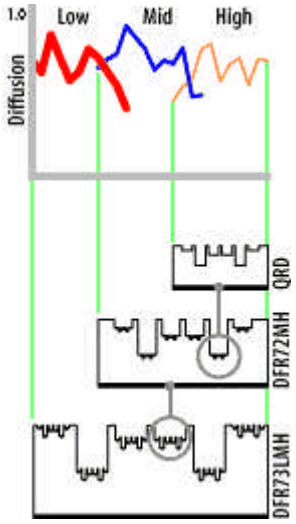
DIFFRACTAL DIFFUSER

- Full spectrum sound diffusion in a single integrated diffusor.
- Fractal surface consisting of nested self similar low, mid, and high frequency QRDs offers extended bandwidth
- The modular construction allows for fast and easy installation
  The furniture grade quality coupled with the wide variety of wood species and finishes make the Diffractal an aesthetically pleasing addition to any space

Problem

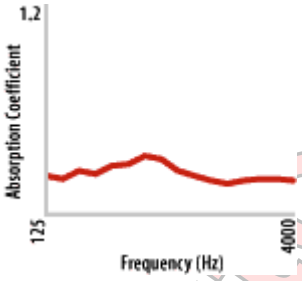
The bandwidth of a QRD 734 is limited at high frequencies by the well width and at low frequencies by the maximum depth. Additionally, wide area coverage with periodic arrays focuses energy into certain diffraction directions. A full spectrum diffusor offering wide area coverage is needed.



Solution

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 lobing 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 lobing 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.

Performance



Absorption

Diffusors essentially scatter sound, but 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 QRDs.

Diffusion

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 boot strap 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.