

Compatible Grafts for Ultrasonic Flow Measurement

The following is a list of prosthetic graft types that have been tested for use with Transonic® ultrasonic transit-time Flowprobes. The list is not comprehensive and new developments in the medical device industry can have significant bearing on the recommendations that are made. As new products are available, Transonic® will continue to test the suitability of blood flow measurement by Transonic® Perivascular Flowprobes on new materials if samples are provided. The information provided below is intended to be a guideline for compatibility with Transonic® products only, and does not make any recommendations for the suitability of one graft or another for a particular procedure or application.

WOVEN & KNITTED DACRON GRAFTS

Woven Dacron fabric grafts are generally the most reliable from the standpoint of flow measurement. Even so, these grafts must be pre-treated and handled appropriately. Acute use requires preclotting, or presoak and gel. For chronic implant, signal may disappear until tissue infiltrates the graft. Appropriate Flowprobes should be selected, normalized and calibrated for use on the graft to ensure accurate flow measurements. The following brands have been tested and can be used with transit-time Flowprobes

BRAND	MANUFACTURER / SUPPLIER	FEATURE	HANDLING	FLOWPROBE RECOMMENDATION
Woven Dacron				<p>Normalize signal and calibrate on graft. PAU-Series 4-Transducer Flowprobes are recommended. Liner size matched to graft outer diameter size.</p> <p>Note: most grafts are sized by the inner diameter. These woven grafts are typically pleated; the outer diameter of the graft is approximately ID + 2 mm to compensate for the pleat. PAU liners should fit without crushing graft pleats. Former PAX-series probes may be 1 size smaller because pleats expand into probe cavity. Acute use requires acoustic coupling gel.</p>
Vasutek Gelweave®	Terumo Cardiovascular Systems	Gelatin Impregnated	Saline presoak	
DeBakey® Soft Woven	Bard Peripheral Vascular		Saline presoak	
Hemashield Platinum®	Maquet	Double Velour Collagen impregnated	Saline presoak	
InterGard Woven	Maquet	External Velour Collagen Impregnated	Saline presoak	
Cooley Low Porosity Woven	Boston Scientific		Saline presoak	
Knitted Dacron				
Vasutek® Gelsoft™ ERS	Terumo Cardiovascular Systems	External polypropylene support	Saline presoak Remove rings at Flowprobe location	

PTFE GRAFTS

Transonic® has also tested many ePTFE (expanded polytetrafluoroethylene) vascular grafts. Achieving adequate ultrasonic signal through these grafts to make measurements requires special handling of the graft that is not practical for intraoperative acute applications, though it may be acceptable for longer term chronic applications after tissue has infiltrated the graft. Measurement requires saturation of the graft which can be achieved by first soaking the graft under pressure in alcohol; then maintaining saturation by keeping the graft submerged in saline. Any exposure to air or excessive manipulation causes the graft to reabsorb air and signal will be blocked. This necessary treatment makes PTFE grafts marginal for acute flow measurement protocols. Further, the time required for tissue ingrowth in chronic studies cannot be guaranteed and may take as long as 2 weeks. If flow measurement is an essential measurement parameter, Dacron grafts are preferred. If PTFE grafts are the only option available, Transonic® can test Flowprobe signal quality following the alcohol soak regimen described in Vascular Graft Surgical Protocol RL-42-sp, to determine if adequate signal can be achieved.

BRAND	MANUFACTURER	FEATURE	HANDLING	FLOWPROBE RECOMMENDATION
IMPRA FLEX™ Thinwall Small Beading	BARD Peripheral Vascular	ePTFE with Spiral bead	ethyl alcohol / saline treatment under pressure; remove bead at flowprobe	Acute Measurement Marginal PAU series 4-Transducer probes are recommended; sized to fit graft outer diameter. For grafts < 10 mm, PS-series may be usable. Probe signal must be normalized to minimum threshold for measurement.
Gore-Tex® Stretch	W.L. Gore & Associates	ePTFE	ethyl alcohol / saline treatment under pressure	

IMPLANTED VENTRICULAR ASSIST DEVICES

Flow measurement during the surgical implant of rotary blood pump type VADs in patients is also recommended by some manufacturers. The VAD outflow conduit is generally one of the above grafts previously tested in preclinical studies. Clinical Flowprobes are available for use with the following devices.

BRAND	MANUFACTURER	OUTFLOW GRAFT	FLOWPROBE RECOMMENDATION
HeartMate II®	Thoratec	Dacron 16 mm ID	Transonic® Clinical Flowprobes are available for use with these devices. Calibration and Signal Normalization on graft is required. See Clinical Confidence Flowprobes®
DuraHeart™	Terumo Heart	Dacron 16 mm ID	
HeartAssist 5®	MicroMed Cardiovascular	Integrated Flowprobe	
Jarvik 2000 FlowMaker®	Jarvik Heart	Dacron 16 mm ID	
HVAD™	HeartWare®	Dacron 10 mm ID	



Transonic Systems Inc. is a global manufacturer of innovative biomedical measurement equipment. Founded in 1983, Transonic sells “gold standard” transit-time ultrasound flowmeters and monitors for surgical, hemodialysis, pediatric critical care, perfusion, interventional radiology and research applications. In addition, Transonic provides pressure and pressure volume systems, laser Doppler flowmeters and telemetry systems.

AMERICAS

Transonic Systems Inc.
34 Dutch Mill Rd
Ithaca, NY 14850
U.S.A.
Tel: +1 607-257-5300
Fax: +1 607-257-7256
support@transonic.com

EUROPE

Transonic Europe B.V.
Business Park Stein 205
6181 MB Elsloo
The Netherlands
Tel: +31 43-407-7200
Fax: +31 43-407-7201
europe@transonic.com

ASIA/PACIFIC

Transonic Asia Inc.
6F-3 No 5 Hangsiang Rd
Dayuan, Taoyuan County
33747 Taiwan, R.O.C.
Tel: +886 3399-5806
Fax: +886 3399-5805
support@transonicasia.com

JAPAN

Transonic Japan Inc.
KS Bldg 201, 735-4 Kita-Akitsu
Tokorozawa Saitama
359-0038 Japan
Tel: +81 04-2946-8541
Fax: +81 04-2946-8542
info@transonic.jp