PRECISION ACOUSTICS

# 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.

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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
- 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<br>or<br>300 mm x 300 mm x 10 mm |
| Shore A hardness | 78 ± 3 |
| Density | 1010 ± 20 kg / $m^3$ |
| Average wave speed (1 MHz to 10 MHz) | 1500 ± 30 m / s |
| Acoustic impedance | 1.5 MRayls |
| Resistant to | Isopropyl Alcohol (IPA)<br>Tricholethylene |
| Affected by | Ketones (MEK, Acetone) – Swell<br>Dichloromethane – Swell and break down |
| Avoid prolonged exposure to | Ozone<br>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.

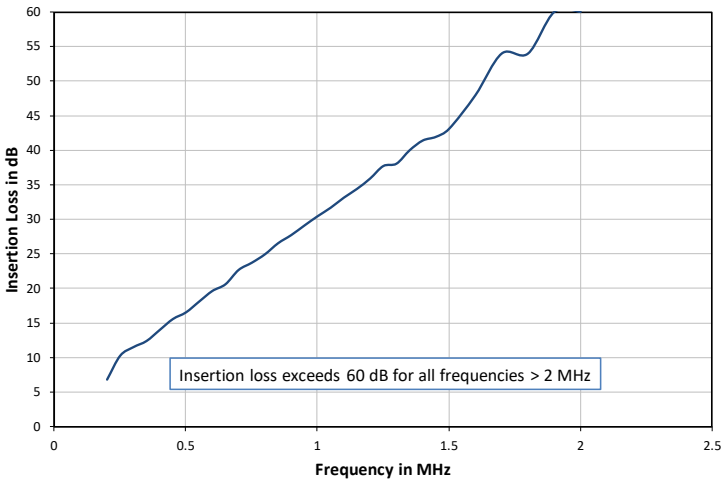


**Figure 1** – Insertion loss vs Frequency for AptFlex F28

## 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.

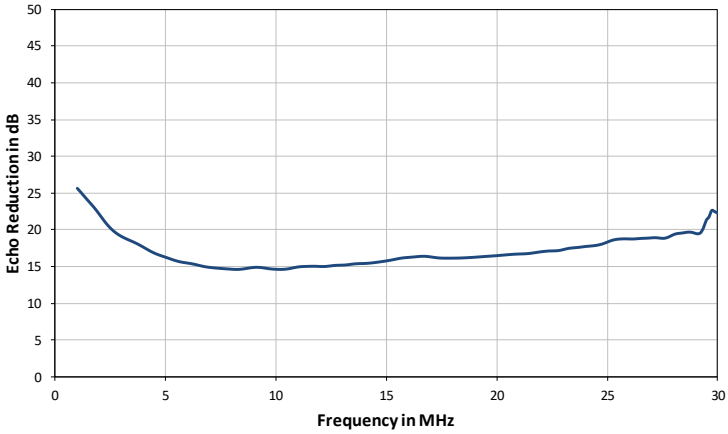


**Figure 2** – Echo Reduction vs Frequency for AptFlex F28

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

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

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 F28, and this is shown in Figure 3.

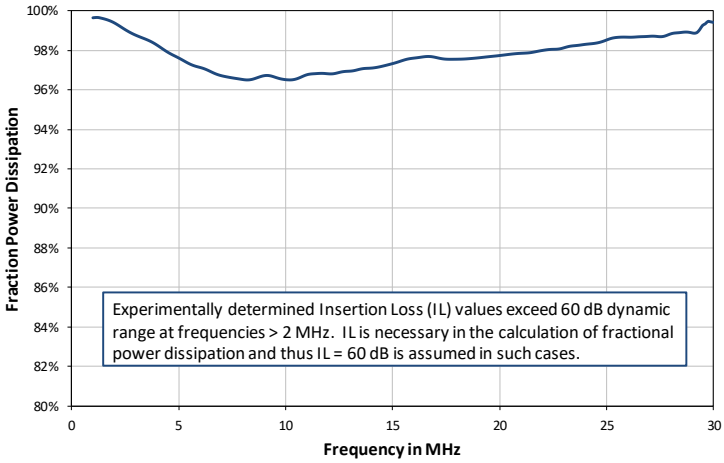


**Figure 3** – Fraction Power dissipation vs Frequency for AptFlex F28