

ULTRASOUND QA SOLUTIONS

Ensure Accurate Screening, Diagnosis & Monitoring



GAMMEX

DOPPLER FLOW PHANTOMS | MULTI-PURPOSE PHANTOMS | TRANSDUCER TEST PHANTOMS

INNOVATORS IN ADVANCED ULTRASOUND TECHNIQUES

Gammex is the only ultrasound QA solutions manufacturer with expertise in medical physics since 1969.

We collaborated with clinical and academic thought leaders to develop our patented HE Gel™ and the first portable Doppler Flow phantoms in the world.

HE (High Equivalency) Gel is what sets Gammex ultrasound products apart; it helps ensure all your transducers and system settings are fully tested

across the entire frequency range from 2 to 18 MHz. Our HE Gel combined with our medical physics and quality control expertise gives you confidence with consistent diagnostic image quality in clinical applications.



HE Gel™ has superior longevity and provides multi-frequency, high quality, reproducible images.

A critical consideration in the selection of an ultrasound phantom

The higher the frequency response, the less depth of penetration. This can lead to a deterioration in axial resolution and penetration depth measurements at higher frequencies, and potentially can produce QC and performance results which are not representative of tissue.^{2,3,4} Gammex HE Gel solves these potential issues.

- Exceeds ACR, ECR, AIUM and other international program requirements
- HE Gel is very uniform with a nonlinearity parameter (B/A) that is equivalent to human liver
- Gammex ultrasound phantoms are comprehensive solutions with a near-linear response of attenuation-to-frequencies between 2 to 18 MHz, due to our HE Gel
- The HE Gel's response of attenuation-to-frequencies over 8 MHz supports accurate axial resolution and penetration depth representative of human tissue^{1,2}

HE Gel™: Gammex's multi-frequency tissue mimicking material

Frequency Range¹: 2 – 18 MHz

Speed of Sound: 1540 m/s

Attenuation Coefficient: 0.5 or 0.7 dB/cm/MHz

Variation of attenuation

with frequency¹: $f^{1.08}$ at 0.5 dB/cm/MHz

$f^{1.1}$ at 0.7 dB/cm/MHz



¹ Browne, J., Ramnarine, K., Watson, A., Hoskins, P., Assessment of the Acoustic Properties of Common Tissue-mimicking Test Phantoms. *Ultrasound in Medicine and Biology*, Vol. 29 (7), pp. 1053-1060, 2003.

² Goldstein, A., The Effect of Acoustic Velocity on Phantom Measurements. *Ultrasound in Medicine and Biology*, Vol. 26, pp. 1133-1143, 2003.

³ O'Donnell, M., Miller, J., Mechanisms of Ultrasonic Attenuation in Soft Tissue. *Ultrasonic Tissue Characterization II*. NBS Spec. Publ. 525, ed M. Linzer (Washington, DC: US Govt. Printing Office) pp. 37-40, 1979.

⁴ Browne, J., Ramnarine, K., Hoskins, P., Watson, A., A Comparative Study of the Physical Properties of Five Commonly Used Ultrasound Test Phantoms. *Ultrasound in Medicine*, pp. 21:S9, 2002.



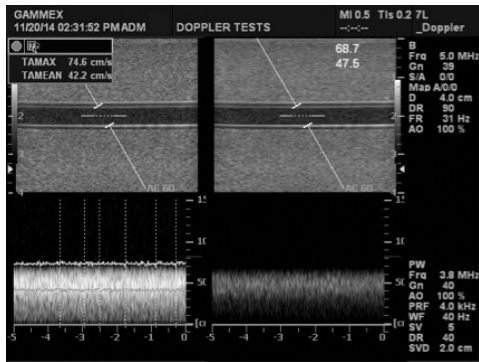
Mini-Doppler Flow 404 and Doppler Flow 403 test Doppler flow and standard static parameters for all your Ultrasound QC needs.

DOPPLER FLOW 403™ & MINI-DOPPLER FLOW 404™

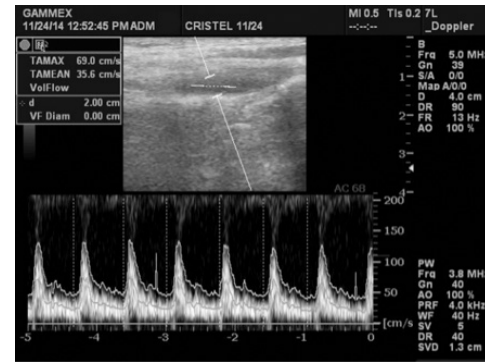
The leading QA solution in ultrasound. The all-in-one Doppler phantoms with B-Mode included. The best of both worlds.

These rugged, self-contained and battery-operated systems help cover all your Ultrasound QC needs and exceed ACR requirements. Precision pulsatile flow rates (constant and turbulent) mimic blood flow in human vessels and allow you to reliably test system

velocities. Whether you require the full capabilities of the Doppler Flow 403 or the specialized small parts' capabilities of the Mini-Doppler 404 - we have the solution for you.



Consistency with a Gammex Doppler Flow phantom...



... means confidence in your patient's assessment.

With Doppler Flow, go from storage to use in under 10 seconds. Both Phantoms include advanced features that provide years of consistent QC measurements and high quality diagnostic imaging.

Common Highlights

- New blood mimicking fluid formulation
 - Represents laminar and parabolic flows (velocity-dependent)
 - Increased viscosity and decreased Reynolds number
 - No need to ever purchase or store blood mimicking fluid
- Patented multi-frequency HE Gel™
- Patented composite film scanning surface

Doppler Flow 403

- The gold standard in Doppler Ultrasound QA
- Resolution measurements from 0 to 16 cm deep

Mini-Doppler Flow 404

- Measure small parts' resolution
- Ideal for cardiology and musculoskeletal (MSK) applications
- Portable and lightweight (<10 lbs / 4.6 kg)

Specifications

	Doppler Flow 403	Mini-Doppler Flow 404
Performance Measures:	Image uniformity, artifact survey, axial and lateral resolution, horizontal and vertical distance, dead zone, depth of penetration, signal-to-noise ratio, anechoic and echogenic mass resolution, and gray scale contrast resolution	
Vessels (2):	5mm inner diameter; 1 horizontal at 2 cm depth, 1 diagonal at 40° from 2 to 16 cm deep	4mm inner diameter; 1 horizontal at 2 cm depth, 1 diagonal at 35° from 2 cm deep
Flow rates:	Customizable, constant and pulsatile	Customizable, constant and pulsatile
Blood Mimicking Fluid:	Speed of Sound 1550 +/- 10 m/s, total volume approx. 300 ml	Speed of Sound 1550 +/- 10 m/s, total volume approx. 100 ml
Targets:	Strings, cysts, grey scale, resolution groups	Strings, cysts, grey scale, resolution groups
Dimensions (Case):	28 H x 30.5 W x 22 cm D (11 x 12 x 8.65 in.)	20 H x 23 W x 15.2 cm D (7.87 x 9.06 x 5.94 in)
Weight:	8.34 kg (18 lbs. 4 oz.)	4.6 kg (9 lbs. 15oz.)

ADVANCED SONO LINEUP FOR QC AND TRAINING

We can help you simplify the transition from QC testing to clinical use. Our solutions are used to simulate challenging clinical situations with identical ultrasound settings because of our high quality materials and collaborative development.



SONO403™

It's what's inside the phantom that matters when monitoring the performance of your systems and maintaining accreditation. The HE Gel reduces backscatter and is compatible with harmonic imaging. The Sono403 Multi-Purpose phantom has precision-placed targets for measuring dead zone and axial resolution.

The Sono403 family includes the 403 SCG and 403 SC models with complex to simple targets.



SONO410™

The Full Contact™ curved scanning surface improves coupling between convex transducers and the phantom scanning window. Invert the phantom 180 degrees, and use the patented scanning interface for linear arrays. Fast. Easy. Efficient.

Check resolution against published limiting values with the targets at 80 and 150 mm or apply the Skolnick method.

The Sono410 family includes the 410 SCG, 410 SC and 410 S models with complex to simple targets.



SONO408™

The Sono408 provides a unique way to test resolution performance in three dimensions: axial, lateral and elevational. Designed in collaboration with researchers to meet their precise specifications.



SONO404™

The Sono404 provides training and testing for the most difficult cases. Pin targets are vertically spaced at 5 mm from 1 to 9 cm deep to measure image quality of small parts and intra-cavity ultrasound systems.

Test your high frequency transducers routinely to ensure precise measurements with patients.

The Sono404 family includes the 404 SCG and 404 SC models with complex to simple targets.



ULTRASOUND UTEd™

Fast Ultrasound transducer uniformity testing.

- Low cost, high value **Ultrasound Transducer Evaluation Device**
- Provides affordable uniformity tests for linear, convex and inter-cavity transducers



SONO TRANSDUCER HOLDER

The Sono Transducer Holder fits any Gammex phantom including the Sono Family and Doppler Flow phantoms.

- Place a transducer in a precise location in the holder for reproducible tests over time
- Use the cable hook to contain the cable

Rejuvenation will strengthen your investment

Your investment in ultrasound imaging equipment and QC test tools is critical to ensuring accurate screening, diagnosis and monitoring. As part of a performance evaluation program, it is important to look at all characteristics of each phantom. Ideally the phantom will match your ultrasound system calibration, and allow for flexibility in testing all transducers across the clinical frequency range—for years to come.

Gammex's phantoms are designed with our proven, patented HE Gel: it reproduces the ultrasound characteristics of human liver tissue at any given frequency. Our Doppler Flow and Sono phantoms are the only ultrasound phantoms available that can be rejuvenated and re-validated. When a phantom is rejuvenated the life of the phantom is lengthened and your investment strengthened. Rejuvenation is fast, easy and economical. Protect your investment in your equipment and maintain the highest quality, reproducible imaging over time.

Specifications (Sono)

Feature	Sono403 SCG Multi-Purpose	Sono410 SCG Full Contact™	Sono408 Spherical Lesion	Sono404 SCG Small Parts
Speed of Sound 1540 m/s	✓	✓	✓	✓
Frequency Range 2-18 MHz	✓	✓	✓	✓
Patented composite film scanning surface	✓	✓	✓	✓
String/ Pin targets- vertical	20 mm at 2 to 16 cm deep	1, 2 and 4 cm at 1 to 15 cm deep		5 mm at 1 to 9 cm deep
String/ Pin targets- horizontal	30 mm at 2 to 12 cm deep	2 cm at 2 cm deep, 4 cm at 7 and 13 cm deep		10 mm at 1 and 5 cm deep
Anechoic Cysts (mm)	2, 4, 6, 10 mm diameter	12 targets, 1, 2, 4, 8 mm diameter		1, 2, 4, 7 mm diameter
Grey Scale (dB)	3 targets, 10 mm diameter, -6, +6 and +12	6 targets, 8 mm diameter, -6, +6 and +12		3 targets, 7 mm diameter, -6, +6 and +12
Full Contact™ Curved Scanning surface		✓		
Anechoic Spherical Lesions			211 4 mm diameter lesions spaced vertically at 0.5 cm apart and horizontally at 0.75 cm apart, 105 2 mm diameter lesions spaced at 0.5 cm apart vertically & horizontally	
Revalidation reports available	✓	✓	✓	✓
Exceeds ACR and other program requirements	✓	✓		✓

About BC Group

BC Group is a leading provider of test and measurement equipment for the worldwide technical services marketplace. We are a "one-stop shop", offering sales of test equipment & tools, plus calibration and repair services for most types of test equipment.

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