Caution:

Don't mark on the phantom with pen or leave printed materials contacted on its surface.
Ink marks on the phantom will be irremovable.

US-4B

Small Parts Basic QA Phantom

Recommended by Japan Association of Breast and Thyroid Sonology

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

Instruction Manual

Contents

KYOTO KAGAKU CO.,LTD

Please read General information

This quality assurance phantom was produced to help with regular testing for age deterioation and image abnormalities of ultrasound devices.
It is recommended to test all ultrasound devices daily before use.

● Features

- For monthly basic quality test along with longer term quality assurance to maintain consistency in performance of scanners and transducers
- Compact size allows imaging in a single scan
- Longevity and stability of phantom material ensured by 5-year testing process
- To ensure the verticality of the entrance beam, two horizontal wires are embedded and the supporting guide frame secures the transducer in its home position for testing
- Comes with a thermometer to measure inner temperature of the phantom

⚠ DOs and DON'T s

DO s

Handle with care
The materials for phantom and models are special composition of soft resin. Please handle with care at all times.

Cleaning and care
Please clean the phantom completely every time after you finish the training. The remaining lubricating gel may deteriorate the phantom.

Keep the training set at room temperature, away from heat, moisture and direct sunlight.

DON'Ts

Never wipe the phantom or models with thinner or organic solvent.

Don't mark on the phantom with pen or leave printed materials contacted on their surface.
Ink marks on the models will be irremovable.

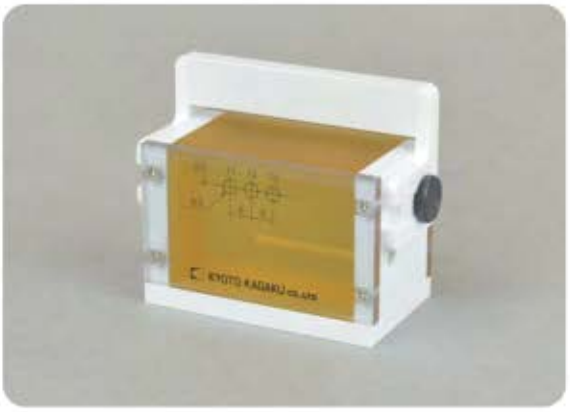
Please note: The color of the phantom may change over time, though, please be assured that this is not deterioration of the material and the ultrasonic features of the phantom stay unaffected.

This phantom has a thin layer of coating for protective purposes which may cause minor wrinkling.

Precautions regarding QA phantom use

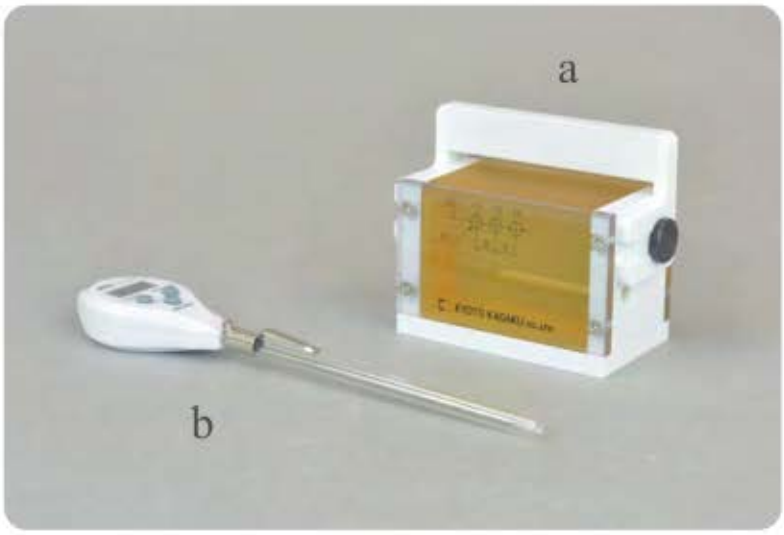
Nowadays ultrasound diagnostic equipment is designed to produce images relying on a method unique to each manufacturer that adopts various configurations of sound velocity, harmonic, beam compound, and special filter processing. Therefore the following precautions should be taken into consideration during use:

- Do not compare images with those produced by a different model of diagnostic equipment.
- Criteria for image quality must be defined for each equipment and probe.
- The optimal imaging condition does not necessarily mean the optimal examination condition.



Set includes

Before your first use, please ensure that you have all components listed below.



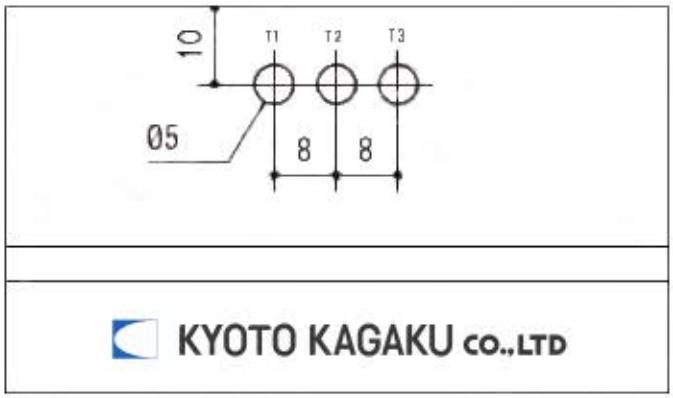
Set includes:

a mass targets block 1
b thermometer 1

	mass targets block
Sound velocity - relation between temperature and sound velocity	25°C 1434 m/sec
Attenuation coefficient	0.59 dB/cmMHz (25°C)
Acoustic impedance	1.37rayl (25°C)
Integrated target	Gray scale targets (high, low, medium echo)

Overview of QA phantom

- This ultrasound QA phantom consists of one mass target block with three gray scale targets inside
- There is a hole in the middle of the phantom in which a thermometer is inserted to measure the internal temperature for determining the imaging condition. A viscous material is put in the hole to make the thermometer adhere to the phantom.
- To ensure the verticality of the entrance beam, two horizontal guide wires are embedded



mass targets block

Preparation for imaging

1 Preparation for imaging

• Ultrasound equipment

1. Wait for at least 15 minutes after the equipment is turned on before use.
2. Set the monitor's brightness and contrast as well as the room light to standard.
3. Set all STC (TGC) settings to maximum position.
4. Set Depth to the depth of the two guide wires.
5. Place probe perpendicular on the phantom, align the guide rail with the probe when the guide wires are clearly visible, and fixate the guide rail by turning the screw.
6. Set Focus to Single Focus and fixate on the target's center or slightly deeper.
   - If the Single Focus can not be aligned with the target, set it to a slightly deeper location as close as possible to the target.
   - If no Single Focus can be set, set the smallest possible multi-focus to an area including the target.
7. Set Gain to roughly 70 dB and adjust until the image is clearest.
   - As age deterioation and image abnormalities appear as a decrease in brightness, a too low Gain will affect the results.
8. Adjust all other parameters until the image is clearest and record the imaging conditions of the observation monitor and the digital recording system to always take images under the same conditions.

* The optimal imaging condition does not necessarily equal the optimal examination condition.

• QA phantom

1. Place on a flat surface during use.
2. Take images when the internal temperature is 23 - 26°C.
   (The internal temperature can be measured by inserting the attached thermometer.)

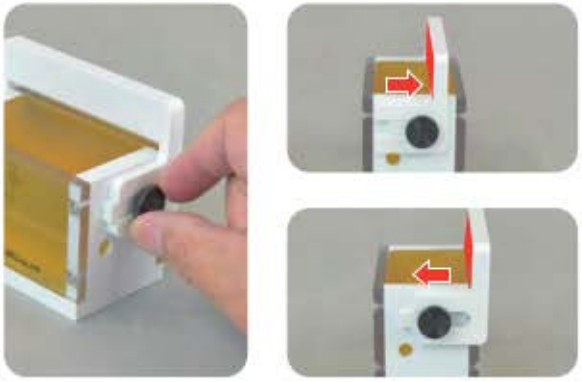
The sound velocity within the phantom base is 1430 - 1450m/s under the temperature conditions described above and it doesn t seem to cause any problems in actual measurement. However, it can be adjusted appropriately if the sound velocity setting of the ultrasound equipment is changed, because the velocity is a little slower than that in a living body.

* Because the temperature of the phantom changes very slowly, it should be left for at least 3 hours in the ultrasonography room before conducting imaging procedure to let the temperature approach the level mentioned above.

2 Preparation for imaging, handling of probe, and maintenance

1. Place the phantom on a flat surface and then apply ultrasound gel.

2. Place probe pendicular on the phantom and find the guide wires.



3. Align the guide rail with the probe when the guide wires are clearly visible, then fixate by turning the screw.

4. After use, wash with water and then carefully wipe off the moisture with a dry cloth.

⚠ Caution

Never use tissue paper or paper towels because it can stick to or scratch the surface of the phantom.
Never wipe off stains on the surface with thinner or similar agents.

3 Purpose of phantom use

The most important purpose of the phantom is to produce an image using ultrasound diagnostic equipment under the same conditions and parameters to find a sign of deterioation of the equipment on the phantom image. If no change is found on the phantom image, the equipment can be relied on for continual use for examination.

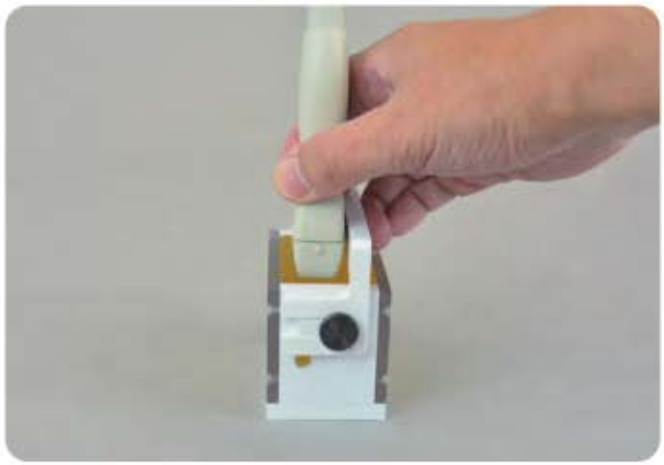
1 Imaging procedure for aged deterioration management for probe

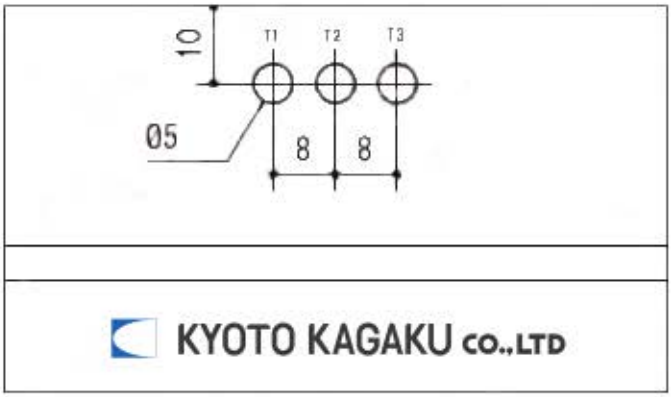
Always test with same conditions and settings.

1. Confirm that the temperature inside the phantom is fit for screening.
2. Set all STC (TGC) settings to maximum position.
3. Use the Depth, Focus, Gain, etc. settings previously established for this phantom (see p. 5 for details)

* The correct imaging conditions vary from device to device.
* Important: When checking for imaging abnormalities and age deterioation, it is vital to test under the same conditions everytime.

4. Align the probe with the guide rail and take an image when the two guide wires are visible.



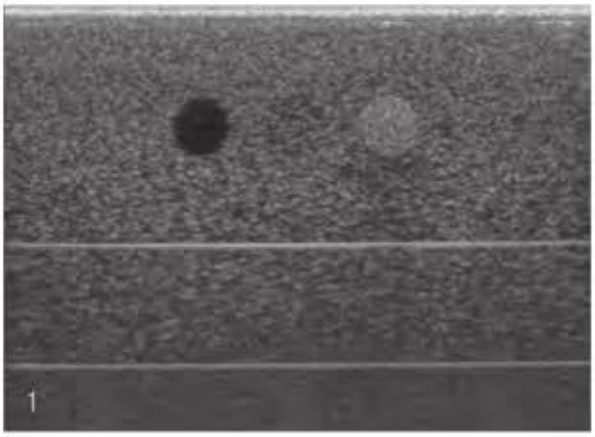


2 Visual evaluation of phantom image

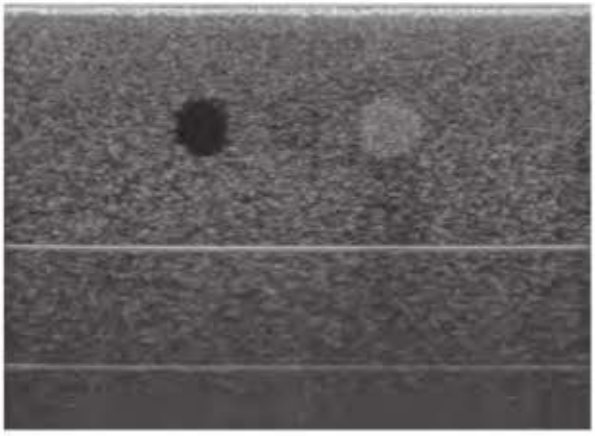
1. Always compare with original image (control image) taken.
   Save image on ultrasound device and compare directly, or save the data to your DICOM viewer to compare.

Important: Confirm that the imaging conditions are the same and the phantom's inner temperature is between 23 and 26°C.

In case of disparities between the test images, contact your device maker to discuss how to proceed.



2016.6 Original image



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3 Saving, recording and reproduction

1. Recordings and images should not be compressed, and instead saved with their original resolution. As printing reduces the image quality, this form of storage is not suitable.
2. For assessing abnormalities and deterioation, the original image and later inspection data should be output or displayed by the same method.

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KYOTO KAGAKU CO.,LTD
URL:http://www.kyotokagaku.com e-mail:rw-kyoto@kyotokagaku.co.jp

■ **Worldwide Inquiries and Orders**
Kyoto Kagaku Head Office and Factories:
TEL：+81-75-605-2510 FAX：+81-75-605-2519
15 Kitanekoya-cho, Fushimi-ku, Kyoto, 612-8388, JAPAN

■ **All American regions**
Kyoto Kagaku America Inc.
TEL：1-310-325-8860 FAX：1-310-325-8867
3109 Lomita Boulevard, Torrance, CA 90505-5108, USA

■ **Europe, Russia & Africa**
Kyoto Kagaku Europe GmbH.
TEL： +49-69-5060-28160
De-Saint-Exupery-Str.10, 60549 Frankfurt, Germany

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