

STANDARD IMAGING 

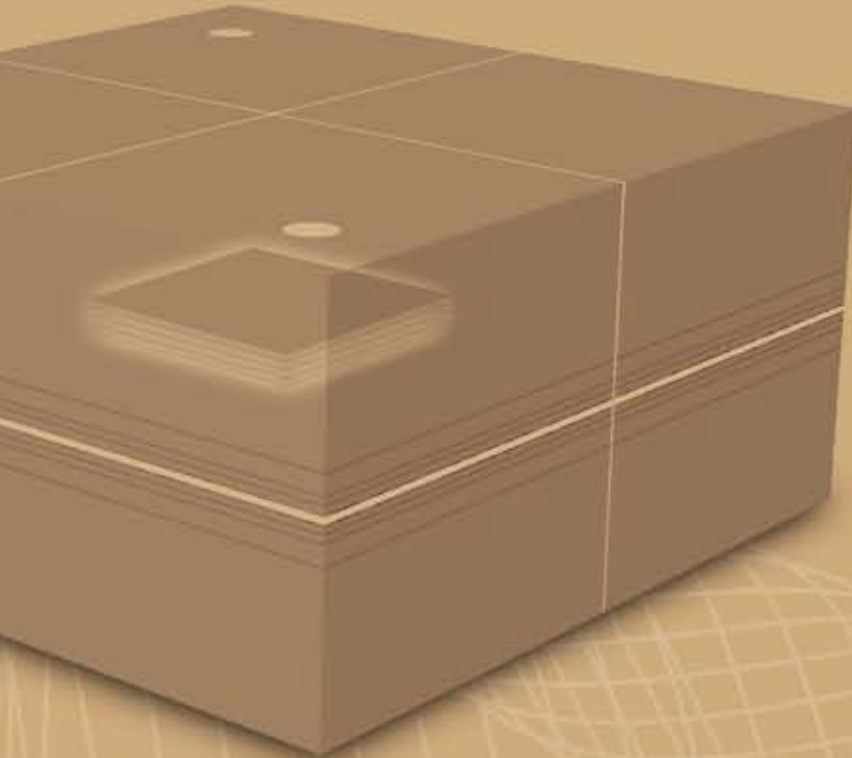
This product is available through:

JRT Associates

5 Nepperhan Avenue, Suite 2B

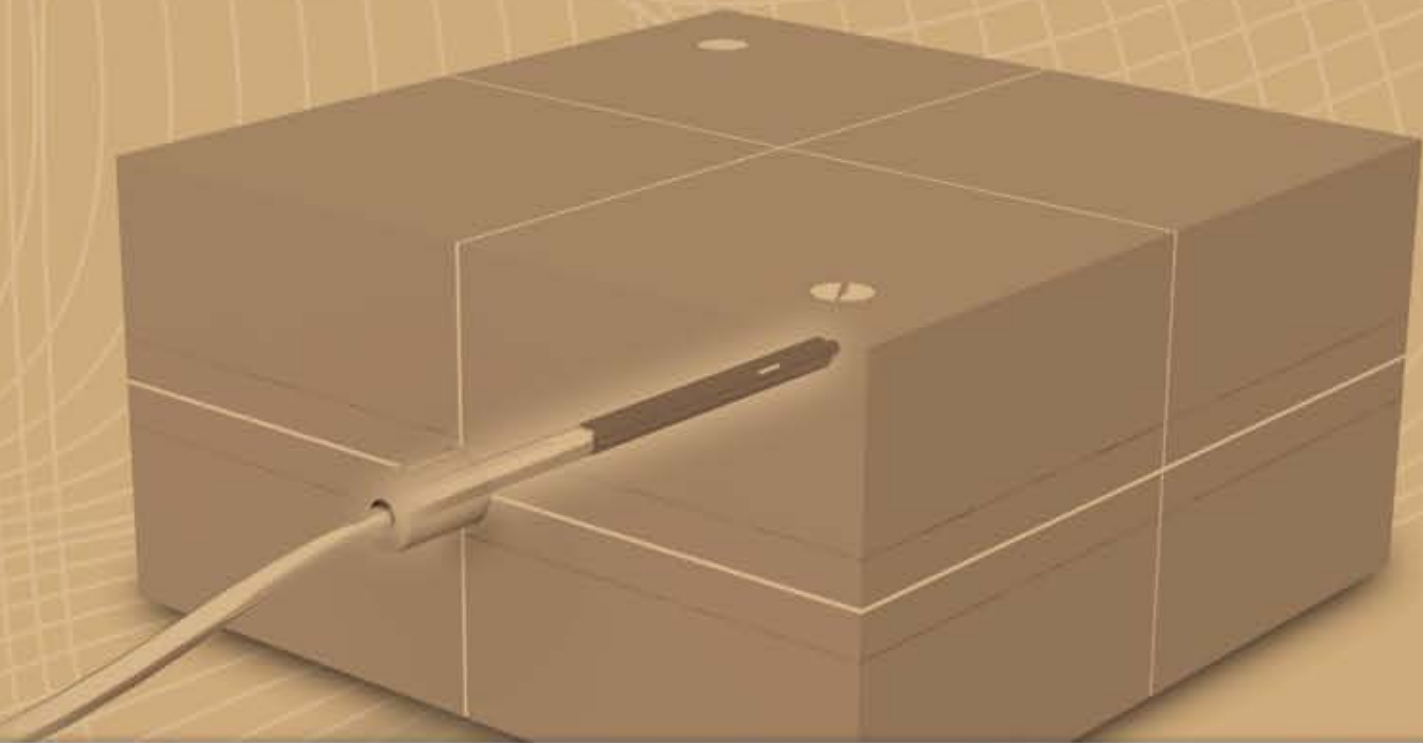
Elmsford, NY 10523

800-221-0111



VERSATILE STEREOTACTIC QA

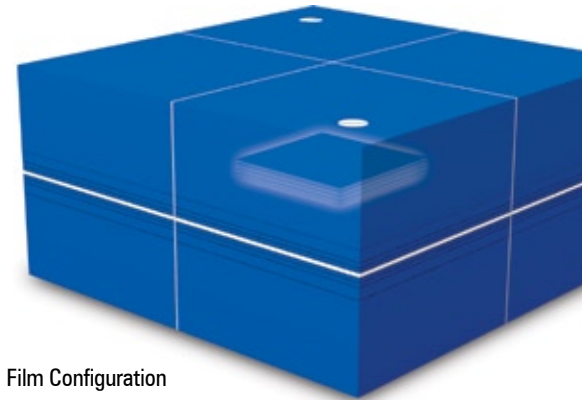
For fast and accurate commissioning
of Accuray CyberKnife® treatment
systems and patient specific
dose verification plans



STEREOTACTIC DOSE VERIFICATION PHANTOM

Stereotactic Radiosurgery QA

The **Stereotactic Dose Verification Phantom** provides dose measurements for commissioning treatment systems, such as Accuray CyberKnife®, and specific plan dose verification. With just one phantom, use film, ion chambers and the unique SRS Dosimetric QA Slab to perform fast and accurate system evaluation.

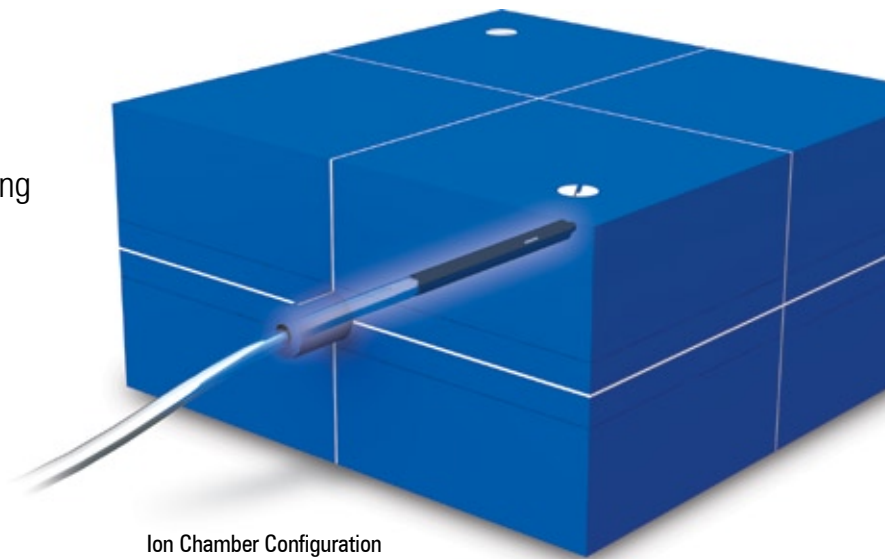


Film Configuration

Convenient Design

Compact size allows for easy repositioning

The entire phantom is 20 x 20 x 10 cm in size, comprised of two 4 cm top and bottom build-up slabs, and three interchangeable 2 cm test slabs in the center. Rigid alignment posts ensure phantom configurations are precisely repositioned, and thumb or flat-head screws secure the phantom together for repeatable results. The Stereotactic Dose Verification Phantom is constructed of Blue Water material and additional slabs are available in many thicknesses for increased build-up.

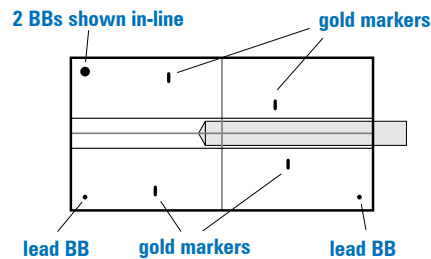


Ion Chamber Configuration

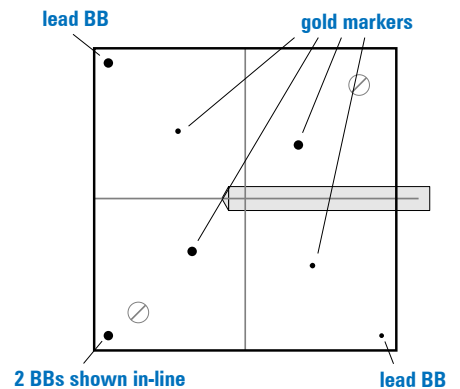
Gold and Lead Fiducial Markers

Precise orientation and positioning - Ideal for Accuray CyberKnife®

Laser alignment lines are provided to accurately position the phantom for CT scans and for treatment. Gold and lead fiducial markers are located throughout the phantom for additional orientation and positioning accuracy. Distance measurements within the CT scanning and TPS can be verified with confidence.



Side View



Top View

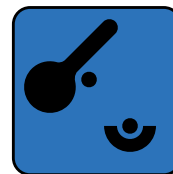
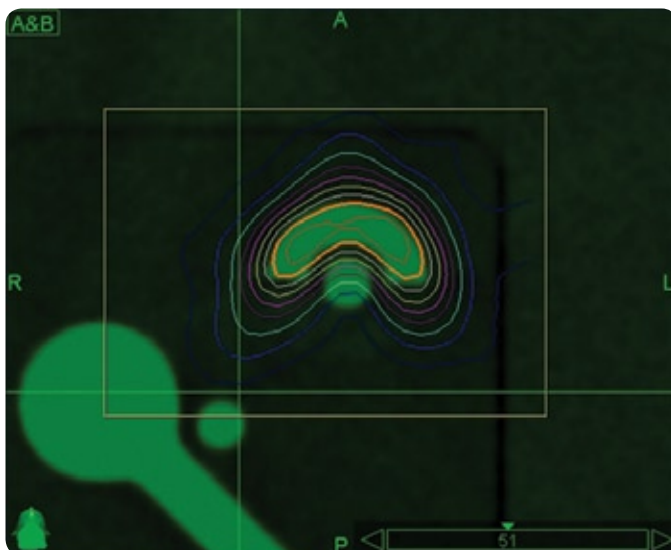
(larger marks indicate marker located in top slab)

Alignment features both inside and outside of the Stereotactic Dose Verification Phantom make positioning easy

SRS Dosimetric QA Slab

For rigorous testing and evaluation of imaging, treatment planning, and dose conformity

The SRS Dosimetric QA Slab provides complex geometric targets to evaluate the imaging avoidance and inclusion components of the treatment planning system. The volume of the test objects are known and can be used to evaluate the volumetric accuracy of the treatment planning system. Five CT densities are available for a QA check of the CT density model.



Target shapes and avoidance structure insert can be removed and replaced at any 90° rotation for multiple tests in challenging the TPS to recreate images

This image shows a plan intended to include the semi-circle and avoid the cylinder as if it was a spinal cord

Typical Procedure for Using the SRS Dosimetric QA Slab

1. CT Scan the Stereotactic Dose Verification Phantom.
2. Import the CT scans as patient scans into the treatment planning software and create digitally reconstructed radiographs. Compare the DRR to the original CT scans to confirm accurate image transfer has been accomplished.
3. A treatment plan is created for the complex geometric shapes in the SRS Dosimetric QA Slab. The geometric shapes can be used as structures to include or to avoid.
4. The plan is imported into the SRS delivery system.
5. The SRS Dosimetric QA Slab is replaced by the Film Configuration Slab.
6. The treatment is delivered to the phantom in the Film Configuration.
7. The film is processed and the dose calculated with a calibrated film dosimetry software program such as RAY™ Film Dosimetry software also available from Standard Imaging.
8. The dose on the film is compared to the prescribed dose using tools within the treatment planning program.

Additional Information

For a Sample Dosimetry Test with the Accuray CyberKnife® system, view the Stereotactic Dose Verification Phantom User Manual at our website:

www.standardimaging.com

Blue Water Construction

Build-up Slabs

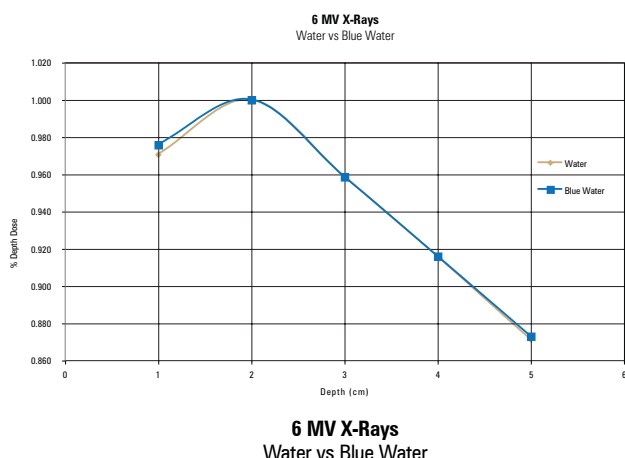
- Two 4.0 cm thick Blue Water slabs positioned above and below the film, chamber or SRS QA Dosimetric Slab provide adequate build-up
- White fiducial lines are located on the X, Y, Z coordinates of the phantom
- Alignment posts provide a clamping mechanism to prevent the phantom slabs from moving during use

Tested for Consistency

- Each production run of Blue Water is tested at an independent calibration laboratory for consistency

Wide Range

- Blue Water is also available in nine standard thicknesses for additional build-up
- Custom phantom sizes and shapes are available upon request



STEREOTACTIC DOSE VERIFICATION PHANTOM SPECIFICATIONS

MATERIAL	MATERIAL DENSITY	NOMINAL CT DENSITY #	RELATIVE ELECTRON DENSITY TO WATER
Blue Water	1.09 g/cm ³	70	1.055
Black delrin alignment posts and thumbscrews	1.43 g/cm ³	350	N/A
Nylon 6/6 flathead screws	1.14 g/cm ³	100	N/A
Black C552 target shapes	1.76 g/cm ³	-30	1.593
Cortical bone plug	1.91 g/cm ³	850	1.782
Trabecular bone plug	1.20 g/cm ³	220	1.157
Adipose plug	0.94 g/cm ³	-60	0.929

DIMENSIONS (Assembled phantom) *Height:* 10.00 cm, 3.94 in *Width:* 20.00 cm, 7.87 in *Length:* 20.00 cm, 7.87 in *Weight:* 4.4 kg, 9.7 lbs

DIMENSIONS (SRS Dosimetric QA Slab) *Height:* 2.00 cm, 0.79 in *Width:* 20.00 cm, 7.87 in *Length:* 20.00 cm, 7.87 in *Weight:* 0.9 kg, 2.0 lbs

INCLUDED COMPONENTS

- (1) Bottom slab with imbedded gold markers, lead BBs, and integral alignment posts
- (1) Top slab with imbedded gold markers and lead BBs
- (1) 2.0 cm chamber slab with generic cavity hole
- (2) Ion chamber plugs (drilled for Model A19 Exradin Classic Farmer-type Chamber and Model A16 Exradin Micro Chamber)
- (1) Solid ion chamber plug
- (2) 5.0 mm slabs
- (5) 2.0 mm slabs with recessed pockets to accept 2.500" x 2.500" film
- (2) Flathead nylon 6/6 screws
- (2) Black delrin thumbscrews
- (1) Flathead screwdriver

CyberKnife® is a registered trademark of Accuray Incorporated. Specifications subject to change without notice.

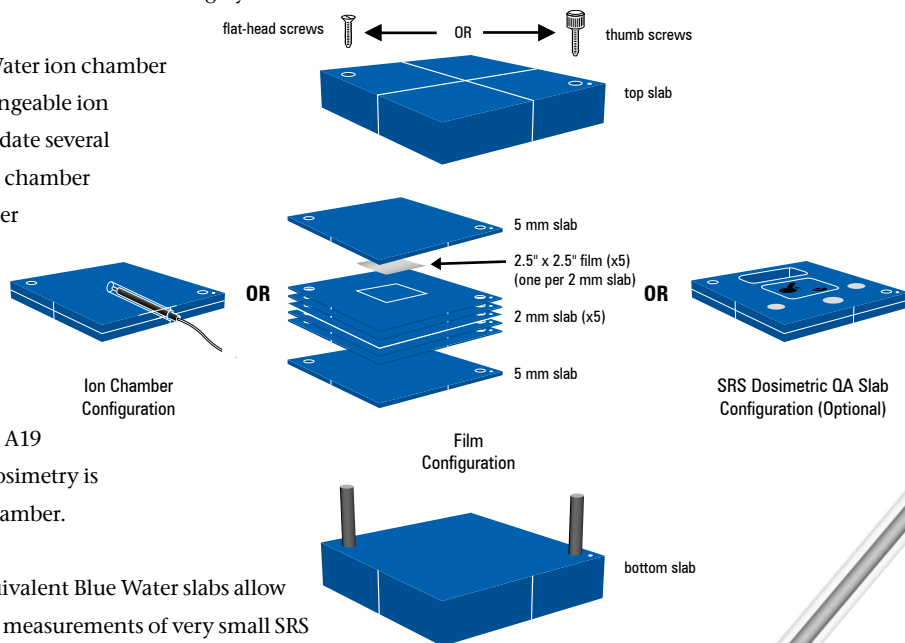
Blue Water is a water equivalent material within 1.0% for photons, and is free of contaminants and air

Versatile Dosimetry Measurements

Obtain measurements with ion chambers or film

Film and ion chamber dose measurements are achieved with one water equivalent phantom designed specifically for stereotactic radiosurgery.

Ion Chamber Measurements - The 2 cm Blue Water ion chamber slab has a cavity which accommodates inter-changeable ion chamber plugs, therefore one slab can accommodate several plugs drilled for different ion chambers. The ion chamber plug positions the ion chamber in the exact center of the phantom to facilitate repositioning and fast, accurate measurements. Two drilled ion chamber plugs and one solid plug are included with each phantom. Absolute dose traceability is provided with a standard Farmer-type chamber such as the Exradin Model A19 Classic Farmer-type Ion Chamber. Small field dosimetry is measured with the Exradin Model A16 Micro Chamber.



Film Dosimetry Measurements - Five water equivalent Blue Water slabs allow film to be positioned 2 mm apart for dose profile measurements of very small SRS targets. A cavity in each slab positions a 2.5 x 2.5 inch film in the exact center.

MODEL A16 (REF 92726) SPECIFICATIONS

COLLECTING VOLUME	0.007 cm ³
NOMINAL CALIBRATION FACTOR	450 R/nC
COLLECTOR DIAMETER	0.33 mm
OUTSIDE DIAMETER OF SHELL COLLECTING VOLUME	3.4 mm
WALL THICKNESS	0.5 mm
CENTROID OF COLLECTING VOLUME (from tip of chamber diameter)	Approx. 1.7 mm

Specifications subject to change without notice.

MODEL A19 (REF 92734) SPECIFICATIONS

COLLECTING VOLUME	0.62 cm ³
NOMINAL AIR KERMA CALIBRATION FACTOR*	5 R/nC
COLLECTOR DIAMETER	1.0 mm
OUTSIDE DIAMETER OF SHELL COLLECTING VOLUME	7.0 mm
WALL THICKNESS	0.5 mm
CENTROID OF COLLECTING VOLUME (from exterior tip)	12.8 mm

** Nominal calibration factor for energies greater than 200 keV.
Specifications subject to change without notice.*



The optional Model A16 Exradin Micro Chamber and Model A19 Exradin Classic Farmer-type Chamber are ideal for small field dosimetry and absolute dose traceability respectively

Use the Stereotactic Dose Verification Phantom for a variety of SRS applications