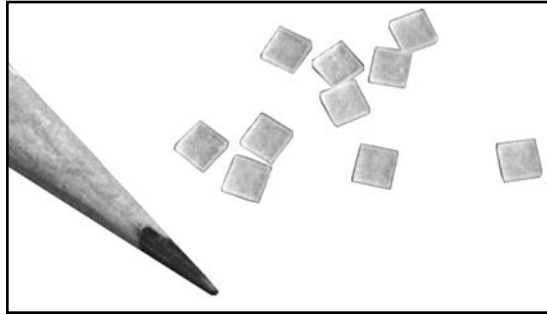


# TLD - CHIPS, FURNACE & ACC.; STEROTACTIC SYSTEM

## TLD-100 CHIPS



- **Optically transparent chips**
- **Simulate “point detector” in medical physics applications**
- **Reusable hundreds of times**
- **Independent of dose rate up to 100 MGy/s**
- **Long term response retention**
- **Nearly tissue-equivalent**
- **±15% sample-to-sample uniformity**
- **Repeatability to within 2% or better.**

### Approximate tissue equivalence

- Z - 8.14 (LiF )
- Z - 7.64 (AIR)
- Z - 7.42 (TISSUE)

Consistent, well-controlled and repeatable procedures are key to successful TLD. Variations in annealing temperature will affect dosimeter sensitivity.

When using TLDs, vacuum tweezers should always be used. Mechanical tweezers and fingers should not be used.

### Specifications

**Radiations Measured:** Photon - energies >5 keV,  
Neutron - thermal to 100 MeV  
Electron/beta - energies >70 keV

**Range:** 10 µGy to 1 Gy (1 mrad to 100 rad) linear  
1 Gy to 20 Gy (100 rad to 2000 rad) supralinear

**Tissue Equivalence:** Nearly tissue equivalent

**Fading:** <20% in 3 months without thermal treatment and <5% in 3 months using preheat or glow curve deconvolution

**Batch uniformity:** ±15% STD DEV from the batch mean

**Residual TL Signal:** <0.2% of reading, over the range, without annealing

**Repeatability:** for 1 mGy (100 mrad) <sup>137</sup>Cs doses, <2% STD DEV of 10 sequential measurements

**Reuse:** More than 500 per dosimeter with <10% sensitivity change

**Threshold:** <10 µGy (1 mrad) based on 2.26 STD DEV of 10 repeat readings of an unexposed dosimeter

**Material:** Lithium Fluoride LiF:MgTi

**Density:** 2.64 gm/cc

**Size:** 0.125" sq. x 0.035" (3.2 mm<sup>2</sup> x 0.9 mm)

**Temperature of Main TLD Glow Peak:** 195° C

**Sensitivity at Cobalt 60 Relative to LiF:** 1.0

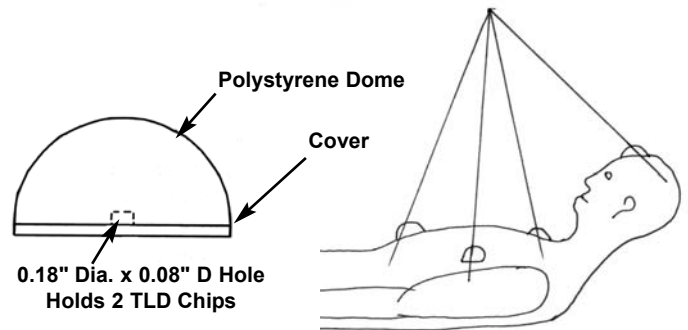
**Energy Response 30 keV/Cobalt 60:** 1.25

Item #	Description	Quantity
155-000-1	TLD-100 Chips	1
155-000-10	TLD-100 Chips	10
155-000-50	TLD-100 Chips	50
155-000-100	TLD-100 Chips	100

## POLYSTYRENE DOME TLD CHIP HOLDER



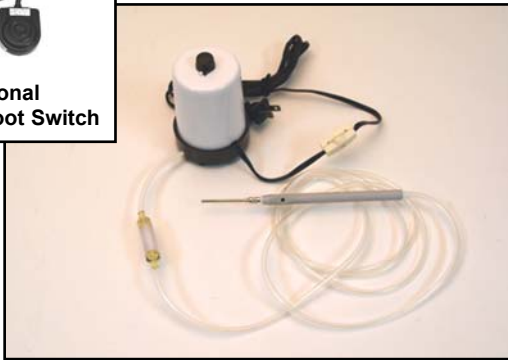
The Polystyrene Dome TLD Chip Holders can be positioned at any angle on the patient during treatment, allowing the radiation to pass through the same amount of thickness. Each TLD Holder holds two 0.125" square x 0.035" TLDs. The TLD Holder includes a 0.8 mm cover.



Item #	Description	Dome Diameter	Build-Up
155-010	TLD Holder	12mm	6 mm
155-020	TLD Holder	20 mm	10 mm
155-030	TLD Holder	30 mm	15 mm
155-040	TLD Holder	40 mm	20 mm
155-050	TLD Holder	50 mm	25 mm

# TLD - CHIPS, FURNACE & ACC.; STEROTACTIC SYSTEM

## VACUUM TWEEZERS SYSTEM



The Vacuum Tweezers System allows the handling of TLDs of varying sizes without risk of damage or contamination. This system eliminates defects caused by pinching, scratching or handling when using a mechanical tweezers. An optional Remote Foot Switch (Item 906-002) is available.

### Item 162-000 Vacuum Tweezers System Includes

- Compact vacuum generator with a line switch
- 4 feet of clear tubing
- Vacuum line filter
- Vacuum pen
- 3 needle tips (small, medium and large)

### Specifications

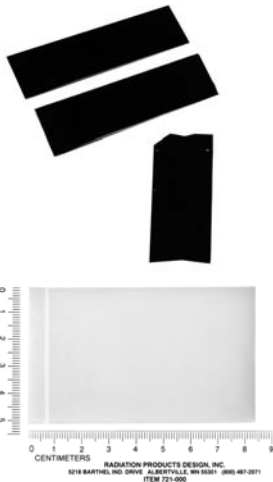
**Vacuum:** 14" Hg.

**Air Flow:** 125 in.<sup>3</sup>/min.

**Power:** 115 VAC, 60Hz, 2 watts or 220VAC, 50Hz

Item #	Description
162-000	Vacuum Tweezer System, 115V
162-002	Vacuum Tweezer System, 220V
906-002	Remote Foot Switch for Vacuum Tweezer System

## TLD PLASTIC BAGS AND BAG SEALERS



The TLD Plastic Bags are used with the Bag Sealer for sealing individual TLDs in plastic. The bags can then be placed in or on the patients by taping. Identification of TLD is accomplished by labeling or trimming the corner of the plastic bag.

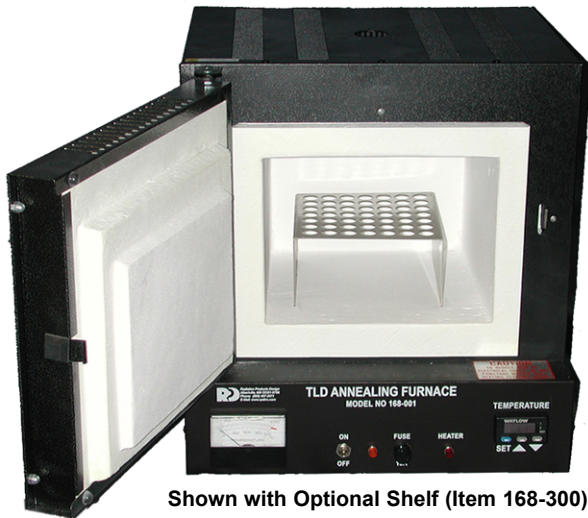
Plastic Bag Sealers are ready to use instantly - no warm up time is needed. The adjustable timer settings ensure a perfect seal for all thicknesses of bags.

Item #	Description	Size	Quantity
156-000	Black TLD Plastic Bags	1" x 3" x 0.015" (2.54 x 7.62 x 0.04 cm)	500
158-100	Clear TLD Plastic Bags	2" x 3" (5.08 x 7.62 cm)	500
161-001	Plastic Bag Sealer, 110V	4" (10.2 cm) Wide	

# TLD - CHIPS, FURNACE & ACC.; STEROTACTIC SYSTEM

## TLD ANNEALING FURNACE

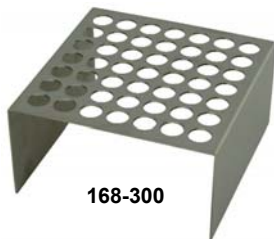
80°, 100° and 400° C



Shown with Optional Shelf (Item 168-300)



Face of Furnace



168-300

- No over temperatures at set points of 80°, 100° or 400°C
- Large inside volume for even heat distribution
- Furnace will reach 375-425° C in less than 15 minutes
- Independent pyrometer with type K thermocouple
- Control stability of ±1° C
- Cold junction compensation
- Long-life type J thermocouple
- If thermocouple opens, unit shuts down automatically
- Heater indicator
- Power indicator, switch and fuse
- No line interference with triac zero switching
- Hospital grade plug
- Ceramic tray protects fiber floor from gouging or scratching
- Non-skid rubber feet
- Fiber hardening agent included

Utilization of this solid state, closed-loop, automatic controlling system provides faster heat-up rates to a temperature setpoint in less than thirty minutes.

A rugged 18 gauge steel cabinet has an easy access side opening door hinged on nylon with a positive latching mechanism. The stepped fiber door insulation panel is spring mounted for optimum sealing when closed. A large interior chamber provides an even temperature distribution for the aluminum planchet. All steel cabinet surfaces are electrostatically coated with high-temperature baked-on enamel.

The heart of the furnace is a rugged, lightweight molded heating unit. The insulation material is space-age alumina-silica fiber. It's molded into a tough, one piece structure with a heavy duty (14 gauge ) heating element embedded in the top and three sides giving increased heat transfer. This provides even temperature distribution inside.

An integrated circuit temperature controller switches power on and off through a triac to the furnace heater. This temperature controller allows you to adjust the desired "Set" temperature. The red digital LED temperature display will indicate the furnace temperature within ±1° C.

Input to the controller is provided by a thermocouple (located in the furnace), which produces a millivolt signal representing furnace temperature. This signal is compared to a reference signal which is adjusted by the "Set" temperature. Any resultant error is amplified and conditioned to provide a switched DC logic signal to an optical coupled solid state relay using zero-cross-over firing pulses to a triac semi-conductor. This proportions power to the furnace heating unit with no line interference.

### Operating Instructions

Turn the power switch to "ON". After an initial adjustment of the "Set" temperature, a red heater indicator lamp will illuminate, indicating power is being applied to the "Heater" in the furnace. A digital display indicates the furnace temperature. After the furnace heats up to the appropriate temperature, open furnace door and place TLD aluminum planchet on shelf then close door. Wait 30 seconds for thermocouple sensor to heat up to furnace temperature then turn furnace on. Leave TLD's in furnace for about 1 hour or until temperature is reached. Allow 20 minutes soaking time for aluminum planchet. Turn power off and remove planchet from furnace. Place planchet between two brass cooling plates to cool down rapidly.

### Specifications

**Maximum Operating Temperature:** 1100° C  
**Oven Dimensions:** 9" W x 9" D x 6.5" H and Tapered 1/4" (22.86 x 22.86 x 16.51 cm and tapered 0.64 cm)  
**Overall Dimensions:** 15.5" W x 15.5" D x 16.5" H (39.37 x 39.37 x 41.91 cm)  
**Color:** Black  
**Power:** 110-120 VAC, 50/60 Hz, 13 amps, 1460 watts  
**Power:** 220-240 VAC, 50/60 Hz, 6.5 amps  
**Shipping Weight:** 46 lb (20.9 kg)  
**Optional Stainless Steel Shelf:** 6" W x 6" D x 3" H (15.24 x 15.24 x 7.62 cm)

Item #	Description
168-001	TLD Annealing Furnace - 120 VAC, 13 amps
168-002	TLD Annealing Furnace - 220 VAC, 6.5 amps
168-300	Stainless Steel Shelf

Z

# TLD - CHIPS, FURNACE & ACC.; STEROTACTIC SYSTEM

## TLD ROD AND CHIP ANNEALING PLANCHET



159-000



163-002



163-000

They are furnished with two holes on one end for the Planchet Handle (Item 163-002). An acrylic storage cover with two thumb screws provides a secure way to retain the chips or rods in their locations after cool down.

### TLD Procedure

- Bake TLD chips at 400° C for 1 hour, then quench between Brass Cooling Plates (Item 164-000)
- Bake TLD chips at 80° C for 16 to 24 hours or 100° C for 2 hours
- Expose to radiation
- The TLD reader preheat cycle is set at 100° C
- The TLD's should be read under a low amount of nitrogen, either 1.88 SLPM (Standard Liters Per Minute) or 4 SCFH (Standard Cubic Feet Per Hour).

### Specifications

**Material:** Anodized Aluminum

**Size:** 10 cm x 12 cm x 6.3 mm

### Note

To clean the holes, use Q-tip® swabs. Bake the planchet for 4 hours at 400° C before using. The aluminum planchet will not deposit aluminum on the TLD chips or rods.

**Z** The TLD Annealing Planchets are engraved with numbers 1 to 10 across the top. The rod planchet is engraved with numbers 11, 21, 31, and 41 on the side, and the chip planchet is engraved with numbers 11, 21, 31, 41, 51, 61, 71, 81 and 91 on the side, indicating chip locations.

The specially machined holes (3/16" diameter) allow good thermal contact of the rods and chips providing rapid cooling when placed between the brass cooling plate set (Item 164-000), as required by the Cameron Annealing Technique.

Item #	Description	Holds
159-000	TLD Rod Annealing Planchet with Acrylic Cover	50 (1 mm x 6 mm) Square or Round TLD Rods
163-000	TLD Chip Annealing Planchet with Acrylic Cover	100 1/8" Square Chips or 100 4.7 mm Diameter Round TLDs
163-002	Stainless Steel Planchet Handle	

## BRASS COOLING PLATE SET



The Brass Cooling Plate Set is used to rapidly cool down the TLD planchet containing the TLD's. After 400° C annealing the Brass Cooling Plate Set can cool the TLD planchet to 95° in 25 seconds. The top cooling plate has a large heavy duty handle.

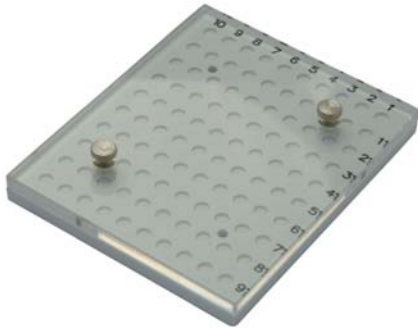
### Specifications

**Size:** 6" L x 6" W x 1" T (15.24 x 15.24 2.54 cm)

Item #	Description
164-000	Brass Cooling Plate Set

# TLD - CHIPS, FURNACE & ACC.; STEROTACTIC SYSTEM

## TLD EASY TRANSFER STORAGE HOLDER



The TLD Easy Transfer Storage Holder provides for an easy transfer to the annealing planchet. The Storage Holder measures 10 x 12cm and is compatible with TLD Rod Annealing Planchet (Item 159-000) and TLD Chip Annealing Planchet (Item 163-000). The numbers on the storage holder are opposite of the planchet numbers. The TLD Easy Transfer Storage Holder also has an acrylic cover to protect TLDs from dust.

To transfer TLD's to the storage holder, line up the numbers on the planchet and storage holder, fasten storage holder to annealing planchet and turn over. Remove annealing planchet and fasten storage holder cover.

Item #	Description	Material	Holds
163-010	TLD Easy Transfer Storage Holder	Polystyrene	100 - 1/8" (3.175 mm) square chips or 4.7 mm diameter round chips
163-013	TLD Easy Transfer Storage Holder	Acrylic	50 - 1 mm x 6 mm square or round rods or 13 mm diameter disks

## TLD IRRADIATION PHANTOMS

### Polystyrene Phantoms



The TLD Polystyrene Irradiation Phantom consists of 2 plates. The TLD phantom is numbered 10 to 1 across the top. The left side of the TLD phantom is numbered 11 to 91 for TLD chips or 11 to 41 for TLD rods. This numbering matches the annealing planchet when the irradiation phantom is flipped. The area that holds the chips or rods is 8.5 cm x 10.5 cm centered on the polystyrene plate.

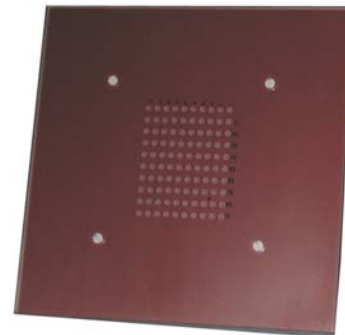
The 6 mm polystyrene cover is secured to the bottom plate which holds TLDs in the individual holes. The plates can be separated for easy cleaning.

#### Specifications

**Size:** 1.43 cm x 25 cm sq. (9/16" x 9.8" sq)

Item #	Description
165-000	Polystyrene Phantom for TLD Chips
167-000	Polystyrene Phantom for Rods

### Plastic or Solid Water Phantom



The Plastic or Solid Water TLD irradiation phantoms consist of a 5 mm phantom plate and a 1/4" acrylic cover. These are numbered the same as the Polystyrene Irradiation Phantom and will hold 100 TLD chips or 50 TLD Rods.

#### Specifications

**Size:** 5 mm x 30 cm sq.

Item #	Description
165-005	Plastic Water Phantom for Chips
165-010	Solid Water Phantom for Chips
167-005	Plastic Water Phantom for Rods
167-010	Solid Water Phantom for Rods

**Custom Units Available**

# TLD - CHIPS, FURNACE & ACC.; STEROTACTIC SYSTEM

## STEREOTACTIC COLLIMATOR SYSTEM



Z

The Stereotactic Collimator System is custom made for each customer. The customer must select the options wanted.

The tray is made to be placed in the wedge tray slot. An X-Y translation stage tray allows for adjustment of the collimator barrel in the X-Y directions. The collimator barrel attaches to either the wedge tray or the X-Y translation stage tray.

The collimator barrel has an outside diameter of 7 cm with an inside diameter of 6.3 cm. The length of the barrel is specified by the customer. With short collimator barrels the lead collimators insert from the top of the barrel (the barrel unscrews from the tray). Long collimator barrels have a screw on bottom which is taken off to insert the lead collimator from the bottom. A test collimator will be sent to determine divergence prior to manufacturing.

### Optional Accessories

X-Y pointer system (Item 1080-06), or a stereotactic front pointer (Item 1080-08). The stereotactic front pointer has a magnetic base that will attach to the collimator barrel or Item 1081-73 Stereotactic Film Holder.

The Stereotactic Film Holder has a ring clamp that mounts to the collimator barrel of the Stereotactic Collimator System. The removable rod extends past isocenter. A film holder plate slides onto the rod and is adjustable to the proper distance, a tightening screw will hold the film holder plate in place. Two spring clips on the film holder plate holds the film.

### Stereotactic Collimator System Includes

- Tray
- Translation Stage Tray
- Barrel

When placing an order, please provide the following information:

- Item 1080-\_\_
- Machine
- Machine Type
- Target to Bottom of Wedge Tray Slot in centimeters
- Target to End of Collimator Barrel in centimeters
- Contact Information

The contact person will have to verify all information prior to manufacturing.

Item #	Description
1080-20	Varian Type II, Screw Coded with X-Y Stage, Wedge Slot
1080-21	Varian Type III, Digital Coded with X-Y Stage, Wedge Slot
1080-30	Siemens Screw Coded with X-Y Stage, Wedge Slot
1080-32	Siemens Digital Coded with X-Y Stage, Wedge Slot
1080-06	X-Y Pointer System
1080-08	Stereotactic Front Pointer
1081-73	Stereotactic Film Holder

**Other Manufacturers Available**  
Items are Custom Made and Nonreturnable

## LEAD COLLIMATORS



The lead collimators have a lip at the bottom which fits into the barrel to insure proper placement of the lead collimator.

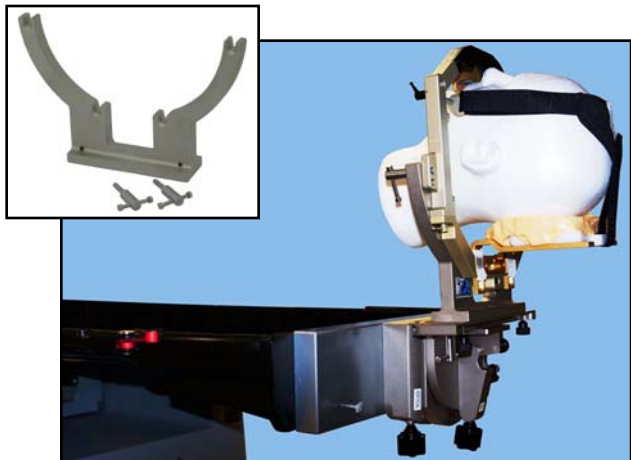
The lead collimators are custom designed for each machine based on field size, flatness, and the slope angle of the radiation penumbra edge.

Item #	Stereotactic Lead Collimator
1081-05	Diameter at Isocenter 5 mm
1081-08	Diameter at Isocenter 8 mm
1081-10	Diameter at Isocenter 10 mm
1081-15	Diameter at Isocenter 15 mm
1081-20	Diameter at Isocenter 20 mm
1081-25	Diameter at Isocenter 25 mm
1081-30	Diameter at Isocenter 30 mm
1081-35	Diameter at Isocenter 35 mm
1081-40	Diameter at Isocenter 40 mm

**Items are Custom Made and Nonreturnable**

# TLD - CHIPS, FURNACE & ACC.; STEROTACTIC SYSTEM

## STEREOTACTIC ADAPTER FOR VARIAN TO RADIONICS SRS HEAD FRAME



Item 1082-001 Shown with  
Varian Couch and Radionics Head Frame

The Stereotactic Adapter allows for the Radionics Head Frame to be attached to a Varian Couch.

Item #	Description
1082-001	Stereotactic Adapter, Varian to Radionics SRS Head Frame

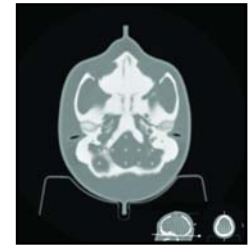
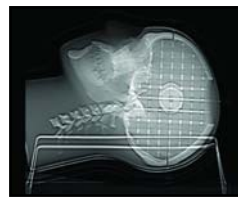
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# TLD - CHIPS, FURNACE & ACC.; STEROTACTIC SYSTEM

## MRI DISTORTION PHANTOM FOR SRS

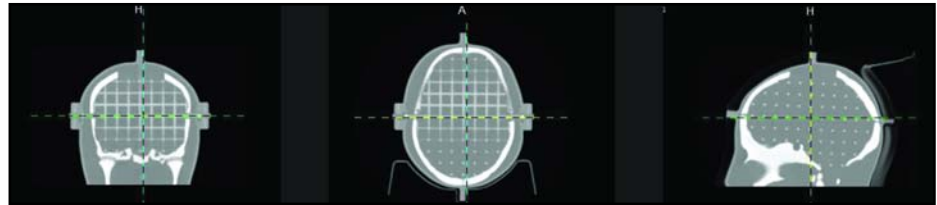
For Assessment of Image Distortion in Treatment Planning Systems



CT

MRI

CT Showing Ear Canals



CT Reconstruction

- Provides a realistic anthropomorphic scenario for CT and MR imaging
- Unique inter-cranial 3D grid design allows assessment of spatial distortion
- Special pads enable use with all fixation frames
- CT/MR markers facilitate positioning and image registration
- 335 control points
- Works with Distortion Check Software

CIRS Model 603A was designed for assessment of MR image distortion in Stereotactic Radiosurgery Planning. It is also a useful tool for verifying image fusion and deformable image registration algorithms used in various treatment planning systems. The tissue equivalent, anthropomorphic design provides the closest conditions to a clinical imaging scenario. The phantom can be imaged using X-ray, Computed Tomography and Magnetic Resonance. It images well with all MRI sequences tested to date, including T1 weighted, T2 weighted, 3D Time of Flight, MPRAGE and CISS.

The skull is manufactured from a plastic-based bone substitute, and the interstitial and surrounding soft tissues are made from a proprietary signal generating water-based polymer. The entire phantom is encased in a clear plastic shell to protect gel from desiccation. The phantom is supplied with specially designed pads that allow fixation with any stereotactic frame or mounting for end-to-end testing. The phantom is also suitable for frameless SRS QA.

The entire inter-cranial portion of the skull volume is filled with an orthogonal 3D grid of 3 mm diameter rods spaced 15 mm apart. Five extended axis-rods intersect at the reference origin of the grid. The end of each extended axis is fitted with CT/MR markers allowing for accurate positioning with lasers and co-registration of CT and MR image sets.

The phantom includes right and left air voids, 3 mm in diameter by 17 mm long to simulate each ear canal for evaluation of potential distortions commonly found in clinical settings.

### 682-825 Includes

- (1) 3D Anthropomorphic Skull Phantom
- (1) ABS Cradle
- (1) Complimentary 90 day license for 5 successful analyzed scans using Distortion Check Software
- (1) SRS Frame Support Cups (Set of 4)
- (1) Custom Carry Case
- (1) User Guide
- (1) 48-Month Warranty

### Specifications

**Overall Dimensions:** 32 cm x 24 cm x 18 cm

### Materials

- Skull:** Plastic-based bone substitute
- Interstitial/Soft Tissues:** Water-base polymer
- Grid:** Reinforced nylon
- Weight:** 12 lbs (5.5 kg)

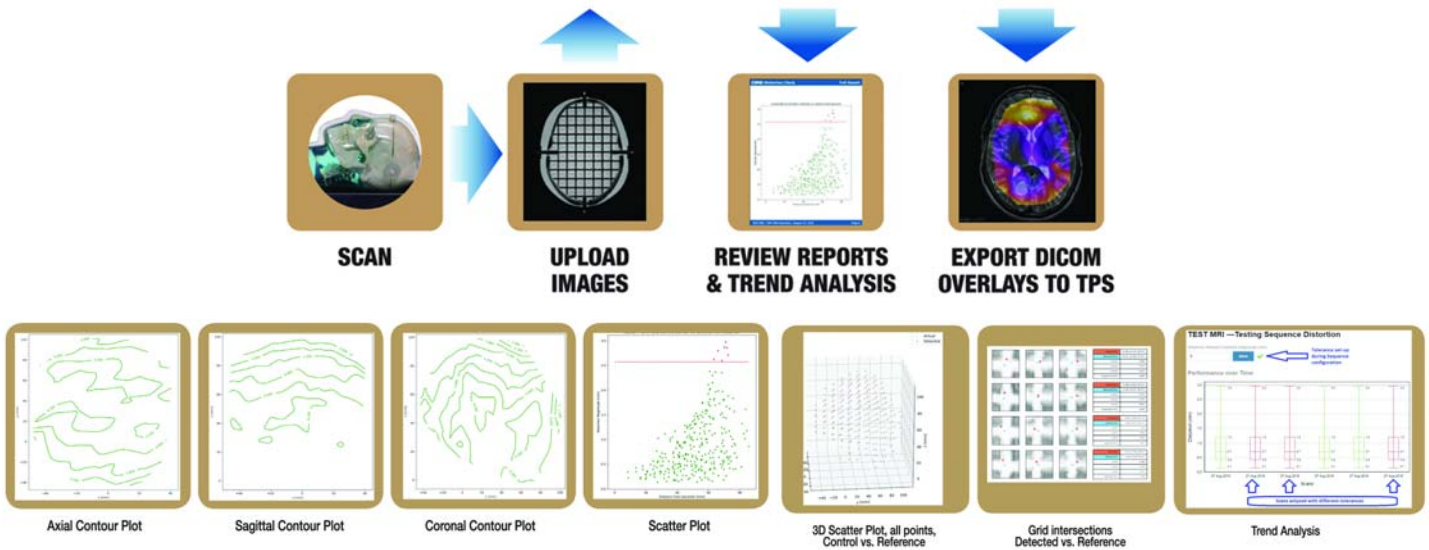
Item	Description
682-825	MRI Distortion Phantom for SRS

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# TLD - CHIPS, FURNACE & ACC.; STEROTACTIC SYSTEM

## DISTORTION CHECK SOFTWARE



- Quickly & automatically analyze complete MR data sets
- Unique grid phantoms provide physical control points through out entire 3D image volume
- Density of control points optimized to bring interpolation close to linearity
- CIRS materials simulate distortion due to susceptibility and chemical shifts typical to clinical patient scans
- Cloud based solution frees user of operating system and hardware constraints
- Online deployment facilitates collaboration and easy review and portability of results

- Simple, user friendly web interface
- Detect physical control points thru out the 3D image volume
- Web based pdf report in summary or detailed format to NEMA MS 12 standard recommendations.
- Output raw data or DICOM overlay files for use with 3rd party software
- Establish multiple user accounts with different permissions
- Easily analyze and track multiple machines, imaging sequences and phantoms
- Establish distortion tolerance thresholds specific to different imaging sequences
- Re-compute any scans acquired for different tolerance thresholds

Distortion Check is a cloud-based solution designed to quickly and automatically quantify distortion in MRI images. Used in conjunction with CIRS MRI Grid phantoms, the software provides the capability to quickly and accurately measure distortion through out the entire image volume.

After automatically detecting all grid intersections, the software registers either a CAD or CT scan ground truth to these MR detected control points. An interpolation is then performed to generate 3D distortion vector fields.

Results can be reported in a variety of output formats including scatter plots, contour plots, box and whisker plots and DICOM overlays that can be imported to TPS or other 3rd party software. The software algorithms will work with any grid configuration and CIRS employs proprietary 3D printing techniques that enable easy modification of grid phantoms to meet customer requirements.

Distortion Check Software is an online application. It does not require any installation on a user's PC. Once a User Account is created the software can be accessed from any device that is connected to internet.

Distortion Check Software is a licensed product. The licensing of this product is based on the number of scans successfully analyzed by the end user within a period of time. For licensing purposes, a successful analyzed scan is defined as follows: more than 50% of the grid intersections are matched to a gold standard point for Item 682-825, The license will expire based on which terms of the license expire first (time or number of scans).

Item #	Description	License or Scans
682-860	Distortion Check Software	2 years or 25
682-862	Distortion Check Software	2 years or 50
682-864	Distortion Check Software	2 years or 100
682-866	Distortion Check Software	2 years or 200
682-868	Distortion Check Software	2 years or 500

- 1) License is for time or number of scans successfully analyzed, whichever expires first.
- 2) Phantom serial number is Required

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