Kyoto Kagaku Co., Ltd has developed an extensive history and tradition in providing high quality phantoms to the field of radiology. Kyoto Kagaku Co., Ltd continues with its challenge in offering innovative, state-of-the-art solutions for this rapidly developing industry.

Founded during post-war Japan in 1948, Kyoto Kagaku Co., Ltd originates from the Shimadzu Corporation. Early days of the company began with the production of scientific specimens, anatomical models and skeletons. Its first radiology phantom was developed in the early 1960’s with the collaboration of Shimadzu. Original human tissue substitute materials for diagnostic energy range and therapeutic energy range were also invented. Tissue substitute materials with ultrasound compatibility were a recent development that opened doors to a variety of QA and training phantoms in the field of sonography.

Through anatomical research and model crafting breakthroughs such as our long sought human tissue substitutes, Kyoto Kagaku strives to perfect the production of anthropomorphic phantoms for medical imaging. Kyoto Kagaku will continue to uphold high standards in developing products that effectively contribute to patient safety and training of healthcare professionals.

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<thead>
<tr>
<th>Year</th>
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<tbody>
<tr>
<td>1895</td>
<td>The educational scientific division of Shimadzu Corp is established.</td>
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<tr>
<td>1909</td>
<td>Shimadzu anatomical human model with muscles wins the Gold prize at the International exhibition in Alaska-Yukon Pacific Ocean</td>
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<tr>
<td>1925</td>
<td>The educational scientific specimens division begins to manufacture of anatomical models</td>
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<tr>
<td>1948</td>
<td>Kyoto Kagaku is established.</td>
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<tr>
<td>1954</td>
<td>First resinous skeleton models</td>
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<td>1955</td>
<td>First resinous anatomical models</td>
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<tr>
<td>1967</td>
<td>Development of Stomach Phantom in partnership with Shimadzu Corp.</td>
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<tr>
<td>1982</td>
<td>Development of XUR* with the Japan Atomic Energy Research Institute (JAERI)</td>
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<td>1986</td>
<td>First participation in RSNA (Radiological Society of North America)</td>
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<td>1988</td>
<td>Development of TOUGH serious, human tissue substitute for radiotherapy range in cooperating with the National Institute of Radiological Sciences</td>
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<td>1994</td>
<td>Development of Synthetic Bones</td>
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<td>2005</td>
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| 2014 | See Page 04-11!
Child maltreatment

Children around the world are victims to domestic violence and abuse, yet the problem is often overlooked. Noticing the signs of an abusive fracture of a child is the first step to putting an end to these maltreatments. This phantom has been designed and developed to cultivate such observation skills in future X-ray radiologists and technicians.

The Phantom

Typical fractures of an abusive attack have been replicated on the left side of the infant model’s body and limbs, including the ulnae and radii. Smaller fractures can be seen around the phantom’s wrist.

Bone fractures
- is there sign of abuse?

Spiral fracture

Certain causes of non-accidental pediatric injuries, such as spiral fractures, include maltreatment stimulated by anger or distress.

Back, scapula and rib fractures

Signs of fractures on the scapulae and ribs are to be inspected not only by their form, but also their location. Rib fractures close to the vertebrae may be potential indicators of the child being thrown.

Supracondylar humerus fracture

A supracondylar humerus fracture occurs on the distal humerus above the epicondyles and is a fracture commonly observed in children. Pediatric cases account for approximately 20% of all lateral condyle fractures.

Skull fractures

A linear skull fracture may be another indication of child maltreatment. A common cause of injury is blunt force trauma, in which the energy from a blow is transferred over a wide surface area of the skull. At times, fractures display better on x-ray scans than CT imaging and it is crucial to prevent such fractures from being overlooked.

Legend

: product video is available  
: publication reference on the product is on page 37

Information on this brochure is of at the time of printing and specifications may change without prior notice. For the latest information and further details, check our website www.kyotokagaku.com, follow us on Facebook www.facebook.com/kyotokagaku or contact us at rw-kyoto@kyotokagaku.co.jp.
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### DynamicPhantoms

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### Ultrasound Phantoms

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### Multilingual Index

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Newborn Whole Body Phantom

The world’s first full body phantom for neonatal radiography.
Newborn Whole Body Phantom is the world’s first full body phantom for neonatal radiography with correct anatomical structure and movable limbs. Neonatal radiography is an important tool in NICU (Neonatal Intensive Care Unit). Patient positioning and immobilization are essential features. This phantom provides opportunities for hands-on training and experiments to minimize radiation exposure to newborn babies.

Features
1. Limbs rotate 360 degrees at shoulders and hip joints.
2. Left hand is clenched and right hand is open.
3. Life size whole body newborn baby.
4. Original human tissue substitute.
5. No metal parts or liquid structures.
6. Meconium aspiration syndrome can be made per custom order.

Training Skills
- Immobilization
  - Manual immobilization
  - Immobilization with fixtures
- Autopsy imaging
- Radiography
  - Upright AP (anteroposterior)
  - Supine AP
  - Upright lateral
  - Supine lateral

Specifications
Set Includes:
1 newborn whole body phantom
1 storage case
1 set of sample X-ray images
1 instruction manual

Size:
phantom size:
42 cm (represent a baby of 50 cm tall)/16.5 in
phantom weight:
2.8 kg /6.2 lb

Anatomies
- Skull, spine, ribs, pelvis, scapulae, clavicles, humeri, radius, ulnae, bones of hands, femora, fibulae, tibiae and bones of feet
- Lungs and mediastinum
**PH-1C**

**Pediatric Chest Phantom**

*Imaging and dosimetry for radiosensitive 5-year-old.*

Chest X-ray is one of the most common examinations in pediatric radiography. This Pediatric Chest Phantom is designed to find out optimal parameters and protocols to minimize radiation exposure to children. The phantom has two kinds of interchangeable lung inserts. The lung vascular insert can be used to study image quality in relation to CT/X-ray protocols. The lung density insert allows users to evaluate dosage distribution in the lung field.

**Features**

1. Two types of interchangeable lung inserts are available. -lung vascular insert and lung density insert.
2. Pencil-shaped ion chamber for CTDI can be set in the mediastinum.
3. TLD or RPL dosimeters can be set in the thyroid block and the lung density insert.
4. Lung vascular inserts with pulmonary vessels provide life-like radiographs.
5. Detachable internal structure allows insertion of variety of pathologies and targets.

**Anatomies**

Rib, clavicle, spine, mediastinum, scapula, sternum and *pulmonary vessel*  
*lung vascular insert only*

**Two types of lung inserts**

**Applications**

Pediatric Chest X-ray  
Pediatric Chest CT  
Dosimetry

**Specifications**

Set Includes:  
1 five-year-old chest torso  
main body: synthetic bones are embedded  
thyroid block  
diaphragm block  
1 lung vasculature insert: mediastinum with pulmonary vessels  
1 lung density insert: mediastinum, lung fields (L-R)  
1 set of sample images  
1 instruction manual

Size:  
phantom size: 32 x 17 x 38 cm/12.6 x 6.7 x 15 in  
weight: 6 kg/3.2 lb
Subsolid Nodules Phantom for PH-1 LUNGMAN (p.15) and CT Lung Phantom (p.24)

Both mixed and pure GGO are provided in variety of sizes and HU numbers. GGO Tumor Phantom is a set of simulated lesions designed for study and training in Grand-Glass Opacity (GGO) detection and interpretation. Both mixed and pure GGO are provided in variety of sizes and HU numbers. The set also includes 3-D GGO modeled on clinical CT data. The simulated lesions can be attached to the pulmonary vessels of the Chest Phantom N1 "LUNGMAN" or in the CT Lung Phantom.

Mixed GGO with single concentric solid field (No.1-7)

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Mixed GGO with single eccentric solid field (No.8-10)

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Mixed GGO with double eccentric solid fields (No.11, 12)

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Pure GGO (No. a-h)

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GGO Tumor Phantom can be used with PH-1 Chest Phantom see page 15
**CT Colonography Phantom NCCS**

**Innovative study tool for safe and effective CT Colon screening**

Virtual Colonoscopy with CT colonography is an invasive and demanding examination for patients and people who undergo screening for polyps. CT Colonography Phantom NCCS provides ideal tools to evaluate preparation, including tagging and cleansing, protocol for CT scanning, and software for interpretation.

**Features**

1. Cylindrical colon units with targets that represent polyps can be set at the position of ascending colon, descending colon and rectum in the life-size lower torso phantom.
2. Four types of colon units are included for evaluation. Each unit has six targets lining in sequence on the inner wall of the unit. Depressed types are to evaluate tumor detection sensitivity, and projection types can be used to evaluate volume measurement accuracy. 
   - Depressed I: circle targets with fixed diameter
   - Depressed II: circle targets with fixed height
   - Projection I: half-ellipsoid sphere targets with fixed diameter
   - Projection II: half-ellipsoid sphere targets with fixed ratio
3. Contrast agent can be poured into the colon units for tagging.
4. Pencil shaped ion chambers can be inserted in the center of the phantom for CTDI measurement.

**Applications**

- Virtual colonography
- Visualization and detection of targets
- Study on optimal dose for low dose CT colonography
- Evaluation of accuracy of measurement (size, volume)
- Study on optimal density of contrast media

**Anatomies**

Spine, pelvis, femurs

**Depressed type**

- 2 variations-

**Depressed I: fixed height**

<table>
<thead>
<tr>
<th>a: Outer diameter</th>
<th>b: Inner diameter</th>
<th>c: Height</th>
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<tbody>
<tr>
<td>0.7 cm/0.27 in</td>
<td>0.35 cm/0.13 in</td>
<td>0.2 cm/0.07 in</td>
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<td>0.35 cm/0.13 in</td>
<td>0.15 cm/0.06 in</td>
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<td>0.3 cm/0.11 in</td>
<td>0.1 cm/0.11 in</td>
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<td></td>
<td>0.25 cm/0.05 in</td>
<td>0.05 cm/0.02 in</td>
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<td></td>
<td>0.25 cm/0.05 in</td>
<td>0.025 cm/0.01 in</td>
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<td>0.015 cm/0.005 in</td>
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**Depressed II: fixed height**

<table>
<thead>
<tr>
<th>a: Outer diameter</th>
<th>b: Inner diameter</th>
<th>c: Height</th>
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<tbody>
<tr>
<td>1.0 cm/0.39 in</td>
<td>0.5 cm/0.2 in</td>
<td>0.2 cm/0.07 in</td>
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<tr>
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<tr>
<td>0.5 cm/0.20 in</td>
<td>0.25 cm/0.1 in</td>
<td>0.1 cm/0.11 in</td>
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<tr>
<td>0.1 cm/0.03 in</td>
<td>0.05 cm/0.02 in</td>
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**Projection type**

- 2 variations-

**Projection I: fixed diameter**

<table>
<thead>
<tr>
<th>a: Diameter</th>
<th>b: Height</th>
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<tbody>
<tr>
<td>1.0 cm/0.4 inch</td>
<td>0.7 cm/0.27 in</td>
</tr>
<tr>
<td>0.5 cm/0.20 in</td>
<td>0.25 cm/0.1 in</td>
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<tr>
<td>0.3 cm/0.11 in</td>
<td>0.15 cm/0.06 in</td>
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<td>0.2 cm/0.07 in</td>
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<td>0.1 cm/0.03 in</td>
<td>0.05 cm/0.02 in</td>
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**Projection II: fixed ratio**

<table>
<thead>
<tr>
<th>a: Diameter</th>
<th>b: Height</th>
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<tbody>
<tr>
<td>1.0 cm/0.20 in</td>
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<tr>
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<td>0.3 cm/0.11 in</td>
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<td>0.2 cm/0.07 in</td>
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<tr>
<td>0.1 cm/0.03 in</td>
<td>0.05 cm/0.02 in</td>
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**Specifications**

Set Includes:
1. lower torso phantom (with three holes for colon units and one hole for ion chamber)
2. 3 plugs for colon unit hole
3. plug for ion chamber hole
4. types of colon units (depressed I, depressed II, projection I and projection II)
5. acrylic container
PH-51 NEW

Lumbar Spine Fluoroscopy Training Phantom

Ideal training tool for hands-on workshop
Lumbar Spine Fluoroscopy Training Phantom allows various training methods of fluoroscopy guided procedures in pain relief of the lumbar area. The phantom has two types of interchangeable and replaceable inserts with radio-opaque lumbar spine.

Product Supervision:
Dr. David Wilson MBBS, BSc, MFSEM, FRCP, FRCR
Consultant Radiologist St Luke’s Hospital Oxford
Senior Clinical Lecturer University of Oxford

Vertebroplasty Block

Anesthesia Block

Features
1. Two types of replaceable training block
   - vertebroplasty block and anesthesia block
2. Lumbar spine L2-L5 can be visualized under X-ray.
3. True-to-life resistance to the needle

Training Skills
- Recognition of fluoroscopic anatomy and landmarks
- Vertebroplasty
- Fluoroscopy guided epidural anesthesia:
  needle placement in facet joint injection, root block and discogram.

Anatomies
Lumbar spine (L2-L5), spinal canal, epidural space (anesthesia block only)

"I have tested the final product with various different manufacturing kits and would have no hesitation in recommending these phantoms to clinicians who wish to teach any of the technical vertebroplasty procedures."

DR DAVID J WILSON MBBS BSc MFSEM FRCP FRCR
CONSULTANT MUSCULOSKELETAL INTERVENTIONAL RADIOLOGIST

Specifications
Set Includes:
1 lumbar torso
1 vertebroplasty block
1 anesthesia block
1 skin cover
1 syringe
1 irrigation bag
1 instruction manual
1 storage case

Replacement Parts:
41913-000-01 anesthesia block
41913-000-02 vertebroplasty block
11348-150 skin cover

M43E NEW

Ultrasound Compatible Lumbar Puncture / Epidural Simulator

Ultrasonic anatomy and needle access training
Ultrasound compatible puncture block is anatomically correct and offers realistic image of ultrasound. Both epidural space and subarachnoid space are accessible for training.

Features
1. Ultrasonic landmarks of lumbar spine can be visualized.
2. Skin cover allows marking with a pen.
3. Both upright and lateral positions are possible for training.
4. Translucent blocks allow users to see the needle pathway under direct vision.

Training Skills
Ultrasound-guided lumbar puncture
Ultrasound-guided epidural anesthesia
CSF collection and CSF pressure measurement

Anatomies
Lumbar spine (L2-L5) including spinous process and transverse process
Spinal canal, epidural space

Specifications
Set Includes:
1 lumbar region model
1 ultrasound lumbar puncture / epidural block
1 lumbar region skin cover
2 lumbar region support bases
   (upright position / lateral position)
1 irrigator bag
1 tube
1 support base
1 syringe
1 storage case

Size:
33 x 21 x 30 cm
13 x 8.3 x 11.8 in

Replacement Parts:
11348-190 ultrasound lumbar puncture / epidural block
11348-230 ultrasound lumbar region skin cover

New Products 08
Female Pelvic Ultrasound Phantom

Two interchangeable inserts to cover basic gyn ultrasound.

The pelvic phantom is unique in that it allows for transabdominal and transvaginal scanning. Though transvaginal scanning is the gold standard for gyn and 1st trimester pregnancy, it is still important to recognize the anatomy from the transabdominal aspect, as patients may present with anatomy and/or pathology that is outside the transvaginal field of view. The transabdominal technique is still a valuable part of assessing the female pelvis. This phantom also provides imaging of normal and abnormal anatomy so that normal protocol can be practiced while still learning to recognize life threatening pathology, such as an ectopic pregnancy. Other pathology such as endometrial cancer and ovarian cysts can also be identified. In a learning environment, this phantom provides a balance of normal and abnormal that will assist in developing the critical thinking skills necessary to successfully evaluate the female pelvis.

Features
1. Both transvaginal and transabdominal scanning are possible.
2. Two types of interchangeable phantom inserts with different pathologies.
4. Excellent ultrasound image quality.

Training Skills
- Handling and manipulation of transvaginal and transabdominal transducers
- Interpretation of sonogram
- Visualization and localization of anatomies and pathologies

Anatomies and Pathologies
- Pathological phantom
  - endometrial cancer, uterine fibroid, dermoid cyst of ovary, bleeding at Douglas pouch

Pathological Phantom

Ectopic pregnancy phantom

- Ectopic pregnancy in a fallopian tube, bleeding at Douglas pouch

Ectopic pregnancy Phantom

Specifications
Set Includes:
1 lower torso manikin
1 ultrasound pathology unit
1 ultrasound ectopic unit
1 storage case

Size: 34 x 33 x 24 cm
13.4 x 13 x 9.5 in
Scrotal Ultrasound Phantom

Repeated training to acquire skills in safe and painless examination
Ultrasound evaluation of the scrotum is an effective, safe, and painless imaging method to assess male reproductive organs for tumors, inflammation, and trauma, as well as potential causes of infertility. The ultrasound phantom provides sonographers, residents in training, and physicians, with the opportunity for hands-on training with a scrotal phantom using an ultrasound scanner. Interchangeable normal and cancerous phantom inserts provide examples of anatomy and pathology of the male genitalia to simulate a real-time experience.

Features
1. Two types of interchangeable scrotums: normal and pathology
2. Excellent ultrasound image quality
3. Compatible with any ultrasound system

Training Skills
- Patient positioning and preparation for examination
- Scrotal ultrasound screening
- Visualization of testicular cancer

Anatomies and Pathologies
- Normal phantom
  - scrotum, testicle, epididymis and penis

- Pathological phantom
  - scrotum, testicle, epididymis and penis
  - testicular cancer (each one in left and right testis, 10mm dia.)

Specifications
- Set Includes:
  1 pelvic body
  1 normal scrotum
  1 pathological scrotum
  1 storage case
- Size:
  34 x 33 x 24 cm
  13.4 x 13 x 9.5 in
**Infant Hip Sonography Training Phantom**

*Best tool to teach Graf’s method*

This is the world’s first training phantom with ultrasound anatomy of a 6-week-old infant and it expands training opportunities for pediatricians, radiologists and orthopedists. Before working on real infants, trainees can repetitively practice on this phantom to become familiar with the examination procedures and key points. Using real ultrasound devices, trainees can learn key ultrasound landmarks to identify standard plane for Graf’s classification. This is a foundation to acquire skills in handling and positioning of the baby as well as correct positioning of the transducer. The life-size full body manikin has movable arms that allows for realistic training in supporting and changing the position of the infant while interacting with his/her guardian.

**Features**

1. World exclusive training model for hip sonography on a full body manikin of 6-week-old infant
2. Bilateral hips for examination
3. Key landmarks that can be recognized under ultrasound include: chondro-osseous junction (bony part of femoral neck), femoral head, synovial fold, joint capsule, labrum, hyaline cartilage preformed acetabular roof, bony part of acetabular roof, bony rim (check list I), lower limb of os ilium, correct plane, labrum (check list II).
4. Facilitate anatomical understanding
5. The full body manikin with movable arms allows training in supporting and changing the position of the infant.

**Training Skills**

- Setting and preparation for hip sonography
- Changing the position of the infant
- Communication and interaction with the infant’s guardian
- Correct positioning and use of the transducer
- Recognition of ultrasonic landmarks for hip sonography
- Visualization of standard, anterior and posterior planes
- Interpretation and morphological classification of the sonogram

**Anatomies**

- Ilium (plane)
- Cartilage acetabular roof
- Labrum
- Bony rim
- Great trochanter
- Femoral head
- Lower limb

**Specifications**

Set Includes:
- 1 ultrasound infant phantom
- 1 instruction manual
Whole Body Phantom "PBU-50" and CT Whole Body Phantom "PBU-60" are full size anthropomorphic phantoms with movable and detachable joints for positioning. Each phantom can be separated into 10 individual parts, allowing a wider application in training and research. Neither phantom has metal parts or liquid structure.

PBU-50 is ideal patient for radiographer student with close-to-human absorption rate and articulation.

Main joints have close-to-human articulation

Shoulders: rotate full 360 degrees in the sagittal plane, approx. 180 degrees to side-ways.

Elbows: bend up to approx. 90 degrees.

Hip Joints: rotate forward up to approx. 90 degrees, then abduct up to 45 degrees each.

Knees: bend up to approx. 90 degrees.

An adjustable head supporter comes with the set, facilitating various head position setting.

PBU-50

PBU-60

An essential asset for every radiography program

Specifications

Set Includes:
1 whole body phantom (separable into 10 parts) *bones and internal organs listed above are embedded.
1 head supporter
1 flat head screwdriver
1 set of sample X-ray images

phantom height: 165 cm/65 in
phantom weight: 50 kg/110 lb

packing size: 85 x 60 x 44 cm x 2 boxes 33.5 x 24 x 17.3 in x 2 boxes
packing weight: 80 kg/176 lb

Optional Parts:
41363-010 2 storage cases
**Fractured Hand/Forearm Phantom**

*Optional Parts for PH-2/2B*

_X-ray phantom for trauma evaluation_

Left hand/forearm phantom with bone fractures for radiography. The phantom is interchangeable with either PBU-60 or PBU-50’s left hand/forearm.

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**Specifications**

Set includes:
1 fractured hand/forearm phantom

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**Bone fractures:**
ulna, radius, first metacarpal, middle phalanx of the index finger, distal phalanx of the first finger (compressed fracture), fifth metacarpal

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**41363-010**

2 carrying cases *Optional Parts for PH-2/2B*

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**Body plates for PH-2/2B**

*Optional Parts for PH-2/2B*

Body plates to simulate a body of BMI30

The body plate provides the phantom with a variety of body shapes.

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**Customized PH-2B**

CT Whole Body Phantom with Pathologies

Pathological findings in the phantom expand possibilities in training application.

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<tbody>
<tr>
<td>a</td>
<td>Brain tumor</td>
<td>130</td>
</tr>
<tr>
<td>b</td>
<td>Subarachnoid bleeding</td>
<td>190</td>
</tr>
<tr>
<td>c</td>
<td>Pulmonary tumor</td>
<td>30 or inside 130</td>
</tr>
<tr>
<td>d</td>
<td>Hepatic tumor</td>
<td>10</td>
</tr>
<tr>
<td>e</td>
<td>Pancreatitis</td>
<td>30</td>
</tr>
<tr>
<td>f</td>
<td>Gall stone</td>
<td>170</td>
</tr>
<tr>
<td>g</td>
<td>Kidney stone</td>
<td>40</td>
</tr>
<tr>
<td>h</td>
<td>Appendicitis</td>
<td>70</td>
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<tr>
<td>i</td>
<td>Spondylolisthesis</td>
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</table>
Pediatric Whole Body Phantom "PBU-70"

This Phantom is easy to handle positioning, and provides complete bone images for every joint.

Pediatric Whole Body Phantom is modeled after a 5-year-old child of 105cm (43") in height. This is a life-size, full body anthropomorphic phantom with a state-of-the-art synthetic skeleton, lungs, liver, mediastinum and kidneys. Its movable and detachable joints allow various positioning.

Features
1. Main joints have life-like articulation, allowing various positioning for plain X-ray.
2. Training and research applications can be enriched by disassembling the phantom into 10 individual parts (head, limbs and trunk).
3. The phantom has no metal parts or liquid structures.
4. No defect in bone images of joints.

Anatomies
- Full synthetic skeleton
- Main pulmonary vessels, mediastinum, liver, kidneys

Training Skills
- Plain X-ray photography and basic CT scanning
- Basic patient positioning for X-ray and CT

Specifications
Set Includes:
1 pediatric whole body phantom:
  - life-size, 5-year-old consists of 10 parts
  - head supporter
  - hand fixture belt
  - 1 set of sample X-ray images

Size:
phantom height: 110 cm/43.3 in
phantom weight: 20 kg/44 lb

Optional Parts:
41303-060
storage case for PH-2C

Bone Fracture Pediatric Phantom "PBU-70B"

Improve your skills in detecting bone fractures in children.

Training in pediatric radiography can be enriched with clear and subtle bone fractures. Typical fractures resulting from child abuse are also included.

Spiral Fracture of the Distal Tibia  Forearm Shaft Fractures
All fractures are prepared on the left side of the phantom.

* Specify with or without adult teeth at the time of order.
**PH-1**

**Multipurpose Chest Phantom N1 "LUNGMAN"**

*Broad range of possible applications in research and training.*

The phantom provides life-like radiographs very close to actual clinical images. The three-dimensional structure allows both PA and LATERAL images to be obtained. The phantom bones and vessels show life-like contrast gradations on the image along with tube voltages. PH-1 is used in a study by the FDA to create a database of CT scans with different scanners and protocols, as a resource for assessment of lung nodule size estimation method.

**Features**

1. Applicable for both plain radiography and CT scanning.
2. Simulated tumors and other targets can be attached at any points in the lung field.
3. Wide variety of uses in interpretation training, anatomical education, evaluation and assessment of devices and other research.
4. Accurate anatomy and high quality substitute materials
5. Arms-abducted position of the torso suits the CT scanning.
6. The pulmonary vessels are spatially traceable.
7. Assessment of computer-aided detection systems is possible.

**Specifications**

Set includes:
1 male chest torso
main body: synthetic bones are embedded mediastinum: heart, trachea
pulmonary vessels (right and left)
abdomen (diaphragm) block: no internal structure
15 simulated tumors (15 variations 1 piece each)
3 varieties of Hounsfield number:
  approx. -800, -630, +100
5 sizes for each type:
diameters 0.3, 0.5, 0.8, 1.0, 1.2 cm
diameters 0.12, 0.2, 0.32, 0.39, 0.47 in

Size:
phantom size:
43 x 20 x 48 cm, chest girth 94 cm
17 x 8 x 18 in, chest girth 37 in
phantom weight: 18 kg/39.6 lb
packing size:
65 x 55 x 29 cm, 25 kg
26 x 22 x 11 in, 55.1 lb
Optional and replacement parts for PH-1

**41337-010**
**Chest Plates**

**41337-070**
**Simulated Tumors** (standard set)

- 800
- 630
+ 100

**41363-020**
**Storage Case**

Custom order simulated tumors

Components for Radioisotope

The set of RI container inserts can be set in the chest phantom in place of standard inserts allowing wider research applications including PET/CT fusion evaluation. The lungs of urethane foam can be worked easily to accommodate simulated nodules or other inserts.

CT fusion

PET

**PH-8**

**Lung Cancer Screening CT Phantom LSCT001**

*Chest phantom for standardization studies in low dose lung cancer CT screening.*

LSCT001 is a unique phantom dedicated for optimizing lung cancer CT screening conditions for early cancer detection, as well as setting standard conditions across multiple systems or facilities for mass screening. Anthropomorphic structure of the phantom provides life-like images allowing operators visual evaluation. Quantitative evaluation on radiation dose and density curve of the image can be done simultaneously with a single scanning.

**Features**

1. Original human tissue substitute material creates life-like artifact under CT scanning.
2. Simulated GGO type tumors with different sizes and HU numbers are prepared in the vicinity of three main sections of bilateral lungs.
3. Dosimeter holder on the central axis of the phantom allows housing a pencil type ion chamber. 8-step cylindrical linearity phantom to control density curve as a scale can be attached to the chest phantom base.

**Specifications**

Set Includes:
- 1 chest phantom: life size torso with arm up position
- internal structures:
  - bones
  - simulated tumors at three lung areas
  - apical portion of the lungs
  - bifurcation of the trachea
  - base of lungs
- dosimeter hole (1.3 cm / 0.5 in dia., on the central axis of the phantom)
- 1 8-step linearity phantom
- 8 steps of 3 cm / 1.2 in dia.
- density samples are embedded
- 1 adjustment base

**Size:**
- chest phantom chest girth 93 cm/36.6 in
- height 45 cm/17.7 in
- weight 18 kg/40 lb
- linearity phantom diameter 20 cm/7.9 in
- height 10 cm/3.9 in
PH-4
CT Torso Phantom CTU-41
A one-piece anthropomorphic torso phantom with anatomical structures allows various CT approaches including helical scanning.

Anatomies
Synthetic bones with cartilage:
- artificial skull, vertebrae, clavicles, ribs, sternum, scapula, coxal bones, femurs
Brain with cerebral ventricles
Eye balls
Lungs with pulmonary vessels
Trachea (up to the third bifurcations)
Liver with portal and hepatic veins
Kidneys, gallbladder, pancreas, spleen, aorta, cava, ureter, urinary bladder, prostate, rectum, sigmoid colon and ascites

Specifications
Set Includes:
1 CT Torso Phantom: life size, male
Optional Parts:
41363-030 storage case

PH-3
Angiographic CT Head Phantom ACS
Kyoto Kagaku’s best-selling CT head phantom.

Features
1. Contrast-enhanced left cerebral arteries are three dimensionally embedded in the brain.
2. Diameters of arteries range from 0.5 to 4.0 mm / 0.02 in to 0.16 in.

41309-100
CT Type

Anatomies
Left anterior cerebral artery, left middle cerebral artery, cerebrum, mesencephalon, cerebellum, ventricles, eye balls, synthetic skull and cervical vertebrae (C1-C7).

41309-200
Angio Type

PH-47
Dental Radiography Head Phantom
Removable jaws and tongue allow a variety of application for training and research.

Production Supervision:
Akiyoshi Katsumata, D.D.S., Ph.D.Professor
Asahi University, School of Dentistry

Features
1. Each tooth is individually modeled and has a three-layer structure of enamel, dentin and pulp cavity.
2. Each hard tissue (enamel, dentin, cortical bone and cancellous bone) has a particular HU number and X-ray absorption rate.
3. Jaws and tongue are detachable to allow access to the oral cavity, pharyngeal cavity and maxillary sinus. Sensors, simulated lesions, or residue can be set in these cavities.
4. Carotid arteries are prepared as lumens to accommodate simulated calcifications.

Anatomies
- Synthetic skull with nasal cavity, maxillary sinus, mandible alveolar, and maxillary alveolar; cervical vertebrae and hyoid bone, teeth with enamel, dentin and pulp cavity.
- Tongue, oral cavity, pharyngeal cavity and carotid arteries

Specifications
Set Includes:
1 tongue
1 fixation base (including screws)
1 tripod
1 storage case
PH-5

CT Abdomen Phantom

CT and ultrasound fusion experiments are possible with combination of the US-1 Echozy.

Anatomies
- lungs (no internal structure)
- heart (no internal structure)
- liver
- portal vein
- gallbladder

Specifications
- Set includes: 1 abdomen phantom
- Size: phantom size: 25 x 18 x 28 cm
- Optional Parts: 41363-050 storage case

PH-19

Rotation Stomach Phantom TMP-R

Rotational phantom to simulate double contrast gastrography.

Features
1. Rotation system to simulate the movement of patient.
2. Life-size distended stomach with lesions modeled from real specimens.
3. Barium can be poured in the stomach for imaging.
4. Pathology includes early cancer and gastric ulcer.
5. Sample model of lesions are included.

Specifications
- Set includes: 1 stomach phantom 1 rotation unit 1 controller
- Size: phantom holder: 11.8 x 7.9 x 13 in phantom weight: 16 kg 35.3 lb

PH-46

CT Prostate Phantom

Resourceful model for therapy planning for prostate cancer.

Anatomies
- Organs: prostate, urinary bladder with simulated internal fluid, seminal vesicles and rectum.
- Bones: L4, L5, pelvis and femurs (partial).

Specifications
- Set includes: 1 prostate phantom
- Size: 35 cm H/13.8 in H

PH-18

Stomach Phantom BMU-1

Stomach phantom for double contrast gastrography.

Features
1. Life-size distended stomach with lesions modeled from real specimens.
2. Barium can be poured in the stomach for imaging.
3. Pathology includes early cancer and gastric ulcer.

Specifications
- Set includes: 1 stomach phantom 1 storage case
- Size: phantom size: 30 x 20 x 33 cm phantom weight: 16 kg 35.3 lb
PH-48
Dynamic Heart and Lung Phantom
The motion of diaphragm and tumor, and the realistic heart motions provide various solutions for clinical research.

Features
1. The phantom represents movement of the heart, lungs and pulmonary nodule.
2. The pulmonary nodule and diaphragm moves independently with the respiratory cycle.
   - Three dimensional movement of the pulmonary nodule (linearly and rotationally)
   - Motion disc represents respiratory movement of abdomen.
3. The elastic heart represents systolic and diastolic motion. The coronary arteries including stenotic examples are shown.
4. The phantom can be connected to ECG for ECG gating.
5. Simple operation with wireless tablet

PH-39
Dynamic Thorax Phantom
Anthropomorphic chest phantom for respiratory gating.

Features
1. TLD can be inserted to simulate the nodule.
2. Six preset respiratory patterns are prepared.
3. Respiratory patterns can be modified and saved.
4. Up to three different respiratory patterns can be run in sequence.

Evaluation Applications
Respiratory gating CT, dosimetry and radiation therapy.

Specifications
Set Includes:
1. drive unit
1. chest phantom
1. mediastinum phantom
   - with right pulmonary vessels
1. nodule rotation unit
1. diaphragm block
1. set of simulated nodules
1. controller
1. storage case

Controllable Parameters:
- respiratory rate: 6-24 cycles/min.
- movement of diaphragm: 0-38 mm/0-1.5 in linearly movement of nodule unit: 38-64mm/1.5-2.5 in rotation of nodule unit: 50-70 degrees

PH-6B
Dynamic Cardiac CT Phantom MD-CT
For evaluation and research in ECG gating cardiac and thoracic CT.

Anatomies
- Synthetic bones of the chest
- Heart with coronary artery, diaphragm

Pathologies
- Pulmonary nodule, stenosis of coronary arteries

Applications
- Respiratory gating chest CT
- Tumor tracking in radiotherapy
- ECG gating cardiac CT

Specifications
Set Includes:
1. drive unit
1. nodule rotation unit
1. diaphragm block
1. chest phantom
1. 3 types of heart unit
1. set of simulated tumors
   - (15 types)
1. tablet PC

Controllable Parameters:
- heart rate: 30-120 times/min
- ejection volume: 60, 70, 80, 90, 100ml
- ef rate: 30%, 35%, 40%, 45%, 50%, 55%, 60%
- respiratory rate: 6-24 cycles/min
- linear movement of nodule unit: 8-64mm / 0-1.5 in rotation range of nodule unit: 50-70 degrees

Features
1. The heart phantom is made of human tissue substitute.
2. Simulated coronary arteries including stenosis can be attached to the wall of the phantom heart.
3. The phantom generates pulses that are synchronized with the cardiac movement for ECG gating.
4. Controllable parameters include pulse rate, ejection volume and ejection fraction.
5. Operation with the touch panel controller is simple and easy.

Specifications
Set Includes:
1. drive unit
3. heart phantoms
1. protective cover
1. set of simulated coronary arteries
1. controller
1. storage case

Heart phantom:
- materials: polyurethane based resin
-HU value: approx.40
- volume: ESV=approx.47.5ml

Motion parameters:
- pulse rate: 30-120 beats/min
- ejection volume: 60-100 ml
- ejection fraction: 30-60%
**Tough Phantom Series**

A stable, high quality and shatter-free phantom for radiotherapy.

**PH-40**

**Tough Water Phantom WD**

<table>
<thead>
<tr>
<th>WD</th>
<th>300 x 300 x 2 mm</th>
<th>12 x 12 x 0.08 in</th>
</tr>
</thead>
<tbody>
<tr>
<td>WD-3002</td>
<td>300 x 300 x 3 mm</td>
<td>12 x 12 x 0.12 in</td>
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<tr>
<td>WD-3003</td>
<td>300 x 300 x 5 mm</td>
<td>12 x 12 x 0.2 in</td>
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<tr>
<td>WD-3005</td>
<td>300 x 300 x 10 mm</td>
<td>12 x 12 x 0.4 in</td>
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<tr>
<td>WD-3010</td>
<td>300 x 300 x 15 mm</td>
<td>12 x 12 x 0.6 in</td>
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<tr>
<td>WD-3015</td>
<td>300 x 300 x 20 mm</td>
<td>12 x 12 x 0.8 in</td>
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<td>WD-3020</td>
<td>300 x 300 x 25 mm</td>
<td>12 x 12 x 1.0 in</td>
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<tr>
<td>WD-3025</td>
<td>300 x 300 x 30 mm</td>
<td>12 x 12 x 1.2 in</td>
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<td>WD-3030</td>
<td>300 x 300 x 35 mm</td>
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<td>WD-3040</td>
<td>300 x 300 x 40 mm</td>
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<td>WD-3050</td>
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</tr>
<tr>
<td>WD-4002</td>
<td>400 x 400 x 2 mm</td>
<td>16 x 16 x 0.08 in</td>
</tr>
</tbody>
</table>

**PH-41**

**Tough Bone Phantom BE-T, BE-H, BE-N**

| BE-T-05 | 200 x 200 x 5 mm / 8 x 8 x 0.2 in |
| BE-T-10 | 200 x 200 x 10 mm / 8 x 8 x 0.4 in |
| BE-T-20 | 200 x 200 x 20 mm / 8 x 8 x 0.8 in |
| BE-H-05 | 200 x 200 x 5 mm / 8 x 8 x 0.2 in |
| BE-H-10 | 200 x 200 x 10 mm / 8 x 8 x 0.4 in |
| BE-H-20 | 200 x 200 x 20 mm / 8 x 8 x 0.8 in |
| BE-N-05 | 200 x 200 x 5 mm / 8 x 8 x 0.2 in |
| BE-N-10 | 200 x 200 x 10 mm / 8 x 8 x 0.4 in |
| BE-N-20 | 200 x 200 x 20 mm / 8 x 8 x 0.8 in |

**PH-42**

**Tough Lung Phantom LP**

| LP-3010 | 300 x 300 x 10 mm / 12 x 12 x 0.4 in |
| LP-3020 | 300 x 300 x 20 mm / 12 x 12 x 0.8 in |
| LP-3030 | 300 x 300 x 30 mm / 12 x 12 x 1.2 in |
| LP-3050 | 300 x 300 x 50 mm / 12 x 12 x 2.0 in |

**PH-37**

**Therapy Body Phantom THRA-1**

THRA-1 is an anthropomorphic, cross sectional dosimetry for therapeutic energy range.

**Specifications**

Set Includes:
- 1 torso phantom
- 1 pair of breast phantom
- 1 supporting frame
- 1 storage case

Size:
- phantom size: 90 cm/35.5 in
- slice thickness: 3 cm/1.2 in
- dosimeter holes:
  - in lattice-like pattern of 3x3 cm/1.2 x 1.2 in
  - *Slice thickness and dosimeter holes can also be custom ordered.*

**Stable Quality**

Excellent homogeneity is realized by high standard of production and quality inspection.
**PH-31**

**MRI Quality Assurance Phantom MHR**

*This QA phantom for MRI allows to evaluate the slice thickness, spatial resolution, uniformity and geometric distortion as well as contrast. Complies with NEMA standards.*

**Specifications**

Set Includes:
- 1 phantom unit A
- 1 phantom unit B
- 1 set of nickel chloride solution

**Size:** 22 dia. x 14 cm / 8.7 dia. x 5.5 in

---

**PH-33**

**MRI Head Phantom NH**

*Life-size head phantom to assess uniformity.*

**Conforming to JIS Z 4924**

**Specifications**

Set Includes:
- 1 head phantom
- 1 nickel chloride solution
- 1 storage case

---

**PH-34**

**MRI/NM Head Phantom BHC**

*Simulate life-size head images in nuclear medicine and MRI.*

**Conforming to JIS Z 4924**

**Specifications**

Set Includes:
- 1 phantom
- 2 simulated tumor
  - (1 cm dia., 2 cm dia. each)
  - (0.4 in dia., 0.79 in dia. each)
- 1 nickel chloride solution
- 1 storage case

Size: 33 cm height
12.9 in height

---

**Brain Phantom IB-20 advanced**

*This brain phantom of the striatal region with replicated skull densities of a male and female is useful for uptake ratio calibrations and studying the I-123 DaTSCAN scatter correction techniques.*

**Specifications**

Size:
- inside dimensions
  - 13.5 x 18.3 cm / 5.3 x 7.3 in height
  - 8.8 cm / 3.5 in
PH-24
Myocardial Phantom

For the study of high radio accumulation interference in the liver with the myocardial SPECT images.

Features
1. Allows the study of RI liver intake and its effect on the myocardial SPECT.
2. Cold defect can be set in the left cardiac muscle.
3. Background can be set individually in lung field, mediastinum and right ventricle.

Specifications
Size:
32 x 22 x 31 cm
12.6 x 8.7 x 12.2 in

PH-25
Myocardial Phantom HL-D

Five variations of myocardial volume.

Features
1. Myocardium, liver and gall bladder can be separately filled with RI solution.
2. Close-to-human chest anatomy allows effective attenuation and scatter correction.
3. Five variations of myocardial containers with different shape and volume

Specifications
Set Includes:
1 chest phantom
5 mediastinum inserts
5 myocardial containers
1 storage case

PH-29
ECT Hot Cold Phantom SP-6

Volumetric measurement phantom for PET/SPECT

Features
1. Five sphere containers with different sizes can be filled with RI solution.
2. Volume of sphere phantoms are:
   - 50 mm/2 in (100%), 80%, 60%, 40% and 20%.

Specifications
Set Includes:
1 outer phantom
5 sphere phantoms
1 storage case
Size:
21 dia. x 16 cm
8.3 dia. x 6.3 in

PH-30
SPECT QA Phantom JS-10

Features
1. Hot/cold spot phantom
2. Scatter radiation phantom
3. Phantom holder
4. Storage case

Specifications
Set Includes:
1 outer phantom
1 slice thickness phantom
1 spatial resolution phantom
1 bar phantom
1 storage case

PH-28
SPECT QA Phantom JSP

For daily quality control in SPECT and PET imaging

Conforming to JIS Z 4922

Specifications
Set Includes:
1 outer phantom
1 line source phantom
1 cold spot phantom
1 hot spot phantom
1 dose linearity phantom
1 geometric distortion phantom
1 phantom holder
1 storage case

Size:
22 dia. x 22 cm
8.7 dia. x 8.2 in
**PH-9**

**Multi Slice CT Phantom MHT**

The phantom can be used for features of CT evaluation such as high and low contrast resolutions, feed direction and CTDI.

**Features**

1. Non-aqueous / Easy Set-up enables liquid-free evaluation session.
2. The phantom is designed to allow evaluation in volume scanning.

1. **Low Contrast Phantom**
   Low contrast resolution evaluation in abdominal area

2. **High Contrast Phantom**
   High contrast resolution evaluation in lung area

3. **Elliptical Absorber**

4. **Low Contrast and CTDI Phantom**

5. **Micro Disc Phantom**
   SSPz evaluation in helical scanning

**Specifications**

Set Includes:
- 1 low contrast phantom
- 1 high contrast phantom
- 1 Elliptical absorber
- 1 low contrast phantom with CTDI
- 1 micro disc phantom
- 1 angle adjustment holder

Optional parts:
- 41334-110 sliding phantom holder

---

**PH-45**

**3D Digital Image Phantom ODA**

Digital imaging phantom compatible with various 3D imaging methods

Digital image evaluation phantom applicable to 3D imaging such as cone beam CT with FPD, tomosynthesis. Angiographic image and low contrast resolution can be evaluated on axial, coronal, sagittal and oblique sections as well as 3D DSA and CT. The phantom can be used either as a sphere phantom or a cylinder phantom.

**3D Sphere Phantom**

Sphere shape phantom is to house 3D Angio Phantom or 3D Low Contrast Phantom.

**3D Low Contrast Phantom**

Low contrast spherical targets with 5 sizes and 3 step HU numbers are three dimensionally placed in the cube.

**3D Column Phantom**

Simulated vessels enclosing resin containing iodine with 4-step density are three dimensionally placed at 4 sites on the phantom.

**Specifications**

Size:
- 3D Sphere Phantom
  - 20 cm dia. / 7.9 in dia.
- 3D Angio Phantom
  - 10 x 10 x 10 cm / 4.0 x 4.0 x 4.0 in
- 3D Low Contrast Phantom
  - 10 x 10 x 10 cm / 4.0 x 4.0 x 4.0 in

---

**PH-7**

**CT-AEC Phantoms**

*Four types of phantoms designed to evaluate CT-AEC performance*

Image quality can be evaluated by noise and S.D. on the phantom section images.

Four types of CT-AEC Phantoms:
- Cone Phantom: evaluates performance of AEC for different patient sizes and gradual size changes in size along the axis.
- Elliptical Cone Phantom: in combination with the Cone phantom, facilitates evaluation of XY AEC.
- Variable-XY Phantom: evaluates performance of XY AEC as cross section changes from circular to elliptical.
- Stepped Phantom: evaluates the performance of the AEC to sudden changes in patient’s cross section.

**Specifications**

1. **Cone (Apollo) Phantom**
   - 35 dia. x 32 cm
   - 13.8 dia. x 12.6 in

2. **Elliptical Cone Phantom**
   - X:Y= 1:1.5
   - Sectional area equal to that of the cone phantom

3. **Variable XY Phantom**
   - X:Y ratio varies continuously from 1.0 to 2.5
   - Sectional area is kept to be equal to 20 cm/8 in dia.

4. **Stepped Cylinder Phantom**
   - Diameter difference by 5 cm/2 in
**PH-13**

**Digital Mammographic Phantom NCCE**

**Features**
1. Outer shape of the phantom simulates a compressed breast of D shape.
2. Features of evaluation include: contrast resolution, frequency enhancement, noise and contrast transfer function.
3. Targets include simulated microcalcifications, nylon fibrils, acrylic disks, an aluminum ring, Teflon disks, and a resolution test chart.

**Specifications**
Set Includes:
- 1 breast phantom
- 1 storage case
Size: 12.5 x 18.5 x 5.5 cm
4.9 x 7.3 x 2.2 in

---

**PH-12**

**Mammographic Step Phantom AGH-D210F**

*A QA phantom for mammography with 10 steps of background densities.*

A simulated tumor of 0.5 mm thickness and 200 μm simulated calcifications are embedded in each phantom block of 30 x 15 mm. Recommended by The Central Committee on Quality Control of Mammographic Screening of Japan.

**Specifications**
Set Includes:
- 2 phantom units (10 steps)
Size: 11.5 x 7 x 1.5 cm each
4.5 x 2.8 x 0.6 in each

---

**PH-21**

**CT QA Phantom JCT**

*Six features of daily evaluation are possible.*

**conforming to JIS Z 4923**

Possible valuation:
- Noise, contrast scale, spatial resolution, slice thickness, high contrast resolution and low contrast resolution.

**Specifications**
Set Includes:
- 1 CT QA phantom
1 storage case
Size: 20 dia. x 20 cm
7.9 dia. x 7.9 in

---

**CT Lung Phantom**

*Used by QIBA COPD/Asthma Committee, for longitudinal sites comparison study.*

**Features**
1. Simulated airways and vessels are embedded in the lung tissue substitute.
2. Layers of different materials allow study in axial variation such as slice thickness effect.
3. Image distortion can be assessed.

**Specifications**
Set Includes:
- 1 CT lung phantom
  - Simulated airways 3-14 mm dia.
  - Simulated vessels 2-14 mm dia.
1 storage case
Size: 200 dia. x 300 mm/ 7.9 dia. x 11.9 in

---

**PH-22**

**CT QA Phantom CT-200B**

*12 features of evaluation to cover recommendation of Japanese Committee*

Possible evaluation includes: uniformity, noise and contrast-scale, PSF, LSF, MTF, slice thickness, high contrast resolution, low contrast resolution, radiation dose, artifact, edge effect, absorbed dose and linearity.

**Specifications**
Set Includes:
- 1 set of QA phantoms
1 storage case

---

**PH-9-2**

**Ladder Phantom**

*The phantom with simulated vessels to evaluate spatial resolution in CT.*

11 features of CT evaluation are possible by using interchangeable measurement units. Conforming to second recommendation of Japanese Committee for Evaluating Performance of CT Scanners.

**Features**
1. On each plate phantom of 5 mm thickness, five slits of 5 mm length are made to represent vessels.
2. Nine variations of vessel width are prepared:
   - 0.3, 0.4, b0.6, 0.7, 0.8, 1.0, 1.2, 1.5 mm.
   - (0.012, 0.016, 0.024, 0.028, 0.032, 0.039, 0.047, 0.059 in)

**Specifications**
Set Includes:
- 1 outer phantom
9 ladder phantoms
1 storage case

---
**PH-10**

**BMD Chart Phantom UHA**

*Bone Mineral Density chart for microdensitometry (MD) method.*

**Features**
1. 21 steps with different hydroxyapatite content.
2. Steps range from 0 to 400 mg/cm³, with 20mg/cm³ difference each.

**Specifications**
- Set Includes:
  - 1 chart phantom (consists of 21 blocks of 3 x 1 x 1.5 cm each.)
  - 1 storage case (consists of 21 blocks of 8.3 x 0.4 x 0.6 in each)

**PH-15**

**Tissue Substitute Phantoms XUR**

*XUR is a series of human tissue substitute phantoms co-developed with Japan Atomic Energy Agency.*

**Specifications**
- Rod 15 and Hole 15: 24.5 x 24.5 cm each (9.6 x 9.6 in each)
- Rod 10 and Hole 10: 17 x 17 cm each (6.7 x 6.7 in each)

**Features**
Four types of phantoms with different sizes and target types.
- Rod 15: 15 x 15 rods of height range from 1.0 to 8.0 mm (0.4 to 3.1 in)
- Hole 15: 15 x 15 holes of depth range from 1.0 to 8.0 mm (0.4 to 3.1 in)
- Rod 10: 10 x 10 rods of height range from 1.0 to 5.5 mm (0.4 to 2.2 in)
- Hole 10: 10 x 10 holes of depth range from 1.0 to 5.5 mm (0.4 to 2.2 in)

**PH-17**

**Water Body Phantom WAC**

*Water Body Phantom represents human chest and abdomen to serve as radiation absorber and scatterer.*

**Confirming to JIS Z 4915**

**Specifications**
- Set Includes:
  - 1 body phantom
  - 1 storage case
- Size: 30 x 20 x 45 cm
- 11.8 x 7.9 x 17.7 in

**PH-16**

**Contrast Detail Phantom**

*Image evaluation in plain X-ray*

**Specifications**
- Rod 15 and Hole 15: 24.5 x 24.5 cm each (9.6 x 9.6 in each)
- Rod 10 and Hole 10: 17 x 17 cm each (6.7 x 6.7 in each)

**Features**
Four types of phantoms with different sizes and target types.
- Rod 15: 15 x 15 rods of height range from 1.0 to 8.0 mm (0.4 to 3.1 in)
- Hole 15: 15 x 15 holes of depth range from 1.0 to 8.0 mm (0.4 to 3.1 in)
- Rod 10: 10 x 10 rods of height range from 1.0 to 5.5 mm (0.4 to 2.2 in)
- Hole 10: 10 x 10 holes of depth range from 1.0 to 5.5 mm (0.4 to 2.2 in)

**PH-14**

**Acrylic Phantom XAC**

*Slab phantoms for radiation absorption and scattering measurement.*

**Specifications**
- XAC-01 41430-000: 30 x 30 x 0.1 cm/11.8 x 11.8 x 0.04 in
- XAC-02 41431-000: 30 x 30 x 0.2 cm/11.8 x 11.8 x 0.08 in
- XAC-03 41432-000: 30 x 30 x 0.3 cm/11.8 x 11.8 x 0.12 in
- XAC-04 41433-000: 30 x 30 x 0.4 cm/11.8 x 11.8 x 0.16 in
- XAC-05 41434-000: 30 x 30 x 0.5 cm/11.8 x 11.8 x 0.2 in
- XAC-06 41435-000: 30 x 30 x 0.8 cm/11.8 x 11.8 x 0.3 in
- XAC-07 41436-000: 30 x 30 x 1 cm/11.8 x 11.8 x 0.4 in
- XAC-08 41437-000: 30 x 30 x 2 cm/11.8 x 11.8 x 0.8 in
- XAC-09 41438-000: 30 x 30 x 3 cm/11.8 x 11.8 x 1.2 in
- XAC-10 41439-000: 30 x 30 x 4 cm/11.8 x 11.8 x 1.6 in
- XAC-11 41440-000: 30 x 30 x 5 cm/11.8 x 11.8 x 2.0 in
- XAC-12 41441-000: 30 x 30 x 8 cm/11.8 x 11.8 x 3.1 in
- XAC-13 41442-000: 30 x 30 x 10 cm/11.8 x 11.8 x 3.9 in

**Reference**
P.35

The phantoms developed based on Reference Man data of ICRP publication 23 and has close-to-human specific gravity and attenuation rate in diagnostic energy range.
US-5

FAST/Acute Abdomen Phantom
"FAST/ER FAN"

Best tool for workshop in emergency ultrasound.

FAST/ER FAN provides simulated training in FAST (Focused Assessment with Sonography for Trauma); an ultrasound examination directed at identifying the presence of free intraperitoneal or pericardial fluid in traumatic patients.

Features
1. An innovative phantom for repetitive training of FAST as an adjunct to the ATLS primary survey.
2. Pathologies include cholecystitis, aortic aneurysm and lesion on the colon.

Pathologies
- Internal hemorrhage at perihepatic, perisplenic, pelvis and pericardium area.
- Diverticulitis, inflammation of the gallbladder, aneurysm and appendicitis.

Specifications
Set Includes:
1 ultrasound phantom
1 tutorial manual (DVD)

Size: approx. 61 x 30 x 30 cm
approx. 24.4 x 12 x 12 in

Weight: approx. 31 kg
approx. 68.2 lb

US-8

Pediatric FAST/Acute Abdomen Phantom

The world’s first pediatric ultrasound torso phantom

Pediatric FAST/Acute Abdomen Phantom provides opportunities of hands on training in ultrasound that is a crucial modality for radiosensitive children.

Features
1. The phantom includes life-size 2-year-old thoracoabdominal organs, a bone structure, free fluid to learn FAST procedures and pathologies that are commonly seen in pediatrics.
2. With this phantom, trainees can acquire skills in basics of pediatric abdominal ultrasound.

Pathologies
- Internal hemorrhage at perihepatic, perisplenic, pelvis, and pericardium area
- Bowel intussusception, appendicitis and biliary dilatation

Specifications
Set Includes:
1 ultrasound phantom
1 storage case
1 tutorial manual (DVD)

Size: 41 x 15 x 5 cm
approx. 16 x 6 x 6 in
US-7 α
Fetus Ultrasound Examination Phantom "SPACE FAN-ST"

Fetus ultrasound phantom with a full skeletal structure. SPACEFAN-ST provides high quality training for second trimester screening in pregnancy. A 23-week fetus is included with detailed anatomies which are essential for the assessment at the period.

The oval shape phantom abdomen can be set in four different positions.

Features
1. SPACEFAN-ST provides high quality training for routine second trimester screening.
2. The oval shape phantom abdomen can be set in four different positions.

Anatomies
Uterus:
- amniotic fluid, placenta, umbilical cord, and a 23-weeks fetus (26 cm/10.2 in)
Fetus:
- skeletal structure, brain with septum lucidum, lateral ventricles and cerebellum, heart with four chambers, lungs, spleen, kidneys, aorta, UV, UA, and the external genital

Training Skills
- Fetal size assessment: BPD, AD, AC and FL
- Measurement of amniotic fluid volume
- Determination of fetus presentation (cephalic or breech)
- Assessment of each body part
  - Head: skull and brain
  - Spine and limbs
  - Cardiac chambers, blood vessels and lung
- Assessment of umbilical cord and placenta position
- Determination of sex (This phantom represents a male fetus)

US-6
Breast Ultrasound Examination Phantom "BREAST FAN"

Training in ultrasound breast cancer screening with detailed anatomy.
BREASTFAN is a unique phantom for training in basic breast ultrasound examination. Simulated targets with different echogenicities are embedded in the mammary gland.

Features
1. State-of-the-art breast phantom with ultrasound anatomy
2. Skills required for ultrasound breast screening can be greatly advanced with practice.

Training Skills
- Skills to scan full area of breast systematically
- Visualization of key anatomical landmarks
- Tracking galactophore
- Visualization and differentiation of typical pathologies
- Localization and measurement of cyst and tumors

Anatomies
Subcutaneous adipose, mammary gland, galactophore, Cooper’s ligament, retromammary adipose, costae, clavicle, pectoralis major, lung and lymph nodes at axilla.

Pathologies
Cyst, mammary ductal ectasia, malignant tumor, benign tumor

Specifications
Set Includes:
1 breast phantom
1 storage case
1 tutorial manual (DVD)

phantom size: 19 x 22 x 7 cm, 3.6 kg
packing size: 35 x 36 x 12 cm, 6 kg
Abdominal Intraoperative & Laparoscopic Ultrasound Phantom "IOUS FAN"

Innovative phantom simulating abdominal open intraoperative and laparoscopic ultrasound examination.

Features
1. Soft phantom materials allow realistic probe manipulation.
2. Various simulated lesions including biliary stones and cysts, solid tumors (hypoechoic, hyperechoic and target-appearance) in the liver, pancreas, spleen and kidneys.
3. Detachable stomach and duodenum allows various scanning methods of the bile duct and pancreas.

Training Skills
- Abdominal intraoperative ultrasound examination
- Laparoscopic ultrasound examination

Anatomies
- liver (segmental anatomy, portal and hepatic venous systems, ligamentum teres and ligamentum venosum)
- biliary tract (gallbladder, cystic duct, intrahepatic and extrahepatic bile ducts)
- pancreas (pancreatic duct)
- spleen / kidneys
- detailed vascular structures (aorta, vena cava, celiac artery and its branches, portal vein and its branches, superior mesenteric vessels, renal vessels, etc.)

Specifications
Set Includes:
1 upper abdomen ultrasound phantom
1 stomach ultrasound phantom
1 phantom container
1 tutorial manual (DVD)

Size:
phantom size: 30x38x17.5 cm, 5.8 kg 47x42x25 cm, 9 kg
12x15.2x7 in, 12.8 lb 18.8x16.8x10 in, 19.8 lb

Simulated lesions in liver, pancreas, kidney, spleen, gallbladder

Ultrasound Examination Training Phantom "ABDFAN"

Unique high-fidelity ultrasound phantoms that facilitate effective training in abdominal ultrasound scanning with your own clinical devices.

Simulated lesions are embedded.

Training Phantom with no pathology

Features
1. Detailed hepatobiliary, pancreatic and other abdominal anatomy; eight Couinaud's hepatic segments can be localized.
2. ABDFAN has various simulated lesions to provide wider training variety.

Training Skills
Basics of abdominal sonography:
Cross sections and sonographic anatomy
Sonographic demonstration of each individual organ
Localization of hepatic Couinaud's segments

Anatomies
- liver (segmental anatomy, portal and hepatic venous systems, ligamentum teres and ligamentum venosum)
- biliary tract (gallbladder, cystic duct, intrahepatic and extrahepatic bile ducts)
- pancreas (pancreatic duct)
- spleen / kidneys
- detailed vascular structures (aorta, vena cava, celiac artery and its branches, portal vein and its branches, superior mesenteric vessels, renal vessels, etc.)

Pathologies *(ABDFAN only)*
- hepatic lesions (cystic and solid)
- gallbladder and bile duct stones
- pancreatic tumors
- (one invading the portal vein)

- splenic lesions
- both kidney lesions
- left adrenal tumor

Pancreas
Liver, Hepatic Vein

Ultrasound Phantoms
Ultrasound Guided Breast Biopsy Phantom

Provides step by step training in ultrasound guided breast biopsy.

Features
1. Fine Needle Aspiration Biopsy (FNAB), Core Needle Biopsy (CNB) and Mammoctome biopsy can be performed under ultrasound guidance.
2. Tissue of the breast phantom represents softness and resistance of the mammary gland.
3. Targets are colored to confirm successful sampling.
4. Targets are embedded in three levels to allow training in needle access with different angles and depth.
5. Transparent and opaque type phantoms provide various level of training.
6. An inexpensive and disposable training tool that provides many numbers of trials.

Training Skills
- Hand-eye coordination in ultrasound biopsy
- Localization of targets under ultrasound guidance
- Sampling of target

Specifications
Set Includes:
- Duo Set: 11387-000 (transparent + opaque type)
- Transparent Set: 11387-100 (1 pair of transparent type)
- Opaque Set: 11387-200 (1 pair of opaque type)

Size:
- Duo Set: 16dia. x 8 cm
- Transparent Set: 6.3 dia. x 3.13 in
- Opaque Set: 6.7 dia. x 3.13 in

Introductory Ultrasound Training Block "REAL VESSEL"

Provides training in hands-eye coordination and basic skills in ultrasound-guided venous access.

Features
1. 2 simulated vessel lines: straight and curve.
2. Lines have slope to represent vessels with different depth.
3. Vessel wall yields under pressure of a needle tip.

Training Skills
- Visualization and localization of the vessels.
- Transducer manipulation.
- Basics for ultrasound-guided vascular access.

Specifications
Set Includes:
- REAL VESSEL Introductory ultrasound training block (a set of 2)

US-2

Ultrasound Quality Assurance Phantoms

Durable and stable.

Production supervision:
Hiroshi Natoli,
Ph.D. Professor Sapporo Medical University

N-365 Multipurpose Phantom

Features
1. Useful both for daily assessment and further research.
2. The phantom is designed to allow scanning from all four side walls.

Varieties:
- N-060 QA Phantom/N-255 Cyst Phantom/N-211 String Phantom

Common Specifications
Set Includes:
- 1 phantom each
- 1 carrying case each

- phantom size: 19 x 22 x 7 cm, 3.6 kg
- 7.6 x 8.8 x 2.8 in, 79 lb

- packing size: 35 x 36 x 24 cm, 6 kg
- 14 x 14.4 x 9.6 in, 13.2 lb

- Sonic velocity: 1432m/sec at 25 degrees C
- Attenuation rate: 0.57 dB/cm MHz at 25 degree C
- Acoustic impedance: 1.38 rayl at 25 degree C

Breast Ultrasound QA Phantom

Ensure highly detailed images to enable reliable breast cancer examinations.

Product supervision:
Japan Association of Breast and Thyroid Sonography, Quality Assurance Committee Working Team.

Recommendation from:
Japan Radiology Society, Imaging Committee Breast Imaging Group

Features
1. Four kinds of targets, gray scale, cyst targets, dot targets and 45 degrees line target at 2 different depth, 10mm (0.4 in) and 20mm (0.8 in).
2. Background of each phantom block is of different attenuation rate and speed of sound.
3. Detailed spatial resolution as minute as 0.5mm (0.02 in) can be assessed.
4. Comes with a thermometer to measure inner temperature of the phantom.

Specifications
Set Includes:
- 1 mass targets block
- 1 dot targets block
- 1 thermometer
- 1 storage case

Size:
- mass targets block phantom size: 18 x 7.5 x 11 cm, 1.3 kg
- 7.2 x 3 x 4.4 in, 2.9 lb
- dot targets block phantom size: 13.5 x 7.5 x 11 cm, 1.0 kg
- 5.4 x 3 x 4.4 in, 2.2 lb
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<th>項目</th>
<th>内容</th>
</tr>
</thead>
<tbody>
<tr>
<td>US-5</td>
<td>多言語目次</td>
</tr>
</tbody>
</table>
PH-2B CT Whole Body Phantom “PBU-60”

PH-2C Pediatric Whole Body Phantom “PBU-70”
Read more: http://dx.doi.org/10.1117/12.2001694

PH-1 Multipurpose Chest Phantom N1 “Lungman”
Read more: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3517707/

Read more: http://www.ncbi.nlm.nih.gov/pubmed/21232683


Read more: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3408907/

Read more: http://www.ajronline.org/doi/full/10.2214/AJR.08.1066


PH-8 Lung Cancer Screening Phantom LSCT 001
Read more: http://www.ncbi.nlm.nih.gov/pubmed/12794601

PH-47 Dental Radiography Head Phantom
Read more: http://www.ncbi.nlm.nih.gov/pubmed/22612390

PH-48 Dynamic Heart and Lung Phantom
Read more: http://www.ncbi.nlm.nih.gov/pubmed/24710435

PH-6 Dynamic Cardiac CT Phantom


PH-7 CT-AEC Phantoms

PH-15 Tissue Substitute Phantom XUR

US-2 Ultrasound Quality Assurance Phantoms
Natori H, Igarashi T, Arakawa M. Durable fine resolution test phantom for diagnostic ultrasound phantom. ECR 2013 Poster C-1765.

US-4 Breast Ultrasound QA Phantom
Custom Orders and Future Phantoms

Let us know your thoughts
We believe in the importance of providing phantoms that meet your needs and listening to your voice to find a solution.
If you would like to suggest any additional features for our phantoms, please do not hesitate to contact Kyoto Kagaku Co., Ltd. Innovation is our tradition.

Common Specifications

All KYOTO KAGAKU phantoms are made in Japan
All KYOTO KAGAKU phantoms are latex free

Materials:
Tissue substitute materials: polyurethane based resin
Synthetic bones: epoxy based resin
PH-6, PH-48
Tissue substitute materials: polyurethane based resin
Synthetic bones: epoxy based resin
Heart Phantom: silicon
PH-8, PH-10, PH-15
Polyurethane based resin
PH-37, PH-40, PH-41
Epoxy based resin
PH-9-2
Epoxy based resin, acrylic resin

Specifications printed in this catalogue are of the time of printing. Since products are continuously improved and updated, specifications are subject to change without prior notice.
KYOTO KAGAKU human tissue substitute breakthroughs enable to create unique phantoms in combination with model crafting expertise.

Phantoms for diagnostic energy range

<table>
<thead>
<tr>
<th>Tissue Substitute Phantom XUR</th>
<th>see also page 25</th>
</tr>
</thead>
<tbody>
<tr>
<td>electron density (×10¹⁶/g)</td>
<td>effective atomic number</td>
</tr>
<tr>
<td>ZS-49</td>
<td>adipose</td>
</tr>
<tr>
<td>ZS-160</td>
<td>cartilage</td>
</tr>
<tr>
<td>ZS-207</td>
<td>soft tissue</td>
</tr>
<tr>
<td>ZS-208</td>
<td>muscle</td>
</tr>
<tr>
<td>ZS-220</td>
<td>muscle &amp; adipose</td>
</tr>
<tr>
<td>ZS-50</td>
<td>3.258</td>
</tr>
</tbody>
</table>

Kyoto Kagaku’s ZS series (XUR) is a self-produced material used in its state-of-the-art, radiology phantoms and was developed in the 1980’s through joint research with JAERI (Japan Atomic Energy Research Institute). The joint research aimed to create an anthropomorphic phantom that has a shape and size similar to that of the human torso and also include removable organs to calibrate detector systems of Pu-239 and other actinides deposited in the human lungs. Desired organs included human soft tissues such as the muscle, muscle-adipose tissues, and cartilage and lungs. Having photon attenuation properties similar to those of the human tissue is particularly important for low energy photons such as Pu-239.

Polyurethane was selected as a basic ingredient of the ZS series because it is easy to adjust its elemental composition with additives. Polyurethane also easily forms into various shapes, and products composed of polyurethane are highly resistant of deformation or damage. Linear attenuation coefficients derived from the HU values of ZS matched excellently with the calculated values.

JAERI Phantom was completed in 1984. The phantom was used in the IAEA-TECDOC-1334 report as a standard phantom of an Asian patient.

The ZS series was first developed for the atomic energy industry and its application has now expanded to phantoms for medical imaging and dosimetry. The ZS series are an essential material for the production of Kyoto Kagaku’s wide range of radiology phantoms.

Phantoms for therapeutic energy range

Tough Phantom Series  see also page 20

Comparison of Physical Properties JCRU publication 23 (Reference material)

<table>
<thead>
<tr>
<th></th>
<th>human soft tissue</th>
<th>muscle</th>
<th>fat</th>
<th>cartilage</th>
<th>lung</th>
</tr>
</thead>
<tbody>
<tr>
<td>electron density (×10¹⁶/g)</td>
<td>3.29</td>
<td>3.31</td>
<td>3.34</td>
<td>3.28</td>
<td>3.31</td>
</tr>
<tr>
<td>effective atomic number</td>
<td>7.01</td>
<td>7.45</td>
<td>6.33</td>
<td>7.89</td>
<td>7.49</td>
</tr>
<tr>
<td>specific gravity</td>
<td>1.00</td>
<td>1.05</td>
<td>0.95</td>
<td>1.10</td>
<td>0.26</td>
</tr>
</tbody>
</table>

| | water | acryl | Tough Water Phantom WD | Tough Bone Phantom BE-H | Tough Bone Phantom BE-N | Tough Lung Phantom LP |
|-----------------|-------|----------------------|-----------------------|------------------------|----------------------|
| electron density (×10¹⁶/g) | 3.343 | 3.248 | 3.265 | 3.108 | 3.154 | 3.213 | 3.211 |
| specific gravity | 1.000 | 1.180 | 1.018 | 1.730 | 1.500 | 1.240 | 0.370 |

Elemental Composition (wt%)

| | Tough Water Phantom WD | Tough Bone Phantom BE-H | Tough Bone Phantom BE-N | Tough Lung Phantom LP |
|-----------------|-----------------------|------------------------|----------------------|
| H | 8.83 | 3.69 | 5.11 | 6.97 | 2.00 |
| C | 38.97 | 27.27 | 44.40 | 50.40 | 37.20 |
| N | 2.18 | 1.19 | 1.73 | 2.45 | — |
| O | 17.88 | 32.66 | 28.13 | 21.79 | 35.10 |
| P | — | 10.24 | 7.00 | 2.90 | 0.10 |
| Ca | 0.15 | 0.15 | 0.15 | 1.15 | 1.15 |
| C | 2.22 | 22.92 | 15.49 | 6.33 | — |
| Al | — | — | — | 1.50 | — |
| Si | — | — | — | — | 5.00 |

Tough Phantom Series has been jointly developed with National Institute of Radiological Sciences.

Japanese patent No.2651585
Phantoms for ultrasonography

Ultrasound Phantoms
Japanese patent No.3650096

Durable, stable with homogeneous granular background reflection with excellent and controllable echogenicities

Sonic velocity: 1432m/sec at 25 degrees C
Attenuation rate: 0.57dB/cm MHz at 25 degree C
Acoustic impedance: 1.38 rayl at 25 degree C

Results of directional lateral distance measurements are shown in this figure. Both old and new phantom showed same measured distance. Directional lateral distance measurement is not mainly dependent to ultrasound velocity.

Natori H, Igarashi T, Arakawa M. Durable fine resolution test phantom for diagnostic ultrasound system. ECR 2013 Poster C-1765.

"Durable fine resolution test phantom for diagnostic ultrasound system", H.Natori 2013

US-4 Breast Ultrasound QA Phantom
see also page 29

Higher sonic velocity for detailed QA in high-frequency ultrasound.

Mass targets block (contrast resolution)

Dot targets block (spatial resolution)

Gray scale targets
Cyst targets