Acoustical Design
& Solutions Guide



Armstrong®
World Industries

Less Noise,
More Design Freedom

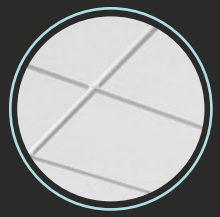
Complete Acoustic Solutions

The way a space sounds defines how people work, communicate, and feel within it. In commercial environments, acoustics shape far more than ambiance. They determine whether conversations are heard clearly, teams stay focused, and occupants leave the day refreshed rather than drained. Yet many interiors face the same obstacles: loud reverberation that makes speech unintelligible, excess noise that distracts, and poor sound clarity that leaves listeners straining to follow a conversation.

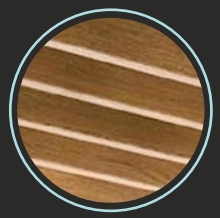
Thoughtful acoustic design solves each challenge at its source, sharpening speech intelligibility and shaping spaces where productivity rises, comfort improves, and occupant well-being follows. Through informed design guidance and dedicated acoustic problem-solving, Armstrong helps architects bring bold ideas to life, with less noise.



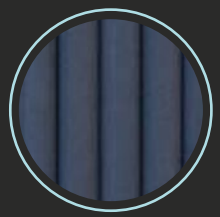




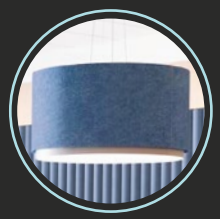
Calla®
Ceiling Panels



MetalWorks®
Blades – Classics



Turf® Reed
Wall Panels

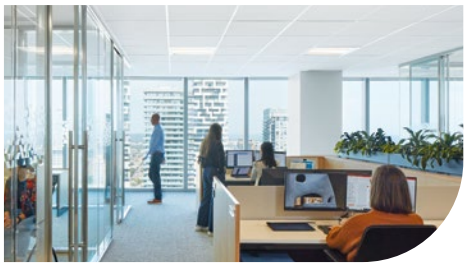


LightArt®
Acoustic Shade

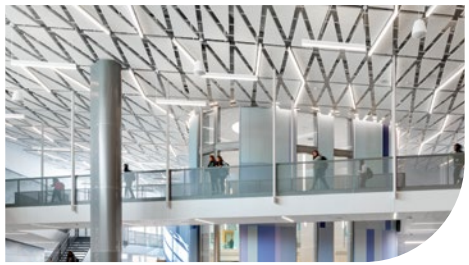


The Right Acoustic Solutions for Your Spaces

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Ultima® Ceiling Panels
Colder Products Company
Global Headquarters

Hagen, Christensen
& McIlwain Architects

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.

Want help?

Request a complimentary Custom Acoustical Report at armstrong.com/acousticalreport to help get the acoustics right



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.



Ultima® High NRC Ceiling Panels
Cassels Brock & Blackwell

Gensler

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 Absoption
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.



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.

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.

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.

AcoustiBuilt® Seamless Acoustical Ceiling System
Southern First Bank

SMHa



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)

*Speech Privacy Class measurements and calculations are defined in ASTM E2638
Note: Confidential speech privacy SPC 66 with STC 45 wall and 40dB background.



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



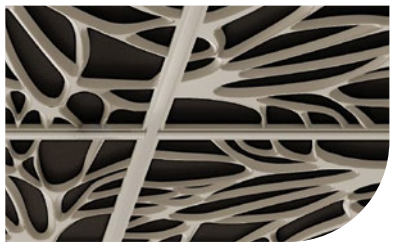
WoodWorks® Channeled Tegular



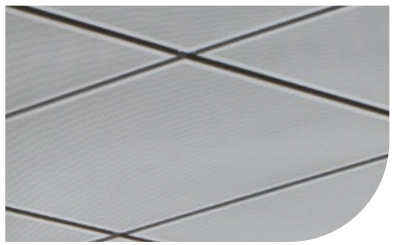
WoodWorks® Grille Tegular



MetalWorks™ Immix®



CastWorks® Metaphors®



MetalWorks™ Tegular



MetalWorks™ 3D



Tectum® DesignArt® – Lines Tegular



Tectum® Tegular



FeltWorks® Blades
& Beams – VarAffix®

WoodWorks® Grille with Calla® Infill Panels
Children's Research Hospital

Evans Taylor Foster
Childress Architects

Note:
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.

Want help?

Request a complimentary Custom Acoustical Report at armstrong.com/acousticalreport to help get the acoustics right







Custom Tectum® Finale™ Ceiling Panels
Maria Weston Chapman Middle School

HMFH Architects, Inc.

Controling Acoustics with Blades and Baffles

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

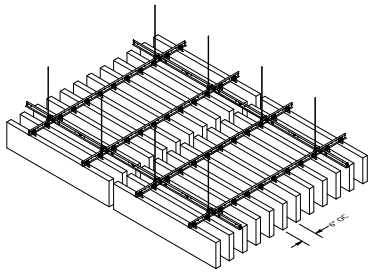
SoundScapes® Blades Acoustical Comparison

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

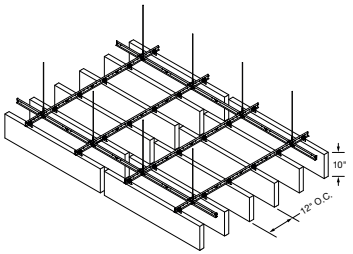
Panel Depth	6" O.C.	12" O.C.	18" O.C.	24" O.C.
5"	0.80	0.50	0.40	0.30
10"	1.15	0.80	0.60	0.50

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

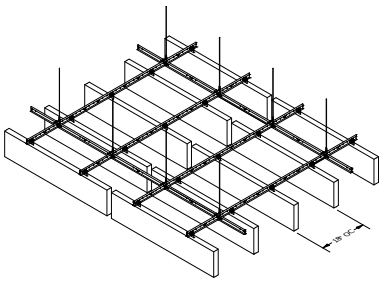
Compare



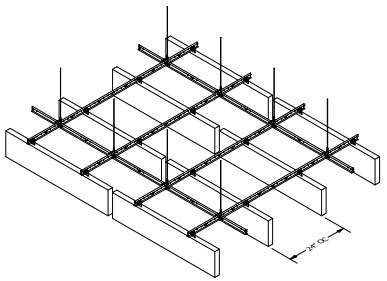
1.15 NRC –
6" O.C. Blade Spacing



0.80 NRC –
12" O.C. Blade Spacing



0.60 NRC –
18" O.C. Blade Spacing



0.50 NRC –
24" O.C. Blade Spacing

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@armstrong.com

SoundScapes® Blades
Tachi Palace Casino Resort

Cunnigham Group


FOOD IS MY BEST FRIEND
TACHI PALACE CASINO RESORT
THE MARKETPLACE
PICK UP ORDERS HERE
GOOD FOOD with GOOD FRIENDS
SATISFACTION 100% GUARANTEED
FULL MENU
TACHI PALACE CASINO RESORT
MARKET
PORK CHOP HILL



Wall **Applications**

Enhance Design and Acoustics with Walls and Partitions

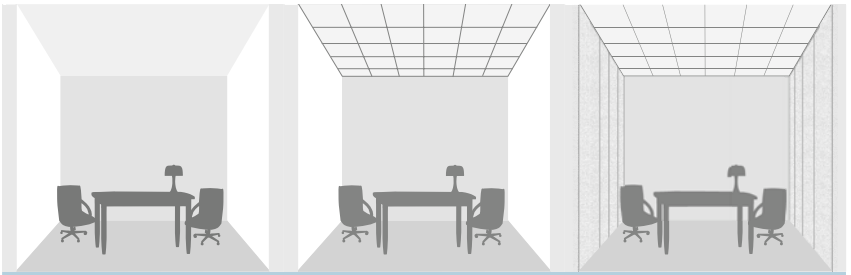
Acoustical wall treatments offer an additional option to further reduce noise. Measures for walls are stated in STC and NRC values. Adding wall treatments, in addition to an acoustical ceiling, can reduce reverberation time by 87%.

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3form Elements
Hush Stack Rendering

Compare



		No Treatment (Drywall Ceiling)	Acoustical Ceiling (Ultima® 0.70/35)	Acoustical Ceiling (Ultima 0.75/35) and two Soundsoak® 60 Walls (NRC 0.60)
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 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)

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.

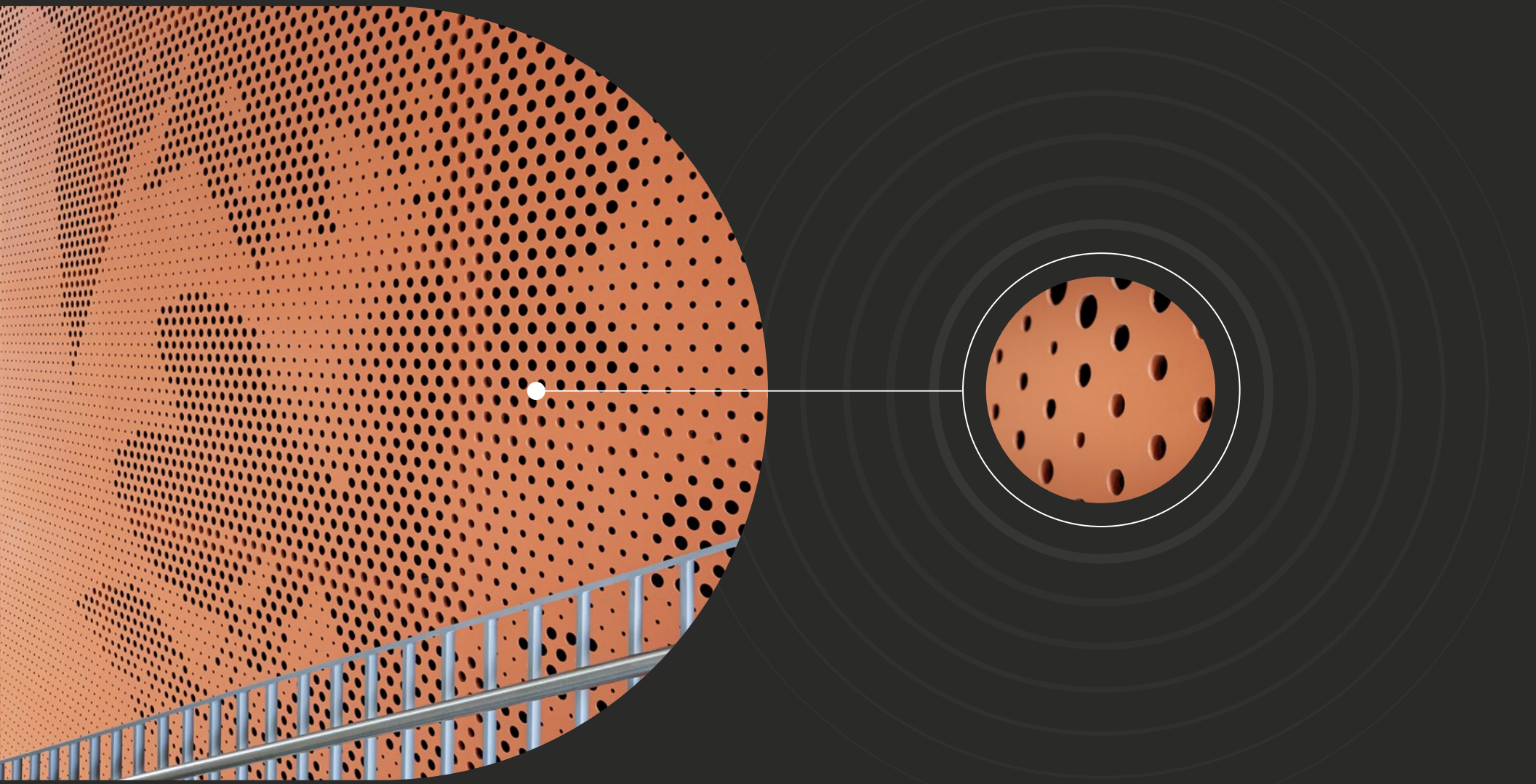
Wall Options for Every Space and Design

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

Available in a variety of finishes, panel configurations, and installation styles, wall systems can complement the overall design while improving speech clarity and reducing unwanted reverberation. Perforation options—including standard, micro-perforated, and custom patterns—can be selected to balance visual character with targeted sound absorption.

When paired with appropriate acoustic backing or insulation, perforated wall panels help manage reflections and create more comfortable, functional environments for offices, education, hospitality, performance, and public spaces.





CastWorks® GRG Custom Perforated Wall Panels
UC Riverside School of Medicine

Hensel Phelps, CO Architects



Acoustic Design for **Education**

Making the Grade

Good acoustic design in schools addresses high performing learning environments for students and for teachers. Excessive reverberation and noise in a classroom interferes witha 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.

Want help?

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Arktura® Atmosphera® Analog 3D
North Bend Elementary

PBK

Ultima® Templok®
Ceiling Panels

City Island Library



Acoustical Requirements

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.



Calla® Shapes for DesignFlex®
Saratoga Springs High School

Mosaic Associates Architects



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.

Want help?

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Optima® Ceiling Panels
Penn State Health Pediatric Hospital

Neenan Archistruction

Calla® Shapes for DesignFlex®
Children's Research Hospital

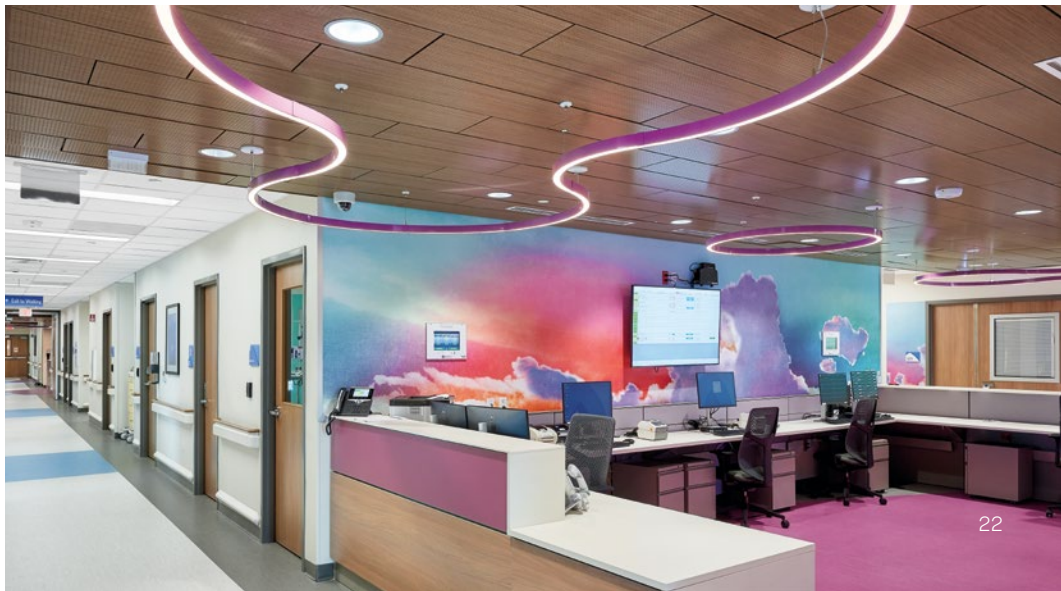
Evans Taylor Foster
Childress Architects



Acoustical Requirements

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.



Ultima® Health Zone™ and WoodWorks® Vector® Ceiling Panels
Dell Children's Medical Center - North Campus

HKS



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.

Want help?

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Calla® Ceiling Panels
Clarkson Platou

PDR

MetalWorks™ Blades - Classics and Fine Fissured™ Ceiling Panels
RedThreadCampus

QA+M Architecture



Acoustical Requirements

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.



Turf® Slab Acoustical Ceiling Baffle and Turf® Slab LED Acoustical Ceiling Baffle
Worthington Armstrong Venture Offices

D2 Groups

The Experts in **Acoustics**

Armstrong offers the industry's most comprehensive portfolio of acoustical solutions and, for more than a century, has helped shape the acoustical codes, standards, and testing methods that have improved the built environment for today's occupants.

From an in-house, third-party-certified NVLAP-accredited acoustics laboratory to an extensive portfolio of UL® certified acoustical solutions, Armstrong brings unmatched expertise to the industry.

Keep Learning

Continue learning about acoustics and earn CEUs with on-demand and rep-hosted courses:
armstrong.com/ceu
armstrong.com/findarep





Ultima® High NRC and
Tectum® Tegular Ceiling Panels
Beiersdorfl

Armstrong®
World Industries

How Can We **Help You?**

1 877 276 7876

Customer Service Representatives
7:45 a.m. to 5:00 p.m. ET
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. ET, Monday through Friday.
Email: techline@armstrong.com

armstrong.com/commercial

Latest product news

Standard and custom product information

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®

armstrong.com/projectworks

The power of ProjectWorks® Design and Pre-construction Service

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.

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armstrong.com/acoustics

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BPCS-7276-1026



On the Cover: Calla® Ceiling Panels, Turf® Reed Wall Panels, MetalWorks™ Blades - Classics, and LightArt® Acoustic Shade