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RAN100  
RAN110

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## The RANDO® Phantom, RAN100 and RAN110

The RANDO® Phantom is an invaluable aid in radiotherapy treatment planning. It enables detailed mapping of dose distribution. This detailed dose information is useful for teaching patient treatment evaluation, quality assurance of automated treatment planning systems and research.

There are two RANDO® models: The RANDO® woman and the RANDO® man. The woman represents a 163cm (5'4") tall and 54kg (118 lb) female figure. The man represents a 175cm (5'9") tall and 73.5kg (162 lb) male figure. Neither have arms or legs.

Both phantoms are constructed with a natural human skeleton which is cast inside soft tissue-simulating material. Lungs are molded to fit the contours of the natural rib cage. The air space of the head, neck and stem bronchi are duplicated. The phantom is sliced at 2.5cm intervals for the insertion of film. Hole Grid patterns can be drilled into the sliced sections to enable the insertion of dosimeters.

Two tissue-simulating materials are used to construct the RANDO® Phantom: the RANDO® soft tissue material and the RANDNO® lung material. Both of these are designed to have the same absorption as human tissue at the normal radiotherapy exposure levels.



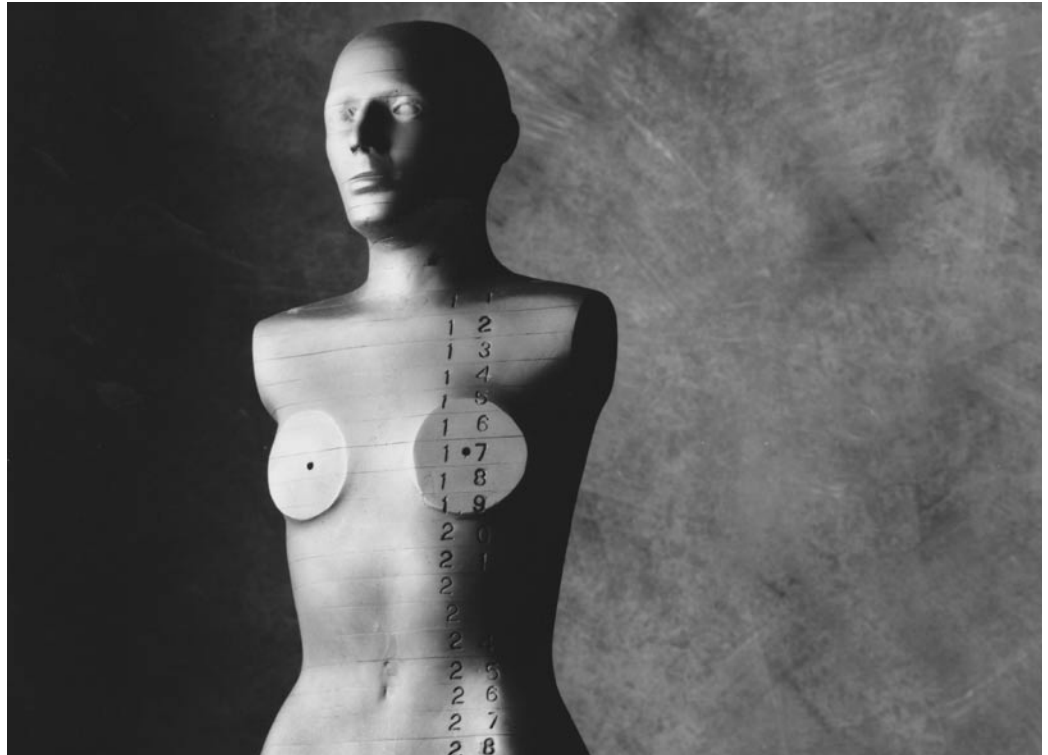
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#### Soft Tissue

The RANDO® phantom's soft tissue is manufactured with a proprietary urethane formulation. The material has an effective atomic number and mass density which simulates muscle tissue with randomly distributed fat. The RANDO® Phantom will provide infinite years of service because the material is virtually indestructible. It is able to withstand substantial impact and continuous handling without damage. Small air bubbles may be evident in images of the RANDO® Phantom. These occur during the molding process and are small enough that they should not have a significant effect on studies.

#### Lungs

RANDO® lung material has the same effective atomic number as the soft tissue material with a density which simulates lungs in a median respiratory state. The molded lungs are hand-shaped and fitted to naturally fill the rib cage.

#### Skeletons

We use natural human skeletons in our anthropomorphic phantoms. Many human skeletons are not the same size and shape as our molds. Also, many skeletons reflect natural human characteristics such as lack of symmetry and distorted joints. As our technicians reconstruct the skeleton, minor adjustments may be made to facilitate its positioning within the mold. The natural characteristics and the adjustments should not present any problems in the use of the phantom.



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#### Assembly

Each phantom section has registration pins mounted within it. These pins assist in the proper alignment of the phantom sections. An assembly unit is supplied with the phantom. It will hold the entire phantom or a smaller set of sections together at one time. Holes for insertion of individual dosimeters may be drilled to customer requirements. Standard size grids are available: 1.5cm x 1.5cm and 3cm x 3cm. Hole grids are only drilled through soft tissue and not through bone. Hole grids are available with 2, 5 and 6mm diameter holds. Drilled holes are filled with standard, solid Mix D plugs. There are a number of optional plugs available which are designed to hold TLD chips and rods.

#### Breasts and Breast Cups

Optional breasts in sizes A through E are available for female and male RANDO® Phantoms. Each breast is molded into 3cm thick sections. The female RANDO® phantom has flat chest contours onto which the breast sections are mounted. The breasts for the male RANDO® phantom have adaptor bases for matching breasts to the male's chest contours. Breast shapes are not natural....



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