

Diffractal



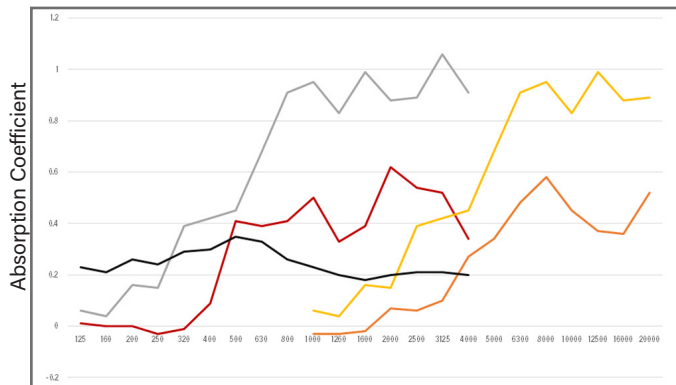
The Diffractal is the first diffusing fractal. It consists of nested self-similar scaled diffusors, each of which covers a specific frequency range and offers wide area coverage without lobbing effects. A second generation Diffractal (DFR72) contains two nested QRDs, thus forming a diffusor within a diffusor. Each diffusor provides uniform scattering over a specific range of frequencies so that the effective bandwidth is extended. The DFR72 can be nested within a larger low frequency diffusor to provide wide area coverage, extended low frequency diffusivity, and also, minimum lobbing associated with periodic arrays. This third generation Diffractal (DFR73) offers low, mid, and high frequency diffusion over an extended bandwidth, limited only by the depth available.

Acoustic Performance

Absorption may occur from wave resonances within the wells when they are narrow and deep and viscous losses due to pressure gradient induced air particle flows between adjacent wells. The Diffractal® provides high frequency diffusion without adding additional absorption by replacing the mid frequency QRD® wells with nested reduced scale high frequency QRD®s. The nested diffusors comprising the Diffractal® extend the high frequency diffusive performance beyond that of the QRD® 734. The graph illustrates how the Diffractal® mid frequency and high frequency nested components essentially bootstrap the uniform diffusion from 500 Hz to 20 kHz. The diffusion coefficient is also compared to a flat reflective panel which exhibits decreasing diffusivity with increasing frequency.

Installation

The Diffractal can be flush mounted into an opening or surface mounted on a wall or ceiling.



Frequency	Diffusion (mid)	Diffusion (high)	Scattering (mid)	Scattering (high)	Absorption
125	0.01		0.06		0.23
160	0		0.04		0.21
200	0		0.16		0.26
250	-0.03		0.15		0.24
320	-0.01		0.39		0.29
400	0.09		0.42		0.3
500	0.41		0.45		0.35
630	0.39		0.68		0.33
800	0.41		0.91		0.26
1000	0.5	-0.03	0.95	0.06	0.23
1260	0.33	-0.03	0.83	0.04	0.2
1600	0.39	-0.02	0.99	0.16	0.18
2000	0.62	0.07	0.88	0.15	0.2
2500	0.54	0.06	0.89	0.39	0.21
3125	0.52	0.1	1.06	0.42	0.21
4000	0.34	0.27	0.91	0.45	0.2
5000		0.34		0.68	
6300		0.48		0.91	
8000		0.58		0.95	

