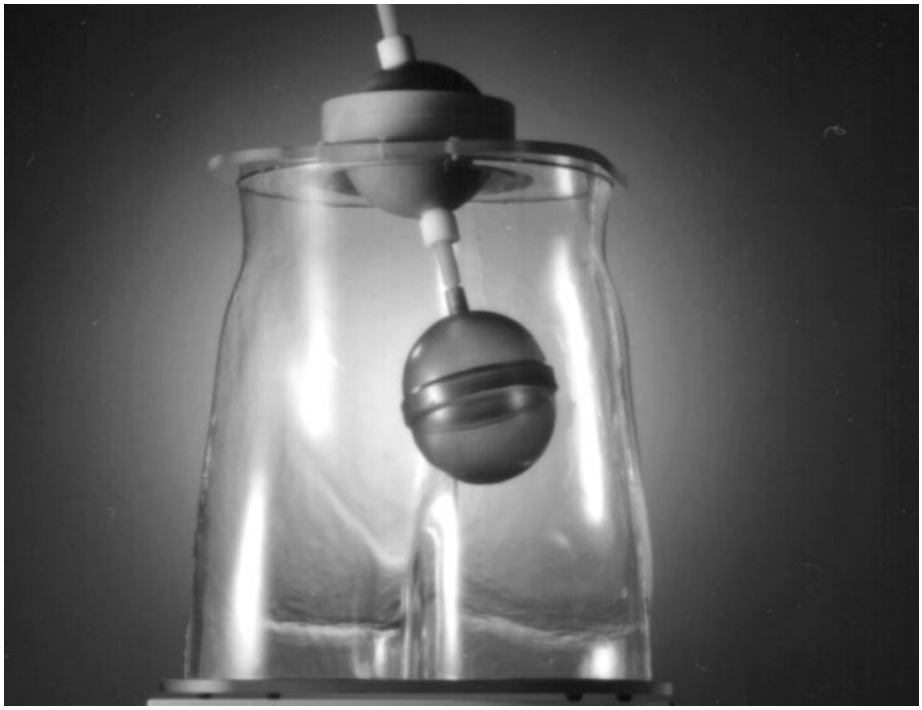
part number
TLP260



RSVP Phantom™ Pelvis

Design

The RSVP Phantom™ Pelvis provides isodose distribution and verification information for both conventional and intensity modulated radiation therapy machines. Charles W. Coffey, II, Ph.D., medical physicist with Vanderbilt University Medical Center, established the design criteria that The Phantom Laboratory used in constructing the RSVP Phantom™. The phantom is an excellent tool for final quality verification of therapy dose delivery and for comparing the delivered dose profiles for different treatment plans.

The life-size pelvic shape is formed from CAB material. The phantom is filled with water to simulate the radiation absorption and scatter of human soft tissue. An internal container called a tumor vessel or an ion chamber[1] can be positioned inside the phantom through the rotation ball port. The rotation ball enables the tumor vessel or chamber to be positioned in any location within the phantom. Once the desired location is selected, the rotation ball is locked into position with a locking ring.

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The Phantom Laboratory

phone
800-525-1190 or 518-692-1190

fax
518-692-3329

mail
P.O. Box 511
Salem, New York 12865

shipping
2727 State Route 29
Greenwich, New York 12834

email
info@phantomlab.com

web
www.phantomlab.com

Delivered Dose Profiles

To develop a three-dimensional dose profile, the tumor vessel is filled with a dosimetry gel[2]. The filled tumor vessel is positioned at the location of interest in the water-filled phantom which is then scanned with CT or MR to create a data set for treatment planning. After the image data is analyzed and a treatment plan is prepared, the phantom is irradiated. A review of the exposed gel in the tumor vessel will illustrate the shape, size, and location of the area exposed during a therapy procedure.

Dose Evaluations

In addition to the use of gels for dose measurements, the 1/2” hole through the rotation ball can be used to support either watertight ion chambers with 1/2” diameters or custom modified chambers provided by chamber manufacturers. The chambers can be positioned as desired inside the pelvis and irradiated to measure the delivered dose.

Construction

The shell of the RSVP Phantom™ Pelvis is formed from 1/4” cellulose acetate butyrate sheet, a transparent material chosen for its strength and low water absorption. The anatomical shell is mounted on polycarbonate end plates. The rotation ball cover plate assembly is attached with nylon screws to the end plate. Before the phantoms are shipped to customers, all seams are tested to ensure a watertight seal. In addition, The Phantom Laboratory provides a wooden storage case for each RSVP Phantom™.

Two tumor vessels are included with the RSVP Phantom™ Pelvis, but only one vessel may be used in the phantom at a time. The tumor vessels are molded out of Barex®, an oxygen impermeable material that is ideal for use with radiation-sensitive gels[2]. The vessels have an inside diameter of 10cm and an inside length of 12cm. The two ends of the tumor vessel are threaded together at the center to allow easy access into the vessel. The user may position the tumor vessel anywhere within the phantom by manipulating the external position rod and the rotation ball. After the desired position is reached, the vessel is locked into place by hand-tightening a lock nut on the rotation ball and a lock bolt on the position rod.

1 Ion chambers are not supplied with the phantom. For information on compatible ion chambers, contact The Phantom Laboratory or ion chamber manufacturers.

2 Agarose gel used in localization evaluations is not included with the RSVP Phantom™. However, the phantom’s manual provides detailed instructions for preparing this gel. The commercially available BANG gel can be purchased and analyzed by MSG Research Inc.

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