

Phantoms of human body

"ROMAN"

ARDF-10, ARDF-11

Standard samples

The anthropomorphic organotropic human body phantom is shaped as a collapsible model of an adult man with body parameters in keeping with the recommendation of the International Commission on Radiological Protection (ICRP) and the corresponding picture in a human anatomy atlas.

The background phantom not containing radionuclide organs models is intended for measuring absorbed doses of X-ray, bremsstrahlung and gamma radiation in organs and tissues of the phantom from external ionizing radiation sources using thermoluminescent detectors (TLD).

The radionuclide phantom containing radionuclide organs models is intended for calibrating spectrometers of human radiation.

Features

- Correspondence with structure of human body and its organs (anthropomorphism, organotropism)
- Tissue equivalence to biological tissues
- Distribution uniformity of components and activities by volume
- Chemical inertness and stability
- Hygienic in comparison with samples of biological tissues
- Reproducibility of characteristics, making models by molding;
- Possibility to choose radionuclide content and required activity

Sphere of application

- Metrology of human radiation spectrometry;
- Calibration of spectrometric Equipment;
- Radiation medicine, radiology, dosimetry of internal human exposure, study of ionizing radiation fields distribution in volume of human body by internal and external exposure;
- Radiation monitoring

Modifications (standard versions):

- ARDF-10, ARDF-11 "ROMAN" background phantom
- ARDF-10, ARDF-11 "ROMAN" radionuclide phantom
- Torso phantom, phantoms of organs and body parts, head, neck, arms and legs phantoms (collapsible models, in background and radionuclide versions)



ADRF-11 "ROMAN"



Phantoms of human body

Technical characteristics and configuration

Density of composite materials used for phantom manufacture:

Simulator of bone biological tissue (BBT).....	1.3 g/cm ³
Simulator of soft biological tissue (SBT)	1.04 g/cm ³
Simulator of lung biological tissue (LBT)	0.26 g/cm ³
Tissue equivalence in energies range of X-ray and gamma radiation	10-3000 keV
Range of activities of incorporated radionuclides..	2-10 ⁶ Bq/g

Incorporated radionuclides

⁹⁰Sr, ⁵⁷Co, ⁶⁰Co, ¹³³Ba, ¹⁵²Eu, ²³⁸Pu, ²⁴¹Am, ²¹⁰Pb, ²²⁶Ra, ¹³⁷Cs, U-nat and other radionuclides by agreement with the Customer

Set of documentation: passport, instruction manual, label

Models	ARDF-10	ARDF-11
Head phantom	+	+
Neck phantom	+	+
Torso phantom	+	+
Arms phantoms	-	+
Legs phantoms	-	+
Total quantity of models	56	92

Head phantom composition

- frontal bone with investing tissue
- parietal bone with investing tissue, left and right
- base of skull with facial bones, face investing tissue
- cerebrum

Neck phantom composition

- throat;
- thyroid;
- cervical spine;
- front and back parts of neck

Body phantom composition

- blades, left and right
- collarbone, left and right
- spine, thoracic;
- connective tissue covering spine, left and right part;
- spine, lumbar part;
- pelvic bone, left and right;
- sacrum;
- bone marrow;
- lung, left and right
- thymus;
- heart;
- liver;
- stomach;
- spleen;
- pidney, left and right
- investing tissue of chest with front of ribs;
- investing tissue of abdomen;
- investing tissue of back with back of rib;
- investing tissue of lumbus with buttocks;
- skeleton (total organs tissue of pelvic-abdominal body part together with total tissue of pancreas);
- « lighthouse », central body (total tissue of esophagus, trachea, aorta, vena cava, and other tissues of chest);

Arm phantom composition

- shoulder bone
- forearm bones
- hand bones with investing tissue
- investing tissue of shoulder bone, front and back parts
- investing tissue of forearm bones. front and back parts

Leg phantom composition

- thigh-bone
- patella (kneecap) with investing tissue
- shin bones
- feet bones with investing tissue
- investing tissue of thigh-bone, front and back parts
- investing tissue of shin bones, front and back parts

