

# **Comparison of high frequency absorbers**



Precision Acoustics Ltd is pleased to offer a range of acoustic absorbing materials covering a wide range of frequencies. This datasheet provides a comparison of the properties of acoustic absorbers designed for ultrasonic frequencies  $\geq$  1 MHz. All products covered in this data sheet are pre-cast tiles that incorporate a micro-bubble filled, pre-cast polyurethane absorbing layer. They also all have a density and wavespeed similar to that of water. However the geometrical shape and the presence of an additional acoustic impedance matching layer will vary.

#### Product

Aptflex F28 Aptflex F28P HAM A

#### Description

	Single blue absorbing layer, Smooth surface (No structure)							
	Single layer tile, Structured front surface							
	Two-layer t	tile:	Clear	impedance	matching	layer,	Blue	
absorbing layer, Pyramid structure								

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## **RECOMMENDED APPLICATIONS**

Application	F28	F28P	HAM A
Anechoic tank lining	$\checkmark$	-	-
Acoustic de-coupling and isolation	$\checkmark$	×	-
Apertures for effective radiating area	×	-	$\checkmark$
assessment §			
Bounded output power masks §	×	-	$\checkmark$
Radiation force balance target (< 20 W)	×	$\checkmark$	$\checkmark$
Radiation force balance target (> 20 W)	×	$\checkmark$	×
Reducing reflections from water tank fixtures	-	$\checkmark$	$\checkmark$

§ Please contact Precision Acoustics about these applications as products optimised for this usage are available

Кеу	
Recommended	$\checkmark$
Acceptable	-
Not Recommended	×

# **INSERTION LOSS**

Insertion loss (IL) is defined as

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

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 high frequency absorbers and 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 – Comparison of Insertion Loss vs Frequency in the range 300 kHz to 3 MHz

#### ECHO REDUCTION

Echo Reduction (ER) is defined as

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

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 the high frequency absorbers and is shown in Figure 2.

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





## 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 the high frequency absorbers and is shown in Figure 3.





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