PRECISION ACOUSTICS
A Coda Octopus Company

Ultrasound Soft-Tissue Phantom Kit
(TMM-001)

Precision Acoustics Ltd (PA) is pleased to be able to offer a kit for users to produce their own agar based soft-tissue mimic material for use as a diagnostic or therapeutic ultrasound tissue phantom.

The user-castable phantom is supplied in kit form consisting of components required to form a soft-tissue mimic material based on the recipes outlined in IEC60601-2-5:2015 (Particular requirements for the basic safety and essential performance of ultrasonic physiotherapy equipment) and IEC 60601-2-37:2024 (Particular requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment).

The kit is a cost-effective solution that is ideal for destructive studies, research and development or metrological uses.

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Product Overview

The Precision Acoustic Tissue Phantom Kit is supplied as a series of 4 individual powders and 2 liquids. Provided the instructions described in the user guide are followed accurately it is designed to provide a complete set of the necessary ingredients to enable the user to cast a tissue phantom of up to about 5500 cm^3 (335 in^3) with acoustic properties comparable to human soft tissue. Once mixed the Tissue Phantom should be kept at temperatures under 25°C (77 °F) in which case it will have a shelf life of up to 7 days.

A user guide and recommendation for handling and storage is provided.

This tissue mimic material is based on the recipe outlined in IEC60601-2-5:2015 and IEC 60601-2-37:2024 and contains all ingredients necessary to produce a material in accordance with these standards with the exception of Benzalkonium Chloride antifungal agent which is not provided for safety reasons, and which can be sourced locally at the customer's option to extend shelf-life of the finished material.

Applications

- Diagnostic Ultrasound Studies
- Therapeutic Ultrasound Studies
- Research and Development
- Reference Test Objects
- Training Aid

Benefits & Features

- Cost-Effective Solution
- Internationally Recognized Formula
- No Hazardous Chemicals
- Ethical Alternative to Tissue Studies
- User Castable

Physical Properties

Property	Value
Density	1043 kg/m^3
Colour	White/grey opaque

Acoustic Properties

Acoustic Properties of a Tissue Phantom made from this kit have been characterised at Precision Acoustics using a through transmission measurement setup as described in IEC TS 63081:2019 (Ultrasonics - Methods for the characterization of the ultrasonic properties of materials.) Data is provided in the following figures.

Property	Value
Group Velocity	1539 m/s
Attenuation Coefficient	0.47 dB/cm/MHz
Acoustic Impedance	1.6 MRayl

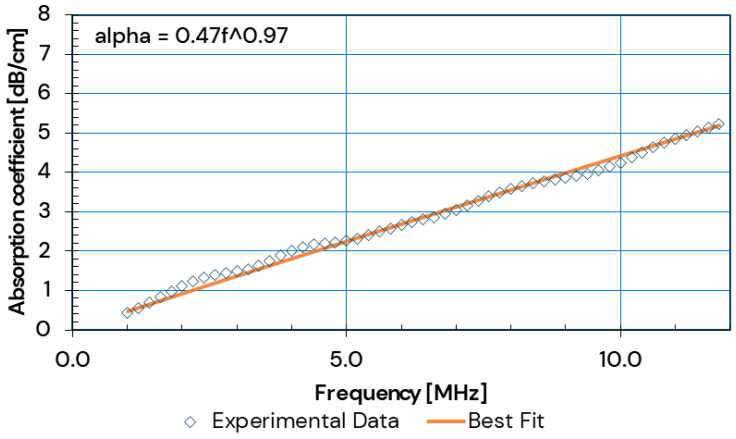

Figure 1. Absorption coefficient for Precision Acoustics Ltd. PA tissue phantom material ATMM-001

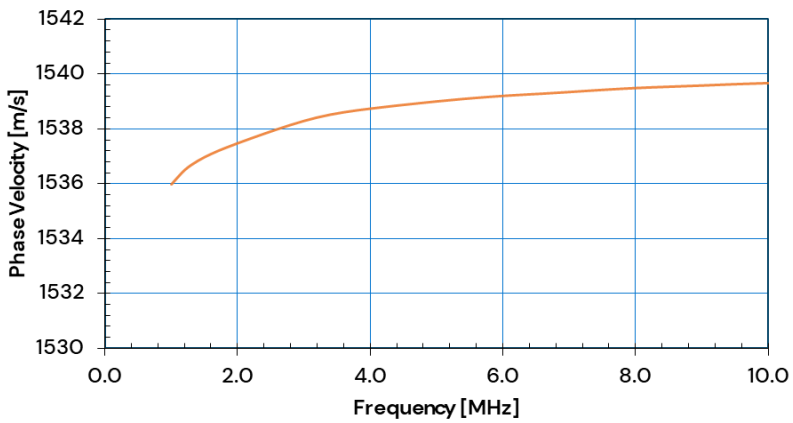

Figure 2. Phase velocity of Precision Acoustics Ltd. PA tissue phantom material ATMM-001

Kit Contents

TMM-001L

Component	Quantity
Distilled Water (< 5 µS/cm)	5000 g
Glycerol	700 g
Silicon carbide (SiC (-400 mesh))	32 g
Aluminium oxide (Al_2O_3 (0.3 µm))	53 g
Aluminium oxide (Al_2O_3 (3 µm))	57 g
Agar	182 g

TMM-001S

Component	Quantity
Distilled Water (< 5 µS/cm)	2500 g
Glycerol	350 g
Silicon carbide (SiC (-400 mesh))	16 g
Aluminium oxide (Al_2O_3 (0.3 µm))	27 g
Aluminium oxide (Al_2O_3 (3 µm))	29 g
Agar	91 g

For users who have access to their own supply of distilled water we can supply these kits without water to simplify shipping. If you would like the kit to be sent without water please let us know at the time of ordering.

References

[1] IEC 60601-2-5:2015 Particular requirements for the basic safety and essential performance of ultrasonic physiotherapy equipment, 2015.

[2] IEC TS 63081:2019 Ultrasonics - Methods for the characterization of the ultrasonic properties of materials, 2019.

[3] IEC60601-2-37;2024 Particular Standard for Safety of Ultrasonic Medical diagnostic and monitoring Equipment, 2011.