

ViVitro Labs offer a wide variety of accessories and complementary equipment to support our products and your laboratory. The following list includes the most requested items for the ViVitro Pulse Duplicator, however we do offer additional products and can provide customizations to meet any needs. Please contact us by email at info@vivotrolabs.com to discuss your specific requirements.

Viscoelastic Impedance Adapter (VIA)

Made by ViVitro



The Viscoelastic Impedance Adapter (VIA) produces realistic ventricle pressure waveforms and can be used to interface between a fluid flow generator and a load. It consists of a unique combination of resistive and compliance elements which simulate visco-elastic behavior. The viscoelastic properties simulated by the VIA help produce, for example, realistic ventricle pressure waveforms in pulse duplicator systems simulating cardiovascular function. In prosthetic heart valve studies ventricle pressures with physiologic dp/dt values can be achieved using the VIA. The VIA can be readily mounted between a flow source, such as the ViVitro SuperPump, and a load such as the ViVitro Model Heart.

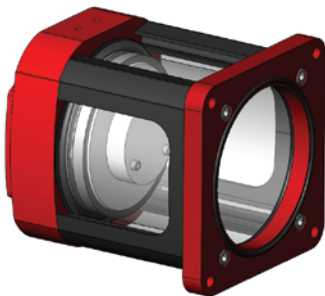
The VIA consists of one fixed resistive element and two adjustable compliance chambers. Using a syringe, a measured volume of air at atmospheric pressure can be inserted or withdrawn from the SOURCE and OUTPUT stop-cocks to adjust system compliance. The SOURCE air volume is normally 120 ml while the OUTPUT air volume is normally 50 ml; other air volumes can be set to simulate different visco-elastic properties as required.

SPECIFICATIONS

Fixed resistance:	200 c.g.s. units
Compliance air volumes:	SOURCE 0-135 ml, OUTPUT 0-60 ml, syringe adjustable
Total liquid volume:	500 ml with SOURCE / OUTPUT compliance air volumes zero
Transmission:	VIA reduces the volume of fluid transmitted between the source and the load
Materials:	Acrylic, Polycarbonate, Delrin, Nylon, Polyethylene, Stainless Steel, Viton

High Volume Pump Head

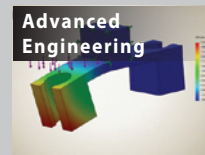
Made by ViVitro



The High Volume Pump Head is a direct replacement for the pump head in our current system. This accessory has a maximum stroke volume of 300 ml.

The High Volume Pump Head allows for versatility in test method development for a variety of high volume or high pressure cyclic applications.

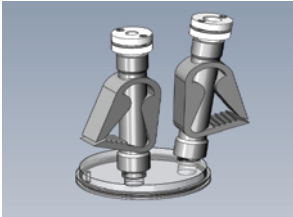
Making device testing simpler, faster and more reliable.



ViVitro Labs offer a wide variety of accessories and complementary equipment to support our products and your laboratory. The following list includes the most requested items for the ViVitro Pulse Duplicator, however we do offer additional products and can provide customizations to meet any needs. Please contact us by email at info@vivotrolabs.com to discuss your specific requirements.

Percutaneous Heart Valve Entry Ports (PHV)

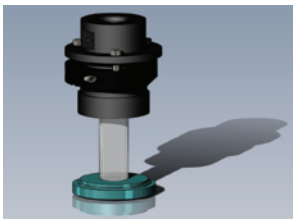
Made by ViVitro



The percutaneous entry components (PHV option) allows for deployment of catheters and/or valve devices through the ViVitro Heart Model's aorta. This component is interchangeable with the supplied aorta view lid or camera viewport. With this accessory, insertion of such devices can be done while the flow loop is operating under pressure. Two entry ports are provided. Standard French sizes (16, 18, 20, 22, 24, and 21) are provided, but custom sizes may be requested to ensure a proper fit. The catheter fitting may be interchanged with the PHV entry ports.

Right Ventricle Outflow Tract

Made by ViVitro

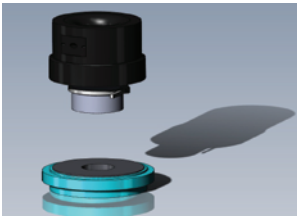


The ViVitro model heart can be used to test valve in compliant conduits to simulate right ventricular outflow tracts (RVOT). This accessory can be used to mount compliant aorta and test percutaneous valves into the ViVitro Model Heart system.

A variety of RVOT sizes can be custom made to accommodate silicone tubes with relaxed tube IDs of 13, 16, 19, 22, 25 and 28 mm. A tube may be expandable up to about 50mm OD.

Stentless Heart Valve Mounting (SHV)

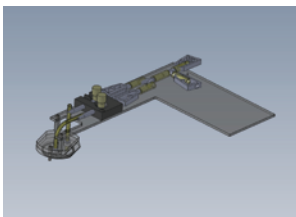
Made by ViVitro



The ViVitro Model Heart can be used to test stentless valves. The optional Stentless Heart Valve (SHV) components facilitate mounting the valve and adapting it to operate in the model heart. The SHV option is offered with two standard IDs 20 and 24mm; other sizes are available on request.

Coronary Load Assembly

Made by ViVitro



The ViVitro Coronary Load Assembly is designed to create physiological LCA and RCA loads for assessment, ostia obstruction, coronary flow, or coronary evaluation.

Making device testing simpler, faster and more reliable.



ViVitro Labs offer a wide variety of accessories and complementary equipment to support our products and your laboratory. The following list includes the most requested items for the ViVitro Pulse Duplicator, however we do offer additional products and can provide customizations to meet any needs. Please contact us by email at info@vivotrolabs.com to discuss your specific requirements.

Heat Bath temperature controller

Made by Cole-Parmer



These heated circulating baths feature a long life, high-wattage heater that delivers rapid fluid heat-up, optimized for the ViVitro Pulse Duplicator. The overtemperature and low reservoir level cutoffs protect the Pulse Duplicator and unit from damage.

Reservoir volume:	6 litres (1.5 gallons)
Temperature range:	Digital ambient 15°C to 150°C; ambient 15°C to 150°C; ambient+15°C 150°C
Stability:	Digital $\pm 0.05^{\circ}\text{C}$ $\pm 0.05^{\circ}\text{C}$ $\pm 0.05^{\circ}\text{C}$
Work area dimensions:	8 x 6 x 51 / 4 inches (20 x 15 x 13 cm)
Overall dimensions :	91/4 x 14 x 143/4 inches (23 x 36 x 37 cm)
Heater:	1000 W
Pumping capacity:	12 L/min at 0 psig
Electrical requirements:	115 VAC, 60 Hz, 15 amp or 230 VAC, 50 Hz 10 amps (specify when ordering)

Heat Exchanger

Made by ViVitro



The ViVitro heat exchanger is a highly efficient add-on to the ViVitro Pulse Duplicator to heat the test fluid with minimal interference of the fluid flow. When coupled with the ViVitro water bath testing can be conducted at 37° C. An isolated inflow and outflow metal heat conducting channel transfers heat to the solution; test flow flows through exchanger to maintain testing solution to desired temperature $\pm 0.5^{\circ}$ Celsius

ViVitro products are manufactured in an ISO 13485 facility and meet applicable CE marking directives.



One year **Warranty** on all products

For further information please contact us:
www.vivotrolabs.com
tel. +1.250.388.3531
email. info@vivotrolabs.com

Page 3 of 3

Making device testing simpler, faster and more reliable.

