

# FlutterFree®



*The First Acoustical Hardwood Molding  
From The Industry's Leading Innovator*

Absorptive fabric wrapped panels are the traditional treatment for flutter echoes which are caused by repetitive reflections between hard parallel walls. While absorption reduces flutter echoes, it also produces an acoustically "dead" space. The resulting lack of ambiance makes the room seem psychoacoustically smaller and reduces the support of acoustic speech levels which makes conversation difficult. FlutterFree® is a handsome, furniture grade, acoustical hardwood molding that provides flutter echo control as well as bass absorption. Its application converts small rooms with flat parallel surfaces into functional spaces with good speech intelligibility, sound quality, and a natural, comfortable ambiance. It expands the designer's flutter control finish treatment options beyond fabric upholstered surfaces.



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# Problem and Solution

## Problem

Repetitive reflections from hard parallel surfaces produce flutter echoes that are perceived as timbre coloration and degrade sound quality and speech intelligibility. Absorptive surfaces are often used to control this annoying problem, with the unfortunate side effect of making the room too “dead”.

## Solution

FlutterFree® is the first diffusive acoustical hardwood molding that controls flutter echo by diffusion, maintaining the natural ambiance of the room.

When adjacent panels are spaced and mounted with an air cavity, low frequency absorption can also be achieved.



## FEATURES

- Furniture grade, hardwood, sound diffusing acoustical molding
- Low frequency absorption mounting option
- FlutterFree® works on the 1D QRD® reflection phase grating principle
- Modular extruded diffusive strips

## BENEFITS

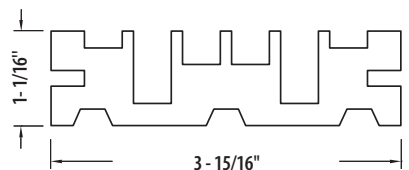
- Handsome furniture grade hardwood finish offers specifiers a new approach to flutter echo control that does not rely on the use of fabric upholstered fiberglass panels
- Offers an almost unlimited variety of lacquered, stained, or painted finishes and hardwood options
- Diffusive flutter control minimizes flutter echoes without making the space acoustically “dead”
- Diffusive flutter control provides an ambient environment to support speech in conference rooms for less fatigue, greater coverage, and high speech intelligibility
- Mounting FlutterFree® over an air cavity provides low frequency absorption to minimize boominess and lack of definition in small rooms

## APPLICATIONS

Conference and teleconference rooms, Public spaces, Listening rooms, Recording and broadcast studios, Post production studios, Home theaters, Distance learning centers, Rehearsal rooms, Auditoriums, Performance spaces

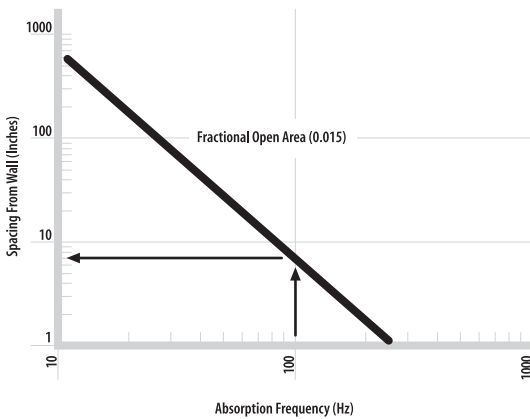
## SPECIFICATIONS

- Size: 47-1/4" (L) x 3-15/16" (W) x 1-1/16" (D)
- Custom lengths are available up to 8'
- Weight: 1 lb/ft
- Finishing: FlutterFree® can be supplied unfinished, clear lacquered, stained and lacquered, and painted.
- When field finishing, all exposed surfaces, including the cut end surfaces, should be treated to minimize warping



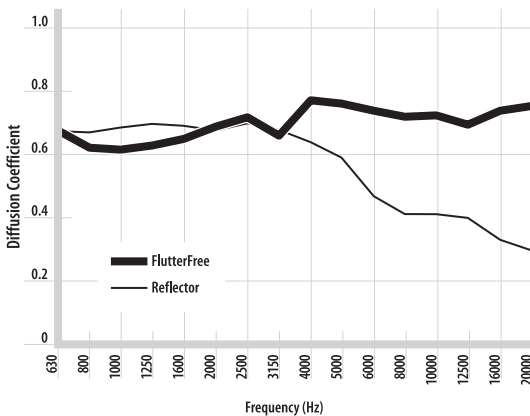
FlutterFree® Top View

# Performance Specifications



## Absorption

When FlutterFree® panels are mounted 1/16" apart, the graph can be used to determine the spacing from the mounting wall for the desired absorption frequency. For example, to achieve bass absorption at 100 Hz, follow the vertical 100 Hz frequency line until it intersects the leftward sloping fractional open area line. Follow the horizontal line to the 8" intersection point.



## Diffusion

The graph illustrates how FlutterFree® provides useful diffusion above the diffraction limit of roughly 3400 Hz compared to a flat reflective surface. The chart represents the mean diffusion coefficient, which is the normalized standard deviation of the 1/3 octave polar responses for angles of incidence between 0° and 90°.

# Installation

FlutterFree® is molded on a 5 head wood molder from hardwood that is kiln dried to 6-8% moisture content. RPG® takes every precaution to minimize warping by stress relieving the rear surface and treating all exposed surfaces on prefinished orders. FlutterFree® can either be nailed or glued directly to a wall surface or mounted with a rear air cavity for low frequency absorption. In this Helmholtz mounting, a semi rigid fiberglass panel is mounted 1/4" behind the FlutterFree®. To standardize and maintain the proper spacing, lamello biscuits are included. When used as wall panels, a hardwood frame—not supplied—is suggested.

## Standard Unit Construction

Milled, Soft White Maple  
Clear Coat  
1' height x 3-15/16" width x 1-1/16" deep

## Product Options\*, \*\*

### *Hardwood Selection*

Uniform White Birch  
Soft White Maple  
Red Oak  
White Oak  
White Ash  
Honduran Mahogany  
American Cherry  
Custom wood species (based on availability)

### *Finish Selection*

Unfinished  
Clear Coat only (satin lacquer finish)  
Stained and unfinished  
Stained and clear coat  
Painted

### *Unit Size*

Typical maximum length is 8 feet for most wood species. Longer lengths are available in some wood species for an additional cost.

## 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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## Wood One Dimensional Flutter Control Molding

## CSI Specifications

- A** The Wood One Dimensional Flutter Control Molding shall be the model FlutterFree® as manufactured by RPG® Diffusor Systems, Inc., Upper Marlboro, MD 20774. Tel: 301-249-0044, Fax: 301-249-3912.
- B** The Wood One Dimensional Flutter Control Molding shall be fabricated from solid hardwood birch (or select other suitable hardwood).
- C** The Wood One Dimensional Flutter Control Molding 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 for each nested diffusor shall be based on the prime seven quadratic residue theory sequence.
- D** Flutter control in the horizontal plane shall be provided by wells in the vertical position while flutter control in the vertical plane shall be provided by wells in the horizontal position. The Wood One Dimensional Flutter Control Molding 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
0.23	0.24	0.35	0.23	0.20	0.20	0.25

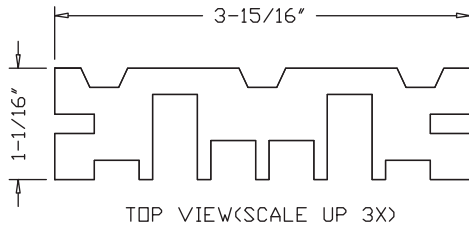
- F** Diffusion Coefficients for the product shall be measured in accordance with the recommendations of the Audio Engineering Society Working Group SC-04-02 boundary measurement technique. The directional diffusion coefficient is given by the standard deviation of the 1/3-octave polar response, for 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	0.68	0.77	0.72	0.73	0.69	0.06

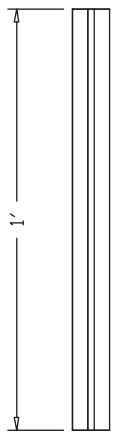
- G** Flame Spread and Smoke Developed shall be tested by an independent, accredited NVLAP facility according to the test methods as defined by ASTM E 84 and NFPA 255. If a Class A finish is required, the Wood One Dimensional Flutter Control Molding shall be finished with an intumescent coating to achieve a Flame Spread Rating of less than 25 and a Smoke Development of less than 450.
- H** The Wood One Dimensional Flutter Control Molding shall be supplied with a standard lacquered finish (or select other suitable finish).
- I** The overall dimensions shall be 1'(H) x 3-15/16"(W) x 1-1/16"(D) and weigh no more than 1 pound per linear foot.



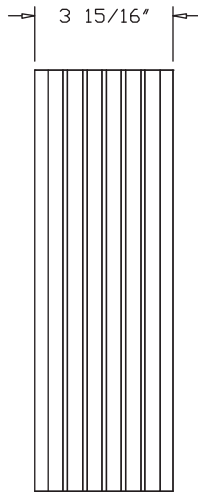
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**Cutsheet**



SIDE VIEW



FRONT VIEW

**Project:**

**Specifier:**

**Drawing Number:**

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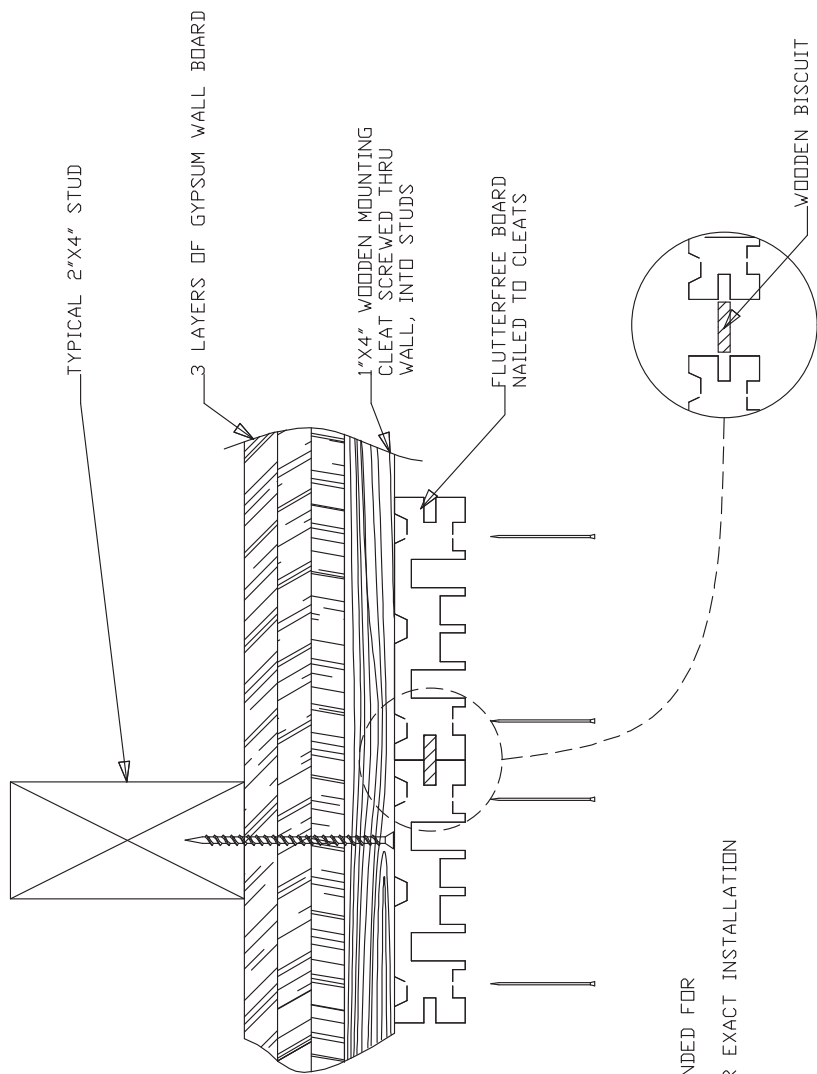
*Tolerance: ± 1/16"*



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## Flush Mount



- #1 PRE-DRILL THRU FLUTTERFREE INTO CLEAT TO AVOID SPLITTING.
- #2 NAIL THRU THE THICKEST PART OF THE FLUTTERFREE AS ILLUSTRATED
- #3 USE PUTTY TO FILL AFTER COUNTER-SINKING FINISHING NAILS

NOTE: THIS DRAWING IS INTENDED FOR GENERAL ILLUSTRATION ONLY. CONSULT SPECIFICATIONS FOR EXACT INSTALLATION

**Project:**

**Specifier:**

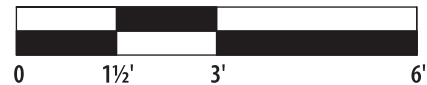
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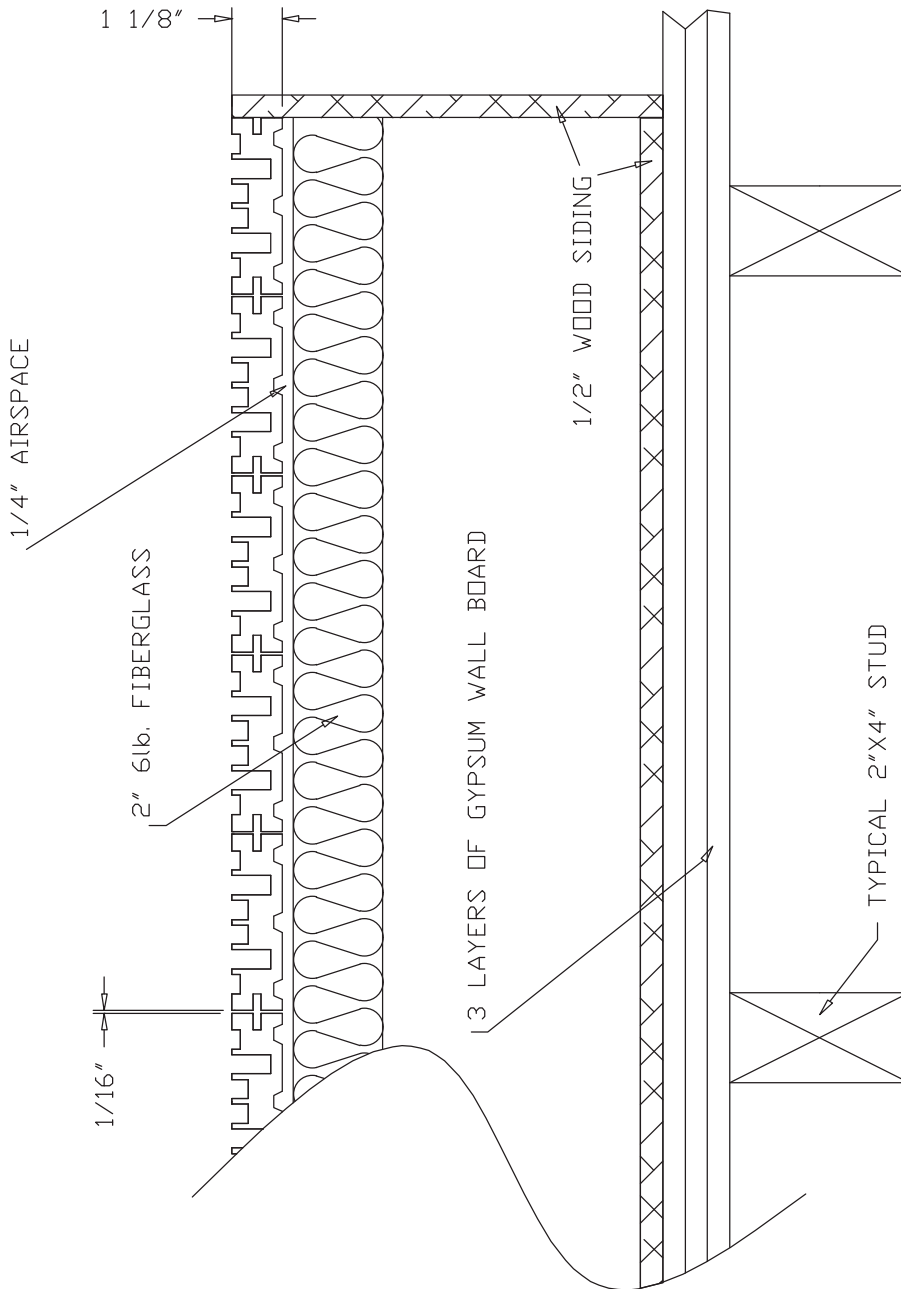
All dimensions should be field verified prior to installation.



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## Helmholtz Mount



**Project:**

**Specifier:**

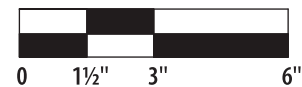
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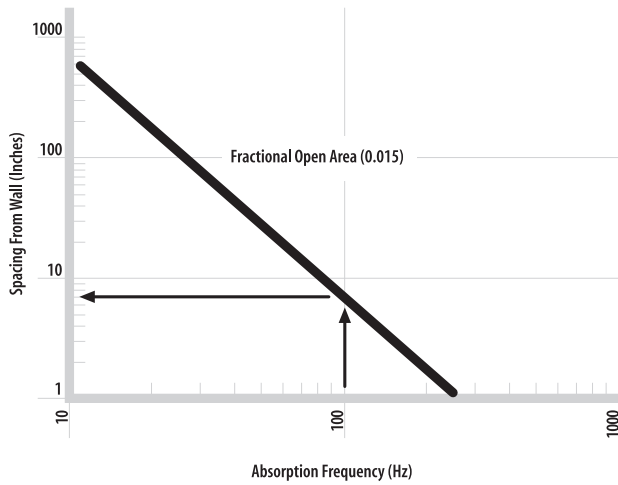
*All dimensions should be field verified prior to installation.*



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## Absorption Coefficients

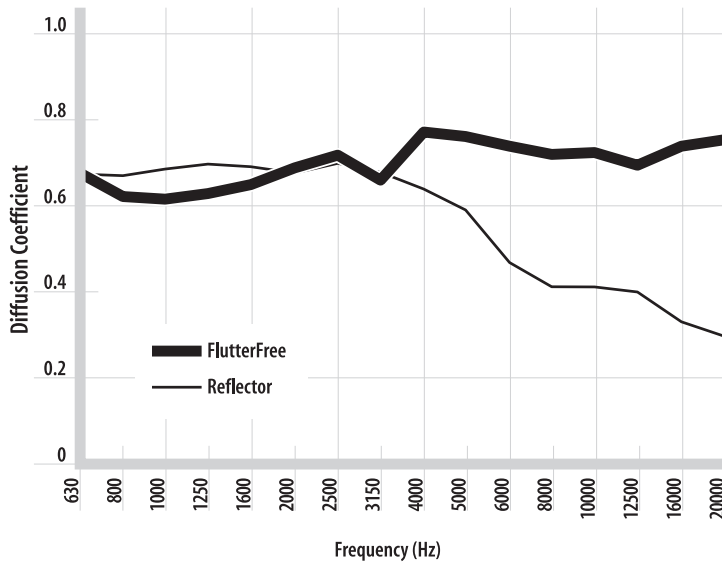


Hz	Inches
10	699.84
20	174.96
30	77.76
40	43.74
50	27.99
60	19.44
70	14.28
80	10.93
90	8.64
100	6.99
110	5.78
120	4.86
130	4.14
140	3.57
150	3.11
160	2.73
170	2.42
180	2.16
190	1.93
200	1.74
210	1.58
220	1.44
230	1.32
240	1.21
250	1.11



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## Diffusion Coefficients



Hz	FlutterFree®	Reflector
630	0.67	0.67
800	0.61	0.67
1000	0.61	0.68
1250	0.62	0.70
1600	0.64	0.69
2000	0.68	0.67
2500	0.72	0.70
3150	0.65	0.68
4000	0.77	0.63
5000	0.76	0.59
6300	0.74	0.46
8000	0.72	0.41
10000	0.72	0.41
12500	0.69	0.40
16000	0.73	0.33
20000	0.75	0.29



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