

Doppler Flow Phantom

Models ATS 523A & 524

USER GUIDE

CIRS

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INTRODUCTION

The Doppler Flow phantoms provide a reliable means of evaluating a Doppler Flow Imaging System's ability to detect the location and direction of flow, flow velocity and sensitivity.

The phantoms are constructed of a rubber-based tissue mimicking material. This material extends the useful life of the phantom by avoiding problems due to melting, freezing, dehydration and breakage from dropping, which are commonly associated with hydrogel (water-based) phantoms. By eliminating these problems, the durability, quality and reliability of this product is guaranteed for three years.

The acoustic properties of all biologic and non-biologic materials are affected by temperature variations. Most diagnostic imaging systems and tissue-mimicking phantoms are calibrated at room temperature, commonly referred to as 23°C. To ensure measurement accuracy ATS incorporates a thermometer strip affixed to the outside surface of the phantom.

The sound velocity of most diagnostic imaging systems is calibrated to 1,540 meters per second (mps), the assumed average velocity of sound through human soft tissue. The rubber-based tissue-mimicking material has a sound velocity of 1450 mps at 0.5dB/cm/Mhz (measured at 3.5MHz) at room temperature (23°C).

The rate of fluid flow through the phantom when measured by a Doppler imaging system is not affected by the differences in sound velocity, therefore, distortion of these measurements will not occur.

Product Description

Model 523A Cardiac Doppler Flow Phantom

The Model ATS 523A tissue mimicking doppler flow phantom contains four flow channels of varying diameters simulating the deep vasculature, such as the cardiac and abdominal vessels. Two fixed-angled scan surfaces maintain a constant angle between the sound beam and the Doppler Fluid flowing through the phantom.

The scan surfaces are angled at 18° and 56°, permitting continuous scanning at depths ranging from 3 to 17 cm.

Model 524 Peripheral Vascular Doppler Flow Phantom

The Model ATS 524 tissue mimicking doppler flow phantoms contain four flow channels simulating superficial vasculature. The simulated vessels are located 15.0 mm below the scan surface. Built-in scanning wells are provided to permit the use of water or a low viscosity gel as acoustic coupling agents.

The Model 524 contains four flow channels with diameters 2, 4, 6, & 8 mm, without stenosis.

If the user requires depths greater than 15 mm, we recommend the use of our Model 528 scanning wedge. The wedge is constructed of the same tissue mimicking material as the doppler flow phantoms and provides an additional 50 mm of scanning depth.

Test Performed

- Flow Velocity
- Sensitivity at varying depths
- Maximum Penetration
- Location of Flow

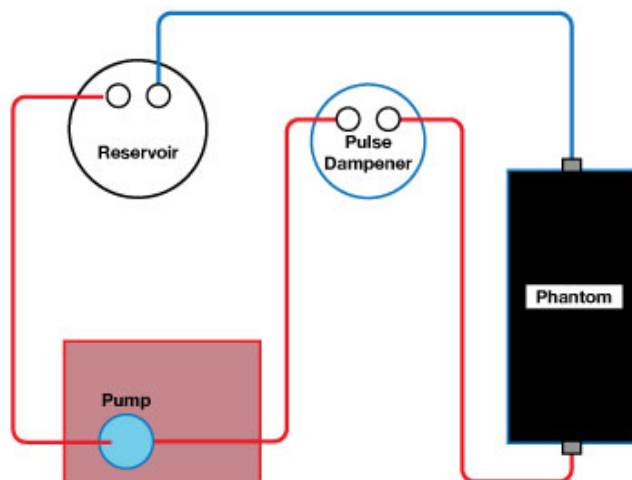
Specifications

Tissue Mimicking Material

Type	Urethane Rubber
Freezing Point	<-40°C
Melting Point	>100°C
Attenuation Coefficient	0.5 dB/cm/Mhz (measured at 3.5Mhz)
Speed of Sound	1450 mps at 23°C

General

	Model 523A	Model 524
Overall Dimensions	32x14x10 cm	22x14x10 cm
Weight	15.2 lbs (6.9 Kg)	6.5 lbs (2.9 Kg)
Housing Material	PVC	PVC
Scan Surfaces	2	1
Scan Surface Dimensions	25.5x12.0cm at 18° 9.5x12.0cm at 56°	17.5x9.8 cm
Flow Channels		
Type	Circular	Circular
Number of Channels	4	4
Diameters (mm)	2	4
Scan Surface Depths	3.0-11.0cm at 18° 4.0-17.0cm at 56°	
Maximum Fluid Pressure – psi (Kg/cm)	15 psi (1.05 Kg/cm)	15 psi (1.05 Kg/cm)
Connector	Quick Disconnect	Quick Disconnect



Equipment and Material Required

- Doppler Flow Pump Model 769
- Model 769DF Doppler Fluid

Procedure

1. Select a clean, flat, stable working surface.
2. Check to make sure all of the above equipment/materials are available.
3. Set-up the Doppler Flow Pump according to the manufacturers directions.
4. Arrange the system components to provide easy access during a testing procedure. The phantom should be positioned near the pumping system.
5. Use provided coupling hoses to connect pump to the phantom.
6. Gently shake the Doppler Fluid to ensure any material which may have settled to the bottom is combined with the solution.

NOTE: In the operation of any flow phantom it is likely that some air bubbles will enter the fluid stream; either through cavitation in areas of expanded diameters or entrainment of air at a fitting or connector. For these reasons a large reservoir is required. As the pump begins to circulate the test fluid through the system, entrapped air bubbles will enter the fluid and be pumped into the return side of the reservoir.

A large reservoir will allow enough time for the entrapped air bubbles to separate from the returning test fluid. The air bubbles may appear as foam and will float on the top of the test fluid on the return side of the reservoir.

NOTE: WHEN USING WITH THE MODEL 769 DOPPLER FLOW PUMP, THE PRESSURE WILL NOT EXCEED 9 PSI, EVEN AT THE MAXIMUM FLOW RATE OF 750 ML/S. IF YOU NOTICE AN OBSTRUCTION IN THE FLOW CIRCUIT, IMMEDIATELY TURN OFF THE PUMP.

The phantom is now ready for performance testing.

CARE RUBBER-BASED PHANTOMS

For best results the phantom should be kept clean at all times and stored at room temperature. In particular a build-up of dried coupling gel on the scan surface should be avoided. The phantom may be cleaned with warm water using a lint free cloth. Particularly stubborn stains and dirt may be removed with a mild household cleaner. The use of petroleum solvents should be avoided since they may adversely react with the rubber-based material.

WARRANTY

All standard CIRS products and accessories are warranted by CIRS against defects in material and workmanship for a period as specified below. During the warranty period, the manufacturer will repair or, at its option, replace, at no charge, a product containing such defect provided it is returned, transportation prepaid, to the manufacturer. Products repaired in warranty will be returned transportation prepaid.

PRODUCT	WARRANTY PERIOD
Doppler Flow Phantoms	24 Months

There are no warranties, expressed or implied, including without limitation any implied warranty of merchantability or fitness, which extend beyond the description on the face hereof. This expressed warranty excludes coverage of, and does not provide relief for, incidental or consequential damages of any kind or nature, including but not limited to loss of use, loss of sales or inconvenience. The exclusive remedy of the purchaser is limited to repair, recalibration, or replacement of the product at manufacturer's option. This warranty does not apply if the product, as determined by the manufacturer, is defective because of normal wear, accident, mis- use, or modification.

NON-WARRANTY SERVICE

If repairs or replacement not covered by this warranty are required, a repair estimate will be submitted for approval before proceeding with said repair or replacement.

RETURNS

If you are not satisfied with your purchase for any reason, please contact Customer Service or your local distributor prior to returning the product. Visit <https://www.cirsinc.com/distributors/> to find your local distributor. Call 800-617-1177, email rma@cirsinc.com, or fax an RMA request form to 757-857-0523. CIRS staff will attempt to remedy the issue via phone or email as soon as possible. If unable to correct the problem, a return material authorization (RMA) number will be issued. Non-standard or "customized" products may not be returned for refund or exchange unless such product is deemed by CIRS not to comply with documented order specifications. You must return the product to CIRS within 30 calendar days of the issuance of the RMA. All returns should be packed in the original cases and or packaging and must include any accessories, manuals and documentation that shipped with the product. The RMA number must be clearly indicated on the outside of each returned pack- age. CIRS recommends that you use a carrier that offers shipment tracking for all returns and insure the full value of your package so that you are completely protected if the shipment is lost or damaged in transit. If you choose not to use a carrier that offers tracking or insure the product, you will be responsible for any loss or damage to the product during shipping. CIRS will not be responsible for lost or damaged return shipments. Return freight and insurance is to be pre-paid.

With RMA number, items may be returned to:

CIRS

Receiving

900 Asbury Ave,

Norfolk, Virginia, 23513 USA