

## Model Numbers

Model No.	Product Description
RS-800T	Heart/Thorax Phantom
RS-801	Thoracic Cavity with the bottom plate
RS-802	Perfusable Lungs with Styrofoam beads (pair)
RS-804	Heart with two hollow defects in myocardial wall – standard size or to fit
RS-805	Liver Shell ONLY
RS-806	Chest Overlay
RS-807	Removable Breast with set of tumors

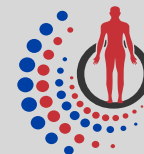
**Materials** See page 30 for more information.

RSD Soft Tissue	RSD Cortical Bone	RSD Trabecular Bone
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## Specifications

Packing Size	Packing Weight
86W x 79D x 48H cm	32 kg
34W x 31D x 19H in	70 lb.

**Publication References:** 1) Gallivanone F, Carne I, Interlenghi M, et al. A Method for Manufacturing Oncological Phantoms for the Quantification of 18F-FDG PET and DW-MRI Studies. *Contrast Media Mol Imaging*. 2017;2017:3461684. Published 2017 Sep 7. DOI: <https://doi.org/10.1155/2017/3461684>. 2) Heikkinen JO, Kuikka JT, Rautio PJ. Interdepartmental audit with an anatomically realistic lung phantom. *Journal of Nuclear Medicine Technology*. 2006 Mar;34(1):34-42. PMID: <https://pubmed.ncbi.nlm.nih.gov/16517967>. 3) Doshi N, Basic M, Cherry S. Evaluation of the Detectability of Breast Cancer Lesions Using a Modified Anthropomorphic Phantom. *Journal of Nuclear Medicine*, 39, 1951-7. 1998. PMID: <https://pubmed.ncbi.nlm.nih.gov/9829588>.



## Applications

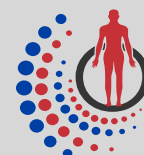
Myocardial perfusion SPECT image quality evaluation

Attenuation corrections

Evaluating patient doses

Training for SPECT/PET imaging

Quantitative phantom for SUV validation



## Modalities

SPECT/PET

# RSD

Radiology Support Devices, Inc.

# Thyroid Phantom



## Applications

I-131 therapy training

Thyroid uptake and scan quality assurance

SUV quantification and validation



## Modalities

SPECT/PET

## THYROID UPTAKE & IMAGE QUALITY ASSURANCE

The Thyroid Phantom is an integral part of the Fission-Product Phantom, but it can also be supplied separately (with or without a head). This phantom has the same contours as in the full Fission-Product Phantom and contains a neck with corresponding “Superhuman Skeleton” vertebrae, a hollow-shell thyroid with filling and flushing ports, and a front-cover of tissue-equivalent phantom material. This assembly has been designed for rapid removal of the cover plate and thyroid, a quick fill with an isotope solution and an equally rapid reassembly. This permits work with iodines of very short half-lives. A portion of the clavicles and sternum are included to further enhance the realism of the phantom.

**Publication Reference:** Kramer GH, Olender G, Vlahovich S, Hauck BM, Meyerhof DP. Comparison of the ANSI, RSD, KKH, and BRMD thyroid-neck phantoms for <sup>125</sup>I thyroid monitoring. *Health Phys*. 1996 Mar;70(3):425-9. DOI: <https://doi.org/10.1097/00004032-199603000-00014>. PMID: 8609037.



## Model Numbers

Model No.	Product Description
RS-542	Without Head
RS-545	With Head and Cervical Spine

**RSD Materials** See page 30 for more information.

RSD Soft Tissue	RSD Cortical Bone	RSD Trabecular Bone
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## Specifications

Packing Size	Packing Weight
36W x 36D x 36H cm	5 kg
14W x 14D x 14H in	12 lb.

**Soft Tissues:** There are unlimited, small variations in density and absorption throughout the human body. Phantom soft tissue is closely controlled to have the average density of these tissues.

**Skeletons:** RSD skeletons are highly detailed polymer moldings which reproduce the shape, mass density and attenuation coefficients of cortical bone and spongiosa. RSD's proprietary moldings allow for continuous production, eliminate the restrictions of human skeleton bones (including limited availability, unethical collection of human bone specimen, variable size, and uncertain chemical composition), and avoid the loss of marrows in dried natural skeletons thereby making RSD skeletons superior to "real bone."

**Molds:** Molds for the RSD cortical bone and spongiosa were made from human skeletons consistent with the sizes of the soft tissue molds.

**ICRU 44:** RSD skeletons conform closely to the standards established by the International Commission on Radiation Units and Measurements ([ICRU Report No. 44](#)); mass density is reduced slightly to take into account a small decrease in calcium content for older patients.

## LINEAR ATTENUATION DATA

1. Monte Carlo simulation was used to calculate linear attenuation coefficients as a function of beam.
2. Monte Carlo results were validated with linear attenuation coefficients derived from Hounsfield Unit measurements at discreet energy levels.
3. RSD Phantom material linear attenuation data was compared to NIST data using ICRU Report 44 compositions of human tissues.
4. NIST data was interpolated when necessary.

MATERIALS	DENSITY (g/cc)
RSD Soft Tissue (Opaque)	1.08
RSD Soft Tissue (Transparent)	1.10
RSD Cortical Bone	1.83
RSD Trabecular Bone	1.17

RSD SOFT TISSUE					
Energy (MeV)	Mean (HU)	Calculated ( $\mu$ )	$\mu$ (ICRU 44)	% Difference	Ratio
00.08	60.30	0.1948	0.1932	0.80%	0.9921
00.10	52.88	0.1797	0.1795	0.15%	0.9985
00.12	57.10	0.1717	0.1709	0.44%	0.9956
00.14	52.95	0.1623	0.1624	0.07%	1.0007
00.20	--	0.1477	0.1439	2.61%	0.9746
00.30	--	0.1245	0.1246	0.04%	1.0004
00.60	--	0.0950	0.0941	1.01%	0.9900
00.80	--	0.0825	0.0826	0.13%	1.0013
01.00	--	0.0744	0.0743	0.18%	0.9982
02.00	--	0.0520	0.0519	0.18%	0.9982
03.00	--	0.0351	0.0357	1.71%	1.0174
06.00	--	0.0288	0.0291	0.88%	1.0088
08.00	--	0.0252	0.0255	0.98%	1.0099
10.00	--	0.0229	0.0232	1.49%	1.0151
15.00	--	0.0203	0.0203	0.15%	0.9985
20.00	--	0.0189	0.0189	0.17%	1.0017

RSD CORTICAL BONE					
Energy (MeV)	Mean (HU)	Calculated ( $\mu$ )	$\mu$ (ICRU 44)	% Difference	Ratio
00.08	1365	0.4345	0.4280	1.51%	0.9851
00.10	1048	0.3496	0.3562	1.84%	1.0188
00.12	0977	0.3211	0.3274	1.91%	1.0195
00.14	0902	0.2932	0.2986	1.80%	1.0184
00.20	--	0.2511	0.2513	0.09%	1.0009
00.30	--	0.2155	0.2137	0.84%	0.9916
00.60	--	0.1596	0.1598	0.11%	1.0011
00.80	--	0.1403	0.1402	0.10%	0.9990
01.00	--	0.1274	0.1261	1.06%	0.9895
02.00	--	0.0883	0.0885	0.17%	1.0017
03.00	--	0.0611	0.0625	2.29%	1.0235
06.00	--	0.0512	0.0525	2.46%	1.0253
08.00	--	0.0468	0.0474	1.20%	1.0121
10.00	--	0.0446	0.0444	0.39%	0.9962
15.00	--	0.0410	0.0409	0.16%	0.9984
20.00	--	0.0393	0.0397	1.02%	1.0103

RSD TRABECULAR BONE (SPONGIOSA)					
Energy (MeV)	Mean (HU)	Calculated ( $\mu$ )	$\mu$ (ICRU 44)	% Difference	Ratio
00.08	551	0.2849	--	--	--
00.10	515	0.2586	--	--	--
00.12	439	0.2337	--	--	--
00.14	318	0.1541	--	--	--