ATOM Dosimetry Phantoms

A Family of Dosimetry Phantoms

Whole Body Dose • Organ Dose • Therapeutic Radiation

ATOM® Dosimetry Phantoms

CIRS
Tissue Simulation & Phantom Technology

Features:

- Phantom models cover a wide range of patient ages
- Organ specific dosimetry with minimal detectors
- Superior tissue simulation and lifelike imaging properties
- Homogeneous bone
- Accommodates wide variety of detectors
- Age appropriate references

Overview

CIRS ATOM® phantoms are a full line of anthropomorphic, cross sectional dosimetry phantoms designed to investigate organ dose, whole body effective dose as well as verification of delivery of therapeutic radiation doses.

ATOM is the only line of dosimetry phantoms to range in sizes from newborn to adult. Six models are available: newborn, 1-year, 5-year and 10-year old pediatric phantoms as well as adult male and female phantoms.

Each phantom is sectional in design with traditional 25 mm thick sections. The sectional surfaces are extremely flat and smooth and do not require any special coatings or treatment. This results in minimal interfaces between the slabs when viewed in a scout or projection X-ray. The ATOM line also differs from other dosimetry phantoms by providing optimized TLD locations specific to 21 inner organs.

Tissue-equivalent epoxy resins are used in all aspects of the phantom. CIRS technology offers superior tissue simulation by covering a wider range of energy levels from diagnostic to therapeutic. In addition, all bones are homogenous and are formulated to represent age appropriate, average bone composition. CIRS bone formulations offer distinct advantages over natural skeletons and other types of simulated bone.

CIRS ATOM phantoms provide our best tissue simulation and the widest variety of options available on whole body cross sectional dosimetry phantoms.

Computerized Imaging Reference Systems, Inc. is recognized world wide for tissue simulation technology and is the leader in the manufacture of phantoms and simulators for medical imaging and radiotherapy.

www.cirsinc.com

Size and Age Related Dose Calculations

ATOM PHANTOMS OFFER A FULL RANGE OF AGES

The size of each model is based on ICRP 23, ICRU 48 and available anatomical references. Only CIRS ATOM phantoms represent both pediatric and adult patient groups.

- Newborn
- 1-year old
- 5-year old
- 10-year old
- Adult Male
- Adult Female

This age range allows more accurate calculations of dose. The pediatric products support practitioners efforts to “child size” diagnostic scanning protocols in CT and more precisely determine effective doses in radiation therapy. Because scattering radiation can give a significant dose contribution to the surrounding tissue, the ATOM newborn and 1-year old are provided with arms and legs as a standard configuration. NOTE: Arms and legs on all other ATOM models can be ordered as a separate option.

ATOM ANATOMICAL REFERENCES

Based on ICRP 23, ICRU 48 and available anatomical reference data

Description	Height	Weight	Thorax Dimensions
Adult Male	173 cm	73 kg	23 cm x 32 cm
Adult Female	160	55	20 x 25*
Pediatric Newborn	51	3.5	9 x 10.5
Pediatric 1 year	75	10	12 x 14
Pediatric 5 years	110	19	14 x 17
Pediatric 10 years	140	32	17 x 20

*Measurement does not include breasts

AGE APPROPRIATE TISSUE SIMULATION

Not only is the size of each model representative of the specified age but the tissue simulating materials are also formulated based on the appropriate body composition typical of each age and/or gender. This is especially significant in the bones of each model and in the pediatric models in particular.

Tissue composition of the ATOM adult male.

Tissue	C	O	H	N	Ca	P	Mg	Cl	Al	Physical Density g/cc	Electron Density g/cc
Adult Bone	0.3703	0.3566	0.0483	0.0097	0.1524	0.0290	0.0619	0.0005	0.0000	1.60	5.030·10^23
Soft Tissue	0.5744	0.2459	0.0847	0.0165	0.0000	0.0000	0.0762	0.0019	0.0000	1.05	3.434·10^23
Spinal Cord	0.5427	0.2659	0.0736	0.0217	0.0000	0.0000	0.0937	0.0022	0.0000	1.07	3.448·10^23
Spinal Disks	0.4627	0.3082	0.0675	0.0188	0.0000	0.0000	0.1407	0.0020	0.0000	1.15	3.694·10^23
Lung	0.6336	0.2046	0.0832	0.0315	0.0000	0.0000	0.0000	0.0137	0.0329	0.21	0.681·10^23
Brain	0.5360	0.2649	0.0816	0.0153	0.0000	0.0000	0.0998	0.0019	0.0000	1.07	3.470·10^23

Proven Tissue Equivalent Phantom Technology

CIRS tissue simulation technology has been validated through specific testing, continuous monitoring of manufacturing applications, worldwide use and acceptance of products for over 25 years.

CIRS formulates Tissue Equivalent (TE) materials for quantitative measurement, training, image quality control and dose calibration. Resins and polymers are available to simulate any tissue in the human body. Computer model calculations consider tissue to be mimicked, modality/energy level and raw materials to be used.

ATOM phantoms are constructed of CIRS proprietary tissue equivalent materials. Linear attenuations of the simulated tissues are within 1% of actual attenuation for water and bone and within 3% for lung from 50 keV to 25 MeV. Lung tissue substitutes are available with a density range from inhale, 0.2 g/cm^3 to exhale 0.5 g/cm^3. Each phantom is made standard with the low density formulation of 0.2 g/cm^3. Other densities are available by special order.

The tissues simulated in ATOM phantoms are average soft tissue, average bone tissue, cartilage, spinal cord, spinal disks, lung, brain, sinus, trachea and bronchial cavities. Simulated bone tissue for pediatric models matches age related density.

Physical and electron density of tissue equivalent materials used in ATOM Dosimetry Phantoms (adult). Recalculated linear attenuation coefficients (cm-^{1})

	Average soft tissue		Average bone tissue		Average lung tissue (inhale)*		Spinal discs (cartilage)	
En, MeV	Reference[1]	ATOM	Reference[1]	ATOM	Reference[2]	ATOM	Reference[2]	ATOM
0.04	0.2679	0.2678	0.7884	0.7887	0.0537	0.0531	0.3158	0.3159
0.06	0.2087	0.2091	0.4244	0.4242	0.0410	0.0414	0.2333	0.2334
0.08	0.1871	0.1876	0.3251	0.3248	0.0365	0.0372	0.2054	0.2056
0.10	0.1742	0.1748	0.2822	0.2819	0.0339	0.0346	0.1900	0.1901
0.15	0.1538	0.1544	0.2344	0.2341	0.0299	0.0306	0.1667	0.1669
0.20	0.1401	0.1406	0.2098	0.2095	0.0272	0.0279	0.1516	0.1517
0.40	0.1086	0.1090	0.1605	0.1602	0.0211	0.0216	0.1173	0.1174
0.60	0.0917	0.0920	0.1351	0.1349	0.0178	0.0182	0.0990	0.0991
0.80	0.0805	0.0808	0.1186	0.1184	0.0156	0.0160	0.0869	0.0870
1.00	0.0724	0.0726	0.1066	0.1064	0.0140	0.0144	0.0781	0.0782
1.50	0.0589	0.0591	0.0868	0.0866	0.0114	0.0117	0.0636	0.0637
2.00	0.0505	0.0507	0.0746	0.0745	0.0098	0.0101	0.0546	0.0547
4.00	0.0347	0.0348	0.0521	0.0520	0.0068	0.0069	0.0377	0.0377
6.00	0.0282	0.0282	0.0431	0.0430	0.0055	0.0056	0.0307	0.0307
8.00	0.0247	0.0247	0.0383	0.0383	0.0048	0.0049	0.0270	0.0270
10.0	0.0225	0.0225	0.0355	0.0355	0.0044	0.0044	0.0247	0.0247
15.0	0.0196	0.0195	0.0319	0.0320	0.0038	0.0038	0.0217	0.0217
20.0	0.0182	0.0181	0.0305	0.0305	0.0036	0.0036	0.0203	0.0203
30.0	0.0171	0.0170	0.0296	0.0296	0.0034	0.0033	0.0193	0.0192
Density, gcm-^{3}	1.03	1.055	1.577	1.60	0.20	0.21	1.122	1.155
El. density, *10^{23}, cm-^{3}	3.421	3.434	5.035	5.028	0.663	0.681	3.694	3.697

* Exhale lung tissue (d=0.5) or average (d=0.26-0.30) also available.

1. ICRP 23, Report of the Task Group on Reference Man (1975).
2. Woodard, H.Q., White, D.R., The Composition of Body Tissues, The British Journal of Radiology (1986) 59: 1209-1219.

ADVANTAGES OF HOMOGENEOUS BONE

The skeletal anatomy of ATOM phantoms includes a homogeneous bone tissue composition that averages known cortical to trabecular ratios and age based mineral densities. Bone tissue compositions for the adult and pediatric phantoms were designed based on the most reliable data available.(3, 4) There are many advantages to using average bone rather than natural skeletons or simulated skeletons that include separate trabecular and cortical densities. This design feature provides for dose verification in different applications, especially when comparative Monte-Carlo calculations are necessary.

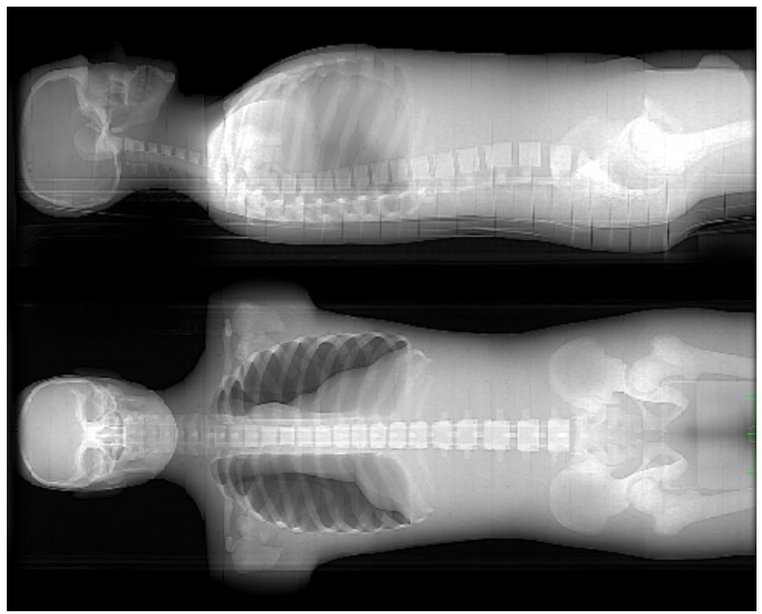
For inner organ dosimetry the bones usually play a shielding role and can be simulated using an average bone because their inner structure is not critical. For the purpose of red marrow dosimetry, it is important to make measurements in electron equilibrium, which is easier to obtain in a homogenous average bone of known density than in an unknown ratio of cortical to trabecular bone material. Further, the size of actual dosimeters does not permit standard misprints of the influence of trabecular structure on measured dose. As a result an average bone substitute is often preferred for simulation except in very unique cases and for reasons of image aesthetics. NOTE: Trabecular and cortical separation can be provided upon special request.

LIFE-LIKE IMAGING CHARACTERISTICS

Because CIRS materials are epoxy based they can be machined to achieve optimal flatness. They also do not require surface treatment or coating thus the air interface between sections is minimized.

Even the phantom holder has been designed to optimize ATOM imaging characteristics. Each phantom comes standard with a unique holding apparatus that consists of a top and bottom compression plate that is adjusted with the included wrench. The plates are joined with four thin teflon wires that are radiographically opaque. There are no solid rods running through the phantom body to interfere with the imaging characteristics. Instead, the top of each section has a small tab which fits into the corresponding indentation on the underside of the preceding section.

THE RESULTS



Benefits

- Consistent size and density
- Eliminates problem of air voids found in trabecular regions of natural bone
- Simplifies dose calculations by eliminating need to know densities and ratios of cortical and trabecular components
- No regulatory concerns associated with use of human remains

ATOM Configurations

Adult ATOM phantoms (Model 701 and 702) are made in three parts: head with c-spine, thorax and pelvis.

ATOM five and ten year-old pediatric phantoms (Model 705 and 706) are made in two parts: head with c-spine and body.

The newborn and one-year old (Model 703 and 704) are only available in 25 mm sections and includes arms and legs.

Optional arm and leg attachments are available for all models (“-E).

Except for the newborn and one-year old (Model 703 and 704), standard configurations include solid non-sectioned parts as mentioned above (“-F) or axially sliced, 25 mm thick, contiguous sections.

NOTE: Phantoms can also be sliced in coronal or sagital orientation by special request

Sectional phantoms are available without holes (“-A”) or they come thru drilled with 5 mm diameter holes. NOTE: 3 mm and 7 mm diameter holes are available upon request. For drilled sections, there is a choice of three different hole grid patterns.

ATOM PHANTOM CONFIGURATION TABLE

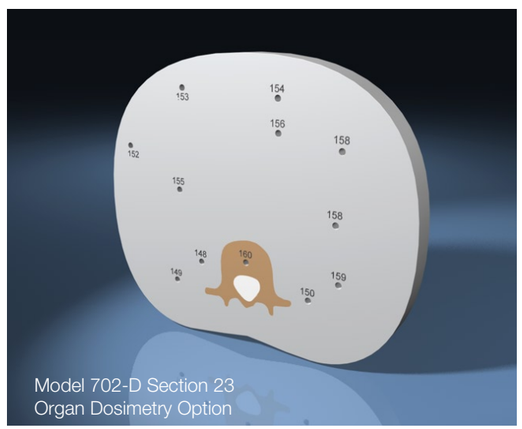
When ordering indicate the model number and the configuration from the table below. Only one configuration option can be selected for each model. Arms and legs can be added to models 701, 702, 705 & 706. (see accessory table on page 10 for part number)

	Options for Section Phantoms					
	-A	-B	-C	-D	-E	-F
	Without holes	5 mm Ø holes in a 3 X 3 cm grid spacing	5 mm Ø holes in a 1.5 X 1.5 cm grid spacing	5 mm Hole placement for Organ Dosimetry	Set of R & L Arm & Leg attachments	Non-sectioned without holes
701 Adult Male (Sections 1-39) Complete Phantom	Available	Available	Available	Available	Available	Available
701-HN Adult Male Head & Neck (Sections 1-10) Partial Phantom	Available	Available	Available	Available	Not Available	Available
701-T Adult Male Torso (Sections 11-25) Partial Phantom	Available	Available	Available	Available	Not Available	Available
701-P Adult Male Pelvis (Sections 26-39) Partial Phantom	Available	Available	Available	Available	Not Available	Available
702* Adult Female (Sections 1-38) Complete Phantom	Available	Available	Available	Available	Available	Available
702-HN Adult Female Head & Neck (Sections 1-10) Partial Phantom	Available	Available	Available	Available	Not Available	Available
702-T* Adult Female Torso (Sections 11-23) Partial Phantom	Available	Available	Available	Available	Not Available	Available
702-P Adult Female Pelvis (Sections 24-38) Partial Phantom	Available	Available	Available	Available	Not Available	Available
703 Newborn Complete Phantom	Available	Available	Available	Available	Included	Not Available
704 1 Year Old Complete Phantom	Available	Available	Available	Available	Included	Available
705 5 Year Old Complete Phantom	Available	Available	Available	Available	Not Available	Available
706 10 Year Old Complete Phantom	Available	Available	Available	Available	Not Available	Available

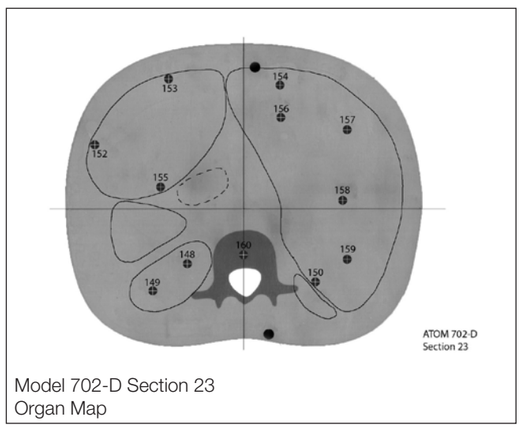
*Standard female breast size is 190 cc included. Optional Male breast attachments is 350 cc.

Optimized Organ Dosimetry

CIRS is the only manufacturer that offers organ hole locations specific to 21 radiosensitive internal organs that are optimized for precise calculations using the minimum number of detectors necessary. The selection of hole positions is supported by detailed anatomical information about the average position of these 21 radiosensitive internal organs. A set of maps outlining the most frequently observed organ locations and also the optimized detector hole distribution within each organ accompanies each phantom with “-D” configuration. This map book shows the hypothetical outline of the internal organs appropriate for each section.



Model 702-D Section 23
Organ Dosimetry Option

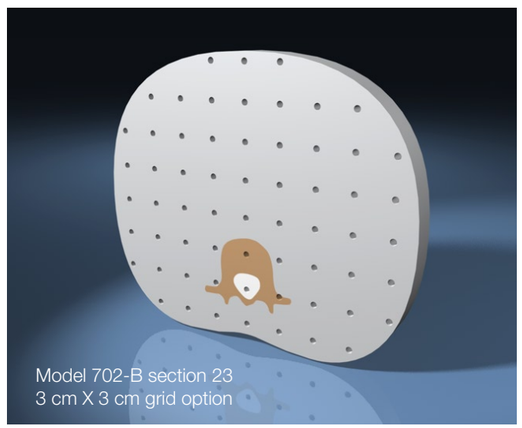


Model 702-D Section 23
Organ Map

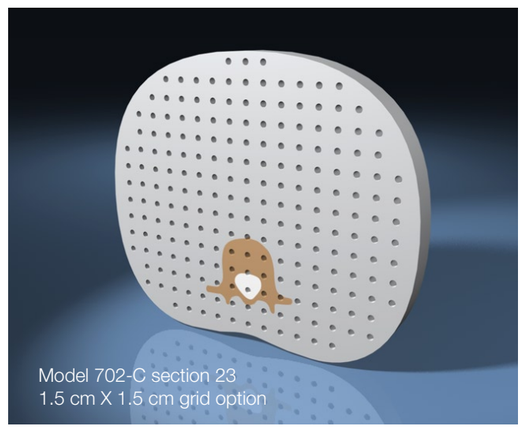
The holes that are drilled into each section are also shown on the map along with the corresponding unique hole ID number. The map is used in conjunction with a lookup table that indicates, for each organ, the number of detectors to insert, the hole number for each inserted detector and the corresponding detector depth for each hole. This assists the dosimetrist in minimizing the quantity of detectors utilized. In this regard it is important to note that the precision of an average organ dose calculation is dependent upon the precision of the detector method. The “organ placement” feature eliminates estimating detector placement and is supported by extensive anatomical and dosimetric research.(5)

DOSIMETRY HOLES IN STANDARD GRID PATTERNS

Dose verification in radiation therapy can require standard 3 cm X 3 cm (“-B”) or 1.5 cm X 1.5 cm (“-C”) hole grids. These are available in lieu of the organ placement feature.



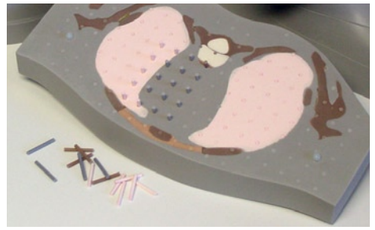
Model 702-B section 23
3 cm X 3 cm grid option



Model 702-C section 23
1.5 cm X 1.5 cm grid option

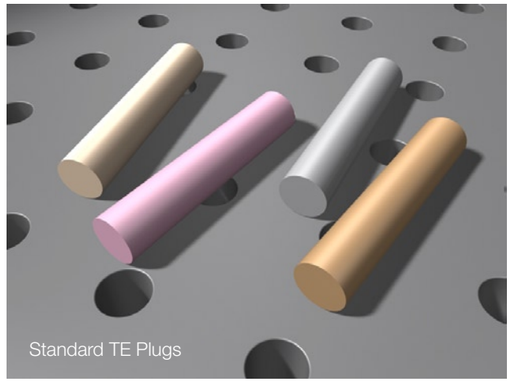
Detector Options

For all grid options, all holes are filled with 5 mm diameter X 25 mm long plugs of corresponding tissue (soft tissue, bone, cartilage, spinal cord, lung and brain). Extra plugs of each tissue are also provided with every unit. Plugs specifically machined for TLD chips, TLD rods, MOSFET detectors and Landauer OSL Micro Dot cassettes are also available as standard models. The OSL Micro Dot cassette requires special drilling of larger diameter holes.

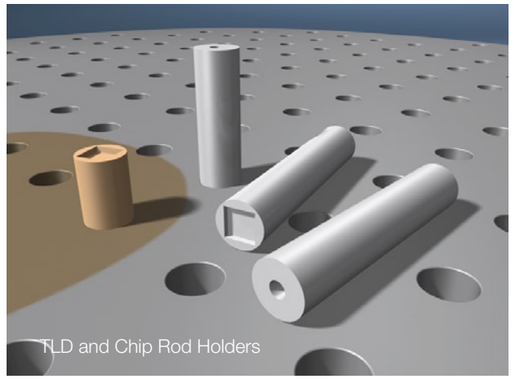


THERMOLUMINESCENCE DOSIMETRY (TLD)

Sectioned & drilled phantoms readily accept TLDs. The end user can cut the tissue equivalent rods so the TLD can be sandwiched between the cut plug and positioned at the appropriate depth within each section. This is especially critical in organ dosimetry and is supported with a table indicating at what depth to place each detector within the sections corresponding to the organ of interest.



Standard TE Plugs

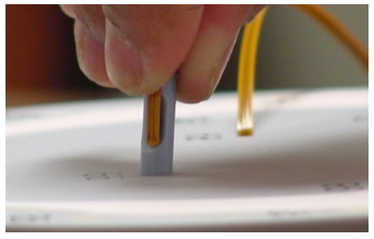


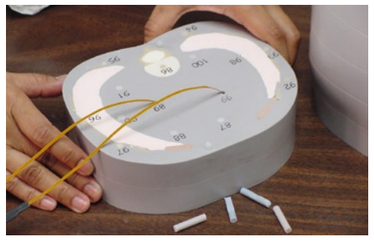
TLD and Chip Rod Holders

Tissue equivalent plugs cast to precisely receive TLD chips and TLD rods are an available accessory. These rods are available in soft tissue, lung and bone formulations and can also be cut to length by the end-user in order to position the TLD at the appropriate depth within the section.

MOSFET DOSIMETRY

MOSFETs are accommodated by ordering the ATOM MOSFET Cartridge as an accessory. This specially machined plug is available in soft tissue and bone formulations. The plug has a recessed area that fits the MOSFET detector along the side of the plug while still allowing the plug to fit into the 5 mm diameter hole within the section. A radius on the end of the cartridge allows a 90 degree bend in the cable. Black tape (included) can be placed on either side of the cable on the slab to prevent damage to the cable when the phantom is assembled.



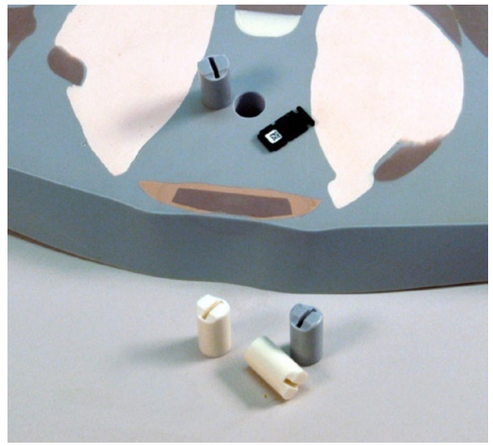


FILM

Film dosimetry is supported by ATOM dosimetry phantoms. Both radiographic and radiochromic film may be placed between any two contiguous sections. The sections are then sealed with the black tape provided to prevent any exposure of the film to light.

ADDITIONAL DETECTOR OPTIONS

One of the advantages of ATOM dosimetry phantoms is that they are highly customizable. Landauer OSL, gel dosimetry, ionization chambers and others can be utilized by special ordering the ATOM phantom.



Breast Attachments

The adult male and female phantom have standard size breast attachments available for purchase. The standard male breast option is 350 cc. There are two standard sizes for female breast attachments: 190 cc and 350 cc. A mastectomy patient can be simulated by removing the breast attachment on the ATOM female. NOTE: other breast sizes and various shapes (to represent different patient positions) are available by special order

Ordering Information

ITEMS INCLUDED WITH EACH ATOM

Quantity	Description
Model specific	Numbered sectional slabs
1	Reinforcement base
1	Reinforcement top with threaded assembly
1	Open end wrench
1 Bag	Teflon cord for reinforcement assembly
1 Bag	Extra soft tissue equivalent through hole plugs
1 Bag	Extra lung equivalent plugs
1 Bag	Extra bone equivalent plugs
1	PVC push rod for through hole plugs
1 Roll	Black (light proof) electrical tape
1	Custom fitted Pelican® Transport/Storage case

ITEMS FOR PURCHASE SEPARATELY

700-BC	ATOM TLD CHIP HOLDER 5mm Ø x 25mm L BONE TISSUE EQUIVALENT
700-BM	ATOM MOSFET CARTRIDGE, 5mm Ø x 25mm L BONE EQUIVALENT MATERIAL
700-BMS	ATOM MICROSTAR SINGLE DOSIMETER HOLDER, 14mm Ø x 25mm L BONE EQUIVALENT MATERIAL
700-BR	ATOM TLD ROD HOLDER 5mm Ø x 25mm L BONE TISSUE EQUIVALENT
700-LC	ATOM TLD CHIP HOLDER 5mm Ø x 25mm L LUNG TISSUE EQUIVALENT
700-LR	ATOM TLD ROD HOLDER 5mm Ø x 25mm L LUNG TISSUE EQUIVALENT
700-SC	ATOM TLD CHIP HOLDER 5mm Ø x 25mm L SOFT TISSUE EQUIVALENT
700-SM	ATOM MOSFET CARTRIDGE, 5mm Ø WITH 25mm L SOFT-TISSUE EQUIVALENT MATERIAL
700-SMS	ATOM MICROSTAR SINGLE DOSIMETER HOLDER, 14mm Ø x 25mm L SOFT-TISSUE EQUIVALENT MATERIAL
700-SR	ATOM TLD ROD HOLDER 5mm Ø x 25mm L SOFT TISSUE
701-BR-350	SINGLE BREAST ATTACHMENT FOR ATOM MALE PHANTOM (350cc)
701-E	ADULT MALE ATOM DOSIMETRIC PHANTOM SET OF RIGHT & LEFT ARM & LEG ATTACHMENTS
701-HN-CS	CASE FOR ADULT MALE HEAD AND NECK 282.00
702-BR-190	SINGLE BREAST ATTACHMENT FOR ATOM FEMALE PHANTOM (190cc)
702-BR-350	SINGLE BREAST ATTACHMENT FOR ATOM FEMALE PHANTOM (350cc)
702-E	ARM AND LEG ATTACHMENTS FOR ADULT FEMALE DOSIMETRIC PHANTOM
705-E	ARM & LEG ATTACHMENTS FOR 5 YEAR OLD DOSIMETRIC PHANTOM
706-E	ARM & LEG ATTACHMENTS FOR 10 YEAR OLD DOSIMETRIC PHANTOM

Warranty

All standard CIRS products and accessories are warranted by CIRS against defects in material and workmanship for a period as specified below. During the warranty period, the manufacturer will repair or, at its option, replace, at no charge, a product containing such defect provided it is returned, transportation prepaid, to the manufacturer. Products repaired in warranty will be returned transportation prepaid.

Product	Warranty Period
Non-Standard or Customized Products	3 months
Training Phantoms and Disposable Products	6 months
Electrical Products and Dynamic Phantoms	12 months
All other Standard Products	48 months
Plastic Water	60 months

There are no warranties, expressed or implied, including without limitation any implied warranty of merchantability or fitness, which extend beyond the description on the face hereof. This expressed warranty excludes coverage of, and does not provide relief for, incidental or consequential damages of any kind or nature, including but not limited to loss of use, loss of sales or inconvenience. The exclusive remedy of the purchaser is limited to repair, recalibration, or replacement of the product at manufacturer's option.

This warranty does not apply if the product, as determined by the manufacturer, is defective because of normal wear, accident, misuse, or modification.

Non-Warranty Service
If repairs or replacement not covered by this warranty are required, a repair estimate will be submitted for approval before proceeding with said repair or replacement.

Returns
If you are not satisfied with your purchase for any reason, please contact Customer Service prior to returning the product. Call 800-617-1177, email rma@cirsinc.com, or fax an RMA request form to 757-857-0523. CIRS staff will attempt to remedy the issue via phone or email as soon as possible. If unable to correct the problem, a return material authorization (RMA) number will be issued. Non-standard or "customized" products may not be returned for refund or exchange unless such product is deemed by CIRS not to comply with documented order specifications. You must return the product to CIRS within 30 calendar days of the issuance of the RMA. All returns should be packed in the original cases and or packaging and must include any accessories, manuals and documentation that shipped with the product. The RMA number must be clearly indicated on the outside of each returned package. CIRS recommends that you use a carrier that offers shipment tracking for all returns and insure the full value of your package so that you are completely protected if the shipment is lost or damaged in transit. If you choose not to use a carrier that offers tracking or insure the product, you will be responsible for any loss or damage to the product during shipping. CIRS will not be responsible for lost or damaged return shipments. Return freight and insurance is to be pre-paid.

With RMA number, items may be returned to:

CIRS
Receiving
2428 Almeda Avenue Suite 212,
Norfolk, Virginia, 23513 USA

TERMS AND CONDITIONS

Pricing
Prices are subject to change without notice. All prices are EXW per INCO Terms. Shipping, handling and insurance charges can be quoted at time of order upon request.

Ordering
CIRS accepts orders by phone, fax or email. When ordering, please specify the quantity and model number and describe the item in detail. Be sure to include shipping and billing addresses (if different). CIRS requires a minimum order of $150.00. All orders received from customers shall be deemed to be an acceptance by the customer of CIRS standard policies and conditions. When order is accepted by CIRS, you will receive confirmation from Customer Service.

Payment Terms
All orders from outside the USA, and purchase of non-standard product require payment in advance. CIRS accepts VISA, MasterCard, American Express, bank wire transfers and certified check in advance. Domestic orders may ship COD.

Delivery
Unless otherwise specified at time of order, shipments in the continental United States are made via insured ground traceable carrier. Shipments outside of the continental United States are made via insured, traceable air-freight.

Standard Product Improvements
CIRS standard items are subject to modification without notice. The customer is assured that the item delivered will equal or exceed the item described in all respects or the item may be refused and money refunded.

Purchase of Non-Standard Product
If you cannot find exactly what you are looking for within the CIRS standard product listings, please send detailed specifications and drawings if applicable via email to admin@cirsinc.com or fax (757) 857-0523 to the attention of customer service. The more information you can provide regarding your particular application and requirements the better we can assist with the design effort. If your request is of a confidential nature, a mutual non-disclosure can be executed.

Quotations for Non-Standard Product
In many cases an informal "ball park" estimate can be provided for budget purposes based on initial discussions. Such estimates are not contractual and orders cannot be accepted based on estimates. In order to provide formal quotation, additional time and effort on the part of CIRS is often required. Formal quotations shall include a pro-forma invoice and written specifications. All designs, drawings, specification and associated documents prepared by CIRS are property of CIRS. It is your responsibility to carefully review quotations for accuracy and completeness. Re-seller discounts do not apply to non-standard product quotations.

All non-standard purchase orders must clearly reference the CIRS quotation number. Submittal of a purchase order to CIRS is deemed acceptance of specifications referenced in the quotation. Upon receipt of a purchase order, CIRS shall confirm receipt of order. This does not indicate acceptance of the order by CIRS. Additional time is often required for planning and scheduling. Thus you will receive separate notice of order acceptance and estimated shipping date. Please note CIRS will make every effort to ship on or before the estimated date; however, due to the nature of non-standard product manufacture, CIRS cannot guarantee the delivery date.

Engineering Change Orders for Non-Standard Product
You may at any time, by written order, make changes in any of the following: (a) the drawings, designs and/or the specifications applicable to the items covered by this order, (b) the method of shipment and/or packing and (c) the place of delivery. CIRS shall not be deemed to have accepted your proposed changes without additional costs to you until CIRS notifies you in writing of acceptance of the change request.

Customer Acceptance of Non-Standard Product
All non-standard products are inspected at CIRS to ensure compliance with written specifications. Upon receipt, it is your responsibility to perform acceptance testing in a timely manner. All claims that product received deviates from written specifications and/or contains defects in material and/or workmanship must be made in writing to CIRS within 30 days of receipt of product and expressly state the details of the complaint. Please refer to the Returns section for additional instructions.

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