi-metastasis targets. The Film Stack accommodates 13 layers of radiochromic film with 4mm

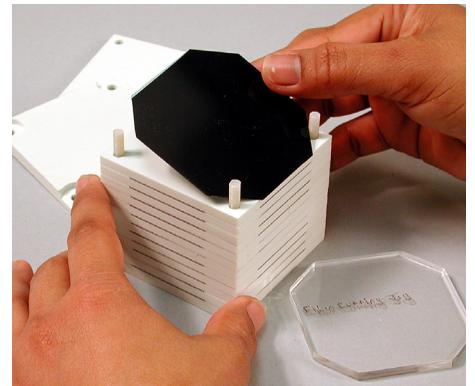


thick spacers in between each film. To keep dimensional integrity, the Film Stack comes with replacement plastic sheets. To optimize use of film, it is recommended plastic sheets be replaced with film only where necessary. CIRS Precision Cut EBT3 Film is available in kits of 20 (Model 158200-09-20) and

Features:

- Provides small volume dose mapping in axial, sagittal and coronal planes
- Verifies multi-lesion, single ISO center treatment plans
- Accommodates 13 films with 4 mm spacing
- Designed to allow x,y, and z registration when viewing individual films

50 (Model 158200-09-50) to save valuable time. External grooves allow for film edge markings to enable x, y, and z image registration for dose analysis. The Film Stack may be placed within the brain cavity in axial, sagittal or coronal orientation.



SINGLE SLICE FILM INSERT WITH FIDUCIALS

MODEL 038-27



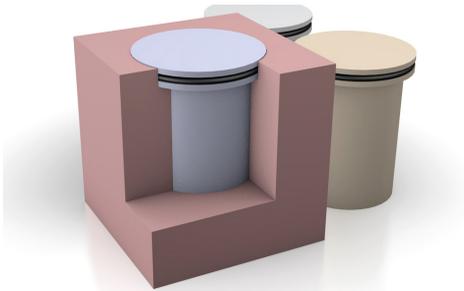
Features:

- Ø30 mm Spherical target with +5% contrast
- Receives a single film through center plane
- Receives pin-point ion chamber in one half of the sphere
- Steel fiducials allow for accurate film registration

The brain-equivalent cubic insert includes a 30 mm diameter spherical target with +5% contrast. It receives a single piece of radiochromic film through the center plane of the sphere. A pin-point ion chamber cavity is machined into half of the target sphere allowing simultaneous measurements of absolute dose & dose distribution inside the target. Film can be positioned inside the 5mm deep pocket which contains 6 stainless steel fiducials asymmetrically placed. Fiducials provide a means for easy treatment plan registration.

ELECTRON DENSITY CUBE WITH REMOVABLE VIAL

MODEL 038-09



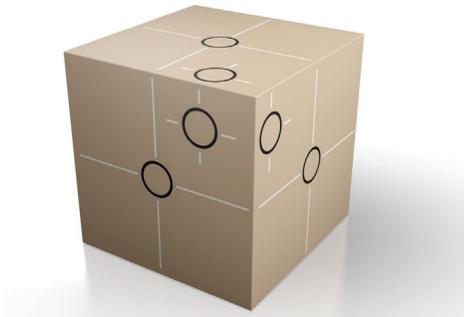
Features:

- Perform CT number to electron density calibrations
- Comes standard with 1" diameter vial for real water measurements
- Compatible with all Model 062M Electron Density reference plugs

The brain-equivalent cubic insert includes a water-equivalent electron density plug surrounding a removable 1" diameter vial surrounding a removable 1" diameter vial surrounding a removable 1" diameter vial. The insert can accommodate any of the standard electron density plugs offered with CIRS Electron Density Phantom (Model 062M). Additional plugs, including high-density options, can be purchased separately. The Electron Density Cube is useful for refining CT number to electron density calibrations.

WINSTON LUTZ CUBE WITH Ø5MM CENTROID AND OFF-CENTER TARGETS

MODEL 038-10



Features:

- Ø5 mm tungsten BB fiducial at the centroid
- Ø5 mm target offset from center

The brain-equivalent cubic insert contains a 5 mm diameter tungsten BB at the centroid and an additional 5 mm BB that is offset from center in three orthogonal planes at x-y-z distances of 15 mm, 20 mm, and 25 mm respectively. The insert facilitates isocenter verification (Winston Lutz) and couch shift localization/repositioning. The insert can be used by itself or inside the head for "blind" Winston Lutz tests.

Interchangeable Inserts

MRI/PET/CT SPHERICAL TARGET INSERT

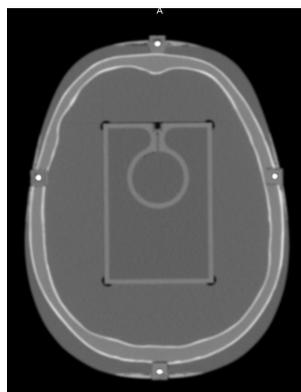
MODEL 038-11

The insert facilitates multi-modality image reconstruction tests. Its 30 mm diameter spherical tumor volume allows for assessment of image and reconstruction integrity when images are moved among different imaging systems. This insert is designed to work together with the "matching target" in the Ion Chamber Target Dosimetry Kit (038-06-CVXX-xx) and Single Film Target Dosimetry Insert

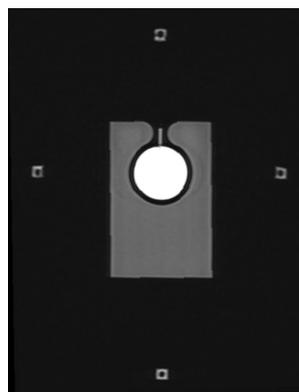
(Model 038-05). The series of interchangeable inserts enables enhanced end-to-end testing of image acquisition, planning and delivery. Spherical target volume and rectangular insert volume can be individually filled through separate fill ports using MRI or PET compatible liquids. Cube is aligned with external MRI/CT fiducials.

Features:

- Use in tandem with other spherical target inserts
- Target volume and surrounding region can be filled separately.



Axial CT



Axial MRI TSE-T1



Axial MRI TSE-T2

MRI/PET/CT ORGANIC TARGET INSERTS FOR DEFORMABLE IMAGE REGISTRATION

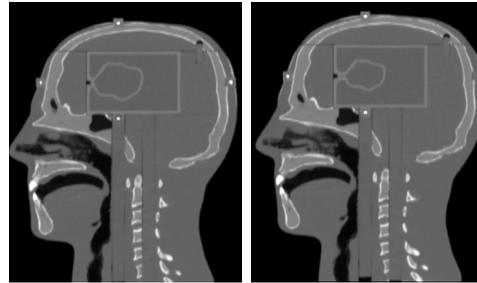
MODEL 038-12 & 038-13

Two MRI/PET/CT Organic Target Inserts are available for experimental testing of TPS deformable image registration and transformation algorithms. The Model 038-12 contains an organic shaped target of 25cc internal

volume. In Model 038-13 the same organic target shape is isotropically reduced to a 12.5cc internal volume. Both targets contain the same central position relative to the phantom's external MRI/ CT fiducials. The target volumes and rectangular volumes can be filled individually through separate fill ports using MRI or PET compatible liquids.

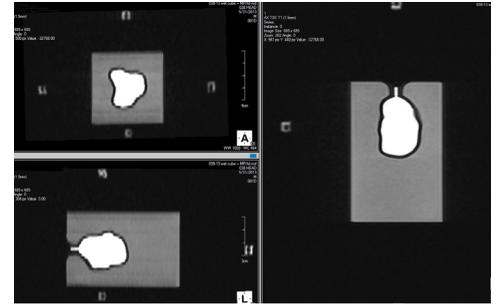
Features:

- 25cc organic target and isotropically reduced 12.5 cc targets in two interchangeable inserts
- Assess TPS deformable image registration and transformation algorithms
- Target and volume each fillable with MRI or PET compatible liquids



25cc Organic Target CT

12.5cc Organic Target CT



12.5 cc- MRI TSE T1 Organic Target

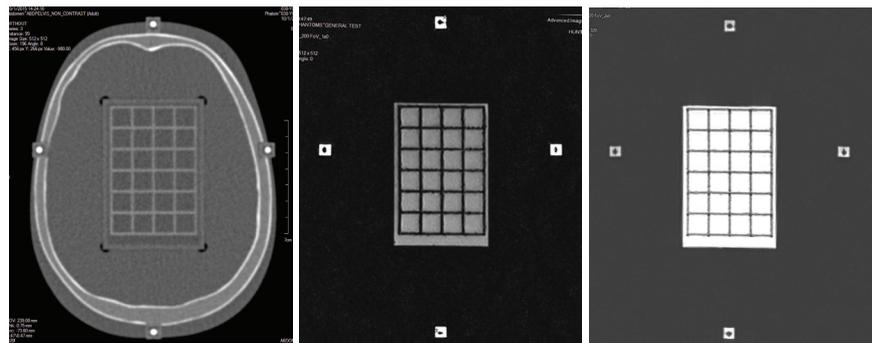
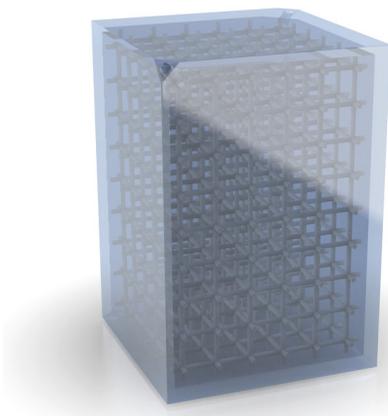
MRI/PET/CT SPATIAL 3D DISTORTION INSERT

MODEL 038-14

The MRI/PET/CT Spatial 3D Distortion insert contains a 3D grid (13 x 13 mm spacing) of \varnothing 1.6 mm high contrast wire (more than 200HU). The insert can be filled with MRI or PET compatible liquids. It provides a single, precise tool to check image fusion and image distortion across multiple modalities. To align internal grid with external MRI/CT fiducials, please position insert with fill ports facing back of head.

Features:

- Quick and intuitive image fusion algorithm verification
- Can be used in tandem with external fiducials for 3D distortion assessment



CT Axial

MRI TSE-T1

MRI TSE-T2

Interchangeable Inserts

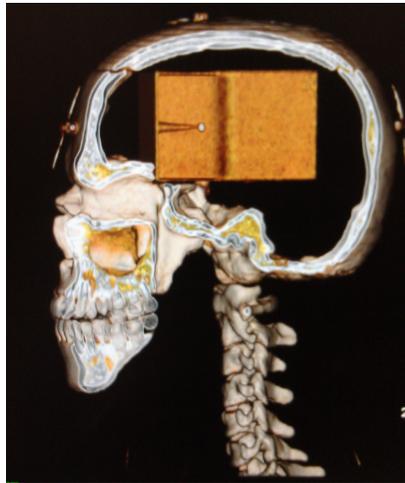
MRI/PET/CT ISO CENTER INSERT

MODEL 038-15

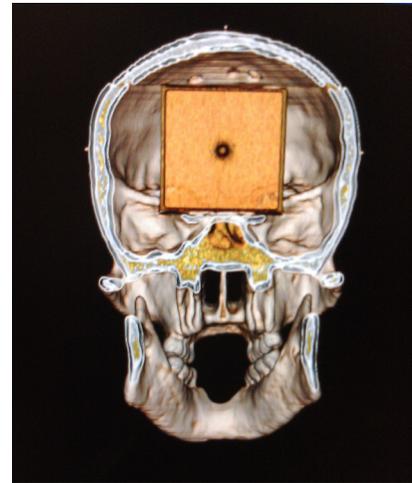
This rectangular insert features a 3.2 mm diameter ceramic BB at ISO center aligned to the phantom's external MRI/CT fiducials. The insert can be filled with MRI or PET compatible liquids. Insert can be used alone or in combination with other imaging inserts to evaluate image fusion functions of treatment planning systems.

Features:

- Assess isocenter alignment accuracy during image fusion
- Fillable with MRI or PET compatible liquids
- Contains ceramic fiducial at ISO center when aligned to phantom's external MRI/CT fiducials



CT Saggital Recon.

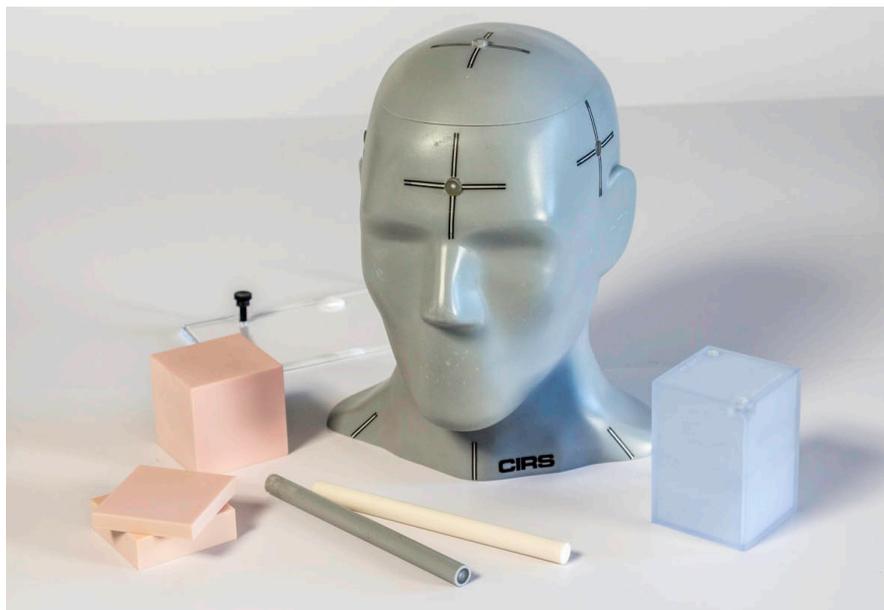


CT Coronal Recon.

The Standard Model 038

THE STANDARD MODEL 038 INCLUDES:

- Phantom head and neck with external fiducials and markings
- Three brain equivalent spacers to fill rectangular intercranial cavity
- Two tissue-equivalent rods to fill cylindrical channels (one includes MRI/CT fiducial)
- MRI/CT/PET ISO Center Insert
- Neck alignment plate
- Foam-lined carry case
- User guide and warranty.



Optional Configurations

SRS MACHINE QA

- Ion Chamber Target Dosimetry Kit
- Single Film Target Dosimetry Insert
- MRI/CT/PET Spherical Target Rectangular Insert
- MRI/CT/PET Spatial 3D Distortion Insert
- MRI/CT/PET Organic Target Rectangular Inserts
- Electron Density Cube with Removable Vial
- Adapter for Model 038 STEEV and Leksell® Frame G

During the commissioning process, SRS systems require QA testing of the entire treatment chain to include positioning and fixation, diagnostic imaging in CT, MRI and/or PET, treatment planning, and dose delivery verification. STEEV's uniquely anthropomorphic design allows for easy transition throughout this process. Users can easily change between dosimetry, image fusion, TPS deformable image registration, and electron density inserts while STEEV remains in position. A series of inserts with identical 30 mm diameter spherical targets allow for target consistency during dose measurements and MRI/CT/PET image-fusion making them ideal for end-to-end testing. Geometric and organic target inserts provide means for comprehensive image QA, geometric machine QA and TPS QA for increased confidence in system performance.

PATIENT-SPECIFIC QA

- Variable Position Ion Chamber Dosimetry Kit
- Film Stack Dosimetry Kit
- TLD Dosimetry Kit
- Gel Cassette Dosimetry Insert
- Adapter for Model 038 STEEV and Leksell® Frame G

To evaluate patient specific QA, STEEV accommodates inserts without targets so that users can validate dose delivery to unique patient target volumes. Inserts facilitate dosimeter placement at multiple locations within the brain, other critical structures such as the spine and within challenging high-dose gradient regions in the neck. Inserts are compatible with a wide range of dosimeters so users can implement patient QA protocol using dosimeters they already own.

RADIATION ALIGNMENT QA

- Winston Lutz Cube with 5mm diameter Centroid and Off-Center Target
- Adapter for Model 038 STEEV and Leksell® Frame G

STEEV's radiation alignment QA inserts allow users to assess optical and geometric isocenter alignment to verify geometric accuracy.

MULTI-LESION TP QA

- Film Stack Dosimetry Kit

DEFORMABLE IMAGE REGISTRATION QA

- MRI/PET/CT Inserts with 25 cc & 12.5 cc Organic Target

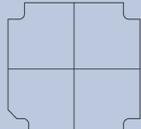
Model 038 Includes

PART NO.	DESCRIPTION
038	Stereotactic End-to-End Verification Phantom Patient (5.3 kg)
038-15	MRI/CT/PET ISO Center rectangular insert
038-23	Brain Equivalent Spacer (63.5 x 63.5 x 10 mm)
038-24	Brain Equivalent Spacer (63.5 x 63.5 x 20 mm)
038-25	Brain Equivalent Spacer (63.5 x 63.5 x 63.4 mm)
-	Solid Ø 12.7 mm posterior plug
-	Solid Ø 12.7 mm anterior plug with MRI/CT fiducial
-	Neck Alignment Plate
-	Foam-lined case
-	User Guide
-	48 Month Warranty

Optional Accessories

PART NO.	DESCRIPTION
038-01	Shoulders (additional 100 mm width, 5.7 kg)
038-02	ABS Vacuum formed cradle
038-03-CvXX-XX	Ion Chamber Dosimetry Kit: (1) 63.5 mm Cube with Ø30 mm Spherical that accommodates Ion Chamber at the center Cavity, (1) Ø12.7mm Sleeve for adapting Ion chamber, ((1) Solid plug with Ø 2.5 mm aluminum oxide BB in ISO center, (1) Solid plug
038-04-CvXX-XX	Variable Ion Chamber Position Dosimetry Kit: (1) 63.5 mm Cube with central thru hole, (2) Ø12.7 mm Sleeves for adapting Ion chamber, (1) Solid cavity plug with Ø 2.5 mm aluminum oxide BB in ISO center, (1) Solid cavity plug, (1) Spacer plug set to accommodate ion chamber at different positions
038-21	Film Stack
038-05	Film Cube for Single Film Dosimetry with Ø30 mm target
038-06	TLD Dosimetry Cube
038-08	Multiple-OSL DosimetryCube with 30 mm target
038-09	Electron Density Cube to accommodate 062M Electron Density plugs. Loaded with 062MA-39 Water-fillable Electronic Density Plugs
038-10	Winston Lutz Cube with Centroid & Offset Ø5mm targets
038-11	MRI/CT/PET Target rectangular insert with Ø30mm target
038-12	MRI/CT/PET Target rectangular insert with 25 cc Organic target
038-13	MRI/CT/PET Target rectangular insert with 12.5 cc Organic target
038-14	MRI/CT/PET Spatial 3D Distortion rectangular insert
038-20	SRS Frame Support Cups, Set of 4
038-22	Gel Dosimetry Cassette (includes B6 Gel Container)
038-27	Single Slice Film Cube With Fiducials, 30mm Spherical Target & Ion Chamber cavity for Model 038
038-29	Adapter for Model 038 STEEV and Leksell Frame G

CIRS Precision Cut Film

PART NO.	DESCRIPTION	SCHEMATIC/ ORIENTATION
158200-09-20	Precision Cut EBT3 Film Kit for Model 038-05, 038-21, 002FC, (Set of 20)	
158200-09-50	Precision Cut EBT3 Film Kit for Model 038-05, 038-21, 002FC, (Set of 50)	

Warranty

All standard CIRS products and accessories are warranted by CIRS against defects in material and workmanship for a period as specified below. During the warranty period, the manufacturer will repair or, at its option, replace, at no charge, a product containing such defect provided it is returned, transportation prepaid, to the manufacturer. Products repaired in warranty will be returned transportation prepaid.

There are no warranties, expressed or implied, including without limitation any implied warranty of merchantability or fitness, which extend beyond the description on the face hereof. This expressed warranty excludes coverage of, and does not provide relief for, incidental or consequential damages of any kind or nature, including but not limited to loss of use, loss of sales or inconvenience. The exclusive remedy of the purchaser is limited to repair, recalibration, or replacement of the product at manufacturer's option.

This warranty does not apply if the product, as determined by the manufacturer, is defective because of normal wear, accident, misuse, or modification.

Non-Warranty Service

If repairs or replacement not covered by this warranty are required, a repair estimate will be submitted for approval before proceeding with said repair or replacement

RETURNS

If you are not satisfied with your purchase for any reason, please contact Customer Service prior to returning the product. Call 800-617-1177, email rma@circsync.com, or fax an RMA request form to 757-857-0523. CIRS staff will attempt to remedy the issue via phone or email as soon as possible. If unable to correct the problem, a return material authorization (RMA) number will be issued. Non-standard or "customized" products may not be returned for refund or exchange unless such product is deemed by CIRS not to comply with documented order specifications. You must return the product to CIRS within 30 calendar days of the issuance of the RMA. All returns should be packed in the original cases and or packaging and must include any accessories, manuals and documentation that shipped with the product. The RMA number must be clearly indicated on the outside of each returned package. CIRS recommends that you use a carrier that offers shipment tracking for all returns and insure the full value of your package so that you are completely protected if the shipment is lost or damaged in transit. If you choose not to use a carrier that offers tracking or insure the product, you will be responsible for any loss or damage to the product during shipping. CIRS will not be responsible for lost or damaged return shipments. Return freight and insurance is to be pre-paid.

With RMA number, items may be returned to:

CIRS
Receiving
900 Asbury Ave,
Norfolk, Virginia, 23513 USA

PRODUCT	WARRANTY PERIOD
Model 038- STEEV Stereotactic End-to-End Verification Phantom Patient	48 Months

Model 038 Features

Tissue-equivalent within 1% actual attenuation of water and bone from 25 kV to 15 MV

11 optional Interchangeable cubic inserts

Suitable for use with MRI, CT, and PET

Optional shoulder attachments

Foam-lined Case

CIRS

COMPUTERIZED IMAGING REFERENCE SYSTEMS, INC.

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