

Experience,
Above All™

Armstrong®
World Industries

Acoustical Design & Solutions Guide



At Armstrong, We See Sound

Acoustics are essential to great design and occupant well-being. That's why we offer the highest quality acoustical ceiling panels and acoustical wall panels. We can help you get the acoustics right in any space from wall-to-wall ceilings, to exposed structure solutions, and walls – with no sacrifice to aesthetics and no limitations to imagination.

At Armstrong, we are acoustics.



Shaping Sound

Some artists work in oils. Others in watercolors. At Armstrong, we work in sound. Because, when placed in the capable hands of architects, designers, and acousticians, sound becomes a medium in and of itself – being shaped, directed, and manipulated. Sound can be sculpted to form the perfect composition for any space or activity.

Managing acoustics is more than a technical process. It's a craft that requires expertise, precision, vision – and a complex palette of materials and techniques – to raise auditory experiences to an art form.

We see sound so you can hear the difference.



Getting the Right Acoustic Solutions for Your Spaces

Ultima® ceiling panels
 Colder Products Company
 Global Headquarters
 Hagen, Christensen
 & McIlwain Architects

Solutions

Spaces



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Continuous Ceilings

Acoustical solutions for wall-to-wall spaces

For continuous ceilings, choosing a ceiling panel that provides both sound absorption and sound blocking is best to reduce noise and improve speech privacy. Armstrong® Total Acoustics® ceilings provide the ideal combination of sound absorption and sound blocking in one ceiling panel. With Total Acoustics ceilings, you'll have the flexibility to meet acoustical needs as the space evolves.

With three levels of sound absorption and high sound-blocking, panels with Total Acoustics performance make it easy to choose the right ceiling for every space, every time.

Ultima® High NRC
ceiling panels
Cassels Brock
& Blackwell
Gensler

Sound Blocking
Ceiling Attenuation Class (CAC) is a measure for rating the performance of a ceiling system as a barrier to airborne sound transmission through a common plenum between adjacent closed spaces.



Total Acoustics®

NRC + CAC =
Total Acoustics

BEST
NRC 0.80+ | CAC 35+

BETTER
NRC 0.70-0.75 | CAC 35+

GOOD
NRC 0.60-0.65 | CAC 35+

Sound Absorption
Noise Reduction Coefficient (NRC) is a measure for rating the overall sound absorption of a material installed inside a building where sound waves strike surfaces at various angles of incidence.



Calla® Shapes for
DesignFlex®
Perkins + Everitt
Evans Taylor Foster
Childress Architects

Sound absorption is not a substitute for sound blocking

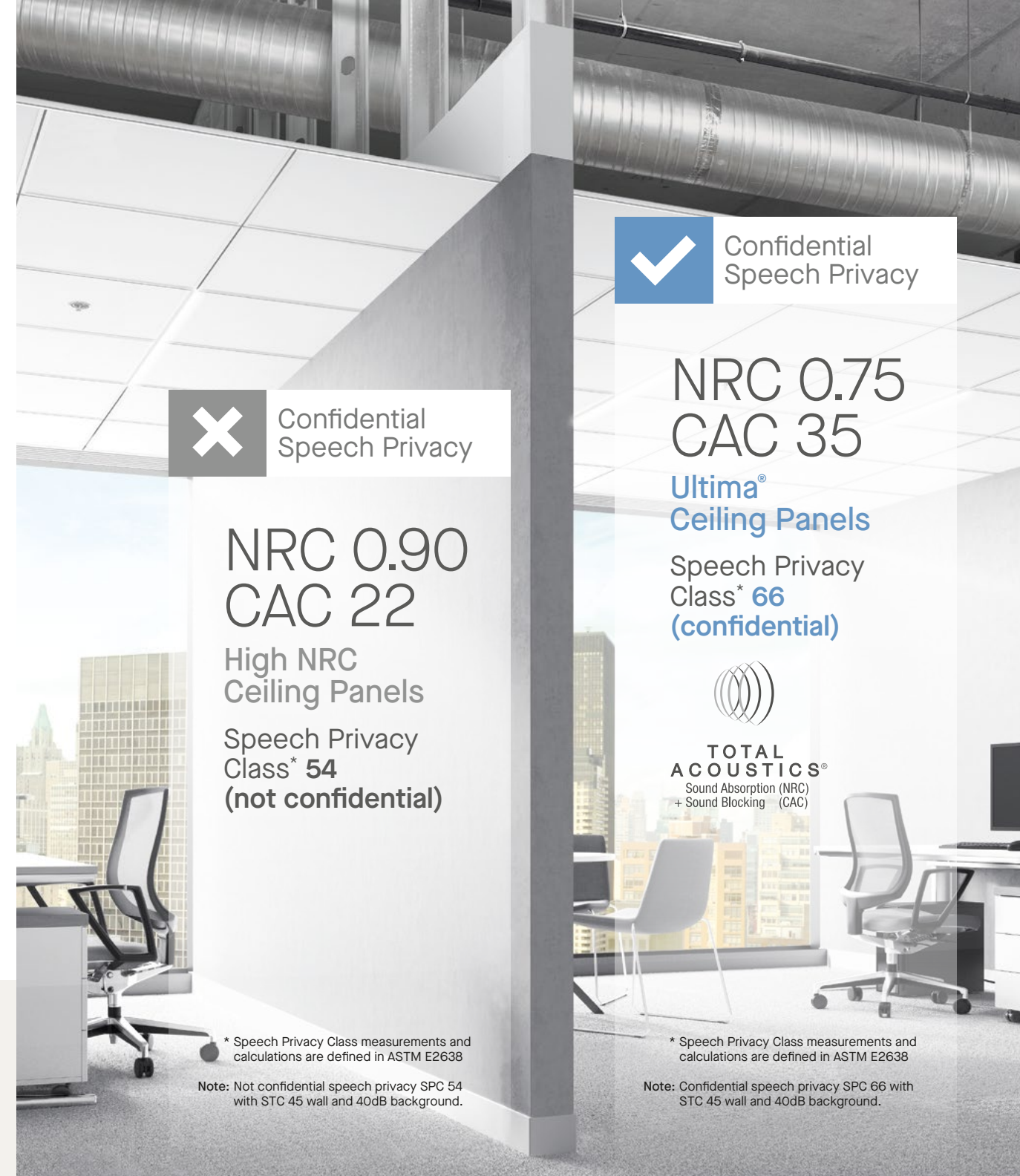
Total Acoustics® ceilings provide the ideal combination of sound absorption and sound blocking in one ceiling panel.

Ceilings with high NRC only can absorb sound within the space – but cannot block sound from leaving or entering the space.

Ceilings with a CAC of 35+ will help block sound from traveling to adjacent spaces through the plenum, providing improved sound isolation, speech privacy, and design flexibility.



Designing an open plan space that doesn't require confidential speech privacy? Consider High NRC only ceiling options to control noise and reverberation time within the space.



Confidential
Speech Privacy

NRC 0.90
CAC 22

High NRC
Ceiling Panels

Speech Privacy
Class* 54
(not confidential)

* Speech Privacy Class measurements and calculations are defined in ASTM E2638

Note: Not confidential speech privacy SPC 54 with STC 45 wall and 40dB background.



Confidential
Speech Privacy

NRC 0.75
CAC 35

Ultima®
Ceiling Panels

Speech Privacy
Class* 66
(confidential)



TOTAL
ACOUSTICS®
Sound Absorption (NRC)
+ Sound Blocking (CAC)

* Speech Privacy Class measurements and calculations are defined in ASTM E2638

Note: Confidential speech privacy SPC 66 with STC 45 wall and 40dB background.

Did you know?

It costs up to 50% less to use a Total Acoustics® ceiling than to install plenum barriers or finish walls to the deck.

Running HVAC duct work, plumbing, and conduit in the plenum above the ceiling makes finishing walls to the deck costly and impractical.



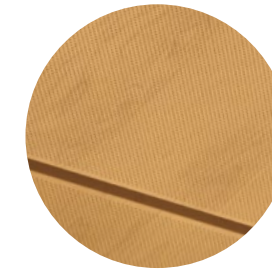
Want help? Request a complimentary Custom Acoustical Report to help get the acoustics right.



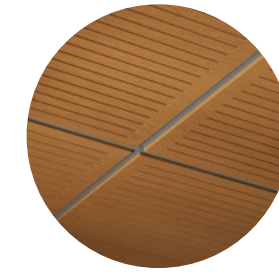
**BEST
BETTER
GOOD**
Performance

Your Choice

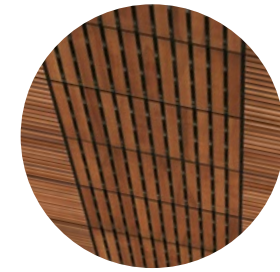
Pair these wood, metal, GRG, and wood-fiber ceilings with an infill panel to reach the level of performance your space needs.



WoodWorks®
Tegular/
WoodWorks®
Shapes



WoodWorks®
Channeled
Tegular



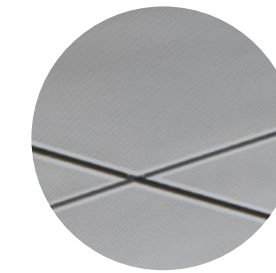
WoodWorks®
Grille Tegular



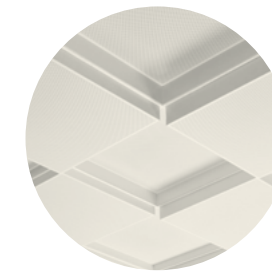
MetalWorks™
Immix



CastWorks™
Metaphors®



MetalWorks™
Tegular



MetalWorks™
3D



Tectum® DesignArt™ -
Lines Tegular



Tectum®
Tegular

WoodWorks® Grille with
Calla® infill panels
Children's Research Hospital
Evans Taylor Foster
Childress Architects

Acoustical performance for these ceilings is determined by the product, perforation, infill panel, and installation method.



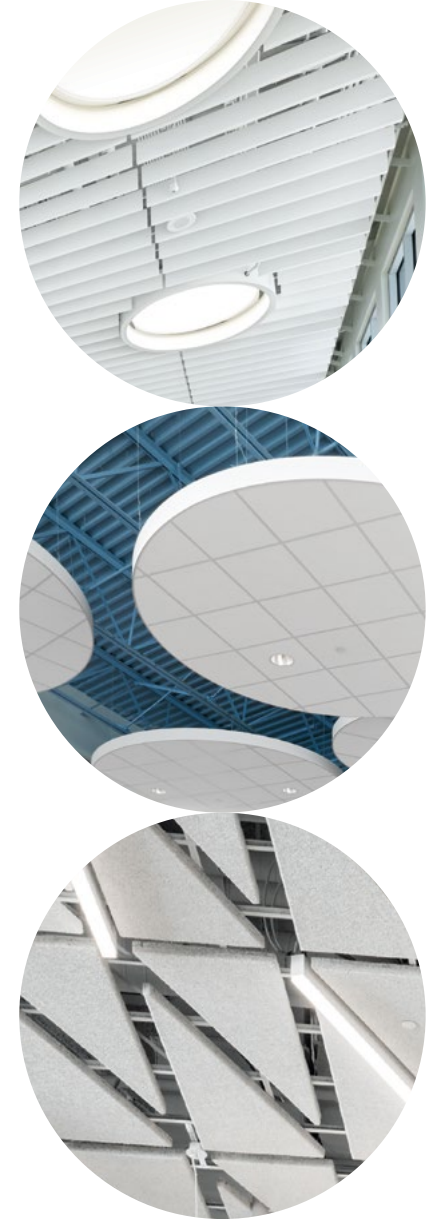
Exposed Structures

Acoustical solutions for industrial-look spaces

Exposed structure spaces with no ceiling can create acoustical problems – noise distractions can make the modern workplace less effective and less productive, inhibit students’ ability to learn, and cause dissatisfaction among restaurant clientele struggling to hear and be heard.

Attach treatments to decks and hide them or bring sound-absorbing design into the space.

Achieve the best of both worlds – optimized experiences in the workplace, educational facilities, and hospitality venues – with the right look and less noise in your open ceiling space.



Custom Tectum® Finale™
Maria Weston Chapman
Middle School
HMFH Architects, Inc



Get Inspired:
View exposed structure
spaces on the photo gallery.



Controlling acoustics with blades and baffles

The sound absorption rating (NRC) of an installation is directly correlated to the depth and on-center spacing of the blades. As the design changes so do the acoustics.

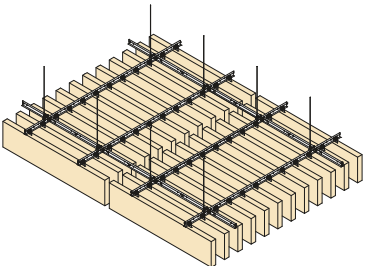
SoundScapes® Blades Acoustical Comparison

NRC ratings based on Panel Depth & O.C. Spacing

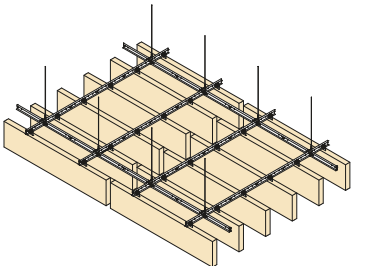
Panel Depth	6" O.C.	12" O.C.	18" O.C.	24" O.C.
	5"	10"	15"	20"
5"	0.80	0.50	0.40	0.30
10"	1.15	0.80	0.60	0.50

NOTE: Tested per ASTM C423 without infill panels. Spacing of blades, blade depth, and acoustical infill panels will impact acoustical performance. Contact TechLine for a custom reverberation time report at: techline@armstrongceilings.com

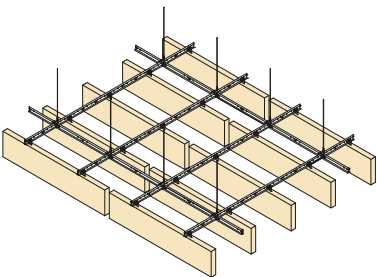
Compare



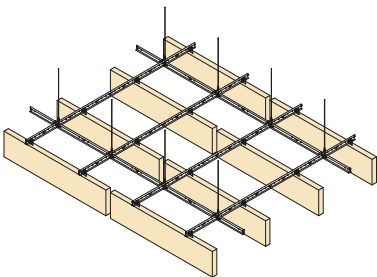
1.15 NRC – 6" O.C. Blade Spacing



0.80 NRC – 12" O.C. Blade Spacing



0.60 NRC – 18" O.C. Blade Spacing



0.50 NRC – 24" O.C. Blade Spacing

Custom MetalWorks™ Blades
Adobe North Tower
Gensler

Reverberation Time (RT)
RT is the time it takes the sound to fade away after the source of the sound has ceased.



Want help? Request a complimentary Custom Acoustical Report to help get the acoustics right.



Custom CastWorks™ GRG walls
UC Riverside School
of Medicine
Hensel Phelps,
CO Architects

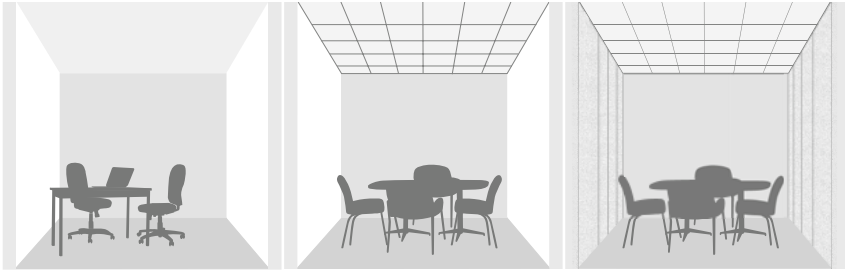
Sound Transmission Class (STC)
STC is a measure for rating the performance of a wall system as a barrier to airborne sound transmission between adjacent closed spaces, such as offices. STC is the wall equivalent of CAC.

Wall Applications

Enhance design
and acoustics with
walls and partitions

Acoustical wall treatments offer an additional option to further reduce noise. Measures for walls are stated in STC and NRC values. Adding wall treatments, in addition to an acoustical ceiling, can reduce reverberation time by 87%.

Compare



In-Room Sound Quality	Noise Reduction Coefficient (NRC)	0.05	0.75	0.75 / 0.60
	Reverberation Time (RT)	2.05 seconds	0.49 seconds	0.26 seconds
	Reverberation Time (RT) Improvement	Reference	76%	88%
Room-to-Room Sound Quality	Shared Wall STC Rating	38	38	43
	Ceiling Attenuation Class (CAC) Value	50	35	35
	Speech Privacy Class – SPC At 40dB Background Sound	67 (confidential)	64 (confidential)	74 (confidential)



Want help? Request a complimentary Custom Acoustical Report to help get the acoustics right.

Comparisons based on 320 SF Closed Conference Room (20' x 16'), 10' ceiling height, drywall, vinyl floor.



Tectum® DesignArt™ –
Shapes direct-attach
wall panels

Wall options for every space and design

Walls offer a wide range of design and acoustical performance options to effectively control noise in any space.



Need More Information?
Download a PDF of the
perforation brochure.



Custom WoodWorks®
micro-perforated ceiling
and wall panels



Acoustic Design For Education

Making the grade

Good acoustical design in schools addresses high performing learning environments for students and for teachers. Excessive reverberation and noise in a classroom interferes with a student’s ability to clearly hear their teacher. In fact, studies indicate that students typically hear only 3 out of every 4 words in the classroom. Good acoustical design promoting high speech intelligibility is key to understanding and learning.



School Zone® Fine Fissured™ ceiling panels

Ultima® ceiling panels
SCU Sobrato Hall
ZGF Architects



AcoustiBuilt® Seamless Acoustical Ceiling System
North Bend Elementary
PBK

ANSI/ASA S12.60 American National Standard	Acoustical Performance Criteria, Design Requirements and Guidelines for Schools
Background Sound	Max 35dBA (from HVAC)
Reverberation Time	< 0.60 seconds
	Sound blocking between spaces/classrooms is critical to minimize distraction and preserve speech privacy. A ceiling with a CAC of 35+ and wall STC of 50+ will work together to provide proper noise isolation.



Learn More:
Browse recommended solutions and resources



Acoustic Design For Healthcare

Caring for outcomes

Healthcare facilities require effective acoustic design as a functional necessity for speech privacy, in compliance with the federally mandated HIPAA privacy rule. This means that wherever patient information is being discussed in the presence of others, speech sounds must be controlled or absorbed. Therefore, administrative areas where multiple patients are seen will need spaces with high NRC, CAC, and STC ratings to prevent the unwanted and unlawful dissemination of a patient’s private information.



TechZone® with Optima® Field Panels
MetalWorks™ Blades - Classics
United Healthcare
Administrative Building
Neenan Archistruction

Calla® Shapes
for DesignFlex®
Children's
Research Hospital
Evans Taylor
Foster Childress
Architects



Optima® Tegular
ceiling panels
Penn State Health
Pediatric Hospital
Greenfield Architects
Noelker and Hull
Associates

FGI Facilities Guidelines Institute	Guidelines for the Design and Construction of Hospitals (2022)
Background Sound	Up to 45dBA for patient rooms
Reverberation Time	0.5 to 0.6 seconds for patient rooms
	Sound blocking between healthcare spaces is critical to maximize sound isolation and create speech privacy. A ceiling with a CAC of 35+ and wall STC of 45+ will work together to provide proper noise isolation.



Learn More:
Browse recommended
solutions and resources



Acoustic Design For Office Spaces

Doing the job well

Good acoustic design in contemporary workplace environments addresses both quiet concentration and energetic collaboration. Studies have shown that noise at the office reduces worker effectiveness, raises stress, and lowers employee satisfaction. To address these issues, speech privacy and excessive reverberation time can be directly addressed using appropriate acoustical design solutions.

Tectum® DesignArt™ –
Lines ceiling panels
801 Second
Avenue Office
LMN Architects

MetalWorks™
Blades – Classics
and Fine Fissured™
ceiling panels
RedThread
QA+M
Architecture



Ultima®
ceiling panels
RedThread
QA+M
Architecture

LEED®	Leadership in Energy and Environmental Design
Background Sound	35dBA to 48dBA for open-plan spaces
Reverberation Time	0.6 seconds maximum for private offices
	Sound blocking between office spaces is critical to minimize distraction and preserve speech privacy. For private offices, a ceiling with a CAC of 35+ and wall STC of 35+ will work together to provide proper noise isolation.



Learn More:
Browse recommended
solutions and resources



We're serious about acoustics

We offer the most comprehensive portfolio of acoustical solutions in the industry. Over the last century, Armstrong has helped to shape the acoustical codes, standards, and testing that have improved the built environment for occupants today.

From our in-house third party certified NVLAP accredited acoustics lab to our extensive offering of UL® certified acoustical ceiling options. Nobody knows acoustics like Armstrong.

Lyra® PB Ceiling Panels
Minneapolis American Indian Center
Cunningham & Full Circle
Indigenous Planning + Design

Keep learning

Continue learning about acoustics and earn CEUs with on-demand and rep-hosted courses:

armstrongceilings.com/ceu

armstrongceilings.com/findarep



How Can We Help You?

1 877 276 7876

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

TechLine – Custom reverberation and privacy index calculation reports, 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

armstrongceilings.com/commercial

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Standard and custom product information
Online catalog
CAD, Revit®, SketchUp® files
A Ceiling for Every Space® Visual Selection Tool
Product literature and samples – express service or regular delivery
Contacts – reps, where to buy, who will install

 **ProjectWorks®**

armstrongceilings.com/projectworks

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ProjectWorks offers cutting-edge collaborative design services to ensure your projects are completed with unmatched precision and efficiency.
Receive 2D layouts, material budgets, and detailed 3D Revit® models to speed up project timelines and improve coordination.
Design with confidence. Partner with ProjectWorks today! Get started at armstrongceilings.com/projectworks

Photo above: Optima® Create!

Cover photo (Left to Right): CastWorks® GRG walls, SoundScapes® Blades, Ultima® High NRC ceiling panels

armstrongceilings.com/acoustics

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