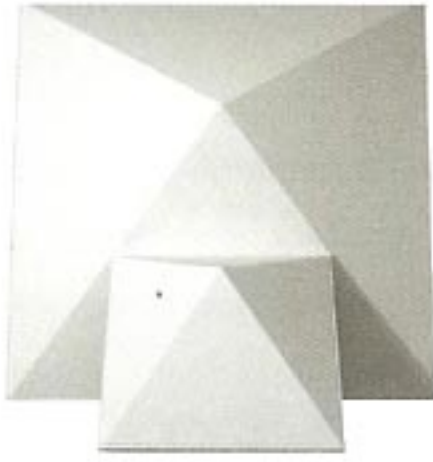


RPG 2D Diffusion

Golden Pyramid



The First Pyramid Based on the Golden Mean
From The Acoustical Industry's Leading Innovator

Pyramidal shaped ceiling units redirect portions of the incident sound energy into different directions. While redirection is not true diffusion, the pyramidal shape offers a moderate amount of acoustic control, preventing excessive harshness and flutter and providing more uniform sound distribution. RPG Golden Pyramid has an offset center based on the geometric Golden Rule. This offset center provides both visual interest and better acoustic performance. Constructed of heavy, fiber reinforced gypsum, the RPG Golden Pyramid offers superior acoustic performance over the lightweight gel-coat replicas provided by other manufacturers. An added benefit is the Class-A fire rating.



Problem and Solution

Problem

Sound absorptive acoustic ceiling tile (ACT) is commonly overused in rooms where people need to understand speech or listen to music. A low-cost but effective ceiling treatment that prevents acoustic problems while simultaneously distributing sound to the far room is needed.

Solution

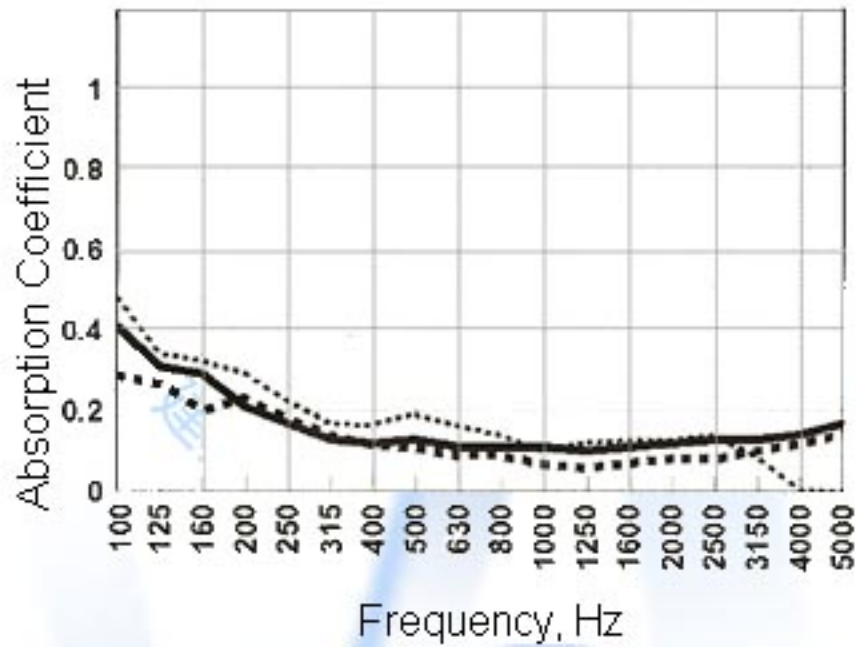
To address this problem, RPG developed the Golden Pyramid, which fits easily into a standard, metal, T-bar, ceiling grid and is Class-A fire rated. Acoustically, the Golden Pyramid redistributes sound across the room, aiding uniform listening and preventing acoustic problems such as flutter with the floor below.

RPG

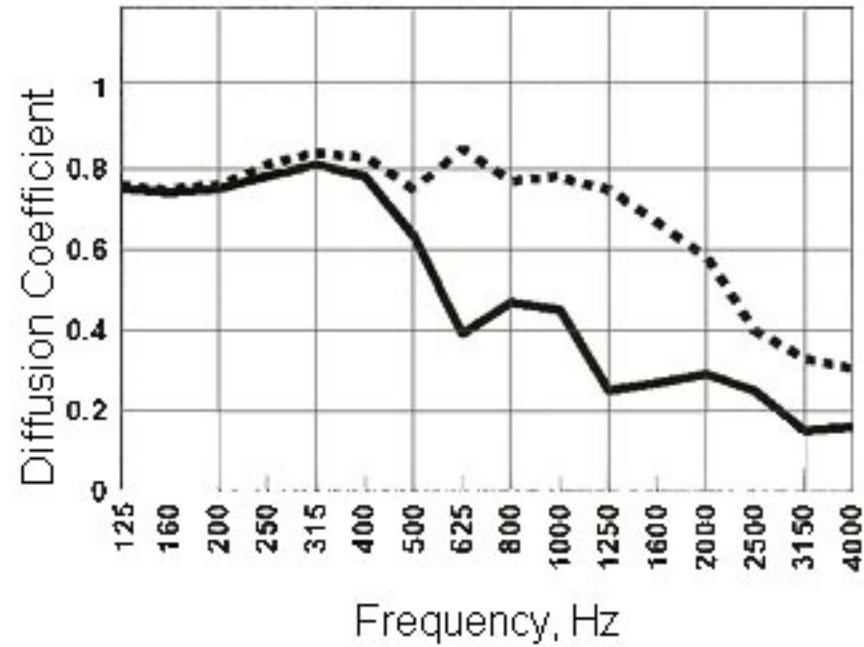
2D Diffusion

Golden Pyramid

Performance Specifications



Legend
 ●●●● 4x4 A Mount — 4x4 E Mount 2x2 E Mount



Legend
 ●●●● Golden Pyramid — Reflector

Absorption

The Fiber Reinforced Gypsum fabrication is rigid and non-diaphragmatic, as opposed to conventional thermoformed plastic pyramids. Therefore, the Golden Pyramid™ exhibits very low absorption, as indicated, for a 4 × 4 unit in both A and E mounts and for a 2 × 2 unit in E mount.

Diffusion

The Golden Pyramid is essentially a redirector of sound, as opposed to a reflection phase grating, providing reflection from each triangular face. The graph illustrates the average different (1 is ideal) for all angles of incidence. Compared to a flat reflecting panel, the Golden Pyramid™ maintains uniform diffusivity as a function of frequency, above the diffraction limit.

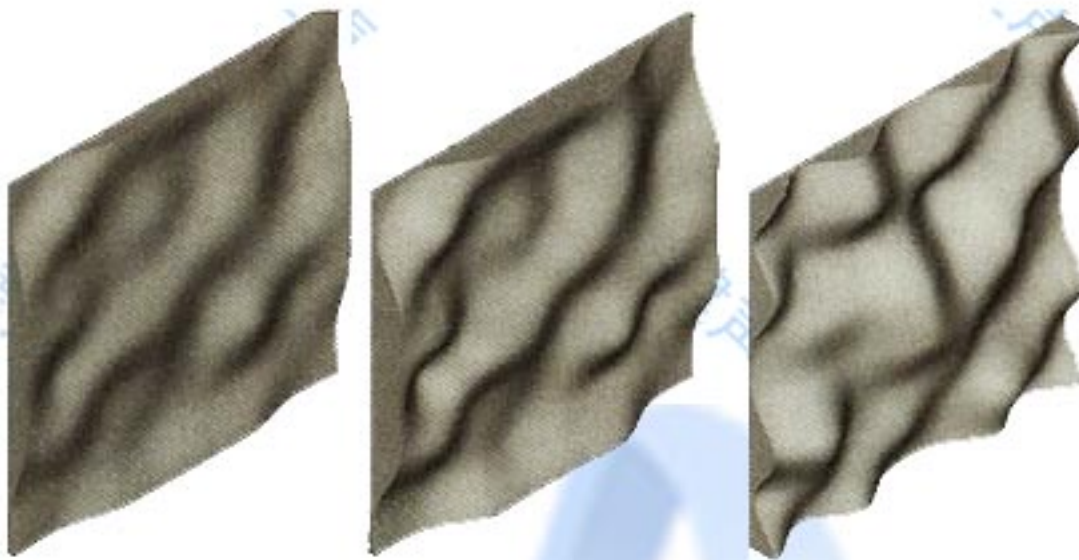
All in one orientation



Installation

The Golden Pyramid™ can be suspended in a T-bar grid. Because of the asymmetrical golden mean shape, the units can be oriented in three way (inset right) forming a two dimensional scattering array.

RPG 2D Diffusion



48"x48"x2"

48"x48"x4"

48"x48"x8"

Overhead canopy arrays are used in auditoriums and worship spaces to blend the direct and early reflected sound, increasing speech intelligibility and enhancing musical clarity and intimacy. Traditionally, non-optimized, periodic flat panels and arcs have been used. These arrays can give rise to non-uniform coverage, due to array gaps, non-optimal shaping, and periodicity effects. RPG has developed an optimization algorithm called the shape optimizer, to provide optimal shaping and tilting, offering omnidirectional scattering. RPG's patent pending aperiodic modulation of a single asymmetric base shape minimizes periodicity arraying effects and provides uniform coverage. Aperiodic modulation of a single asymmetric base shape allows infinite, seamless tiling. Unlimited shapes are possible with different tiling patterns. Waveform Bicubic represents the next generation in acoustical canopy design. No other system provides the aesthetic and performance possibilities. Several depths are available in Class A Glass Reinforced Gypsum.

Waveform Bicubic

Optimized Compound Curvature GRG Canopies
From The Acoustical Industry's Leading Innovator



Problem and Solution

Problem

When multiple spaced canopy panels are used in an array, the scattering response of a single panel and the periodic arrangement. periodicity results in scattering in preferred directions, which depend on the array configuration. The sound level in these preferred diffraction directions depends on the uniform scattering capability of each individual panel. As a result, is often compromised unless optimization is utilized.

Solution

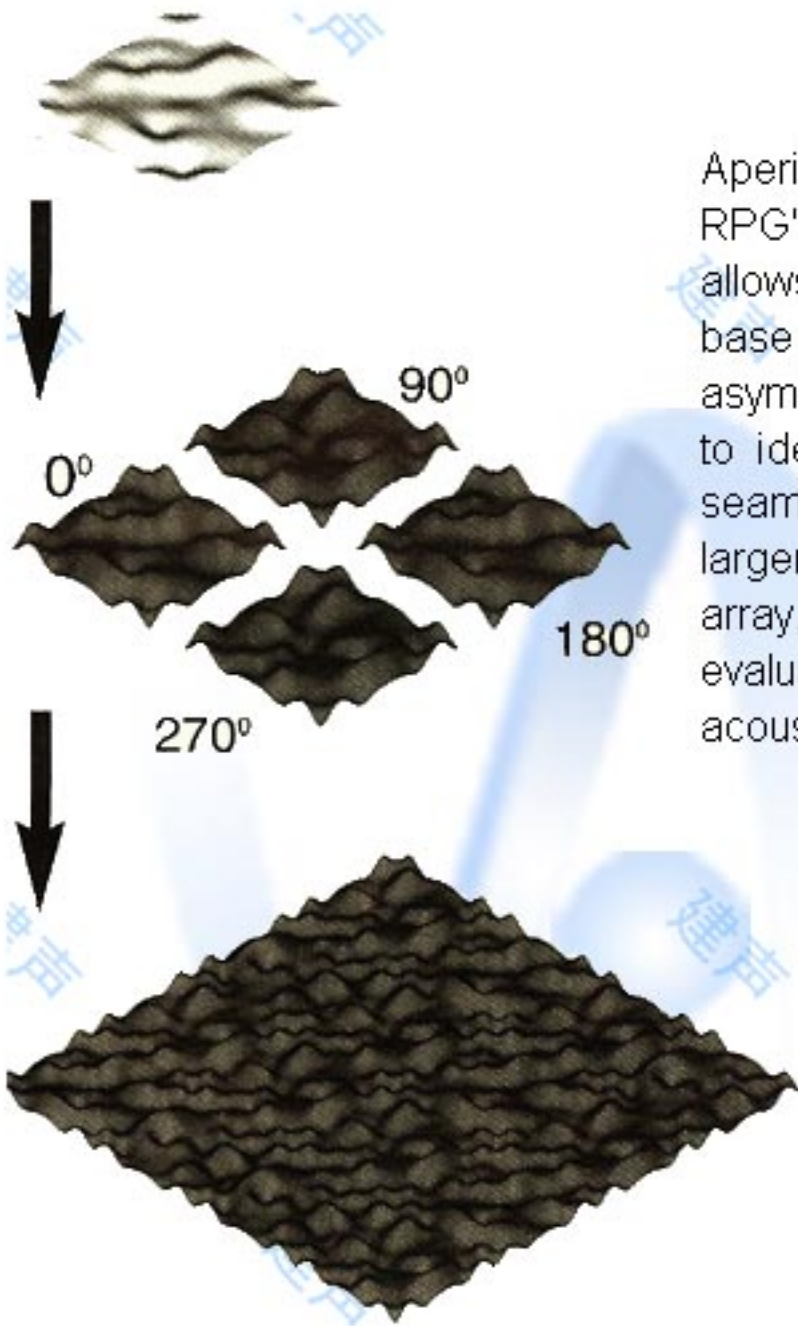
To solve this problem, RPG developed the first shape optimization program, which automatically determines the best shape, tilt, and arraying to insure uniform coverage. The shape Optimizer combines the power of the boundary element and multidimensional optimization techniques, incorporating the diffusion coefficient as the metric of optimal performance. Therefore, optimal shape provides uniform coverage. Periodicity effects are minimized by modulating the asymmetric base shape, thus allowing the canopy array to perform as one of the individual optimized canopy elements. The Waveform Bicubic offers a level of performance and aesthetics formerly not available in commercial canopies.

RPG

2D Diffusion

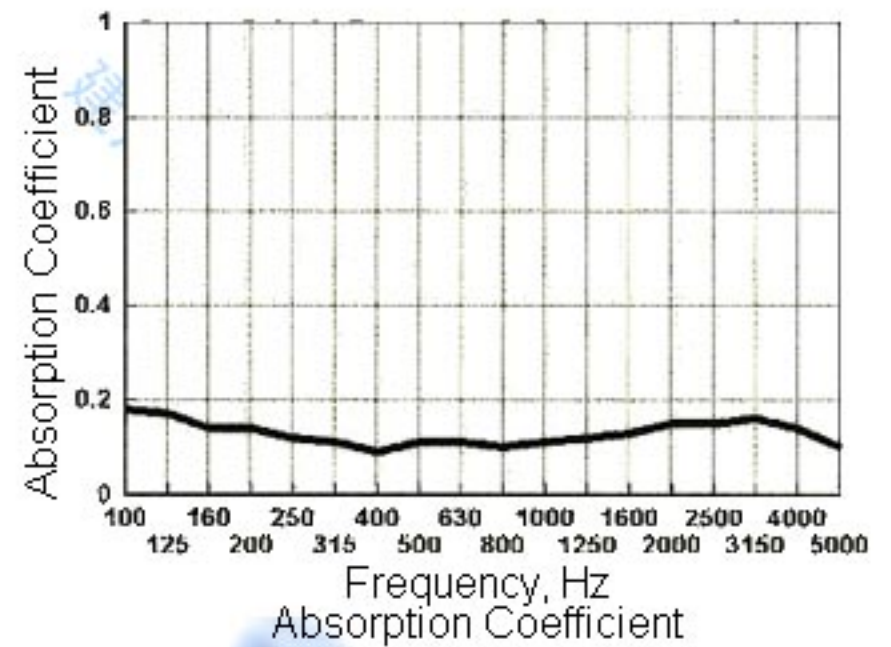
Waveform Bicubic

Performance Specifications



Aperiodic Modulation of a single Asymmetric Base Shape

RPG's patented Aperiodic Modulation of a Single Asymmetric Base Shape allows the creation of wide area coverage seamlessly with a single asymmetric base (top), thus minimizing periodicity effects. This is possible, because the asymmetric central shape, determined by the architect or acoustician, morphs to identical sides, which have a zero gradient, allowing adjacent tiles to seamlessly transition without discontinuity in any orientation (middle) forming a larger aperiodic array (bottom 4x4 array). Thus, with an optimized aperiodic array, canopy performance can finally be mathematically determined and evaluated. The performance of the aperiodic array is similar to that of one of the acoustically optimized canopy elements.



Aperiodic Modulation of an Asymmetric Base Shape

Installation

The Waveform Bicubic can be used as an overhead canopy and also in a wall mounting. Overhead mounting is accomplished by bolting adjacent modules together and suspending from integral hairpin hanging loops with supplied engineered cables. Wall mounting is accomplished by attaching through the sides into cleats mounted to the substrate.

