

ATOM Dosimetry Verification Phantoms

ATOM Phantoms were previously manufactured in Riga, Latvia and sold worldwide. Since the late eighties, these phantoms have been used extensively in Australia, Western Europe and the Republics of the former Soviet Union.

The complete line of ATOM phantoms are now being manufactured exclusively by CIRS. Standard phantoms include bone, lung and soft tissue compositions formulated for accurate simulation for diagnostic and therapy energies. Photon attenuation values between 30 KEV and 20 MEV are within 1% for bone and soft tissue substitutes and within 3% for lung substitute. The skeleton is made from an average composition of normal cortical and trabecular bone and includes vertebral disks and spinal cord.

Standard phantoms consist of 25mm thick contiguous sections. Each section contains 5mm diameter through holes and tissue equivalent plugs for TLD

placement. Hole locations are optimized for precise dosimetry in 19 internal organs (detailed list available upon request). Ion chamber cavities, other grid patterns and hole diameters are available upon request. Standard phantom includes head, torso, upper femur and genitalia. Legs and arms are included with the newborn

and 1 year pediatric phantoms. Legs and arms can be manufactured for other phantoms upon special request.

All phantoms include detailed technical manual, positioning system and storage case. Attenuation coefficients for all materials is available upon request.



CIRS
Tissue Simulation Technology

2428 Alameda Avenue • Suite 212 • Norfolk, Virginia 23513 • USA

(800) 617-1177 • (757) 855-2765 • FAX (757) 857-0523
www.cirsinc.com • admin@cirsinc.com

Specifications

Specifications are based on ICRP 23, ICRU 48 and available anatomical reference data

Model	Description	Height	Weight	Thorax Dimensions
701	Adult Male	173 cm	73 kg	23 cm x 32 cm
702	Adult Female	160	55	20 x 25 *
703	Pediatric Newborn	51	3.5	9 x 10.5
704	Pediatric 1 year	75	10	12 x 14
705	Pediatric 5 years	110	19	14 x 17
706	Pediatric 10 years	140	32	17 X 20
707	Pediatric 15 years	165	54	18 x 24

* measurement does not include breasts



Tissue Equivalent Substitutes Basic Data

	Average Soft Tissue		Average Bone (Adult)*		Lung (Inhale)**		Spinal Cord		Cartilage (vertebral disks)	
	Refer ¹	CIRS	Refer ¹	CIRS	Refer ²	CIRS	Refer ¹	CIRS	Refer ²	CIRS
Density, cm ⁻³	1.03	1.055	1.58	1.6	0.2	0.21	1.038	1.07	1.1	1.155
Z _{eff}	7.23	7.15	11.5	11.5	7.51	7.1	7.41	7.38	7.9	7.87
El.Density, *10 ²³ cm ⁻³	3.42	3.43	5.03	5.03	0.663	0.681	3.45	3.45	3.69	3.7
Basic Elements										
H	10.5	8.47	6.39	4.86	10.3	8.32	10.68	7.36	9.6	6.71
N	2.5	1.65	3.39	0.86	3.1	3.15	1.53	2.17	2.2	1.88
O+C	86.2	82.03	69.57	71.9	85.4	83.82	86.89	80.86	84.3	76.95
Ca			13.8	14.67						

* Average Bone material for Pediatric Phantoms is using in Models 703, 704, 705.

** Average (density - 0.26-0.30 gcm⁻³) and Exhale Lung material (density - 0.45-0.50 gcm⁻³) available.

Attenuation coefficients for all materials is available upon request.

Reference

1.ICRP 23, Reference Man, 1975.

2.ICRU 44, 1989.

