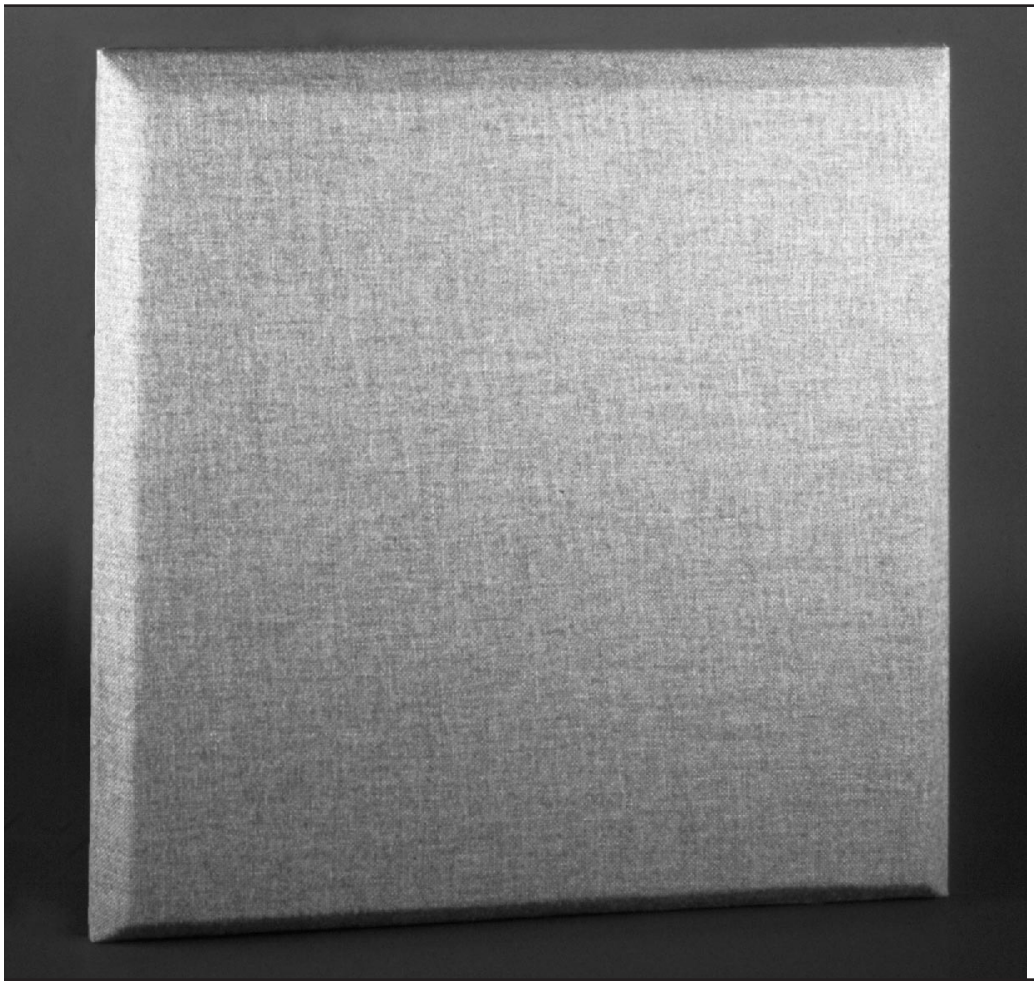
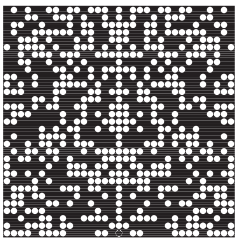
# BAD™ Panel





*The First Thin, Flat Sound Diffsorbor From The Acoustical Industry's Leading Innovator*

Well balanced acoustical designs contain an appropriate combination of absorption, reflection, and diffusion. In many applications, however, limited budget or surface treatment thickness preclude the use of diffusion. Absorptive, fabric wrapped panels are specified for lack of an alternative. Unfortunately, wide area application may lead to an acoustically "dead" environment without "air" or ambiance. To solve this problem, RPG® developed the Binary Amplitude Diffsorbor™: the first flat, zero depth diffusing absorber. A BAD™ Panel simultaneously provides uniform sound diffusion at high and mid band frequencies and crosses over to pure absorption below the diffusive cutoff. The energy that is not diffused is absorbed.

RPG®

*The **Sound** of **Innovation***

651-C Commerce Drive, Upper Marlboro, MD, 20774, Phone: 301.249.0044, Fax: 301.249.3912, Email: info@rpginc.com, Internet: www.rpginc.com

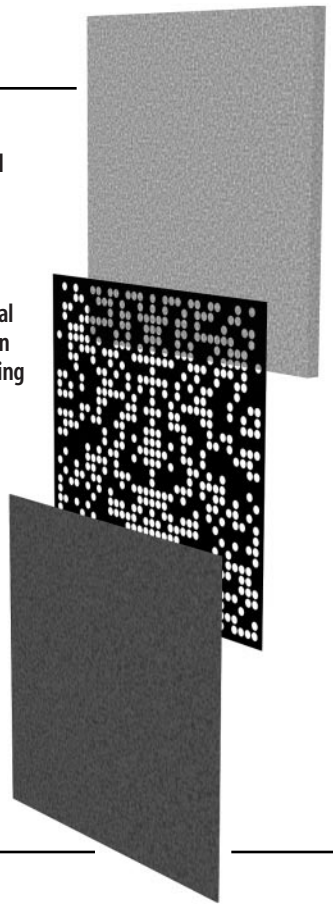
# Problem and Solution

**Problem**

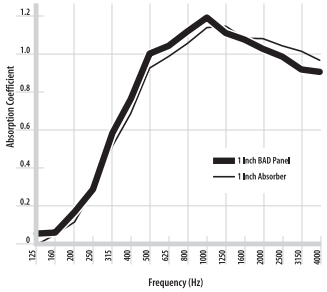
Traditional fabric wrapped panels offer a cost effective, low profile aesthetic approach to providing reflection and reverberation control. However, these panels offer little sound diffusion and large area application may lead to an acoustically "dead" space. Variable impedance arrays offer some help, but cannot provide diffusion at mid and high frequencies.

**Solution**

RPG® developed an innovative variable impedance panel by fabric wrapping a resorptive binary template consisting of reflective areas and holes over a semi-rigid fiberglass panel. The resulting Binary Amplitude Diffsorbor™ Panel provides mid and high frequency diffusion and low frequency absorption.

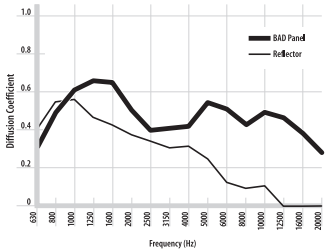



# Performance Specifications



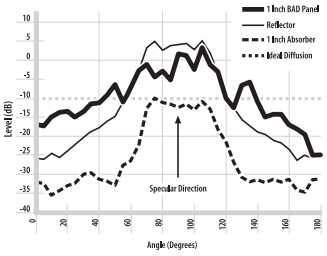

**Absorption**

The graph illustrates how the BAD™ Panel offers a modest increase in bass absorption over a standard upholstered 1" panel below 1000 Hz, and a decreased absorption above this frequency. The binary template allows the sound above 1000 Hz to be uniformly diffused providing reflection control without destroying the room's ambiance.




**Diffusion**

The performance of a scattering surface is characterized by the diffusion coefficient, which is the standard deviation of the 1/3 octave angular response, shown above at 12.5 kHz. The graph illustrates how uniformly the BAD™ Panel scatters sound across the frequency spectrum, compared to a reflective panel, for normal incidence.




**Angular Scattering Response**

For normally incident sound, the graph illustrates the angular response at 12.5 kHz. The flat reflector scatters sound primarily into the 90° specular direction. The wall mounted absorptive panel has similar response, only attenuated. The BAD™ Panel decreases specular scattering and more closely approaches the uniform ideal diffusion line.

# Installation

Installation of the BAD™ Panel is quick and easy. Simply use construction adhesive, hook and loop fasteners, or supplied impaling clips to mount to walls or ceiling. The BAD™ Panel can also be used in any T-bar or similar mounting system.

## FEATURES

- *Simultaneous diffusive and absorptive sound control in a thin, decorative, cost effective panel*
- *Optimal binary reflection amplitude grating containing resorptive elements*
- *Acoustical functionality concealed with decorative upholstered fabrics or commercial stretch fabric systems*

## BENEFITS

- *When space is limited, provides sound diffusion in a shallow depth flat panel*
- *Simultaneously offers diffusion and absorption for an integrated design*
- *Reflections can be diffsorptively attenuated without creating a "dead" space*
- *Extends the performance of absorptive fabric wrapped panels and stretch fabric systems at competitive prices*
- *Can be used for wide area coverage without excessive absorption*
- *Can be used to provide acoustic gain in conference rooms, classrooms, and auditoriums to improve speech intelligibility and reduce fatigue*
- *Diffsorptive surfaces provide greater sound coverage for speech and music*
- *Suitable as stretch fabric core material*

## APPLICATIONS

*Conference rooms, Classrooms, Teleconference and Distance Learning Centers, Recording and Broadcast Studios, A/V rooms, Cinemas and Home Theaters, Financial Exchanges, Music Rehearsal Rooms, and Auditoriums.*

## SPECIFICATIONS

- *Panel dimensions must be a multiple of 2', e.g. 2' x 2', 2' x 4', 4' x 4', etc.*
- *Weight: 2' x 2' x 1" is 2.5 lbs*
- *Thickness: 1", 2", and custom*
- *Standard fabric: Guilford of Maine FR701 #298*
- *Custom fabrics available*
- *Edge conditions:*


# BAD™ Panel

**Standard Unit Construction**

2' height x 2' width nominal (1' 11-5/8" x 1' 11-5/8") x 1" deep
Guilford of Maine FR701 #298 Fabric
6 lb. density fiberglass
Binary Amplitude Diffsorbor™ Template
Flat edges

**Product Options*, ****

*Fabric Selection*
Any acoustically transparent fabric approved by RPG® Diffusor Systems, Inc.

*Unit Size*
Minimum size of units is 24" x 16"
Units can be made with any height up to 8'
Units can be made with any width up to 4'
Units can be made with depths between 1" and 6"

*Edge Conditions*
Units can be made with flat, beveled, angled, or radius cut edges

***Option Sheet***

*Note:*

*All dimensions are allowed a tolerance of ± 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.*

RPG®

*The **Sound** of **Innovation***

651-C Commerce Drive, Upper Marlboro, MD, 20774, Phone: 301.249.0044, Fax: 301.249.3912, Email: info@rpginc.com, Internet: www.rpginc.com

# BAD™ Panel

**Fabric Wrapped Acoustical Panel**

***CSI Specifications***

**A** The Fabric Wrapped Acoustical Panel shall be the BAD™ Panel as manufactured by RPG® Diffusor Systems, Inc., Upper Marlboro, MD 20774. Tel: 301-249-0044, Fax: 301-249-3912.

**B** The Fabric Wrapped Acoustical Panel shall be fabricated from molded fiberglass cores covered with a rigid template. Edges shall be square and plum to within a tolerance of 1/16". The Fabric Wrapped Acoustical Panel shall be of the thickness and sizes indicated on the drawings.

**C** Fiberglass cores shall have a minimum density of not less than 6lbs/ft³ (or specify other desired density).

**D** Provide mechanical clip mounting system (or specify other desired mounting such as construction adhesive or hook and loop fasteners) as per manufacturer's recommendations.

**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 a 1" thick, 6lbs/ft³ density product in an Type A mounting shall be as follows:

| 125Hz | 250Hz | 500Hz | 1000Hz | 2000Hz | 4000Hz | NRC |
|---|---|---|---|---|---|---|
| 0.07 | 0.30 | 1.00 | 1.19 | 1.03 | 0.91 | 0.80 |

**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.

| 1000Hz | 2000Hz | 4000Hz | 8000Hz | 16000Hz | Mean | SD |
|---|---|---|---|---|---|---|
| 0.61 | 0.51 | 0.42 | 0.43 | 0.38 | 0.47 | 0.09 |

**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 BAD™ Panel shall have a composite Flame Spread Rating of less than 25 and a Smoke Development of less than 450.

**H** The Fabric Wrapped Acoustical Panel shall be supplied in a Guilford of Maine FR701 fabric, color to be as specified.

**I** The overall dimensions shall be 1' 11-5/8"(H) x 1' 11-5/8"(W) x 1"(D) (specify other dimensions if desired) and weigh no more than 4 pounds.

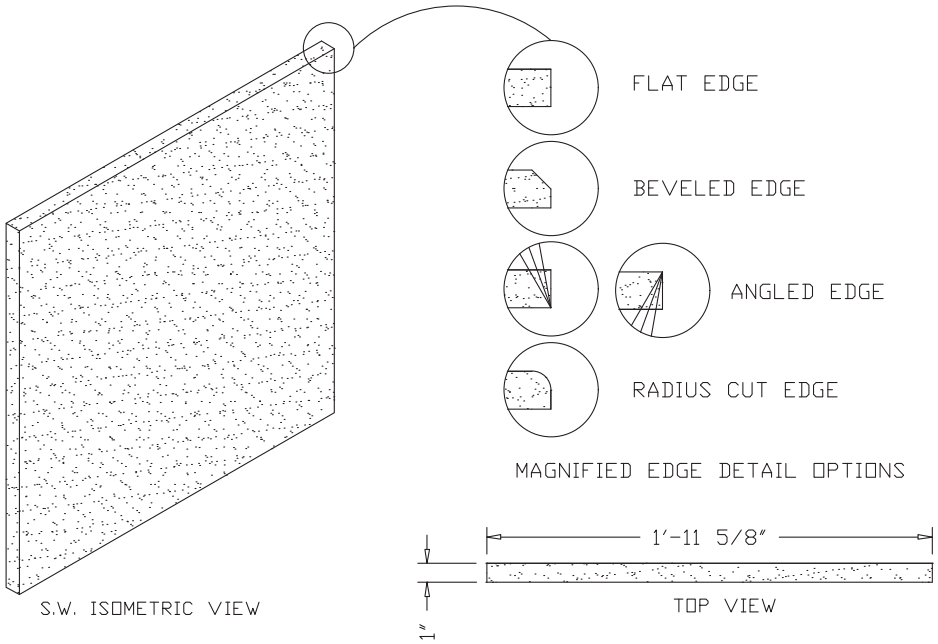
RPG®

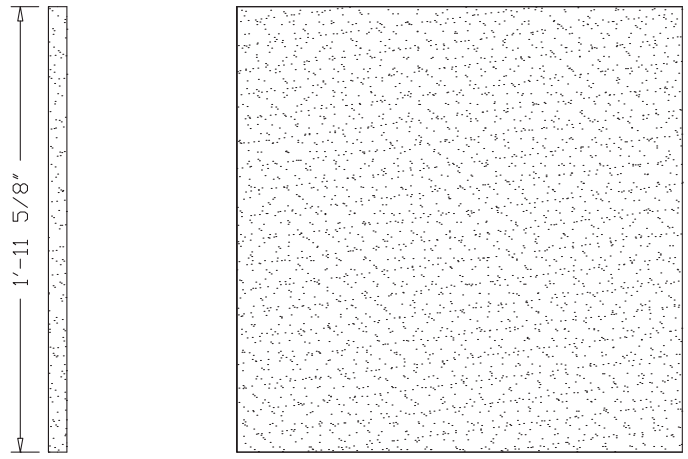
*The **Sound** of **Innovation***

651-C Commerce Drive, Upper Marlboro, MD, 20774, Phone: 301.249.0044, Fax: 301.249.3912, Email: info@rpginc.com, Internet: www.rpginc.com

# BAD™ Panel

***2' x 2' Cutsheet***




***Project:***

***Specifier:***

***Drawing Number:***

***Date:***

*Tolerance: ± 1/16"*

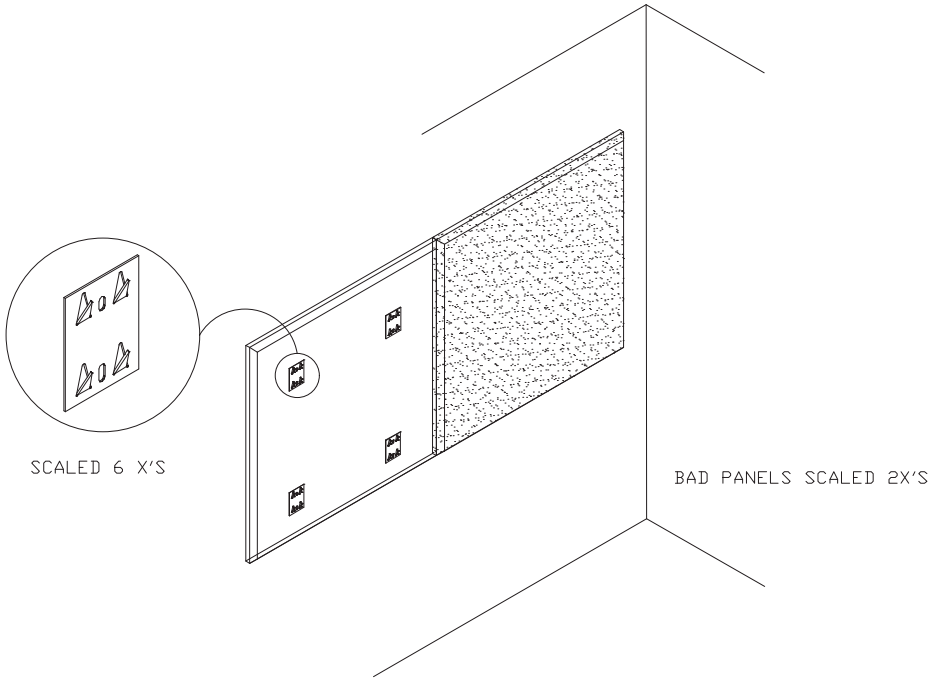

RPG®

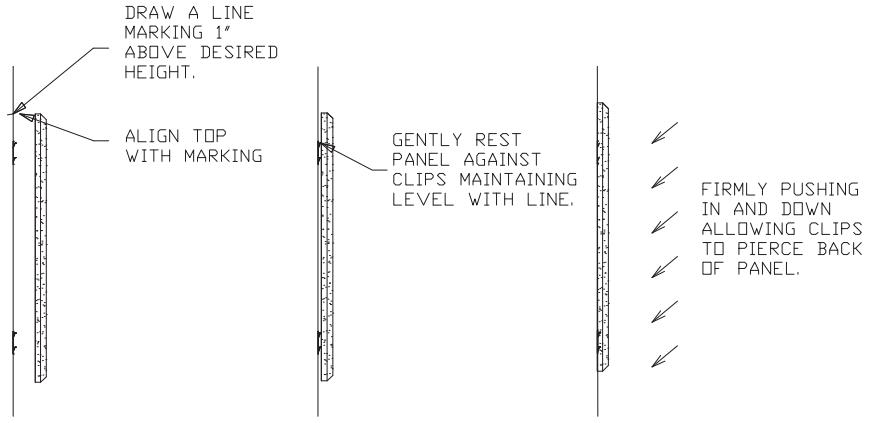
*The **Sound** of **Innovation***

651-C Commerce Drive, Upper Marlboro, MD, 20774, Phone: 301.249.0044, Fax: 301.249.3912, Email: info@rpginc.com, Internet: www.rpginc.com

# BAD™ Panel

***Surface Mount***




***Project:***

***Specifier:***

***Drawing Number:***

***Date:***

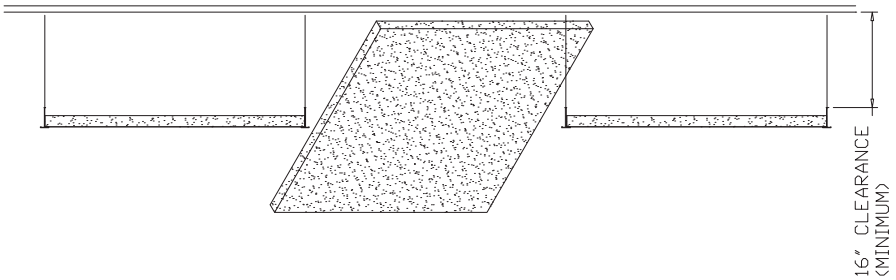
*All dimensions should be field verified prior to installation.*


RPG®

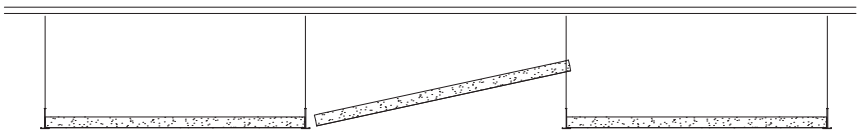
*The **Sound** of **Innovation***

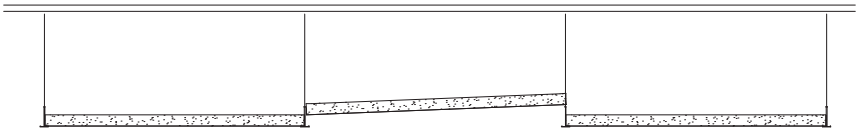
651-C Commerce Drive, Upper Marlboro, MD, 20774, Phone: 301.249.0044, Fax: 301.249.3912, Email: info@rpginc.com, Internet: www.rpginc.com

# BAD™ Panel




***T-Bar Tilt and Drop***





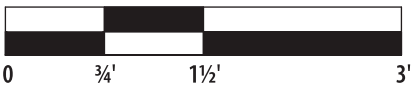
***Project:***

***Specifier:***

***Drawing Number:***

***Date:***

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

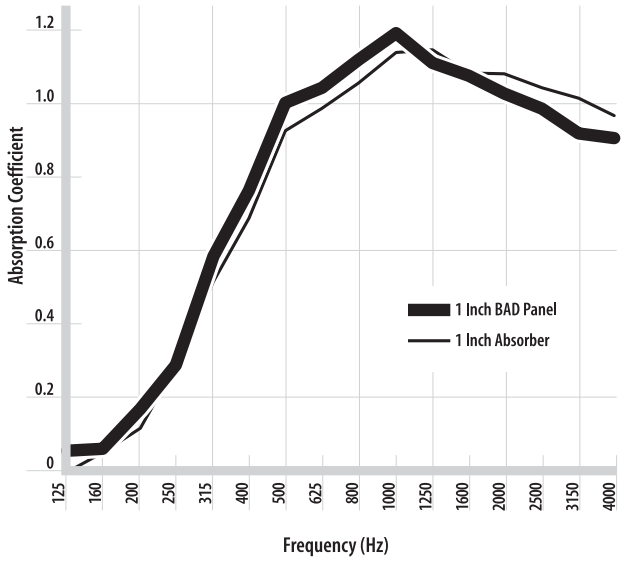



*The **Sound** of **Innovation***

651-C Commerce Drive, Upper Marlboro, MD, 20774, Phone: 301.249.0044, Fax: 301.249.3912, Email: info@rpginc.com, Internet: www.rpginc.com

# BAD™ Panel

***Absorption Coefficients***




| Hz | Absorption Coefficient |
|---|---|
| 125 | 0.07 |
| 160 | 0.07 |
| 200 | 0.18 |
| 250 | 0.30 |
| 315 | 0.59 |
| 400 | 0.77 |
| 500 | 1.00 |
| 625 | 1.04 |
| 800 | 1.12 |
| 1000 | 1.19 |
| 1250 | 1.11 |
| 1600 | 1.08 |
| 2000 | 1.03 |
| 2500 | 0.99 |
| 3150 | 0.92 |
| 4000 | 0.91 |

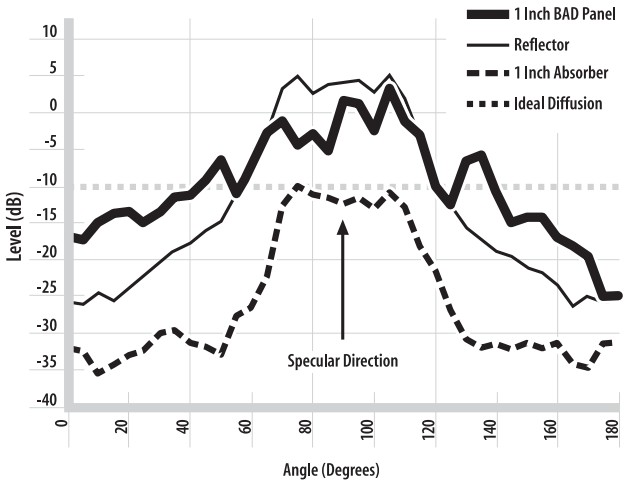
RPG®

*The **Sound** of **Innovation***

651-C Commerce Drive, Upper Marlboro, MD, 20774, Phone: 301.249.0044, Fax: 301.249.3912, Email: info@rpginc.com, Internet: www.rpginc.com

# BAD™ Panel

***Angular Scattering Response***




| | Level (db) | | |
|---|---|---|---|
| Angle | BAD™ Panel | Reflector | 1 Inch Absorber |
| 0 | -17.13 | -26.05 | -31.83 |
| 5 | -17.37 | -26.14 | -32.33 |
| 10 | -14.76 | -24.56 | -35.52 |
| 15 | -13.75 | -25.63 | -34.31 |
| 20 | -13.47 | -23.68 | -33.00 |
| 25 | -14.55 | -22.23 | -32.45 |
| 30 | -13.13 | -20.45 | -29.91 |
| 35 | -11.07 | -18.81 | -29.63 |
| 40 | -11.28 | -17.79 | -31.65 |
| 45 | -9.24 | -16.12 | -31.89 |
| 50 | -6.46 | -14.85 | -32.97 |
| 55 | -10.90 | -11.08 | -27.69 |
| 60 | -9.00 | -7.31 | -26.82 |
| 65 | -2.75 | -1.99 | -22.32 |
| 70 | -1.15 | 3.20 | -12.70 |
| 75 | -4.46 | 4.91 | -9.94 |
| 80 | -2.89 | 2.56 | -11.25 |
| 85 | -5.25 | 3.77 | -11.61 |
| 90 | 1.59 | 4.04 | -12.43 |
| 95 | 1.17 | 4.36 | -11.62 |
| 100 | -2.76 | 2.74 | -12.88 |
| 105 | 3.25 | 5.05 | -10.89 |
| 110 | -1.24 | 1.86 | -12.82 |
| 115 | -3.38 | -3.09 | -18.04 |
| 120 | -9.68 | -7.98 | -21.47 |
| 125 | -12.17 | -12.58 | -26.90 |
| 130 | -6.63 | -15.37 | -30.83 |
| 135 | -5.80 | -17.42 | -32.04 |
| 140 | -10.75 | -18.93 | -31.77 |
| 145 | -15.24 | -19.61 | -32.22 |
| 150 | -14.28 | -20.81 | -31.38 |
| 155 | -14.28 | -21.82 | -32.09 |
| 160 | -17.17 | -23.52 | -31.64 |
| 165 | -18.19 | -26.37 | -34.23 |
| 170 | -19.63 | -25.26 | -34.72 |
| 175 | -25.01 | -25.88 | -31.46 |
| 180 | -25.08 | -25.87 | -31.55 |

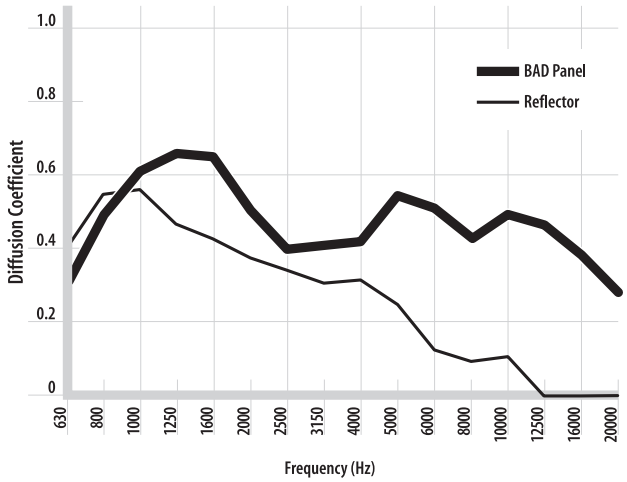
RPG®

*The **Sound** of **Innovation***

651-C Commerce Drive, Upper Marlboro, MD, 20774, Phone: 301.249.0044, Fax: 301.249.3912, Email: info@rpginc.com, Internet: www.rpginc.com

# BAD™ Panel

***Diffusion Coefficients***




| Hz | BAD™ Panel | Reflector |
|---|---|---|
| 630 | 0.31 | 0.40 |
| 800 | 0.49 | 0.55 |
| 1000 | 0.61 | 0.56 |
| 1250 | 0.66 | 0.47 |
| 1600 | 0.65 | 0.43 |
| 2000 | 0.51 | 0.37 |
| 2500 | 0.40 | 0.34 |
| 3150 | 0.41 | 0.31 |
| 4000 | 0.42 | 0.31 |
| 5000 | 0.55 | 0.25 |
| 6300 | 0.52 | 0.12 |
| 8000 | 0.43 | 0.09 |
| 10000 | 0.49 | 0.11 |
| 12500 | 0.47 | 0.00 |
| 16000 | 0.38 | 0.00 |
| 20000 | 0.28 | 0.00 |

RPG®

*The **Sound** of **Innovation***

651-C Commerce Drive, Upper Marlboro, MD, 20774, Phone: 301.249.0044, Fax: 301.249.3912, Email: info@rpginc.com, Internet: www.rpginc.com