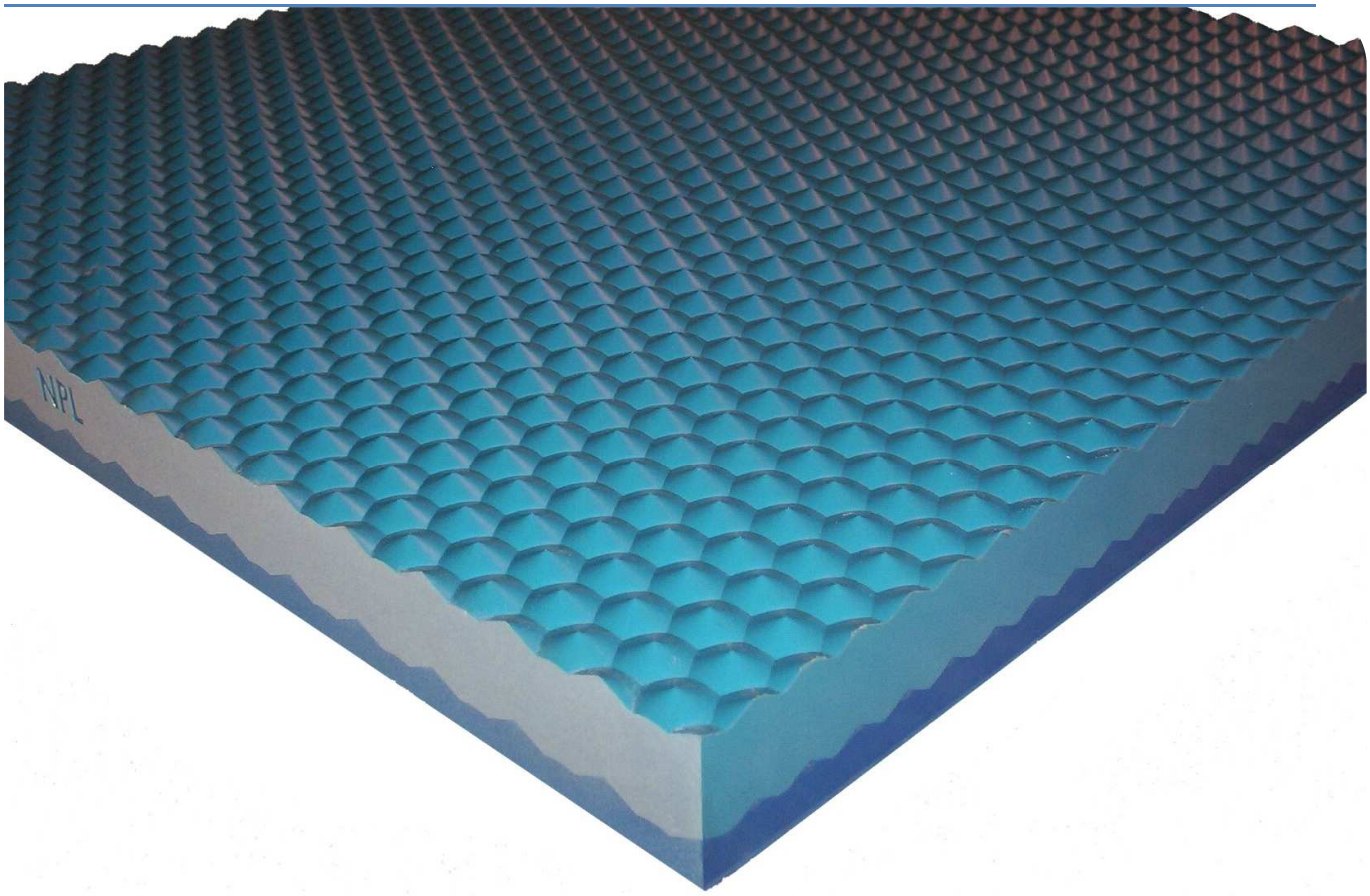
PRECISION ACOUSTICS

The Alberich tile



The Alberich tile, from Acoustic Polymers Ltd, is an acoustic absorbing tile designed to meet the requirements of applications in frequency range below 25 kHz. It is a micro-bubble filled, pre-cast polyurethane sheet with a structured front surface on top of a 35mm thick macro voided layer.

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THIS COMBINATION OF PROPERTIES PRODUCES A MATERIAL THAT CAN BE USED IN AREAS SUCH AS:

- Anechoic linings of ultrasonic measurement tanks operating below 25 kHz.
- Acoustic de-coupling and isolation of low frequency ultrasonic waves in 5 - 25 kHz range.

The Alberich tile is part of a family of low frequency acoustic absorbers and provides a higher level of insertion loss and fractional power dissipation below 25 kHz than any other material in the range. Whilst The Alberich tile provides good levels of echo reduction, SF5048 offers slightly better performance in this respect.

TYPICAL PROPERTIES

Appearance	Pale blue polyurethane sheet
Dimensions of standard tile	600 mm X 600 mm X 85 mm
Shore A hardness	87 ± 3
Density	2100 ± 30 kg / m3
Average wave speed (50-200 kHz)	990 ± 30 m / s
Acoustic impedance	2.09 MRayls
Resistant to	Isopropyl Alcohol (IPA) Tricholethylene
Affected by	Ketones (MEK, Acetone) – Swell Dichloromethane – Swell and Break down
Avoid prolonged exposure to	Ozone UV
Stability	Very stable due to cross-linked nature of polymer
Coefficient of linear thermal expansion	200 ppm / °C

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 The Alberich tile mounted on a 5mm thick steel plate, and this is shown in Figure 1.
The dynamic range of IL measurement is approximately 60 dB and values higher than this cannot be guaranteed.

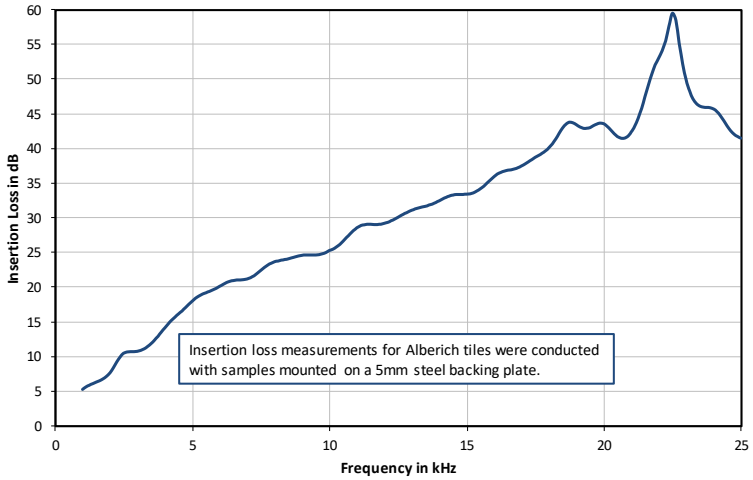

Figure 1 – Insertion loss vs Frequency for The Alberich tile

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 two samples of The Alberich tile mounted on a 5mm thick steel plate, and this is shown in Figure 2.
The dynamic range of ER measurement is approximately 60 dB and values higher than this cannot be guaranteed.

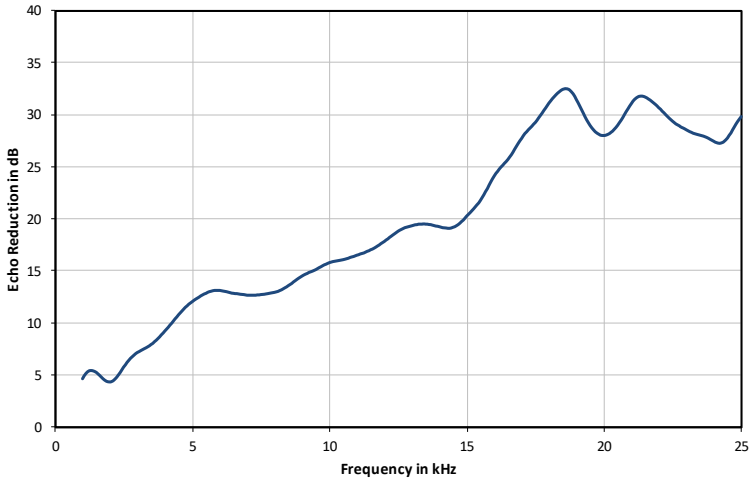

Figure 2 – Echo Reduction vs Frequency for The Alberich tile

IL and ER data relating to The Alberich tile has been provided by the National Physical Laboratory, London. The Alberich tile has been extensively calibrated and further data relating to its variation of performance as a function of temperature and hydrostatic pressure is available from Precision Acoustics Ltd on request.

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 The Alberich tile and shown in Figure 3.

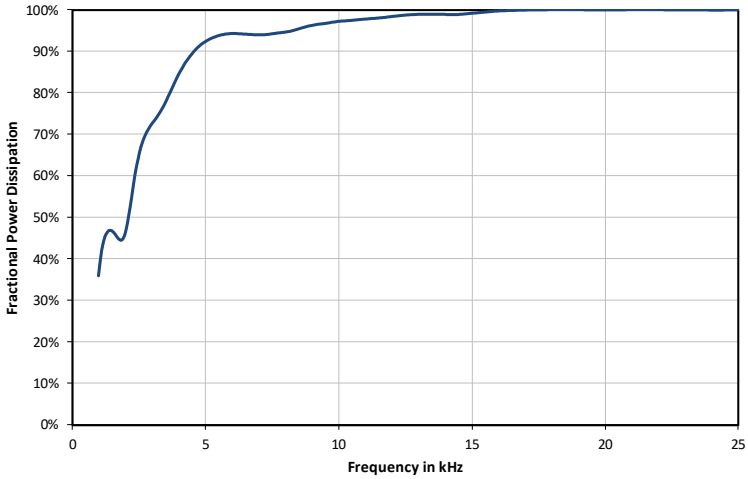

Figure 3 – Fraction power dissipation vs Frequency for The Alberich tile in the range 20-200 kHz

All information is based on results gained from experience and tests, and is believed to be accurate but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside the control of Precision Acoustics Ltd or Acoustic Polymers Limited.