

AptFlex F28



AptFlex F28, from Acoustic Polymers Ltd is a micro-bubble filled, pre-cast polyurethane sheet with density and wavespeed similar to that of water. It is designed to exhibit good acoustic absorption particularly at ultrasonic frequencies above 1 MHz.

AptFlex F28 can be cast to user defined shapes upon request.

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

- Anechoic linings of ultrasonic measurement tanks
- Transducer construction
- Hydrophone baffles
- Acoustic de-coupling and isolation

The system exhibits excellent chemical resistance to a wide range of media.

AptFlex F28 is part of a family of high frequency acoustic absorbers and provides the most cost effective method of absorbing unwanted ultrasonic reflection and acoustic isolation. Other high frequency absorbers within the range provide higher levels of echo reduction.

TYPICAL PROPERTIES

Appearance	Dark blue polyurethane sheet
Dimensions of standard tile	1200 mm X 600 mm X 10 mm or 300 mm X 300 mm X 10 mm
Shore A hardness	78 ±3
Density	1010 ± 20 kg / m ³
Average wave speed (1-10 MHz)	1500 ± 30 m / s
Acoustic impedance	1.5 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 on 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 a 10mm thick sample of AptFlex F28, 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.

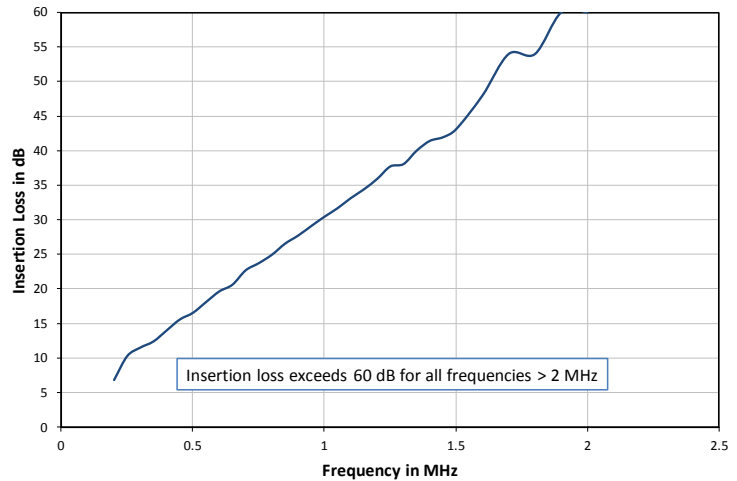


Figure 1 – Insertion loss vs Frequency for AptFlex F28

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 AptFlex F28, and this is shown in Figure 2.

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

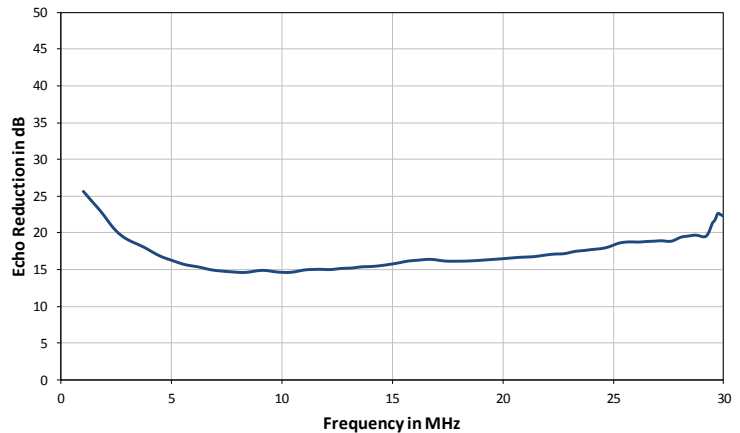


Figure 2 – Echo Reduction vs Frequency for AptFlex F28

All data relating to the ER and IL of AptFlex F28 has been provided by the NPL (London).

FRACTIONAL POWER DISSIPATION

Fractional power dissipation (FPD) is defined as

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

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 F28, and this is shown in Figure 3.

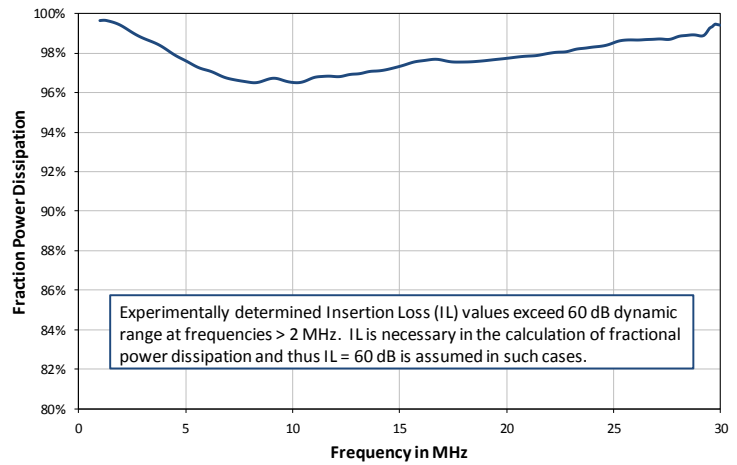


Figure 3 – Fraction Power dissipation vs Frequency for AptFlex F28

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.