

# Formedffusor™



*The First Low Cost Thermoformed QRD® Diffusor  
From The Acoustical Industry's Leading Innovator*

Since its introduction in 1984, the number theoretic QRD® 734 Diffusor has proven to be a versatile general purpose diffusor. Its uniform scattering, wide bandwidth, and broad selection of finishes make it a logical choice for almost any speech, critical listening, or performance facility. The Formedffusor™ brings this proven technology to a wider audience because of its low price, ease of installation, Class A fire rating, light weight, impact resistance, and color and texture options.



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# Problem and Solution

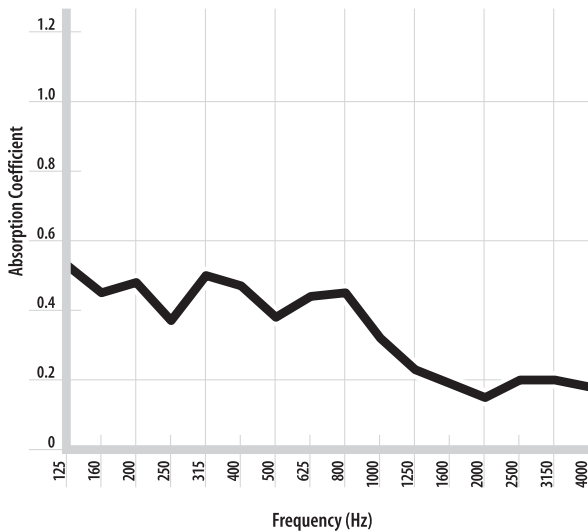
## Problem

Furniture grade QRD® diffusers may be too heavy for some ceiling applications or too expensive for large scale coverage. There is a need for a lightweight, Class A, cost effective, plastic QRD®.

## Solution

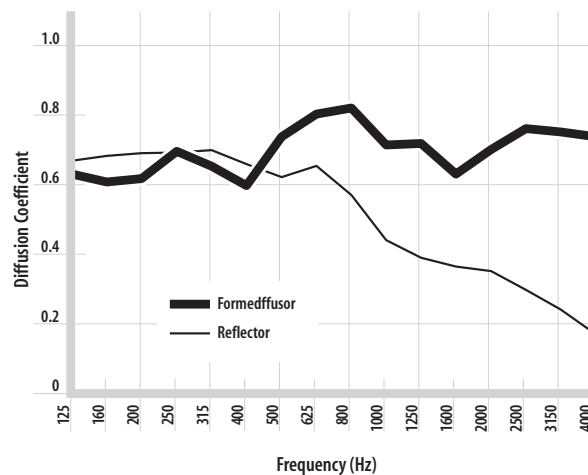
To address this problem, RPG® developed a lightweight, thermoformed panel made of Class A Kydex®. The diffuser has graceful curved inner and outer radii for an attractive appearance. Kydex® is stiff and impact resistant allowing the Formedffusor™ to be used in almost any wall or ceiling application.

# Performance Specifications



## Absorption

The Formedffusor™ is designed to offer wide angle, broad bandwidth sound diffusion as well as useful low frequency absorption. These features control excessive boominess and balance the room's reverberation response. The Formedffusor™ can be used to offset the usually predominate high frequency absorption of people, drapery, rugs, and porous materials.



## Diffusion

The Formedffusor™ is based on the QRD® reflection phase grating introduced by RPG® in 1983. It offers broad bandwidth wide angle diffusion. The graph illustrates the average diffusion coefficient (1 is ideal) for all angles of incidence. Compared to a flat reflecting panel, the QRD® maintains uniform diffusivity as a function of frequency above the diffraction limit.

## FEATURES

- QRD® number theory sound diffusion
- Lightweight thermoformed fabrication
- Low frequency diaphragmatic absorption
- Custom colors and textures
- Can be oriented to provide one or two dimensional diffusion in the far field
- Panels nest into one another

## BENEFITS

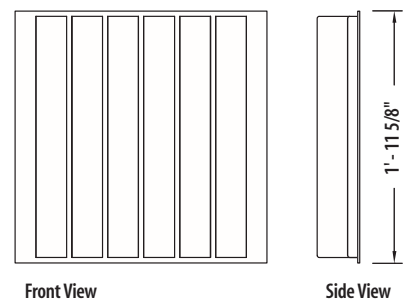
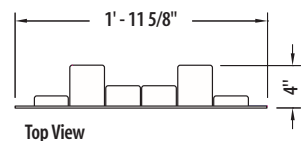
- Low frequency absorption can be used to control boominess in small rooms, while also providing uniform sound diffusion
- Thermoformed panels are designed to nest for lower shipping costs
- Diffusers can be aligned linearly for diffusion in the direction perpendicular to the well direction or rotated 90° forming an alternating pattern to provide omnidirectional scattering
- 2' x 2' size offers more flexibility and higher diffusion performance than larger periodic 4' x 4' formats with a smaller repeat unit
- The Formedffusor™s light weight makes handling and installation simple

## APPLICATIONS

Music education facilities, Recording studios, Broadcast studios, Rehearsal rooms, Classrooms, Auditoriums, Worship spaces, Cinemas, Performing arts centers

## SPECIFICATIONS

- Size: 23-5/8" (H) x 23-5/8" (W) x 4" (D)
- Shipping Weight: 5 lbs.
- Standard finish: white
- Custom colors and textures are available
- Class A Fire Rated



# Installation

The Formedffusor™ can be wall mounted or suspended in a T-bar grid. Panels can be aligned to form a one dimensional diffuser array or staggered 90° for a two dimensional diffuser array.



## Standard Unit Construction

Thermoformed fire retardant acrylic PVC  
2' height x 2' width nominal (1' 11-5/8" x 1' 11-5/8") x 4" deep  
White

## Product Options\*, \*\*

*Color Selection*  
White  
Custom Selection

## Option Sheet

### *Note:*

*All dimensions are allowed a tolerance of  $\pm 1/16$ " due to material shrinkage and variations.*

*\* Most options merit an increase or, in some cases, a decrease in pricing compared to the standard unit.*

*\*\* Due to material availability, RPG® reserves the right to change options at any time. Therefore, any special options—whether listed or not—must be confirmed prior to submittal of P.O. and acceptance verified by RPG® Diffusor Systems, Inc.*



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## Thermoformed Quadratic Residue Diffusor

## CSI Specifications

- A** The Thermoformed Quadratic Residue Diffusor shall be the model Formedffusor™ as manufactured by RPG® Diffusor Systems, Inc., Upper Marlboro, MD 20774. Tel: 301-249-0044, Fax: 301-249-3912.
- B** The Thermoformed Quadratic Residue Diffusor shall be fabricated from fire retardant acrylic PVC.
- C** The Thermoformed Quadratic Residue Diffusor shall work on the one dimensional reflection phase grating principle, using an array of wells of equal width separated by thin dividers. The depths of the wells shall be based on the prime seven quadratic residue theory sequence.
- D** Sound diffusion in the horizontal plane shall be provided by wells in the vertical position while diffusion in the vertical plane shall be provided by wells in the horizontal position. The Thermoformed Quadratic Residue Diffusor may be rotated to achieve a variety of patterns that will provide a highly effective scattering surface.
- E** Absorption Coefficients and Noise Reduction Coefficient for the product shall be measured by an independent, accredited NVLAP facility according to the test methods as defined by ASTM C 423 and ASTM E 795. Random incidence Absorption Coefficients for the product in an E-400 mounting shall be as follows:

125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	NRC
0.53	0.37	0.38	0.32	0.15	0.18	0.30

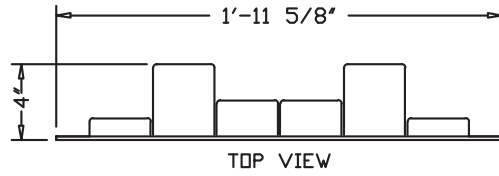
- F** Diffusion Coefficients for the product shall be measured in accordance with the recommendations of the Audio Engineering Society Working Group SC-04-02 boundary measurement technique. The directional diffusion coefficient is given by the standard deviation of the 1/3-octave polar response, for a given angle of incidence, and normalized by the response of a flat panel of similar size. The average incidence diffusion coefficients determined at 5° intervals between ± 85° are listed below at octave-band centers. The mean and standard deviation (SD) of the 1/3-octave-band coefficients are also tabulated.

125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	Mean	SD
0.71	0.73	0.88	0.80	0.69	0.56	0.72	0.10

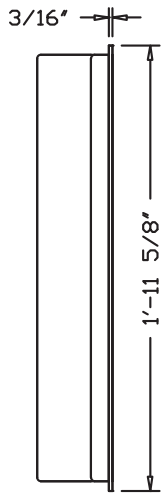
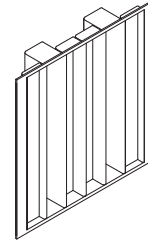
- G** Flame Spread and Smoke Developed shall be tested by an independent, accredited NVLAP facility according to the test methods as defined by ASTM E 84 and NFPA 255. The Thermoformed Quadratic Residue Diffusor shall have a composite Flame Spread Rating of less than 25 and a Smoke Development of less than 450.
- H** The Thermoformed Quadratic Residue Diffusor shall be supplied in a matte white finish.
- I** The overall dimensions shall be 23-5/8"(H) x 23-5/8"(W) x 4"(D) and weigh no more than 4 pounds.



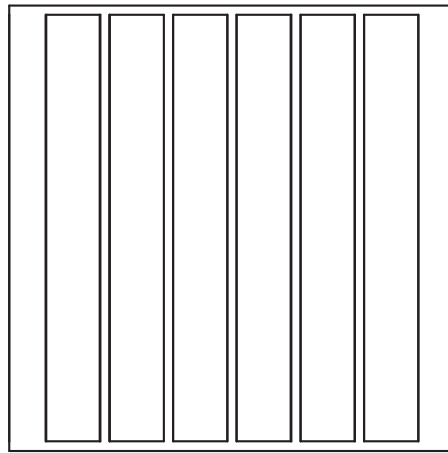
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2'x2' Cutsheet



LEFT SIDE



FRONT VIEW

**Project:**

**Specifier:**

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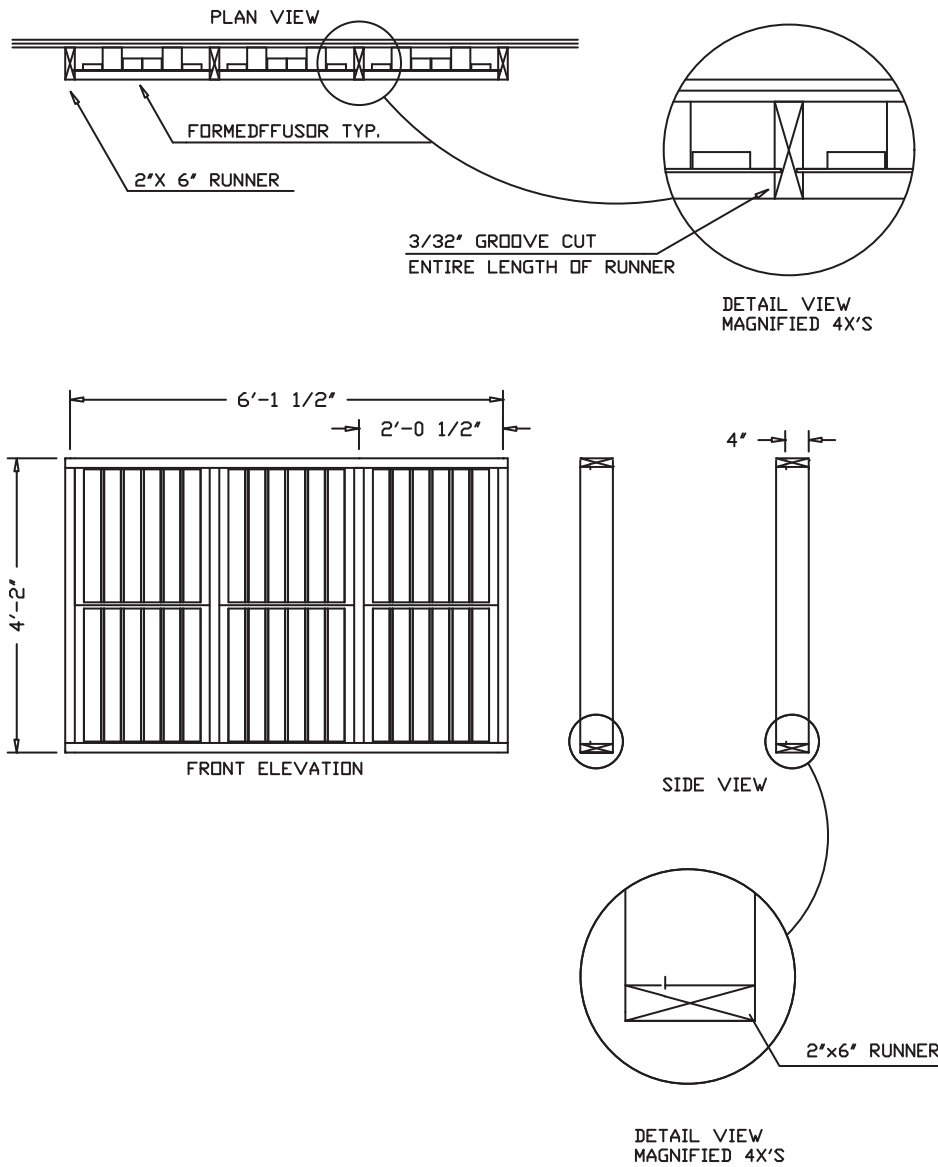
**Date:**

Tolerance:  $\pm 1/16"$



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**Wall Mount**

**Project:**

**Specifier:**

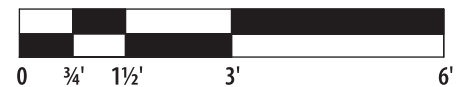
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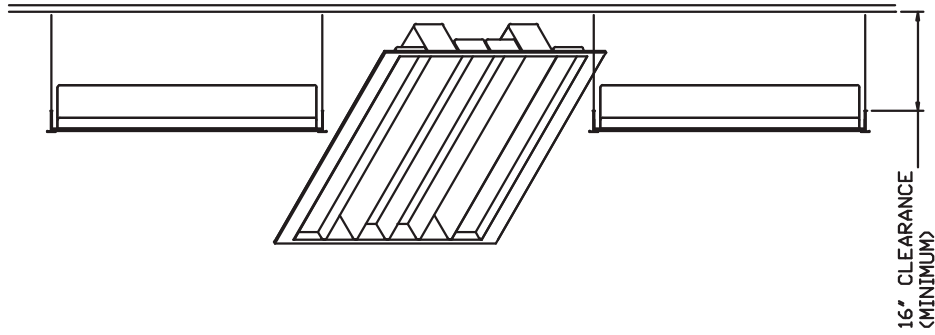
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*All dimensions should be field verified prior to installation.*

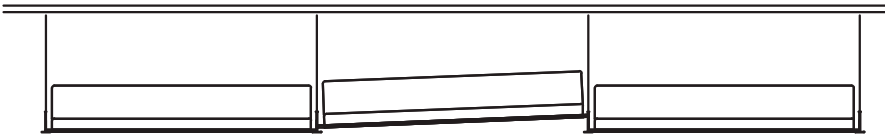
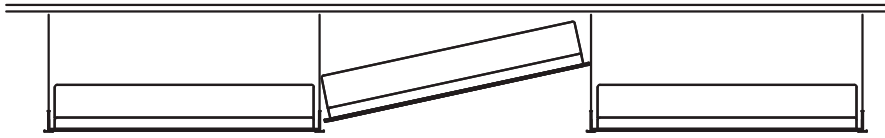


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*T-Bar Tilt and Drop*



**Project:** \_\_\_\_\_

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*All dimensions should be field verified prior to installation.*

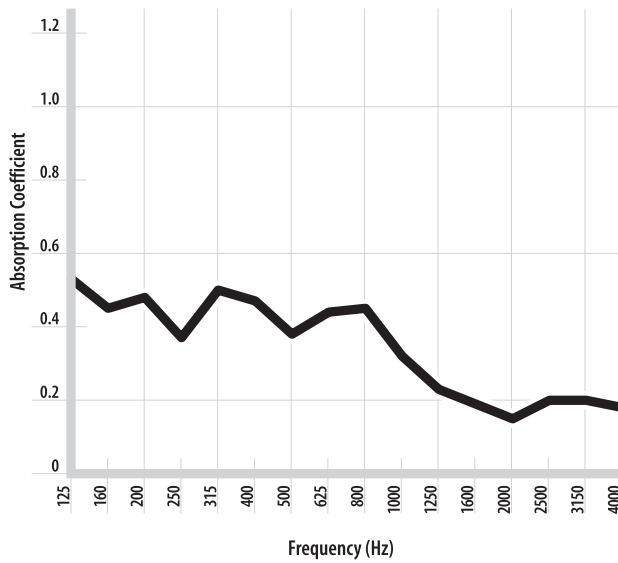


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## Absorption Coefficients

Measured According to ASTM C423 at Riverbank  
Acoustical Laboratories (RAL-A91-369).

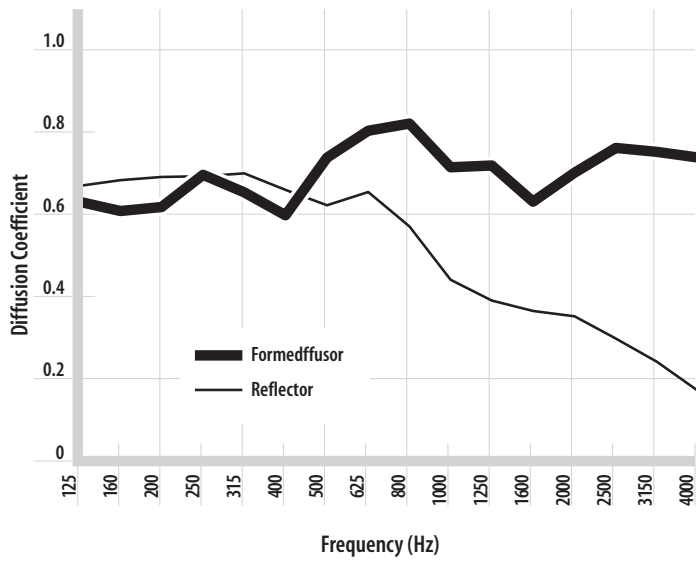


Hz	Absorption Coefficient
125	0.53
160	0.45
200	0.48
250	0.37
315	0.50
400	0.47
500	0.38
630	0.44
800	0.45
1000	0.32
1250	0.23
1600	0.19
2000	0.15
2500	0.20
3150	0.20
4000	0.18



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## Diffusion Coefficients



Hz	Formedffusor™	Reflector
125	0.71	0.67
160	0.71	0.66
200	0.73	0.68
250	0.73	0.70
315	0.64	0.70
400	0.77	0.68
500	0.88	0.70
625	0.83	0.68
800	0.81	0.64
1000	0.80	0.59
1250	0.70	0.47
1600	0.69	0.42
2000	0.69	0.42
2500	0.68	0.41
3150	0.62	0.35
4000	0.56	0.31



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