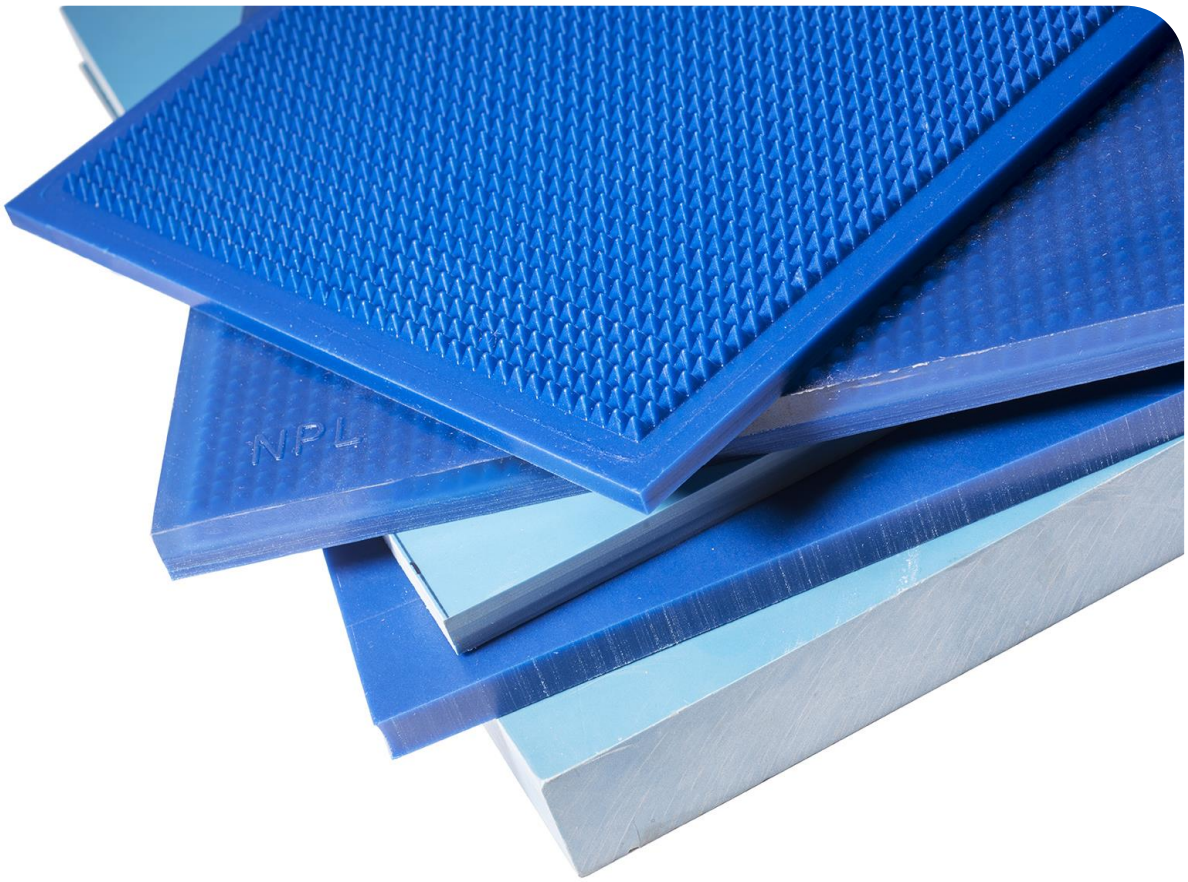
PRECISION ACOUSTICS

Comparison of low frequency absorbers



Precision Acoustics Ltd is pleased to offer a range micro- and macro-voided polyurethane materials for the absorption of low frequency ultrasound waves. The materials within this range cover frequencies from 2 kHz up to 1.5 MHz. The majority of materials in this range are supplied as pre-cast tiles, many of which have a structured outer surface. One of the materials is also available in a user-castable 2-part mix that provides the end-user with the option of casting detailed shapes without subsequent and costly machining.

Product	Description
Aptflex F48	Single layer tile or user castable material
Aptile SF5048	Single layer tile, Structured front surface
The Alberich Tile	Dual layer tile with internal macro-voids, structured front surface

Precision Acoustics Ltd Hampton Farm Business Park, Higher Bockhampton, Dorchester, Dorset DT2 8QH, UK

t. +44 (0) 1305 264669 **e.** office@acoustics.co.uk **w.** acoustics.co.uk

THIS RANGE OF MATERIALS CAN BE USED IN APPLICATIONS SUCH AS:

- Anechoic linings of ultrasonic measurement tanks
- Acoustic baffles for hydrophone and transducer construction
- Acoustic de-coupling and isolation

RECOMMENDED APPLICATIONS

Application	F48	SF5048	Alberich
Basic anechoic tank lining	✓		
High performance tank lining		✓	✓
Transducer backings and baffles	✓		
User-castable form	✓		
Pre-cast sheet	✓	✓	✓

INSERTION LOSS

Insertion loss (IL) is defined as

$$IL = -20 \log_{10}\left(\frac{P_t}{P_i}\right)$$

where P_t is the amplitude of the acoustic pressure transmitted through a sample and P_i is the amplitude of the acoustic pressure incident upon it.

This has been experimentally determined for Aptflex F48 and Aptile SF5048 over the range 50 kHz to 300 kHz and this is shown in Figure 1.

A similar comparison was made between the Alberich Tile and Aptile SF5048 over the frequency range 2 kHz to 25 kHz and the results are shown in Figure 2.

The dynamic range of IL measurement is approximately 40 dB and values higher than this cannot be guaranteed.

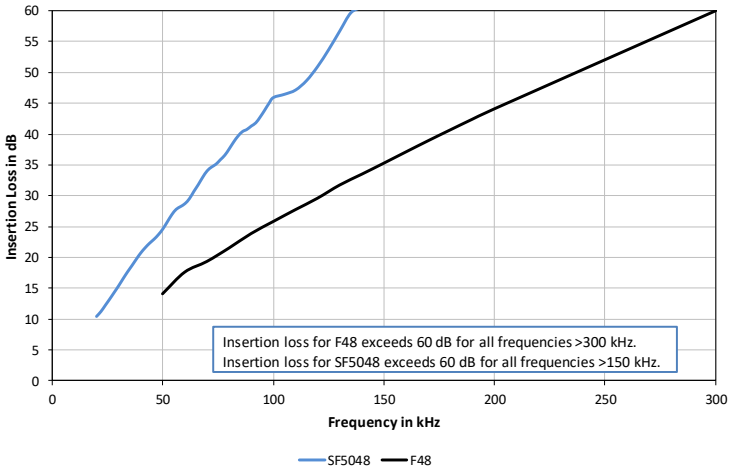


Figure 1 – Comparison of Insertion Loss in the range 50 kHz to 300 kHz

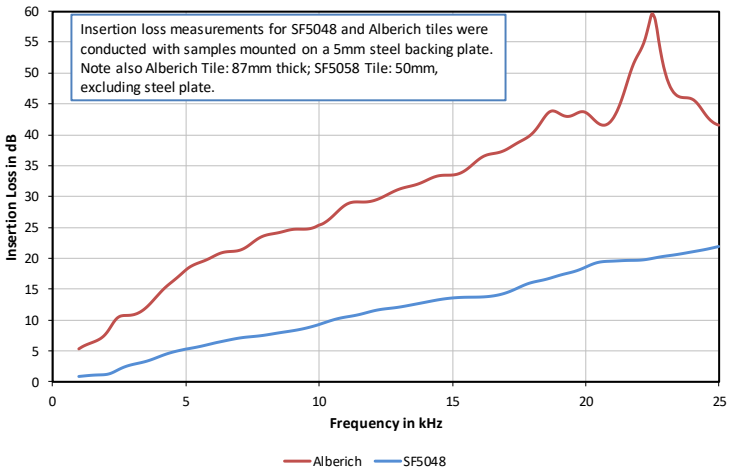


Figure 2 – Comparison of Insertion Loss in the range 2 kHz to 25 kHz

ECHO REDUCTION

Echo Reduction (ER) is defined as

$$ER = -20 \log_{10}\left(\frac{P_r}{P_i}\right)$$

where P_r is the amplitude of the acoustic pressure reflected from a sample and P_i is the amplitude of the acoustic pressure incident upon it.

This has been experimentally determined for Aptflex F48 and Aptile SF5048 over the range 50 kHz to 300 kHz and this is shown in Figure 3.

A similar comparison was made between the Alberich Tile and Aptile SF5048 over the frequency range 2 kHz to 25 kHz and the results are shown in Figure 4.

The dynamic range of ER measurement is approximately 60 dB and values higher than this cannot be guaranteed.

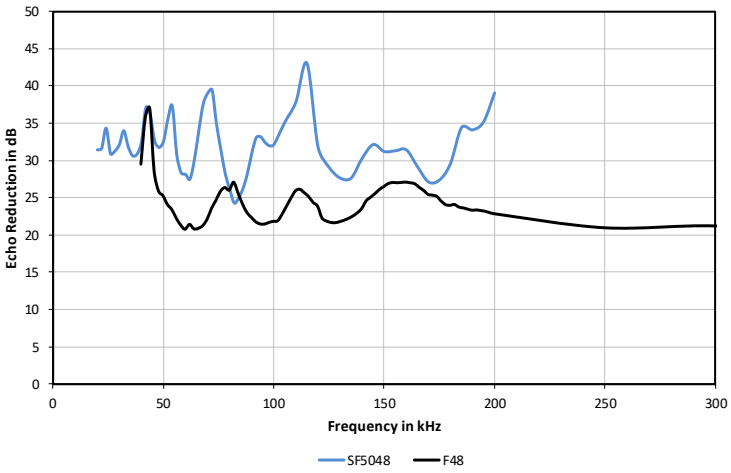


Figure 3 – Comparison of Echo Reduction in the range 50-300 kHz

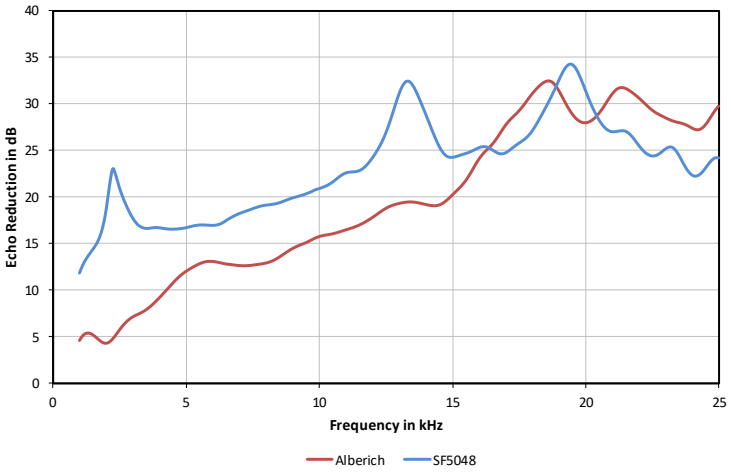


Figure 4 – Comparison of Echo Reduction in the range 2 kHz to 25 kHz

FRACTIONAL POWER DISSIPATION

Fractional power dissipation (FPD) is defined as

$$\mathrm{FPD} = 1 - \left(\frac{P_r}{P_i}\right)^2 - \left(\frac{P_t}{P_i}\right)^2$$

where P_r is the acoustic pressure reflected from the sample, P_t is the acoustic pressure transmitted through the sample and P_i is the acoustic pressure incident upon the sample. This has been derived from the ER and IL measurements for Aptflex F48 and Aptile SF5048 over the range 50 kHz to 300 kHz and this is shown in Figure 5.

A similar comparison was made between the Alberich Tile and Aptile SF5048 over the frequency range 2 kHz to 25 kHz and the results are shown in Figure 6

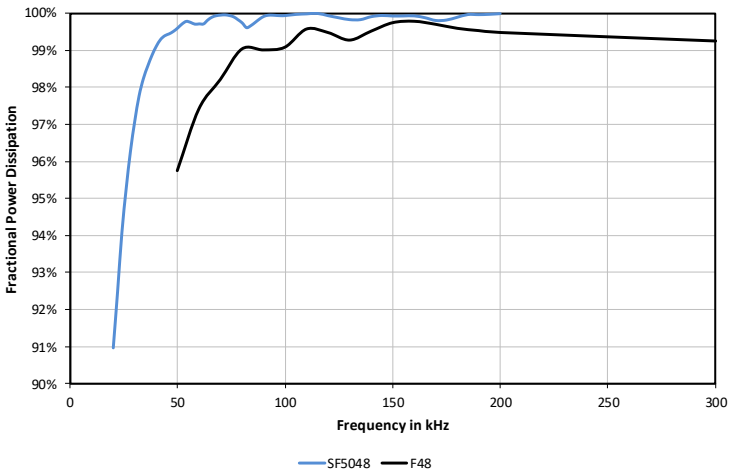


Figure 5 – Comparison of Fraction Power Dissipation in the range 50 kHz to 300 kHz

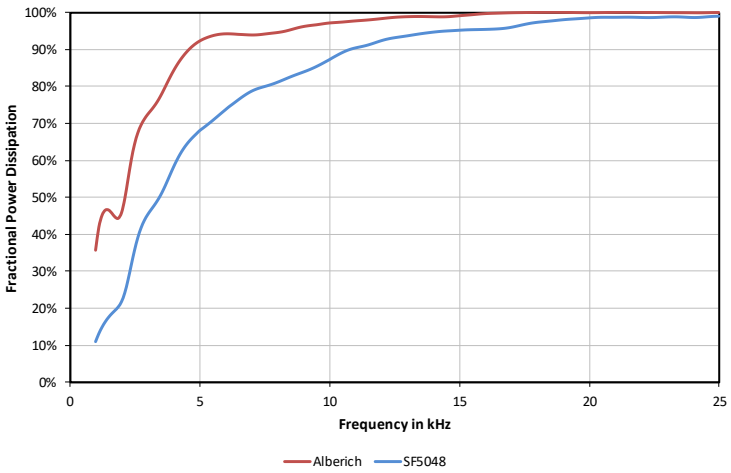


Figure 6 – Comparison of Fraction Power Dissipation in the range 2 kHz to 25 kHz