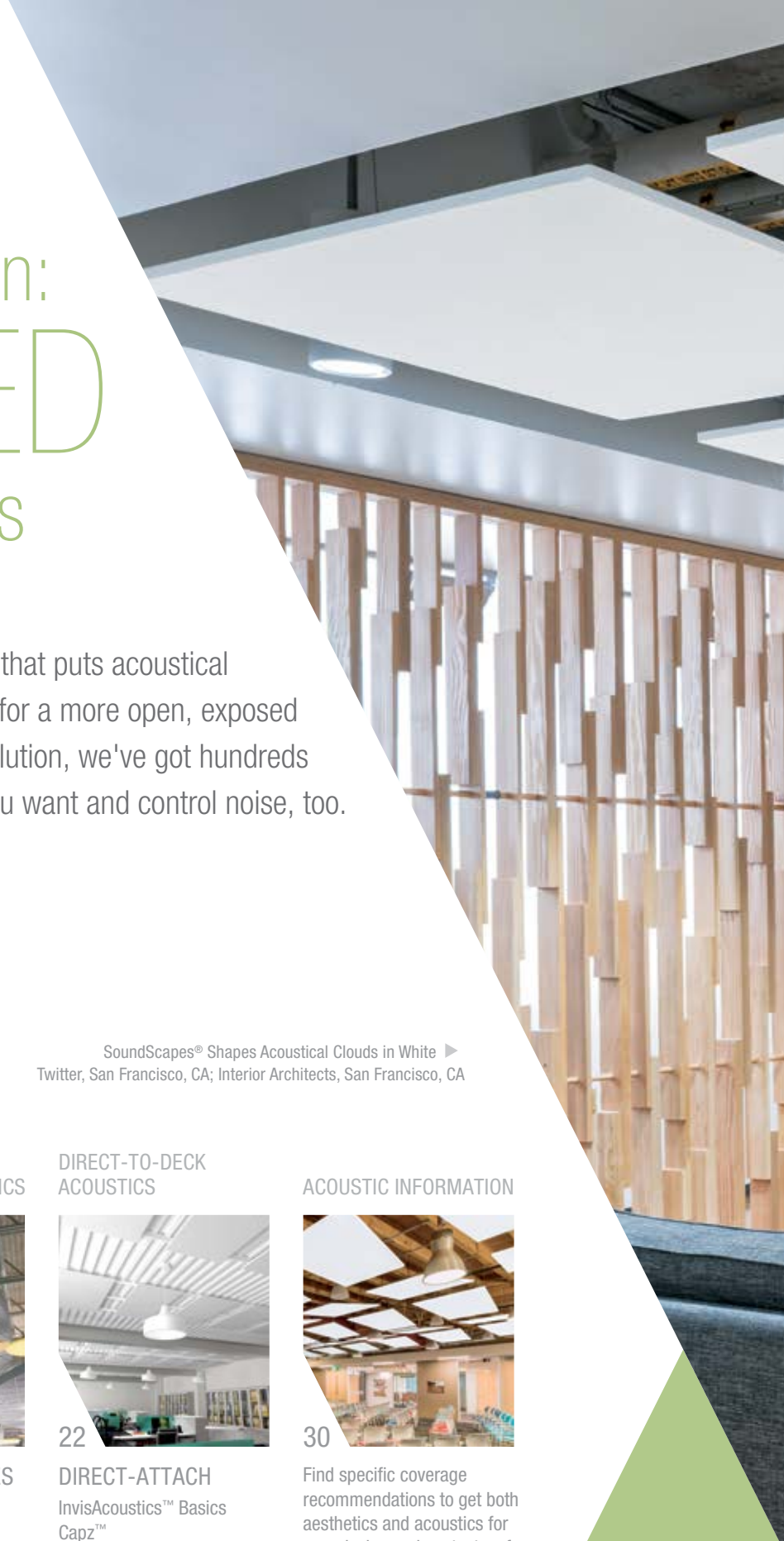
Acoustical Design: EXPOSED STRUCTURE

Inspiring Great Spaces®

Armstrong®
CEILING & WALL SOLUTIONS

Acoustical Design: EXPOSED Structure Spaces

Whether making a design statement that puts acoustical materials front and center, or opting for a more open, exposed structure look with a direct-attach solution, we've got hundreds of options to help you get the look you want and control noise, too.



SoundScapes® Shapes Acoustical Clouds in White ▶
Twitter, San Francisco, CA; Interior Architects, San Francisco, CA

SPOTLIGHT™ ACOUSTICS

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BLADES™ & BAFFLES

SoundScapes® Blades™
MetalWorks™ Blades™
Tectum® Blades
Soundsoak® Baffles
Tectum Baffles

SPOTLIGHT™ ACOUSTICS

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CLOUDS & CANOPIES

SoundScapes® Shapes
Formations™
Tectum® Shapes & Clouds
MetalWorks™ Canopies
WoodWorks® Canopies
Serpentina®

DIRECT-TO-DECK ACOUSTICS

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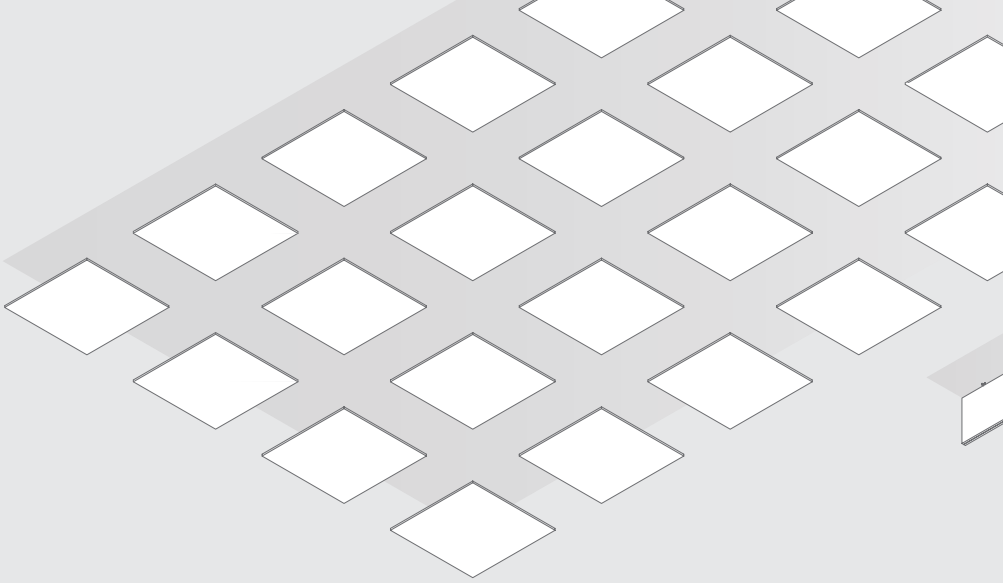
DIRECT-ATTACH

InvisAcoustics™ Basics
Capz™
SoundScapes® Blades™
Tectum® Direct-Attach
Tectum® Finale

ACOUSTIC INFORMATION

30

Find specific coverage recommendations to get both aesthetics and acoustics for your design and contact us for a detailed reverberation time calculation specifically for your project.



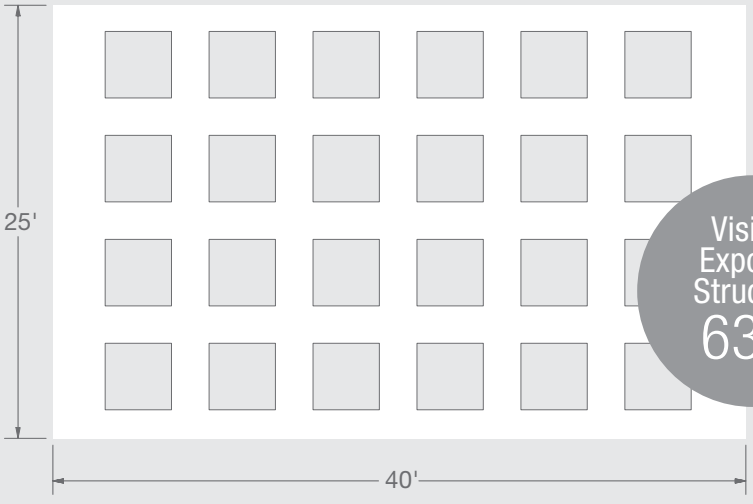
It's up to you.

Both absorb the same amount of noise.

One covers more visual space – the other creates a more open visual.

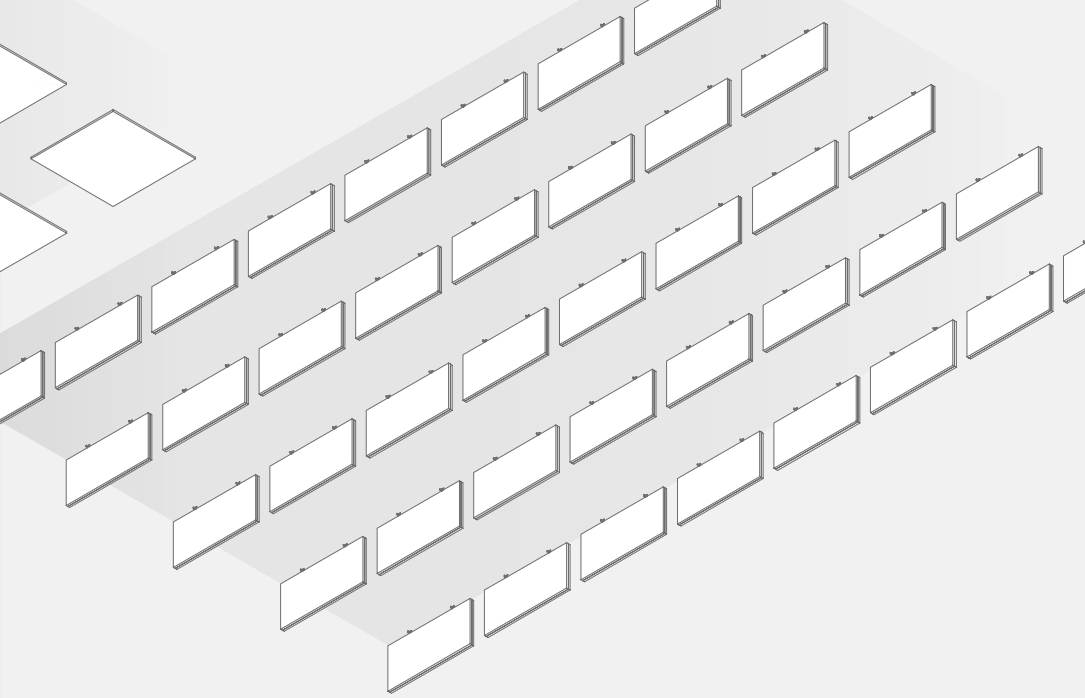
HORIZONTAL ACOUSTICS?

Layout solution shown represents **BETTER** reverberation time



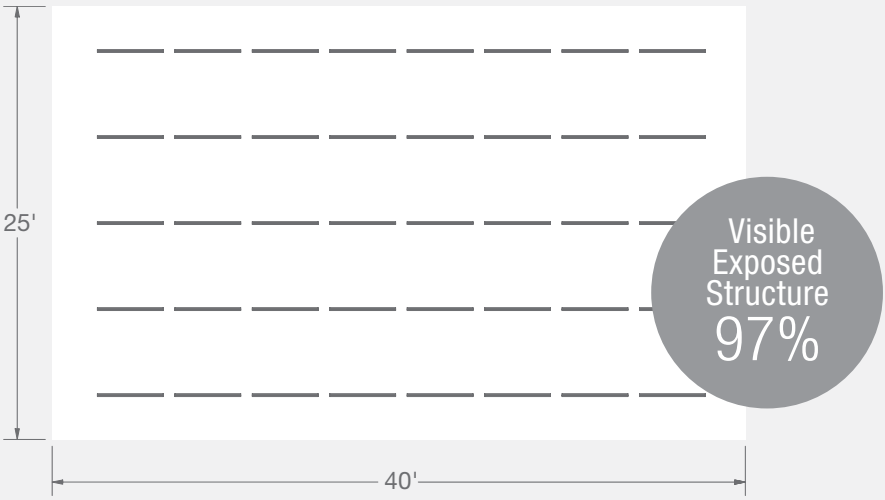
DECK COVERAGE / NOISE REDUCTION	Reverberation Time (RT)		
1,000 ft² (25' x 40') Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 48" x 48" SOUNDSCAPES® Shapes	12	24	49
% of Deck Coverage	19%	37%	78%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)



or VERTICAL ACOUSTICS?

Layout solution shown represents **BETTER** reverberation time



DECK COVERAGE / NOISE REDUCTION	Reverberation Time (RT)		
1,000 ft² (25' x 40') Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 22 x 46 x 2" SOUNDSCAPES® Blades™	20	40	86
% of Deck Coverage	1%	3%	6%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)


HORIZONTAL
OR VERTICAL
ACOUSTICAL
TREATMENTS?
LIFT HERE

▼ SoundScapes® Blades™ vertical panels in White and Stone; Microsoft Office, Chevy Chase, MD; SmithGroupJJR, Washington DC

SPOTLIGHT™ ACOUSTICS

Blades™ & Baffles

ALL ABOUT THE LINES

Straight or wavy, parallel or intersecting, monochromatic or multi-colored – these vertical elements control noise with panache.

▲ MetalWorks™ Custom Baffles in White
Westfield Santa Anita, Arcadia, CA; Westfield Design & Construction, Arcadia, CA

▲ SoundScapes® Blades™ vertical panels in White and Stone
Microsoft Office, Chevy Chase, MD; SmithGroupJJR, Washington DC

SPOTLIGHT™ ACOUSTICS

SOUNDSCAPES® Blades™

ALL ABOUT THE SPACE

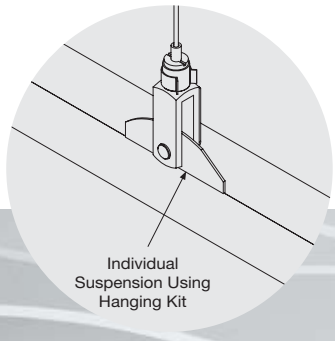
Reduce noise with new layout designs, coupled with size, shape, and color to allow for a unique look for any space.

SOUNDSCAPES® BLADES™ NOISE REDUCTION

1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	Reverberation Time (RT) GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 22 x 46 x 2" Blades™	20	40	86
% of Deck Coverage	1%	3%	6%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

- Flexible installation from the deck, ceiling, drywall, suspension system, or on a wall
- Excellent acoustical absorption – 1.38 Sabins/ft^2 or 64% more sound absorption than an NRC 0.90 continuous ceiling
- Over 20 standard sizes with custom options available
- Seismic-tested



▼ SoundScapes® Blades™ vertical panels in White 48" and 96" wavelengths

METALWORKS™ Blades™

CLASSIC DOESN'T MEAN ORDINARY

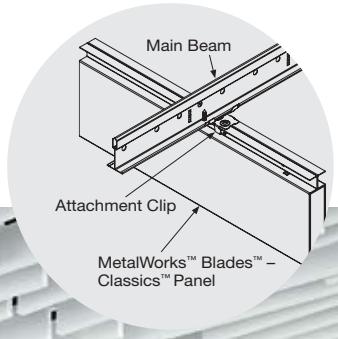
Create a look that visually tells your story.
Durable and flexible.

- Available in two lengths for creative design layouts and easy installation
- Panel spacing is variable for a variety of design and acoustical needs
- Select finishes part of the Sustain™ portfolio and meet the most stringent sustainability compliance standards today

METALWORKS™ BLADES™ NOISE REDUCTION

	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 4 x 96 x 1" Blades™	90	179	377
% of Deck Coverage	6%	12%	25%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)



▼ MetalWorks™ Blades – Classics™ vertical panels in White

▲ Tectum® Blades™ custom vertical panels in White
iFly Indoor Skydiving Family Fun Center, King of Prussia, PA; Stantec

- Living Product Imperative Certified – 1" panels in White and Natural only
- Upscale linear visual adds acoustics and aesthetics to any space
- Noise absorption up to 0.41 Sabins/SF
- Custom shapes and sizes available to meet your project demands
- Select finishes part of the Sustain® portfolio and meet the most stringent sustainability compliance standards today

TECTUM® BLADES™ NOISE REDUCTION

1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	Reverberation Time (RT) GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 24 x 48 x 1" Blades™	75	148	312
% of Deck Coverage	3%	5%	10%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

SPOTLIGHT™ ACOUSTICS

TECTUM® Blades™ TEXTURE TAKES SHAPE

Customize the edges, heights, and thickness of Blades™ panels for the acoustics and aesthetics you need.

▲ Soundsoak® Baffles Custom panel sizes in Sailcloth Yellow, Navy Blue, and Silver
Northern Rockies Regional Recreation Centre, Fort Nelson, BC, Canada

SPOTLIGHT™ ACOUSTICS

SOUNDSOAK® Baffles SIGHT & SOUND

Love the look and control the noise in easy-to-install acoustical baffles.

- Available in a variety of standard and custom fabrics
- On average, 20% coverage results in 50% reduction in reverberation
- Sleek, adjustable aircraft cable installation

SOUNDSOAK® BAFFLES NOISE REDUCTION

	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 24 x 48 x 2" Baffles	14	27	58
% of Deck Coverage	1%	2%	4%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

- Tectum panels are Living Product Imperative Certified by the International Living Future Institute – 1" panels in White and Natural only
- Add acoustics and aesthetics to any space
- Noise absorption up to 0.41 Sabins/SF
- Custom sizes and colors available
- Select finishes part of the Sustain® portfolio and meet the most stringent sustainability compliance standards today

TECTUM® BAFFLES NOISE REDUCTION

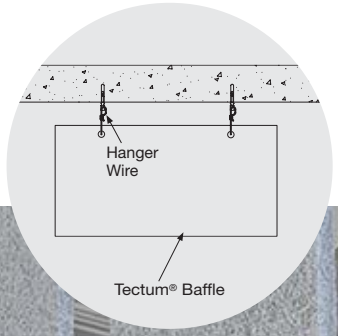
	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 24 x 48 x 1" Baffles	75	148	312
% of Deck Coverage	3%	5%	10%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

SPOTLIGHT™ ACOUSTICS

TECTUM® Baffles MADE TO FIT

Baffle sizes, shapes, forms, and colors are available to fit your design needs.



▼ Tectum® Baffles in White and custom colors
Capital One Labs, San Francisco, CA; Studio O+A, San Francisco, CA

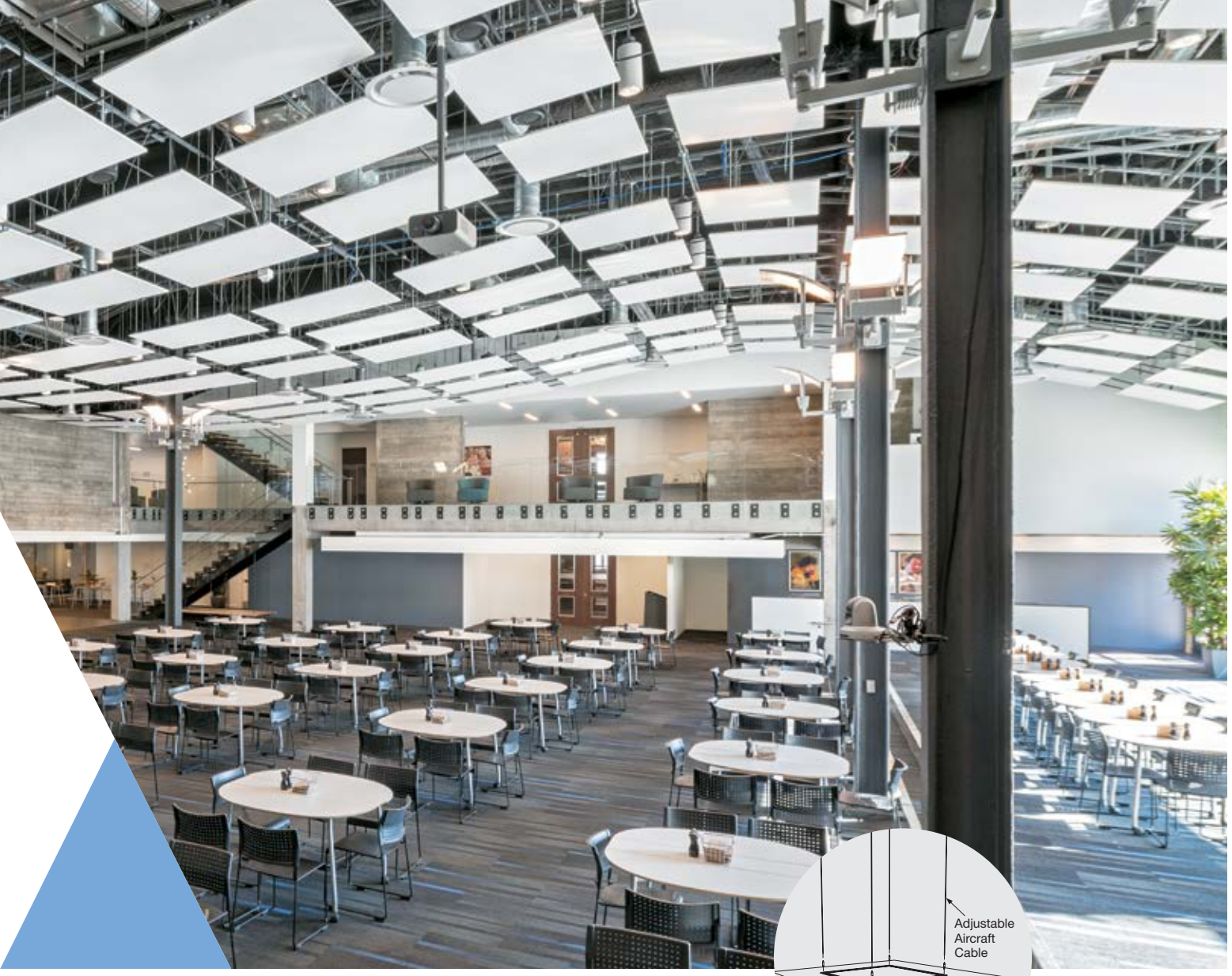
SPOTLIGHT™ ACOUSTICS

Clouds & Canopies TWO-FACED ACOUSTICS

Both sides of the panels soak up the sound. Select from a wide range of standard and custom shapes, colors, and materials.

▼ Serpentina® Classic in Silver Grey
Wichita State University Rhatigan Student Center, Wichita, KS; Howard + Helmer Architects

▲ SoundScapes® Shapes Acoustical Clouds in Pale Lemon, Pecan, Plum, and Tangerine
Evelyn Meador Library, Seabrook, TX; English + Associates Architects, Inc., Houston, TX



▲ SoundScapes® Shapes Acoustical Clouds in White
Twitter, San Francisco, CA; Interior Architects, San Francisco, CA

SPOTLIGHT™ ACOUSTICS

SOUNDSCAPES® Shapes VISUAL MOTION

Deliver acoustics in playful installations with angles, layers, shapes, sizes, and colors.

- Aesthetically define spaces and enhance acoustics
- Quick to install from the deck, ceiling, drywall, suspension system, or on a wall in adjustable heights and angles
- Available in multiple standard and custom sizes and shapes

SOUNDSCAPES® SHAPES NOISE REDUCTION

	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 48" x 48" Shapes	12	23	49
% of Deck Coverage	19%	37%	78%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

▼ SoundScapes® Shapes in White and Moss; Zionsville High School, Zionsville, IN; Fanning Howey, Indianapolis, IN

FORMATIONS™ OUT OF THE BOX

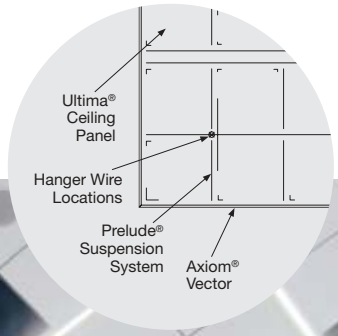
Floating circular or rectangular clouds with crisp Axiom® trim pre-cut and ready to install.

- Reduce acoustical reverberation time in the space
- Reduce noise levels in the space
- Increase speech intelligibility

FORMATIONS™ CLOUDS NOISE REDUCTION

	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 96" x 96" Ultima® Squares	4	8	N/A
% of Deck Coverage	26%	51%	N/A

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)



▼ Ultima® Tegular Clouds with 4" Axiom® Classic Trim in White; University of Rhode Island, Center for Biotechnology and Life Sciences, Kingston, RI; Payette, Boston, MA

▲ Tectum® Clouds; Retail Me Not, Austin, TX; STG Design, Austin, TX

new - Tectum panels are Living Product Imperative Certified by the International Living Future Institute – 1" panels in White and Natural only
- Noise absorption up to 0.41 Sabins/SF
- Wide variety of color options available
- Custom Cloud shapes and sizes for any project need

TECTUM® SHAPES & CLOUDS NOISE REDUCTION

	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 48 x 48 x 1-1/2" Clouds	23	44	N/A
% of Deck Coverage	37%	70%	N/A

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

SPOTLIGHT™ ACOUSTICS

TECTUM® Shapes & Clouds FLEXIBLE FIT

Floating textures custom-shaped to your specifications.

▲ MetalWorks™ Canopies Hill and Valley in Silver Grey
Spartanburg High School, Spartanburg, SC; McMillan Pazdan Smith, Spartanburg, SC

SPOTLIGHT™ ACOUSTICS

METALWORKS™ Canopies DURABLE & SLEEK

Upscale your interior with a muted, refined visual.

- Easy to clean and maintain
- Great aesthetic above and below
- Easy installation

METALWORKS™ CANOPIES NOISE REDUCTION

1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	Reverberation Time (RT) GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 72" x 48" Canopies	7	14	30
% of Deck Coverage	17%	34%	72%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

- Choose from Hill, Valley, or S-curve dual radius canopies
- Real wood and bamboo veneers
- Perforated option available for better acoustics on Hill and Valley canopies
- Concealed mounting hardware for a clean look above and below

WOODWORKS® CANOPIES NOISE REDUCTION

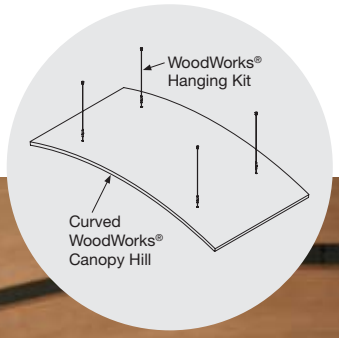
	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 72" x 48" Canopies	12	23	N/A
% of Deck Coverage	38%	74%	N/A

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

SPOTLIGHT™ ACOUSTICS

WOODWORKS® Canopies QUIETING WARMTH

Perforated veneers add acoustics with an organic touch.



▼ WoodWorks® Canopies in Natural Variations™ Light Cherry
Spartanburg High School, Spartanburg, SC; McMillan Pazdan Smith, Spartanburg, SC

SPOTLIGHT™ ACOUSTICS

SERPENTINA®
GREAT CURVES

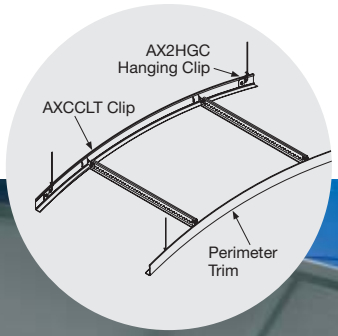
Curved metal clouds combine easy installation with striking visual power and acoustical performance.

- Maximum design flexibility – available in both Hills and Valleys
- Standard panel colors plus four metallic paints; custom RAL® colors available
- Components provide maximum corrosion resistance
- Install perforated clouds with acoustical infill panels for sound absorption

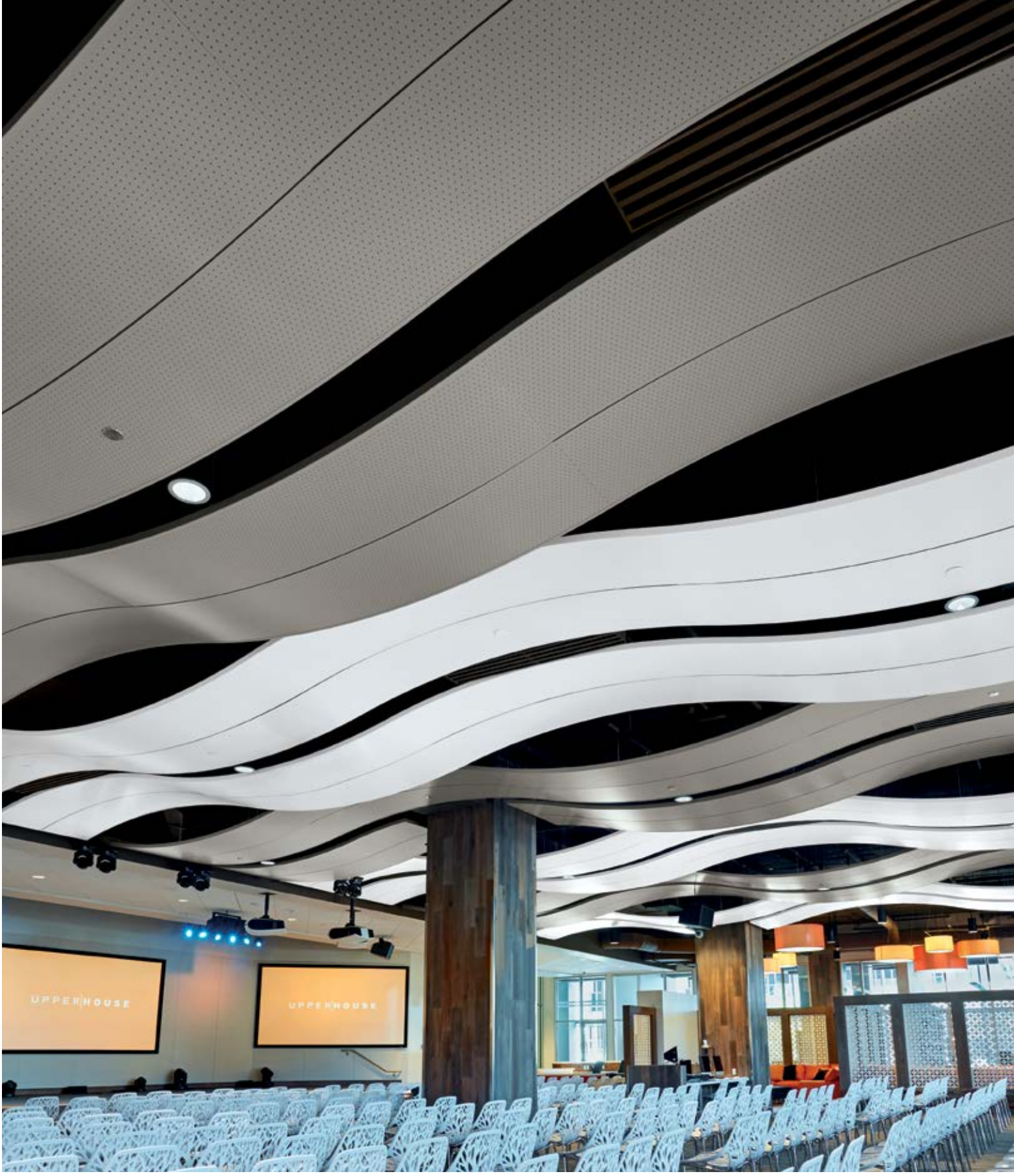
SERPENTINA® CLOUDS NOISE REDUCTION

	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 96" x 96" Clouds (R042 perforation with fleece and polybag infill panel)	3	6	12
% of Deck Coverage	19%	38%	77%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)



▼ Serpentina® Waves Clouds in Gun Metal Grey
Destiny USA Mall, Syracuse, NY; Holmes-King-Kallquist & Associates, Architects, Syracuse, NY



▲ Serpentina® Waves in Gun Metal and White; Upper House, University of Wisconsin, Madison, WI; Brownhouse Architecture, Madison, WI

Direct-To-Deck A

NOW YOU SEE IT.

Whether you want acoustic panels to be visible or have

▼ InvisAcoustics™ Basics in Black

coustics

NOW YOU DON'T.

them disappear into the deck, we have options for you.

▼ InvisAcoustics™ Basics in White

▲ InvisAcoustics™ Basics I-Beam application

INVISACOUSTICS™ Acoustical Panels ABRACADABRA

InvisAcoustics™ Basics panels empower your exposed structure design while bringing quiet to your space.

- Sound absorption NRC 0.75
- Select finishes part of the Sustain™ portfolio and meet the most stringent sustainability compliance standards today- Panels cut easily to fit into any space
- Quick, easy install using hat channel or furring strips
- Foolproof, all-in-one screw allows fast installation without danger of overdriving and damaging the panel
- new - I-Beam and truss application
- new - Walls installation – 6' from ground or higher

INVISACOUSTICS™ PANELS NOISE REDUCTION

	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
Area of 3/4" Ceiling Panels	280 ft²	560 ft²	N/A
% of Deck Coverage	28%	56%	N/A

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

▼ InvisAcoustics™ Basics 24" x 48" panels field-painted to match concrete

DIRECT-TO-DECK ACOUSTICS

CAPZ™ Acoustical Panels SLEEK OR SNEAKY

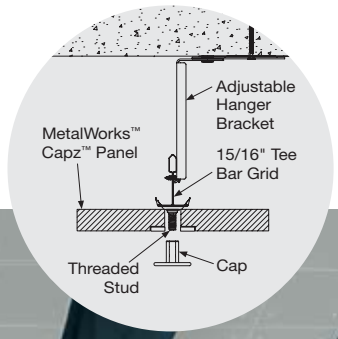
Capz accent hardware pairs with MetalWorks™, fine-textured Optima®, or black Spectra™ panels.

- High light reflectance 0.90 (Optima® and MetalWorks™ white panels)
- Easy alignment suspension system
- Panels can be designed in long runs or grouped based on the acoustical needs
- RAL®/custom colors available for MetalWorks panels

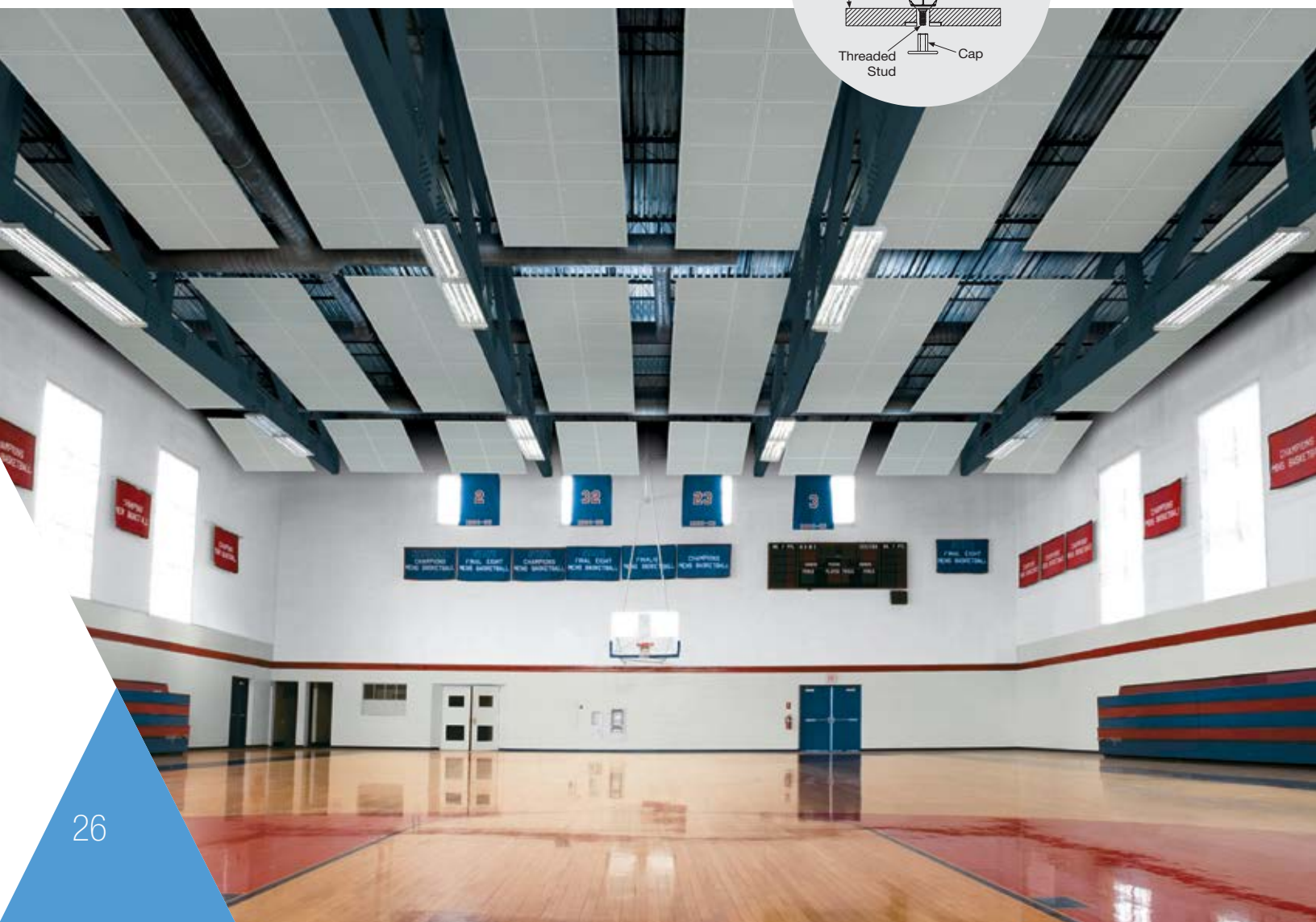
METALWORKS™ CAPZ™ NOISE REDUCTION

	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
Area of MetalWorks™ Capz™ Panels	200 ft²	400 ft²	850 ft²
% of Deck Coverage	20%	40%	85%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

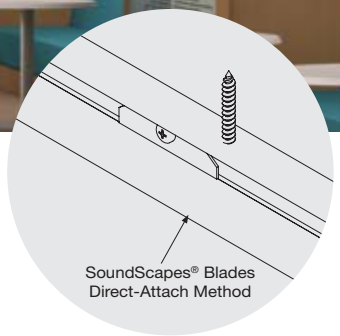


▼ MetalWorks™ Capz™ panels in Silver Grey



▲ Optima® Capz™ panels in White; St. Michael's Country Day School, Multi-purpose cafeteria, Newport, RI

▲ SoundScapes® Blades in White and custom colors



DIRECT-TO-DECK ACOUSTICS

SOUNDSCAPES® Blades™ MULTIPLE CHOICE

Reduce noise and define spaces in unlimited combinations for maximum design flexibility.

- Direct-attach to deck using Axiom® wall molding
- Excellent acoustical absorption – 1.38 Sabins/ft² or 64% more sound absorption than an NRC 0.90 continuous ceiling
- Over 20 standard sizes with custom options available
- Seismic-tested

SOUNDSCAPES® BLADES™ NOISE REDUCTION

	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
# of 22 x 46 x 2" Blades™	20	40	86
% of Deck Coverage	1%	3%	6%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

- Unlimited design possibilities
- Great retrofit solution
- new - Install 1" thick Tectum on Trusses and I-Beams for added acoustics while maintaining exposed structure visual
- Durable for heavy-use interiors
- Can be mechanically fastened to a wide variety of surfaces
- new - Living Product Imperative Certified by the International Living Future Institute – 1" panels in White and Natural only

TECTUM® CEILING PANELS NOISE REDUCTION

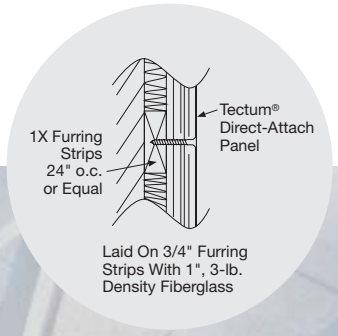
	Reverberation Time (RT)		
1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD* RT=1.4s	BETTER** RT=1.0s	BEST** RT=0.6s
Area of 1" Tectum® Direct-Attach Panels	214 ft²	420 ft²	900 ft²
% of Deck Coverage	21%	42%	90%

* Long RTs (> 1.4 sec) = for lively acoustic environments (auditoriums/hospitality)
** Short RTs (< 1 sec) = high-quality speech intelligibility (classrooms/open plan spaces)

DIRECT-TO-DECK ACOUSTICS

TECTUM® Direct-Attach Panels SLAM DUNK

Durability and noise control to withstand the crowds.



▼ Tectum® Direct-Attach ceiling panels in White; Hamlin Middle School, Corpus Christi, TX

◀ SoundScapes® Shapes in White
Blach Headquarters, San Jose, CA
Pillars Architecture, San Jose, CA

ABOUT ACOUSTICS

EXPOSED STRUCTURE SPACES

How do non-traditional shapes and forms affect noise levels? These products absorb sound from all sides to reduce reverberation times. So placement in about 20-50% of the space gives you impactful acoustical performance. In large, open environments where speech privacy is not a key requirement, these types of solutions address acoustics and aesthetics.

The chart to the right helps you see the differences in noise reduction (Reverberation Time improvement) for Canopies and Clouds, Baffles and Blades™ vertical elements, as well as direct-to-deck solutions, compared to a continuous wall-to-wall ceiling system.

EXPOSED STRUCTURE DESIGN
Spotlight™ Acoustics, Direct-to-Deck Acoustics, and InvisAcoustics™ Options

Acoustical absorption is important to:
- Reduce noise levels and reverberation time
- Enhance speech intelligibility

Reverberation Time (RT)

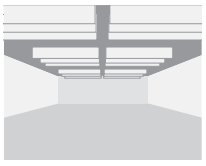
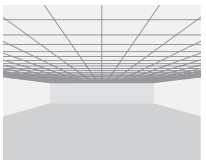
Reverberation Time (RT) is the persistence of sound in an enclosed space after the source of the sound has stopped. The level of the reverberant sound within a room is dependent on both the volume of the room and the amount of sound absorption installed within the room, such that small hard-surfaced rooms are “louder” than large well-treated rooms.

Rules of thumb:
Short RTs (< 1 sec) are preferred for high-quality speech intelligibility in classrooms and open plan office spaces.
Long RTs (> 1.4 sec) are preferred for lively acoustic environments such as auditoriums and hospitality.

Acoustical solutions, like Canopies, Clouds, Baffles or Blades™ vertical elements installed in a way that covers 20% to 50% of the ceiling, will provide significant reverberation time improvement to an exposed structure installation, since sound is absorbed from both the front and back of the panels. Blades are especially effective as the required coverage is much smaller to get the RT reduction because most of the surface area is vertical.

Our acousticians have done the math for you on the product recommendation charts on pages 32 and 33. You'll be able to compare products to see the recommended coverage for GOOD, BETTER, or BEST performance levels to reduce reverberation times.

Comparison: Exposed Structure Options Versus Continuous Ceiling

Example:	Exposed Structure	Blades™ & Baffles	Direct-To-Deck	Canopies & Clouds	Continuous Ceiling
					
1,000 SF Exposed Structure (40' x 25'), 15' to deck, drywall with 20% window coverage and commercial carpet	**No Treatment (0% Coverage)**	**SoundScapes® Blades (4% ceiling coverage, 196 ft² of material)**	**InvisAcoustics™ (50% coverage)**	**SoundScapes® Shapes (50% coverage)**	**Continuous Optima® Ceiling (100% Coverage)**
Deck	**Exposed Structure**	**30 Blades (10 x 94 x 2")**	**62 Panels (24 x 48 x 3/4")**	**32 Shapes 48" x 48" Squares**	**Suspended 60" Below Deck**
Absorption	0	1.38 Sabins/ft²	0.75 NRC	1.49 Sabins/ft²	0.90 NRC
Reverberation Time (RT)	2.4 sec	1.2 sec	1.1 sec	0.8 sec	0.5 sec
	Short RTs (< 1 sec) are preferred for high-quality speech intelligibility in classrooms and open plan office spaces. Long RTs (> 1.4 sec) are preferred for lively acoustic environments such as auditoriums and hospitality.				
Reverberation Time Improvement	–	50%	54%	67%	79%
Noise Reduction	–	-2.0 dB	-2.6 dB	-3.6 dB	-4.5 dB

EXPOSED STRUCTURE SPACES

RECOMMENDATIONS TO REDUCE REVERBERATION TIME & IMPROVE ACOUSTICS

For each of the products featured in this brochure, here are recommendations for the square-foot coverage suggested to reduce reverberation times at three different levels:

BEST levels are recommended to meet specific standards, such as ANSI S12.60 in classrooms, LEED® and WELL Building Standards.

BETTER levels are appropriate for medium-to-large spaces like cafeterias, corridors, and lobbies where speech privacy is not critical.

GOOD levels are suitable for large, casual spaces for music performance and hospitality.

The examples that follow demonstrate how much product is needed in order to treat a sample 1,000 square-foot area to achieve GOOD, BETTER, and BEST levels of reverberation time reduction to create quieter spaces.

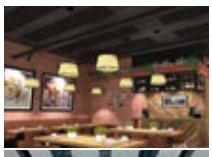
Contact your Armstrong Ceilings Representative or TechLine (1 877 276 7876) for a detailed reverberation time calculation for your project.

SPOTLIGHT™ ACOUSTICS BLADES™ & BAFFLES	Model Room: 1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	Reverberation Time (RT): GOOD RT=1.4s	BETTER RT=1.0s	BEST RT=0.6s
MetalWorks™ Blades™ Page 8	Area of Blades™	240 ft²	477 ft²	1005 ft²
	# of 4 x 96 x 1" Blades™	90	179	377
	% of Deck Coverage	6%	12%	25%
SoundScapes® Blades™ Pages 6-7	Area of Blades™	141 ft²	281 ft²	604 ft²
	# of 22 x 46 x 2" Blades™	20	40	86
	% of Deck Coverage	1%	3%	6%
Soundsoak® Baffles Page 10	Area of Baffles	112 ft²	216 ft²	464 ft²
	# of 24 x 48 x 2" Baffles	14	27	58
	% of Deck Coverage	1%	2%	4%
Tectum® Baffles Page11	Area of Baffles	600 ft²	1,184 ft²	2,496 ft²
	# of 24 x 48 x 1" Baffles	75	148	312
	% of Deck Coverage	3%	5%	10%
Tectum® Blades™ Page 9	Area of Blades™	600 ft²	1,184 ft²	2,496 ft²
	# of 24 x 48 x 1" Blades™	75	148	312
	% of Deck Coverage	3%	5%	10%










	Model Room	Reverberation Time (RT)		
SPOTLIGHT™ ACOUSTICS CLOUDS & CANOPIES	1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD RT=1.4s	BETTER RT=1.0s	BEST RT=0.6s
Formations™ Page 16	Area of Clouds	256 ft²	512 ft²	1,088 ft²
	# of 96" x 96" Ultima® Squares	4	8	N/A
	% of Deck Coverage	26%	51%	N/A
MetalWorks™ Canopies Page 18	Area of Canopies	168 ft²	336 ft²	720 ft²
	# of 72" x 48" Canopies	7	14	30
	% of Deck Coverage	17%	34%	72%
Serpentina® Pages 20-21	Area of Clouds	192 ft²	384 ft²	768 ft²
	# of 96" x 96" Clouds	3	6	12
	% of Deck Coverage	19%	38%	77%
SoundScapes® Shapes Pages 14-15	Area of Shapes	192 ft²	386 ft²	784 ft²
	# of 48" x 48" Shapes	12	23	49
	% of Deck Coverage	19%	37%	78%
Tectum® Shapes & Clouds Page 17	Area of Clouds	368 ft²	704 ft²	N/A
	# of 48 x 48 x 1-1/2" Clouds	23	44	N/A
	% of Deck Coverage	37%	70%	N/A
WoodWorks® Canopies Page 19	Area of Canopies	384 ft²	736 ft²	1,632 ft²
	# of 72" x 48" Canopies	12	23	N/A
	% of Deck Coverage	38%	74%	N/A
DIRECT-TO-DECK ACOUSTICS DIRECT-ATTACH	1,000 ft² Exposed Structure (15' to metal deck), drywall with 20% window coverage, commercial carpet	GOOD RT=1.4s	BETTER RT=1.0s	BEST RT=0.6s
InvisAcoustics™ Basics Pages 24-25	Area of Ceiling Panels	280 ft²	560 ft²	N/A
	% of Deck Coverage	28%	56%	N/A
MetalWorks™ Capz™ Pages 26-27	Area of MetalWorks™ Panels	200 ft²	400 ft²	850 ft²
	% of Deck Coverage	20%	40%	85%
SoundScapes® Blades™ Page 28	Area of Blades™	141 ft²	281 ft²	604 ft²
	# of 22 x 46 x 2" Blades™	20	40	86
	% of Deck Coverage	1%	3%	6%
Tectum® Direct-Attach Panels Page 29	Area of Ceiling Panels	214 ft²	420 ft²	900 ft²
	% of Deck Coverage	21%	42%	90%

N/A indicates that the option is not recommended to achieve a BEST level reverberation time.
Coverage level suggests a wall-to-wall ceiling is a better choice to achieve recommended reverberation times.
"% of Deck Coverage" is defined as the visible deck area covered by a ceiling solution.

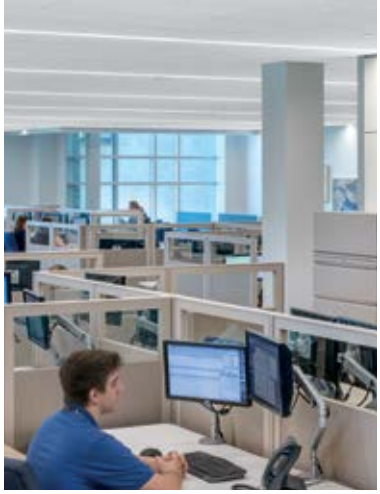
ABOUT ACOUSTICS

WALL-TO-WALL CEILINGS

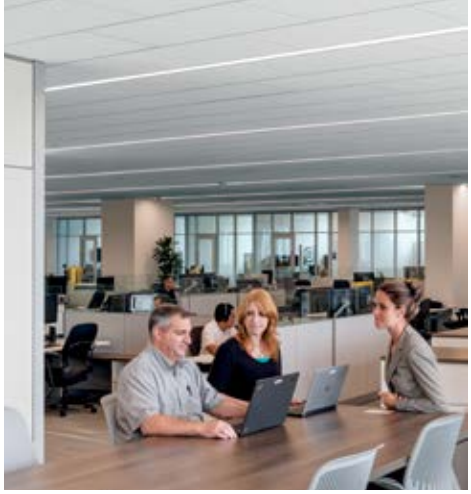
When Speech Privacy is a need, exposed structure solutions do not deliver sound blocking, or CAC (Ceiling Attenuation Class), which is essential to creating confidentiality.

If one moment your space requires you meet privacy needs, and the next moment team members are concentrating or collaborating, then choosing a Total Acoustics® ceiling system, with the ideal combination of sound absorption, NRC (Noise Reduction Coefficient) and sound blocking, CAC (Ceiling Attenuation Class) will give you the needed acoustical attributes for the space.

$NRC_{ABSORB} + CAC_{BLOCK} =$ Total Acoustics®



FOCUS SPACES



COLLABORATIVE SPACES

CONFIDENTIAL SPACES

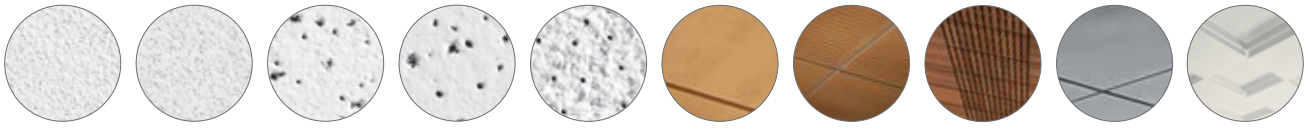
Our Good, Better, Best options help you select the right products for your design. Look for the Total Acoustics® icon on data pages if this performance is desired.

TOTAL ACOUSTICS®

BEST Total Acoustics = NRC 0.80+ and CAC 35+

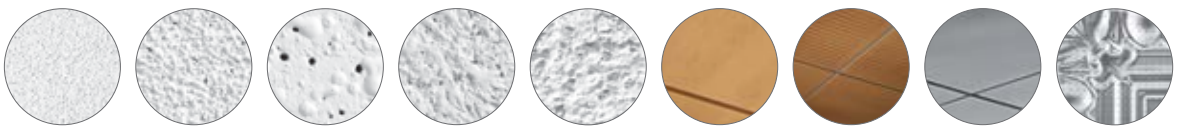
	Infill Panel: 2820	2820	2820	2820	2820	1713
new new Calla® / Calla® High CAC Calla® Shapes	Lyra® PB High CAC	Ultima® / Ultima® Health Zone Ultima® High NRC	WoodWorks® Tegular	WoodWorks® Channeled Tegular	WoodWorks® Grille Tegular	MetalWorks™ Tegular	MetalWorks™ 3D	TECTUM® Tegular

BETTER Total Acoustics = NRC 0.70–0.75 and CAC 35+



	Infill Panel: 1713 or 2820	1713 or 2820	1713	1713	1713
new Ultima® Ultima® Shapes	Ultima® Health Zone™	Fine Fissured™ High NRC	School Zone® Fine Fissured™	Cirrus® / Cirrus® High NRC	WoodWorks® Tegular	WoodWorks® Channeled Tegular	WoodWorks® Grille Tegular	MetalWorks™ Tegular	MetalWorks™ 3D

GOOD Total Acoustics = NRC 0.60–0.65 and CAC 35+



	Infill Panel: 1713	1713	2820	2820
Canyon®	Mesa™	School Zone® Georgian™	Cirrus® Second Look®	Cirrus® Profiles	WoodWorks® Tegular	WoodWorks® Channeled Tegular	MetalWorks™ Tegular	MetalWorks™ Tin

For WoodWorks®, MetalWorks™ and Tectum® Solutions: Acoustics performance is determined by the product, perforation, and infill panel. (Tectum® ceilings are not perforated)

TAKE THE NEXT STEP

1 877 276 7876

Customer Service Representatives
7:45 a.m. to 5:00 p.m. EST
Monday through Friday

TechLine – Technical information, detail drawings, CAD design assistance, installation information, other technical services – 8:00 a.m. to 5:30 p.m. EST, Monday through Friday. FAX 1 800 572 8324 or email: techline@armstrongceilings.com

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Contractor installation assistance

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helping to bring your one-of-a-kind ideas to life

On the cover: ▶
SoundScapes® Shapes Acoustical Clouds in White
Twitter, San Francisco, CA; Interior Architects, San Francisco, CA

Inspiring Great Spaces®

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