

# Shear Wave Liver Fibrosis Phantom

## Model 039



### Measure Known Tissue with Shear Wave Systems

- Single units and sets with custom modulus values are available upon request
- Ensure over ten years of reliable use through reinspection and repair services

***Includes best in industry four-year warranty***

Shear wave elasticity imaging is an emerging biomarker with many possible applications, most prominently for determining the stage of liver fibrosis in a patient without the need for invasive biopsies. The design of the Shear Wave Liver Fibrosis Phantom, Model 039, was developed and validated in a joint study sponsored by the Quantitative Imaging Biomarker Alliance, and serves as the standard reference tool for determining sources of variance in shear wave elasticity measurements (see references on next page).

The Model 039 consists of four phantoms – each filled with Zerdine® gel formulated with differing values of Young's modulus, a tissue-average speed of sound of 1540 m/s and speckle contrast levels matching that of a healthy liver.

Certification of Young's modulus will be provided with each phantom for proof of measurements with a precision of +/- 4%. Young's modulus is tested on batch samples following ASTM standard D575-91 to ensure accurate elasticity. Density will also be measured to allow accurate conversion of shear wave speed to shear wave modulus and Young's modulus.

Model 039 comes with a carry case for easy transport and phantom set up.

### Key Features for Model 039

The Model 039 set contains phantoms with Young's Modulus Values spanning the range healthy livers to those with cirrhosis, as follows:

- Phantom 1: 3 kPa
- Phantom 2: 12 kPa
- Phantom 3: 27 kPa
- Phantom 4: 48 kPa

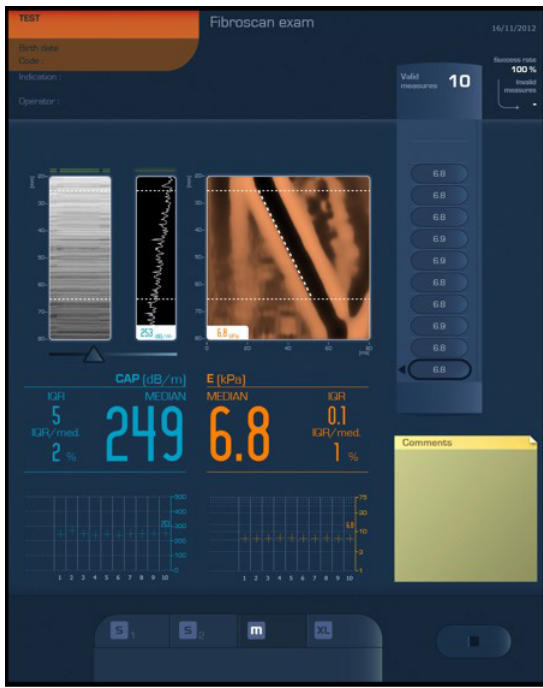
Sets with custom values for Young's modulus and single units are also available upon special request



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The Shear Wave Liver Fibrosis Phantom is compatible with many elastography systems. (Image Credit: Echosens; Paris, France)



Carry Case included with CIRS Shear Wave Liver Fibrosis Phantoms.

SPECIFICATIONS

EXTERNAL DIMENSIONS	Ø 11.6 cm, height 14 cm
INTERNAL DIMENSIONS	Ø 10 cm, height 12 cm
PHANTOM WEIGHT	6.7 lbs (3kg)
HOUSING MATERIAL	ABS Plastic
MEMBRANE	Saran Laminate
SCANNING WELL	16.5 cm x 10 cm x 1 cm deep
TISSUE-MIMICKING MATERIAL	Zerdine® solid elastic hydrogel

PHANTOM STIFFNESS

PHANTOM	YOUNG'S MODULUS*	SHEAR MODULUS	SHEAR WAVE VELOCITY
Phantom 1	3 kPa	1 kPa	1 m/s
Phantom 2	12 kPa	4 kPa	2 m/s
Phantom 3	27 kPa	9 kPa	3 m/s
Phantom 4	48 kPa	16 kPa	4 m/s

\*Young's Modulus tested in batch samples following ASTM standard D575-91 to ensure elasticity measurements within +/- 4%. Measure values will be provided in a certification sheet that comes with each phantom.

MODEL 039 INCLUDES

QTY	COMPONENT DESCRIPTION
4	Shear Wave Liver Fibrosis Phantoms
1	Carry Case
1	Removable Scanning Well
-	48-Month Warranty
-	User Guide
-	Certificate of Compliance

ZERDINE® PROPERTIES

Freezing point: 0° C  
 Melting point: Above 100° C  
 Speed of Sound: 1540 m/s  
 Density: 1.03 g/cc  
 Poisson's Ratio: 0.5

References:

1. Milkowski A, Garra BS, Hall TJ, et al. Ultrasound shear wave speed (SWS) estimation in elastic phantoms: sources and magnitude of variability in a Quantitative Imaging Biomarker Alliance (QIBA) multicenter study. Chicago: Radiol Soc N Am; 2013.
2. Hall TJ, Milkowski A, Garra B, et al. RSNA/QIBA: Shear wave speed as a biomarker for liver fibrosis staging. Prague. IEEE Int Ult Symp; 2013.
3. Dillman JR, Chen S, Davenport MS, et al. Superficial Ultrasound Shear Wave Speed Measurements in Soft and Hard Elasticity Phantoms: Repeatability and Reproducibility Using Two Different Ultrasound Systems. Pediatric radiology. 2015;45(3):376-385. doi:10.1007/s00247-014-3150-6.
4. J Oudry, et al. Comparison of four different techniques to evaluate the elastic properties of phantom in elastography: is there a gold standard? Phys Med Biol. 2014 Oct 7;59(19):5775-93.



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