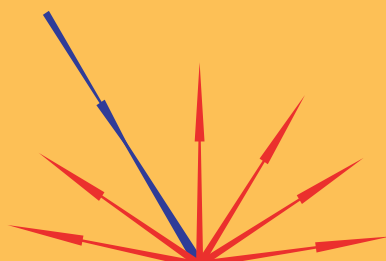


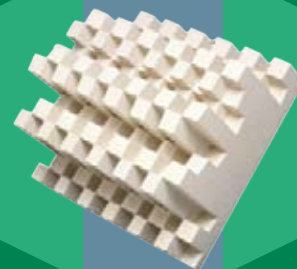
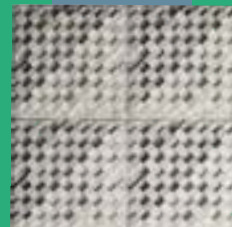


Acoustics First[®]

THE Art **DIFFUSOR**[®]
US PAT. 5160816



**The
Art Diffusor
Series**



Technical Data & Product Overview

www.artdiffusor.com

Toll Free

1-888-765-2900

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General Information

Physical Characteristics

Product	Size (nominal)	Depth	Bandwidth	Material		Color
Model F	2'x2'*	2"	1 kHz to 16 kHz	Class A Thermoplastic		White
Model C	2'x2'*	4.5"	250 Hz to 16 kHz	Class A Thermoplastic		White
Model E	15"x15"	9"	125 Hz to 16 kHz	EPS	Rigid Expanded Polystyrene	White
Model W	15"x15"	9.5"	125 Hz to 16 kHz	Wood		

*Actual size of unit is 23-5/8"x23-5/8" to fit into standard T-bar grid or direct mount to wall or ceiling.

Performance (Absorption/Diffusion)

	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	NRC	Diffusion Coefficient	
Model F									
TYPE A	0.05	0.60	0.07	0.09	0.07	0.13	0.20		
E400	0.20	0.10	0.06	0.05	0.06	0.14	0.05		
Diffusion	0.79	0.74	0.66	0.67	0.69	0.67	-		0.70
Model C									
TYPE A	0.32	0.20	0.10	0.29	0.20	0.16	0.20		
E400	0.20	0.12	0.12	0.31	0.23	0.22	0.20		
Diffusion	0.71	0.71	0.72	0.75	0.72	0.71	-		0.77
Model E									
TYPE A	Absorption not available at time of printing.								
Diffusion	0.68	0.69	0.70	0.73	0.75	0.72	-	0.77	
Model W									
TYPE A	Absorption not available at time of printing.								
Diffusion	0.69	0.69	0.70	0.75	0.74	0.72	-	0.74	

Type A test per ASTM C 423-02, E400 test per ASTM E 795-00.

2247 Tomlyn Street Richmond, VA 23230 USA (804) 342-2900 (804) 342-1107 Fax
 Toll Free 888 765 2900 info@acousticsfirst.com www.acousticsfirst.com

Why Diffusion?

Sound generated within a room will eventually strike a boundary such as a wall, ceiling or other surface in the path of the sound wave, and be reflected back into the room. Diffusion has the goal of controlling these reflections and redirecting sound.

While both absorption and diffusion have the effect of reducing sound intensity, diffusion preserves the sound and spreads it over a larger area, rather than having it disappear. The listener's perception of an expanded space is created by the combination of its spatial and temporal components.

Reflection (Fig. 1)

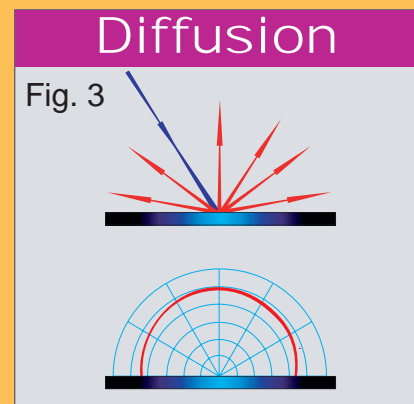
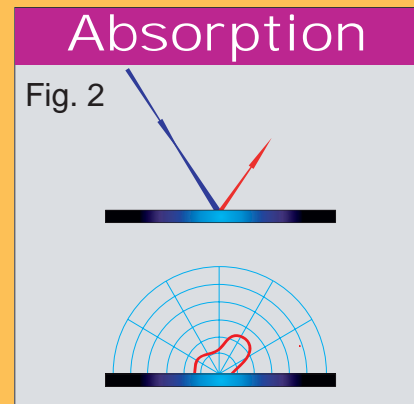
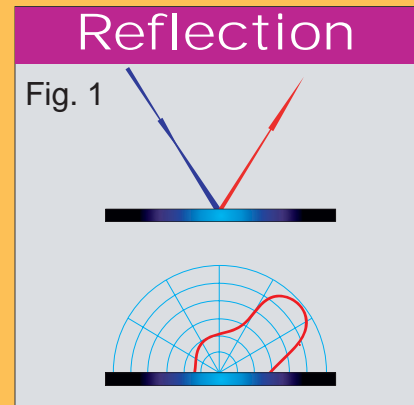
A perfectly reflective, smooth surface will absorb no wave energy, but return all of that energy back to its originating space. One example of a very reflective acoustic surface is a plaster wall.

Absorption (Fig. 2)

A totally absorptive material will not reflect any energy back into the room. Materials that absorb sound are generally porous, fluffy and lightweight such as fiberglass insulation.

Diffusion (Fig. 3)

Diffusion simultaneously increases the distribution of sound, and modifies its direction (red line) without removing energy from within the space (spatial response). Also, the diffused sound energy is distributed in time (temporal response). Bookcases with random-sized books, and quarried stone (or shingled) walls have some sound diffusing properties.



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Sound Prism

Over the years many shapes of sound diffusers and scattering devices have evolved. In the late twentieth century it was discovered that a panel with series of wells, would cause sound hitting its surface to be spread. This phenomenon is analogous to light's behavior.

A butterfly's wings may appear to be many brilliant colors when floating in the sunlight, only to be revealed as dull brown when observed up close. The color perceived is a result of the light being refracted as it bounces off of the small surface variations of the wing and breaking down into its component parts as if passing through a prism.

Smoke and Mirrors

The science of acoustical diffusion involves a lot of math, but it isn't necessary to be a mathematician to understand (and benefit) from the use of diffusers. Taking a cue from the thought that some science seems to be smoke and mirrors, we used a fog machine and light reflection to illustrate diffusion.

Figure 1 shows a pair of parallel laser beams reflected from a flat mirror surface. Nothing changes other than their direction, opposite but equal.

Figure 2 illustrates the laser light absorbed by the black fabric surface of an acoustical wall panel. Like sound entering the absorber, it vanishes.

In figure 3, a pair of laser beams is reflected off of a commercially manufactured "binary array", The Art Diffuser[®], with a custom mirrored finish. Four distinct beams leave where only two entered, each at lower intensity than the original beam and surrounded by additional blooms of light scattered and diffused by the mirror-surfaced elements.



Fig. 1: Laser beams on a flat mirror surface.



Fig. 2: Laser beams on an absorptive panel.



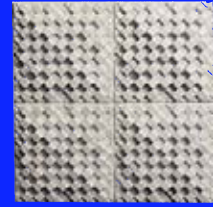
Fig. 3: Laser beams on diffuser.

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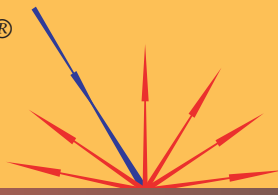
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MODEL F



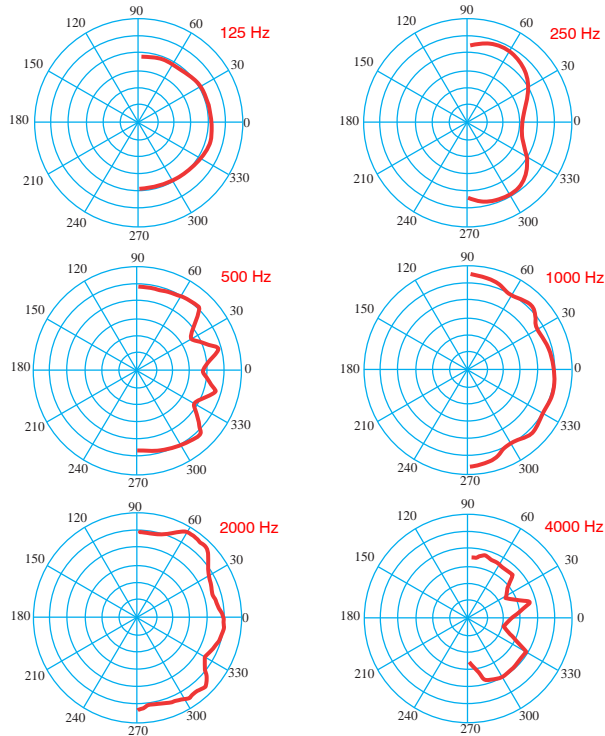
POLAR PLOTS



POLAR RESPONSE AT 0° INCIDENCE 48" x 48" ARRAY

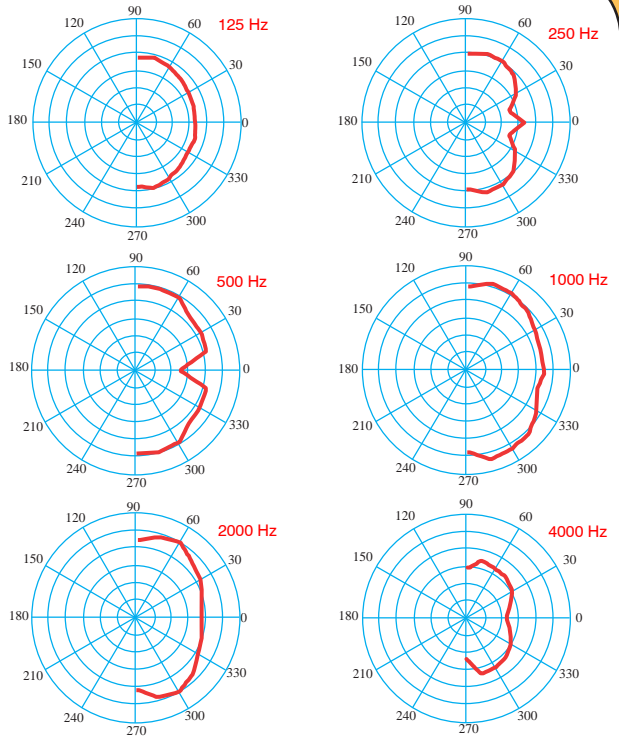
HORIZONTAL

Increments are 6 db per step.



VERTICAL

Increments are 6 db per step.

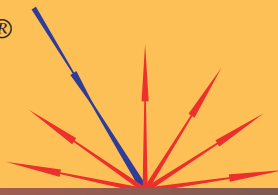


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POLAR PLOTS



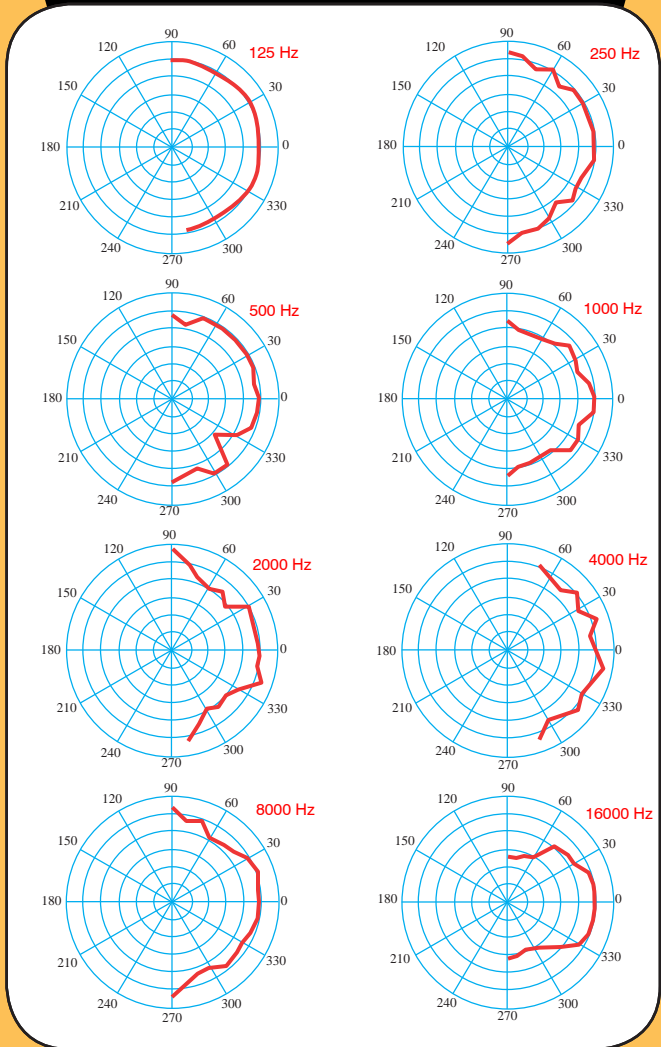
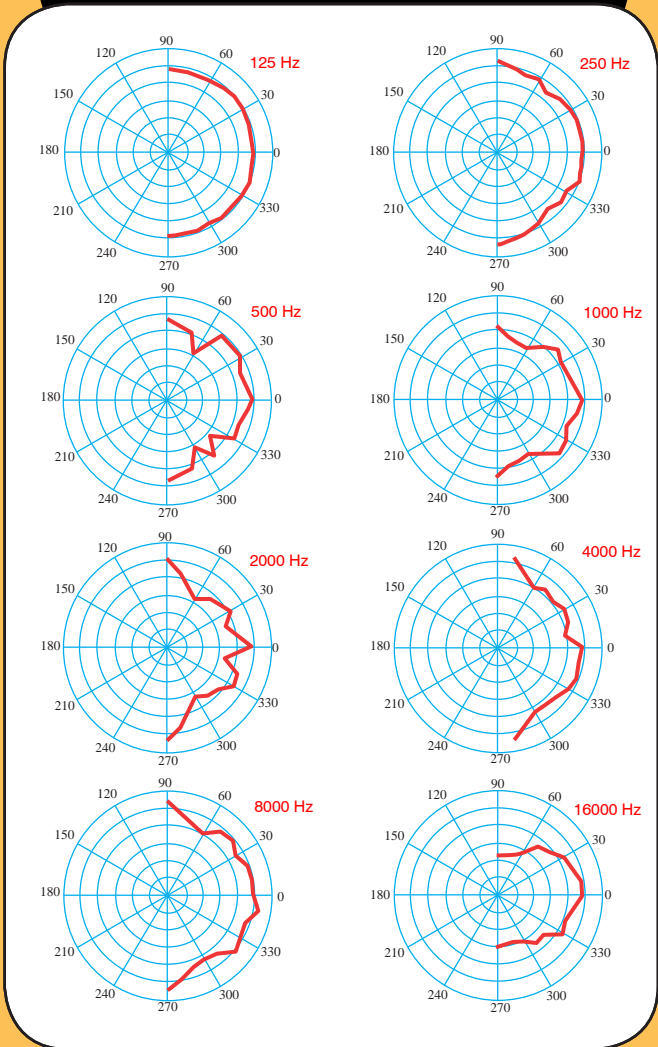
POLAR RESPONSE AT 0° INCIDENCE 48" x 48" ARRAY

HORIZONTAL

Increments are 6 db per step.

VERTICAL

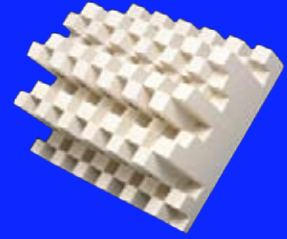
Increments are 6 db per step.



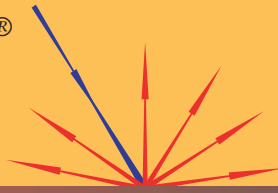
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MODEL E



POLAR PLOTS



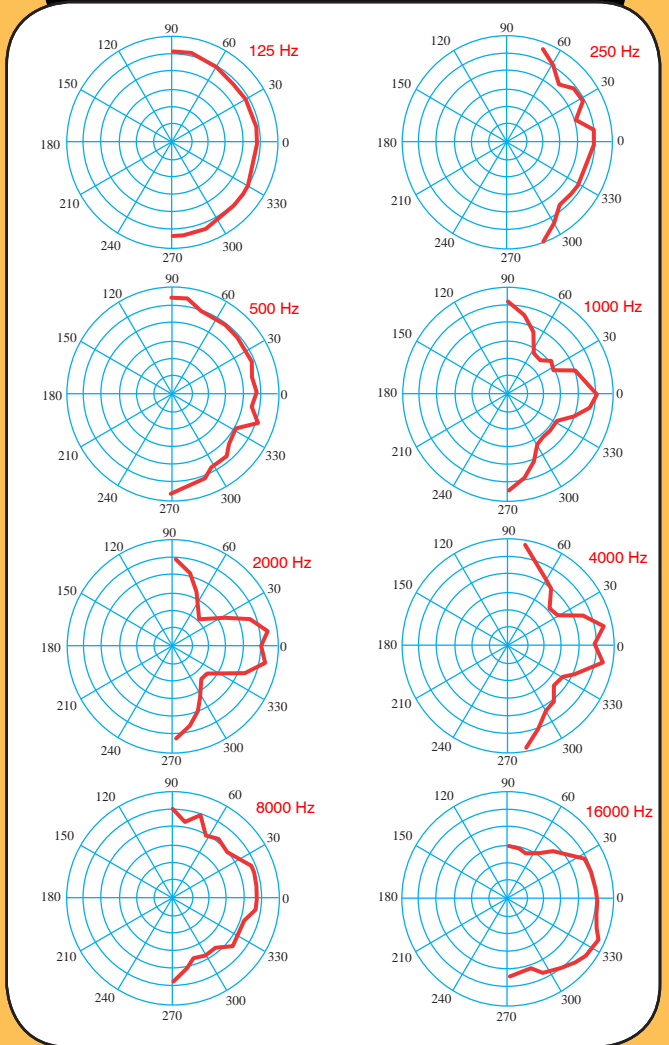
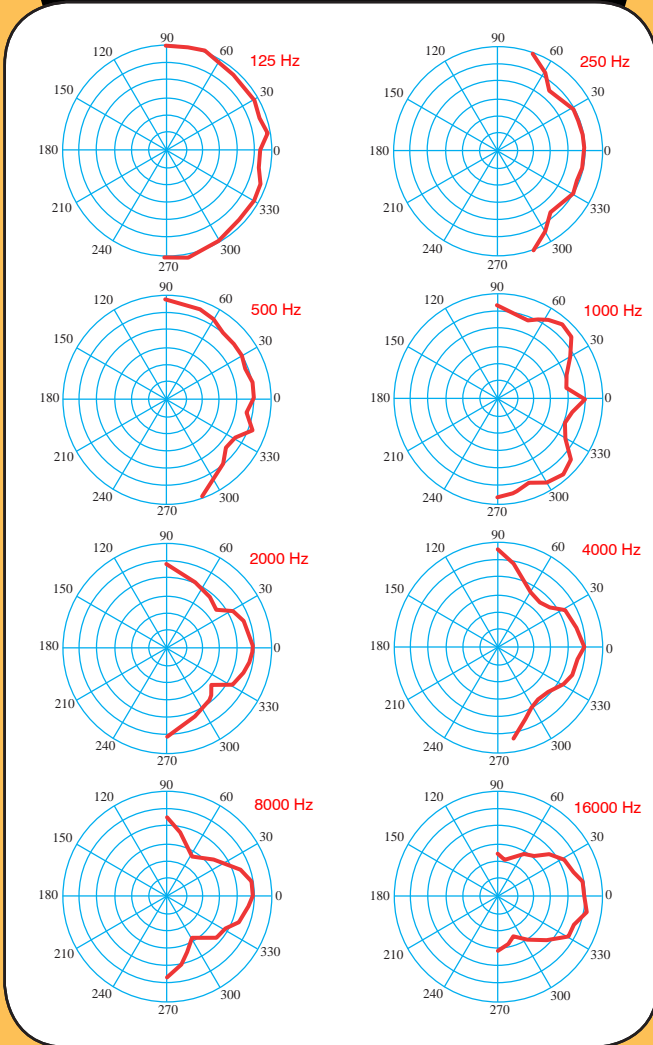
POLAR RESPONSE AT 0° INCIDENCE 30" x 30" ARRAY

HORIZONTAL

Increments are 6 db per step.

VERTICAL

Increments are 6 db per step.



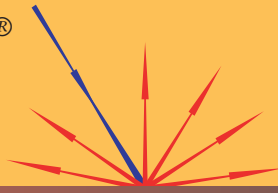
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MODEL W



POLAR PLOTS



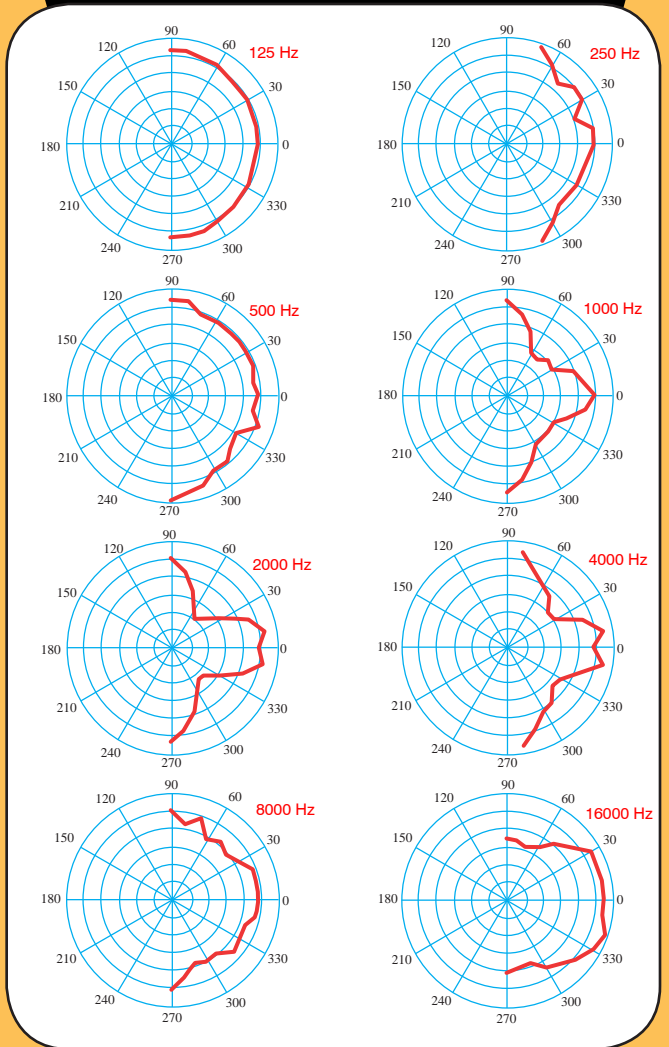
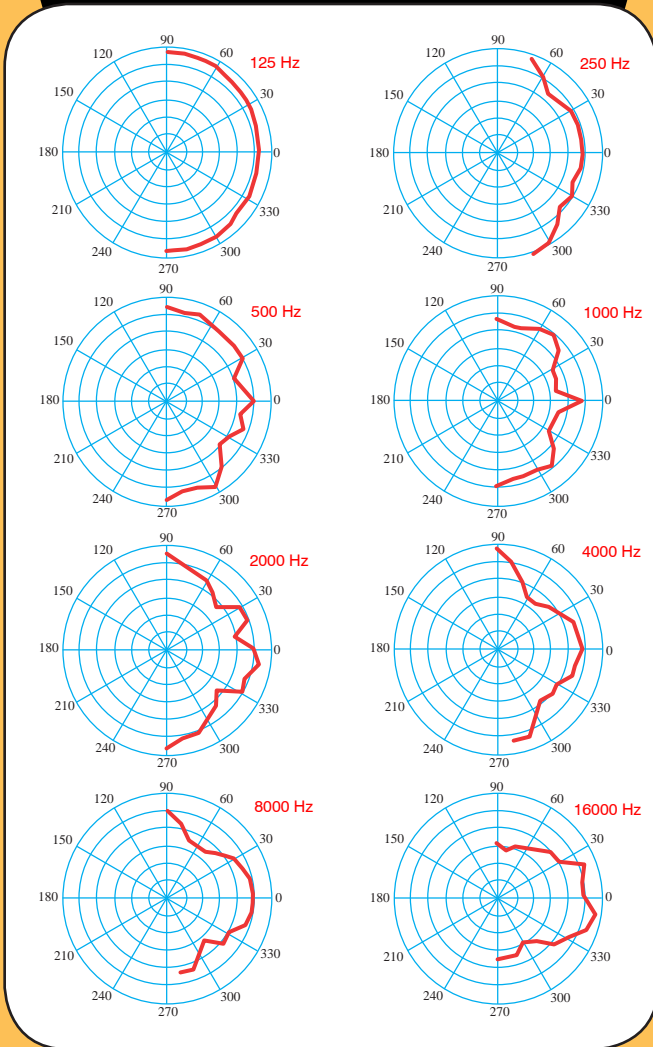
POLAR RESPONSE AT 0° INCIDENCE 30" x 30" ARRAY

HORIZONTAL

Increments are 6 db per step.

VERTICAL

Increments are 6 db per step.




Acoustics First[®]

THE Art DIFFUSOR[®]
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Architectural Specifications

Part 1: General

1.1 Scope: This section includes the Art Diffusor[®] two-dimensional acoustic diffusors (F) (C) (E) (W) as manufactured by Acoustics First Corporation of Richmond, Virginia as shown on drawings or referred to in these specifications.

1.2 Description: The Art Diffusor[®] two-dimensional acoustic diffusor shall work on the two-dimensional sound diffusion principal having a lower bandwidth limit of 1kHz (F), 250 Hz (C), 125 Hz (E & W) to an upper bandwidth of 16K Hertz. Each unit shall consist of wells with varying depth and width to provide two-dimensional diffusion. Individual elements shall terminate in a 10-degree end cap.

Part 2: Product

2.1 Materials

A. Depth: Art Diffusor[®] shall be 2" (F), 4.5" (C), 9" (E), or 9.5" (W) in depth.

B. Size: Art Diffusor[®] shall be 23-5/8" square (F & C), or 15" square (E & W) at its base

C. Material: Art Diffusor[®] shall be made of Thermoplastic (F & C), EPS plastic (E), or furniture grade wood (W).

D. Acoustic Response: Art Diffusor[®] Panels shall have a Noise Reduction Coefficient (NRC) 0.20 using ASTM C423-81a, Sound Absorption and Sound Absorption Coefficients by the Reverberation Method, conducted by an approved independent testing laboratory.

Part 3: Execution

3.1 Job Conditions

A. Installation shall not begin until all wet work, such as plastering, concrete, etc. is completely dry. The panels are designed for installation under standard occupancy conditions from 60 degrees F to 85 degrees F and not more than 80% Relative Humidity in an enclosed building.

B. The contractor shall be responsible for the examination and acceptance of all surfaces and conditions prior to installation.

3.2 Installation

A. All Art Diffusor[®] acoustic diffusors shall be installed in accordance with the manufacturer's specifications and recommendations.

B. All necessary hardware and accessories for the complete job installation are to be furnished by the contractor.

Acoustic diffusors shall be the Art Diffusor[®], as manufactured by Acoustics First Corporation, 2247 Tomlyn Street, Richmond, Virginia. 804-342-2900

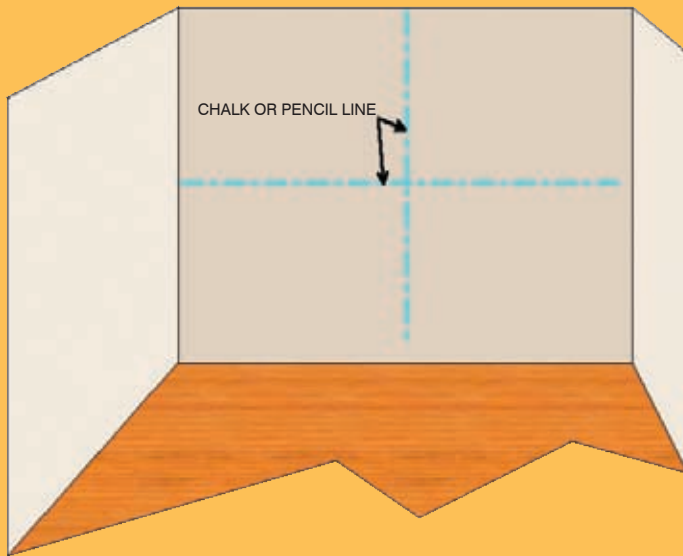
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US PAT. 5160816

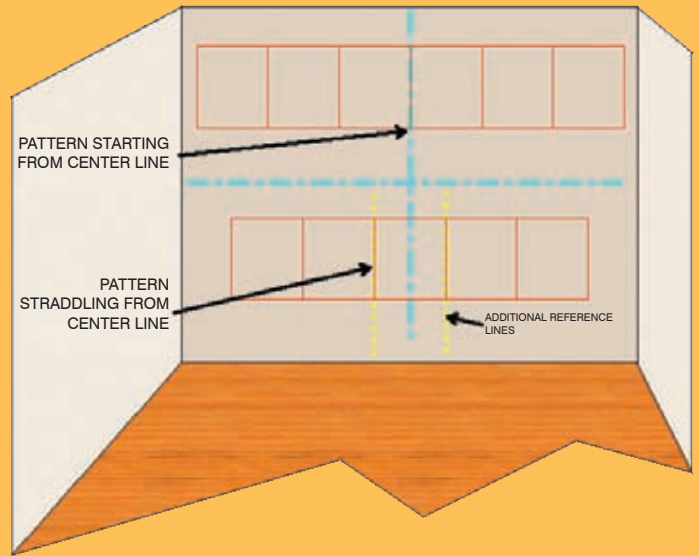
INSTALLATION GUIDE

Installation Preparation

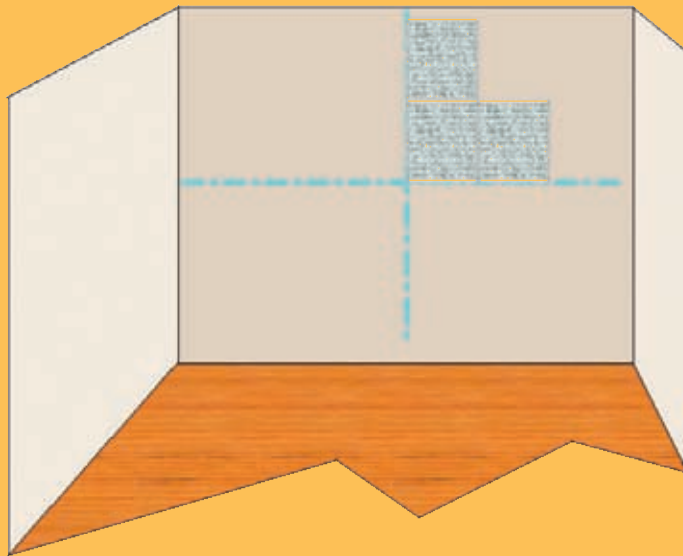
Use a pencil or chalk line to mark horizontal and vertical center lines on wall.



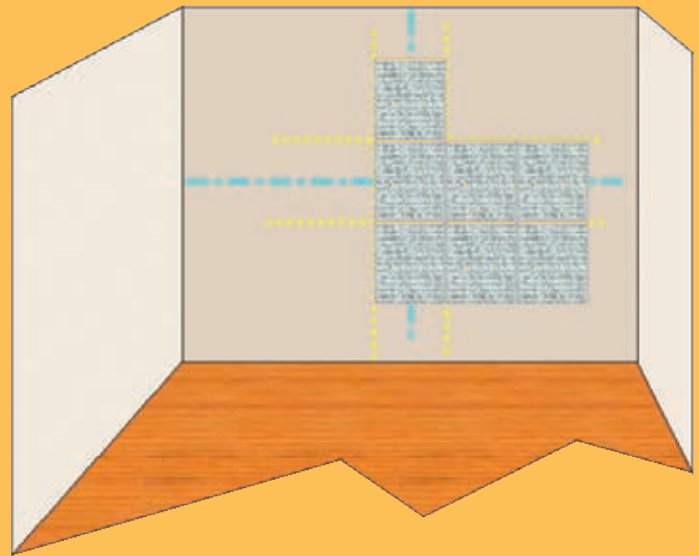
Trace or draw the pattern on the wall to determine the layout pattern. Always work from the center line. Use this method to determine if the panel edge will start at the center line or straddle it. Add additional reference lines to help maintain panel alignment.



Following product installation directions, start at the center line and continue mounting panels. Complete each quadrant before beginning the next.

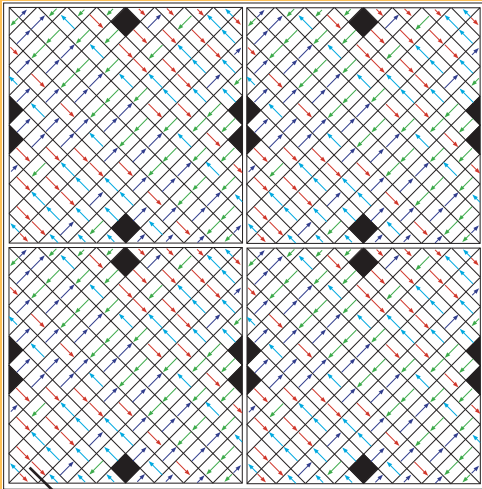


Following product installation directions, start in the middle and continue mounting panels. Complete each quadrant before beginning the next.




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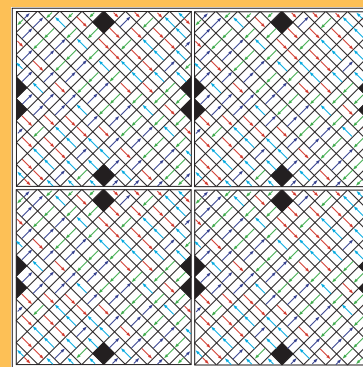
THE Art DIFFUSOR®
US PAT. 5160816
INSTALLATION GUIDE
MODEL F

PLAN OF ONE ART DIFFUSOR SQUARE


ARROWS INDICATE DIRECTION OF
ELEMENT END CAP ANGLE

USE MINIMUM OF FOUR
3/4" DRYWALL SCREWS
PER DIFFUSOR.

Place a dollop of construction adhesive on all four sides marked by the solid color on the back of the diffuser. Position the diffuser holding the front projecting elements. After aligning with the array, press the diffuser onto wall. Install drywall screws through the zero depth elements from the front for extra support.

TOP

REAR VIEW PLAN
Ceiling Grid:

Simply lay the diffuser into the pre-hung ceiling grid. Always orient panels in the same direction (DO NOT ROTATE PATTERN). For extra ceiling rigidity, diffusers can be clamped into the grid with ceiling tile clips.

Wall or Ceiling Mount, No grid:

Mark diffuser array pattern on wall or ceiling. Use construction adhesive to attach diffuser to surface. Apply adhesive to rear zero depth elements. These have been formed to be flush with the rear plane of the diffuser. Make sure to apply adhesive to all four points of the diffuser. Panels must be held in place while adhesive dries. Install appropriate screws and anchors through zero-depth elements.

Always ensure that the diffusers are aligned consistently. Avoid rotating the pattern within an array.

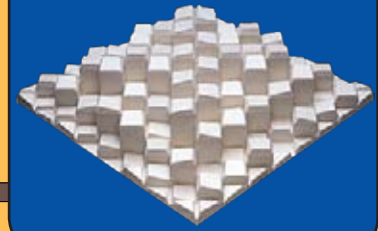
Acoustics First[®]

THE Art DIFFUSOR[®]

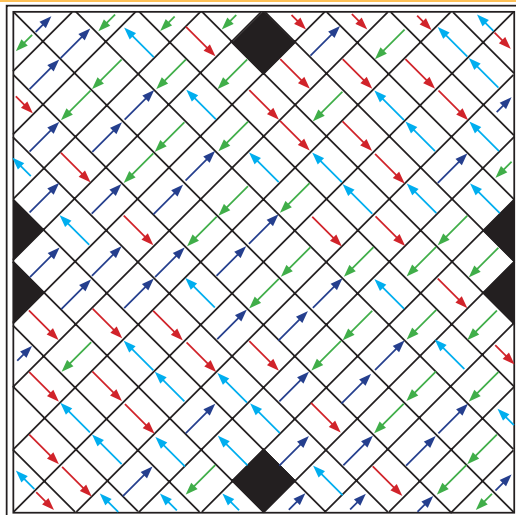
US PAT. 5160816

INSTALLATION GUIDE

MODEL C



PLAN OF ONE ART DIFFUSOR SQUARE

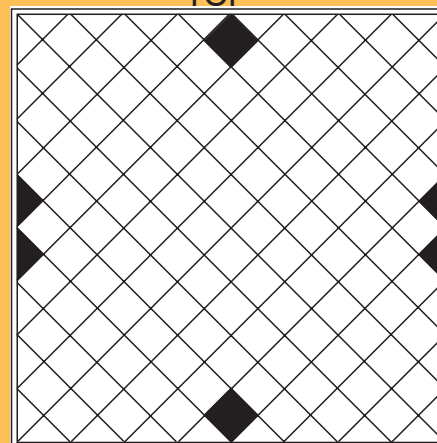


Arrows indicate direction of element end cap angle.

USE MINIMUM OF FOUR
3/4" DRYWALL SCREWS
PER DIFFUSOR.

Place a dollop of construction adhesive on all four sides marked by the solid color on the back of the diffuser. Position the diffuser holding the front projecting elements. After aligning with the array, press the diffuser onto the wall. Install drywall screws through zero depth elements from front for optional extra support.

TOP



REAR VIEW PLAN

Ceiling Grid:

Simply lay the diffuser into the pre-hung ceiling grid. Always orient panels in the same direction (DO NOT ROTATE PATTERN). For extra ceiling rigidity, diffusers can be clamped into the grid with ceiling tile clips.

Wall or Ceiling Mount, No grid:

Mark diffuser array pattern on wall or ceiling. Use construction adhesive to attach diffuser to surface. Apply adhesive to rear zero depth elements. These have been formed to be flush with the rear plane of the diffuser. Make sure to apply adhesive to all four points of the diffuser. Panels must be held in place while adhesive dries. Install appropriate screws and anchors through zero-depth elements.

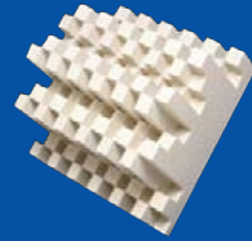
Always ensure that the diffusers are aligned consistently. Avoid rotating the pattern within an array.

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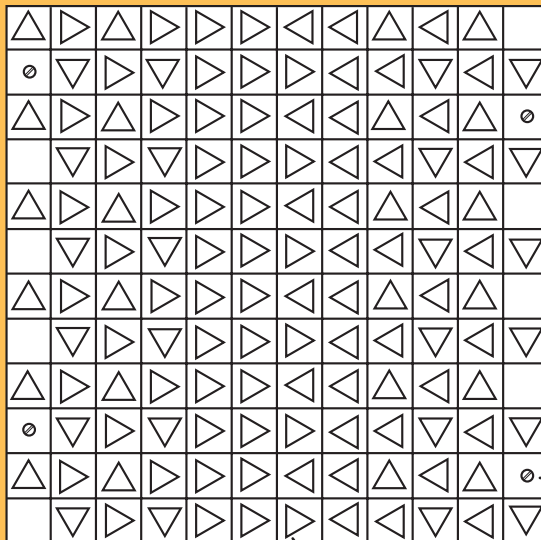
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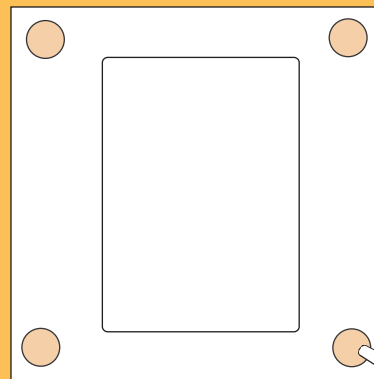
MODEL E



PLAN OF ONE ART DIFFUSOR SQUARE

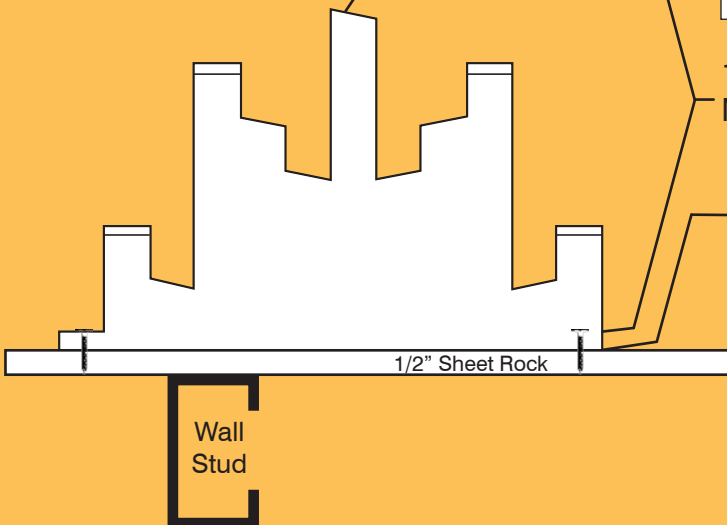


Zero Depth Element (Backing Exposed)
Mounting fasteners can be inserted through any zero-depth element location.



1-1/4" Drywall screw
Minimum of four per square

Due to the z-axis length of diffuser squares, mounting surface must be smooth and flat to avoid gaps between adjoining peaks.

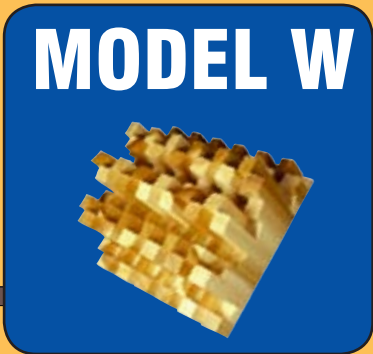


Place one-inch dollop of construction adhesive on all four sides marked by the solid color on the back of the diffuser. Carefully position the diffuser holding the front projecting elements. After aligning with the array, press diffuser onto wall. Install drywall screws through the zero-depth elements from the front for optional extra support.

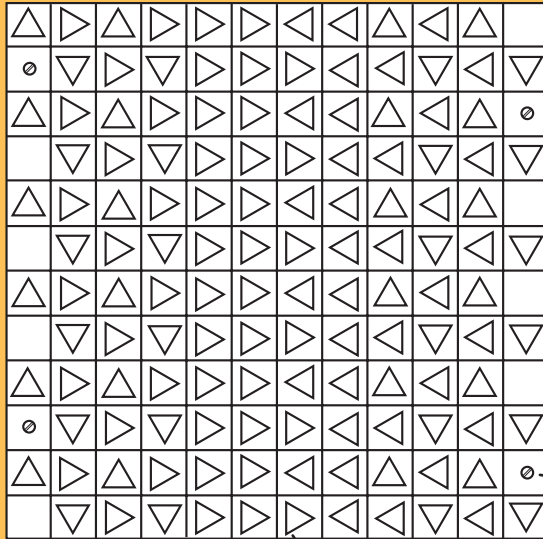
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INSTALLATION GUIDE



PLAN OF ONE ART DIFFUSOR SQUARE



Arrows indicate directions of element end cap angle.

Zero Depth Element (Backing Exposed)

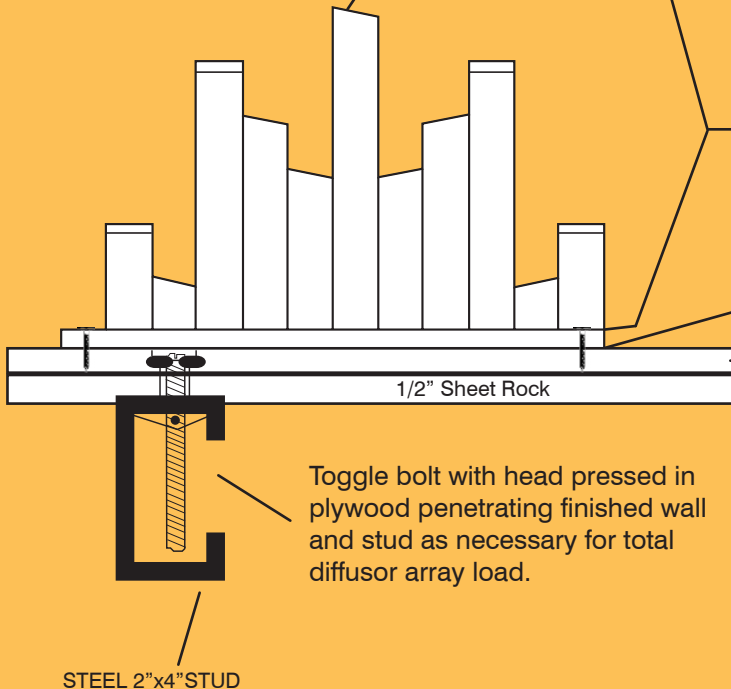
Mounting fasteners can be inserted through any zero-depth element location.



SOLID HARDWOOD WITH 1/2" PLYWOOD BACKING

1-1/4" Drywall screw
Minimum of four per square

Due to the z-axis length of diffuser squares, mounting surface must be smooth and flat to avoid gaps between adjoining peaks.



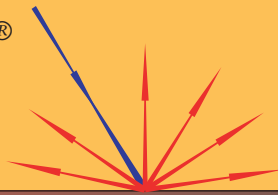
3/4" Plywood on finished wall surface, or embedded into wall construction behind finished surface.

Ceiling mounting is not recommended.



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**For More
Information,
Please
Contact Us.**

**ACOUSTICS FIRST
CORPORATION
2247 TOMLYN STREET
RICHMOND, VA 23230-3334
USA**

TEL: (804) 342-2900

FAX: (804) 342-1107

Toll Free: (888) 765-2900

EMAIL: info@acousticsfirst.com

WEB: www.acousticsfirst.com

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2247 Tomlyn Street Richmond, VA 23230 USA (804) 342-2900 (804) 342-1107 Fax
Toll Free 888 765 2900 info@acousticsfirst.com www.acousticsfirst.com