Phantoms for Absolute Dosimetry

Versatile solid and water phantoms

Phantoms for Absolute Dosimetry

IBA Dosimetry offers a complete range of solid and small water phantoms to support modern dosimetry protocols, e.g. AAPM TG-51 and IAEA TRS-398. All phantoms fulfill highest mechanical engineering standards to ensure optimal accuracy and durability.

Next to the phantoms IBA Dosimetry has a complete range of products including the DOSE 1 reference class electrometer, radiation detectors for dosimetry of photon and electron beams and radioactive stability check devices. Prior to the shipment the equipment is calibrated in our calibration facilities.

FASTest
mostACCURATE
mostRELIABLE

One dimensional water phantoms

One dimensional water phantom for absolute measurements according to AAPM TG-51 and IAEA TRS-398 dosimetry protocols.

WP1D – manual water phantom

One dimensional, stand-alone water phantom for absolute dose measurements according to TG-51 (lead filter option needed) and IAEA TRS-398 dosimetry protocols. The measurement depth can be manually adjusted with 0.1 mm steps and read out on the incremental encoder with integrated display.

WP1D – motorized water phantom including Smart Control Unit (SCU)

One dimensional, stand-alone motorized water phantom for absolute dose measurements according to AAPM TG-51 (lead filter option needed) and IAEA TRS-398 dosimetry protocols. The measurement depth can be adjusted in steps of 0.1-100 mm with the SCU. Up to 8 data sets (e.g. Linacs) with each 62 measurement depths can be preset and stored in the SCU. The SCU can be operated from both the treatment room as well as the control room for convenient remote adjustment of the different measurement depths.

WP1D – motorized water phantom with interface to CU500E or to MCU

The WP1D motorized water phantom can be connected by means of optional adapters to the CU500E or the MCU control device of the Acrylic/Blue Phantom or RFA-300 water phantoms respectively for motorized adjustment of the measurement depth. This version enables both depth scans for beam characterization as well as discrete individual positioning of the detector for measurements at the reference depths[1)] (without picture).

Accessories for the WP1D

Apart from an optional lead filter for photon beam quality determination above 10 MV according to the TG-51 protocol, different detector holders for cylindrical and parallel plate chambers are available. Another option is a three point levelling plate for easy adjustment and carrying of the WP1D.

1) Requires OmniPro-Accept 6.1 or higher.

Calibration water phantoms

One dimensional water phantom for absolute measurements according to AAPM TG-51 and IAEA TRS-398 dosimetry protocols.

The phantom has been designed for absolute dose measurements in radiation beams with horizontal beam incidence. Furthermore it is suitable for the calibration of ionization chambers used in radiation therapy. The phantoms' design allows cross calibration of a field ionization chamber against a calibrated reference chamber at the user's facility. The phantom has engraved crosshairs, two handles for easy carrying and a drain tap for emptying without changing the phantom's position. Various adapters for ionization chambers and $FeSO_4$ dosimeters are available.

WP34

The phantom has an advanced configuration with continuous fine depth adjustments by using linear scale. The measuring depth is adjustable either from 18 mm up to 250 mm for cylindrical chambers or from 8 mm (respectively 12 mm depending on chamber type) up to 250 mm for parallel plate chambers.

Solid phantoms

Standard Calibration Phantom SP22

The SP22 is designed for constancy checks as well as for comparison measurements of ionization chambers.

The phantom consists of a PMMA block which has a hole from one side to the other side of the phantom used to insert various ionization chamber adapters. Depending on the orientation of the phantom, thimble chambers can be placed in measuring depths of 50 mm, 70 mm or 100 mm. Two adapters can be inserted tip to tip without air gap for simultaneous irradiation of chambers.

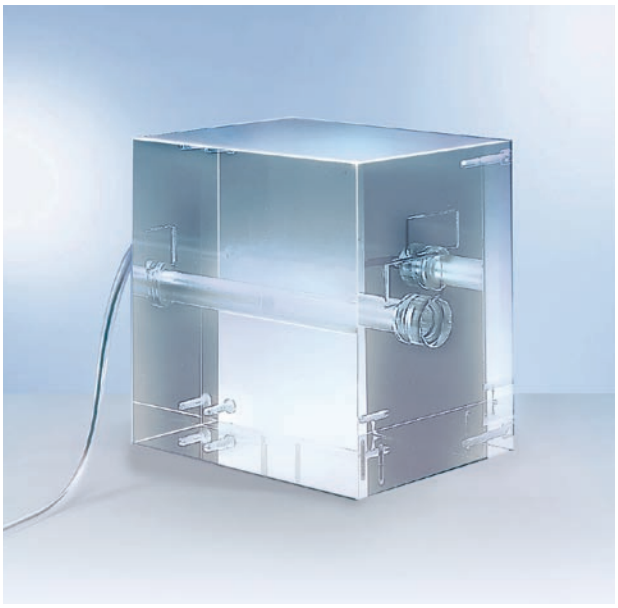

Plate Phantoms

The solid plate phantoms SP33 and SP34 are suitable for quality assurance dosimetry measurements in photon and electron beams, based on the relation between ionization chamber reading in plastic and water in the user beam with different types of ionization chambers.

The plate phantoms consist of 1 plate of 1 mm thickness, 2 plates of 2 mm, 1 plate of 5 mm and 29 plates of 10 mm. Adapter plates for various detectors are available for both phantoms.

The SP33 is made of PMMA. The SP34 is made of white polystyrene, type RW3.

Technical specifications

Small one dimensional water phantom WP1D

General WP1D mechanics

Wall material:	PMMA
Tank size:	40 cm (L) x 34 cm (W) x 35 cm (H) (inner dimensions) 42 cm (L) x 36 cm (W) x 36 cm (H) (exterior dimensions)
Volume:	≈ 45 litres
Draining hose:	included
Scanning mechanics:	aluminium precision linear drive
Chamber support:	carbon fibre reinforced plastic
Max.vertical scan range:	25 cm

Manual version

Position indicator:	incremental encoder with display, battery operated
Battery lifetime:	≈ 10 years (lithium cell)
Position resolution:	0.1 mm
Position accuracy:	± 0.2 mm
Position reproducibility:	± 0.1 mm
Mechanical drift:	negligible due to self-locking hand crank
Weight:	11 kg

Motorized version with SCU or Interface to CU500E or to MCU

Positioning:	DC motor with 10-turn high precision potentiometer
Usable control units:	Smart Control Unit, Scanditronix RFA and Wellhöfer Blue WP
Position resolution:	0.1 mm
Position accuracy:	± 0.4 mm
Position reproducibility:	± 0.1 mm
Mechanical drift:	negligible; closed servo loop
Weight:	12 kg

Optionally connection to water reservoir

Calibration water phantoms

	WP34
Wall material:	PMMA
Measuring depth:	18–250 mm (cylindrical chambers) 8 (resp. 12)–250 mm (parallel plate chambers, depending on chamber type)
Adjustment of depth:	continuously
Radiation incidence:	horizontal beam
Energy range	
Photons:	up to 50 MV
Electrons:	10-25 MeV
Exterior dimensions:	41 cm (L) x 32.6 cm (W) x 37 cm (H)
Interior dimensions:	30 cm (L) x 30 cm (W) x 30 cm (H)
Weight without water:	10 kg

Optionally connection to water reservoir

Solid plate phantoms

	SP22	SP33	SP34
Material:	PMMA	PMMA	RW3 (composition: 98% polystyrene + 2% TiO_2)
Density:	1.18 g/cm^3	1.18 g/cm^3	1.045 g/cm^3
Measuring depth:	50,70,100 mm	1–250 mm	1–250 mm
Energy range:	^{60}Co X-rays up to 50 MV	0.1–50 MV, 3–50 MeV	0.1–50 MV; 3–50 MeV
Exterior dimensions:	20 cm (L) x 20 cm (W) x 12 cm (H)	30 cm (L) x 30 cm (W) x 30 cm (H)	30 cm (L) x 30 cm (W) x 30 cm (H)
Weight:	7 kg	38 kg	38 kg
Additional plate:	20 cm (L) x 20 cm (W) x 3 cm (H)		

Technical data is subject to change without prior notice.
Configurations shown on pictures are not necessarily included in a standard system.

IBA activities in a nutshell

IBA delivers solutions of unprecedented precision in the fields of cancer diagnosis and therapy. The company also offers sterilization and ionization solutions to improve the hygiene and safety of everyday life.

Diagnostics
IBA has unique expertise in the design of cyclotrons and in the production and distribution of radiopharmaceutical tracers which are used every day in hospitals to quickly and accurately detect cancer, neurological and cardiac diseases. IBA also offers dosimetry products used in many hospitals for quality assurance in X-Ray diagnosis and for patient-dose monitoring

Therapy
IBA has developed Radiotherapy solutions and dosimetry equipment to treat cancer with the greatest accuracy. IBA is the undisputed leader in Particle Therapy, acknowledged to be the most precise and effective clinical radiotherapy method in the selective destruction of cancer cells.

Sterilization & Ionization
IBA designs electron accelerators and high power X-Ray solutions used in many industries to sterilize medical devices, to cold pasteurize food products and to improve polymer properties. Over 250 IBA Industrial accelerators are used in the world today, some for more than 40 years.

IBA a Belgian company, is listed on the paneuropean stock exchange EURONEXT and its Annual Reports can be downloaded on the Website: www.iba-group.com.

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