CertainTeed
SAINT-GOBAIN

ACOUSTICAL DESIGN FOR OPEN SPACES

Creative alternatives to suspended ceilings

Creative freedom and acoustic control – no grid required

The design opportunities presented by modern open spaces create a unique set of challenges when it comes to acoustics. Influences as diverse as the creative reuse of factories to the benefits of daylighting have contributed to the popularity of open plenums, exposed structures and the use of glass, wood, metal, polished concrete and other acoustically reflective materials.

A wall-to-wall suspended ceiling may be the most effective acoustic solution, but it's not always an option — for structural reasons as well as design preferences. In adaptive reuse or renovation situations, acoustic solutions often have to accommodate existing HVAC ductwork, plumbing and fire protection systems.

When design dreams and structural realities demand a creative alternative, CertainTeed Ceilings has the sound-absorbing clouds, baffles, direct-to-deck and wall panels you need to elevate your designs with outstanding acoustic control.

And our Technical Services team provides the advice to ensure you get the right ceiling for the space.

Left: *Ecophon® Solo™ Clouds* ***Above:*** *Ecophon® Solo™ Baffles*

Acoustic fundamentals for open spaces

The primary acoustic concern in open spaces is **reverberation time (RT)** — the time it takes for the sound to die off after the source has stopped.

RT is directly impacted by the surface area of sound-absorbing materials in the space. However, properly placed clouds and baffles can absorb a significant amount of sound with less surface area than suspended ceilings because they absorb sound from both sides.

WHAT IS THE RIGHT REVERBERATION TIME FOR A SPACE?

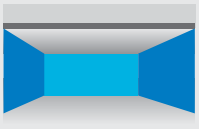
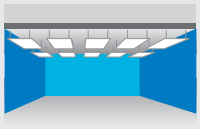
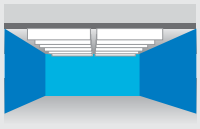
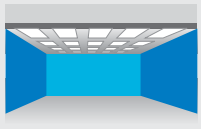
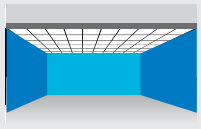
It depends on the purpose of the space.

If the goal is to maximize speech intelligibility — essential for classrooms and office environments — the RT should last less than 1 second. Acoustic ceiling and wall treatments (including clouds, baffles and suspended ceilings) and other acoustically absorptive materials like upholstered furniture, carpet and curtains will shorten RT. Larger room volume will also contribute to shorter RT.

Some areas require a livelier, more energetic sound environment. Restaurants and other social spaces are most comfortable with RT of between 1.4 and 2 seconds. Smaller rooms and acoustically reflective surfaces (glass, drywall, brick, concrete, hard surface flooring, etc.) lead to longer RT. But even energetic spaces require some sound absorption to strike the balance between comfortably lively and just plain loud.

HOW MUCH ACOUSTIC IMPROVEMENT CAN I EXPECT FROM EACH PRODUCT?

IT DEPENDS ON THE AMOUNT OF COVERAGE. THE CHART BELOW COMPARES A WALL-TO-WALL CEILING WITH VARIOUS ALTERNATIVES – INCLUDING NO CEILING AT ALL.

	EXPOSED STRUCTURE: NO CEILING	ECOPHON® SOLO™ CLOUDS 60% COVERAGE	ECOPHON® SOLO™ BAFFLES 30% COVERAGE	ECOPHON® FOCUS™ B, F, SQ DIRECT-TO-DECK	WALL-TO-WALL SUSPENDED CEILING
					
Material required: 1,000 sq. ft. space w/12 ft. ceiling height (12,000 FT³)	—	40 Solo Squares (≈ 620 sq. ft.)	40 Solo Baffles (≈ 310 sq. ft.)	250 Focus SQ/600mm (≈ 1,000 sq. ft.)	125 Symphony f 2 ft. x 4 ft. panels (≈ 1,000 sq. ft.)
RT (reverberation time)	3.2 sec	0.54 sec	1.25 sec	0.66 sec	0.45 sec
Adjusted RT w/addition of 8 panels (2 ctn.) Ecophon Akusto Wall Panel C	1.85 sec	—	0.98 sec	—	—

DIVING INTO DESIGN WITH CLOUDS, BAFFLES AND MORE

The following pages outline key considerations for designing with clouds, baffles, direct-to-deck panels and wall panels, including coverage, placement and quantities. The goal is to jump-start your creativity and give you a basic idea of what you might need for a given project.

READY TO FINE TUNE YOUR DESIGN AND MAXIMIZE ACOUSTIC PERFORMANCE?

To learn more, contact your CertainTeed Ceilings representative, call 800-233-8990 or visit CertainTeed.com/AcousticalDesign.

***Top**: Ecophon® Solo™ Clouds **Left**: Ecophon® Akusto™ One SQ*

Designing with free-hanging clouds

Acoustic clouds are the ultimate tool for design freedom. Different colors, shapes and sizes give designers hundreds of options. And that's just the product itself. Consider positioning, angles, stacking and layering, and the possibilities are as open as the spaces.

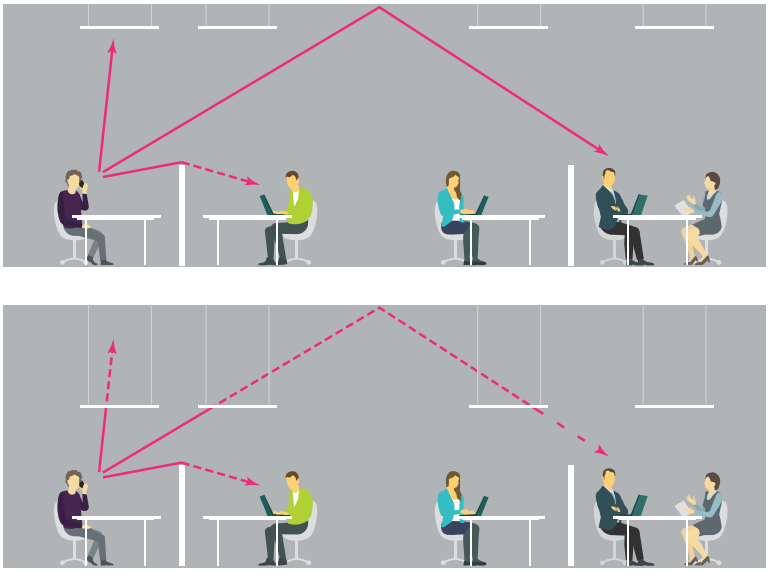
Clouds can also be used with wall-to-wall ceilings to boost noise control in areas where a lot of people are speaking at the same time, such as a call center, reception area or restaurant. Adding lowered clouds directly above tables or desks dramatically reduces the overall noise level and sound propagation.

COVERAGE AND PLACEMENT

On average, 30 - 60% coverage with Ecophon® Solo™ Clouds achieves sound absorption similar to a suspended ceiling. But placement is key to acoustic performance.

The closer to the origin of the sound, the better. In spaces where speech is the primary sound source, installing clouds in the middle of the space rather than close to the ceiling is more efficient, because they absorb sound that has bounced off the deck.

How much more efficient? A 16 square foot absorber (e.g. Solo™ Square) installed 40 inches from the ceiling absorbs 15% more sound than one installed 8 inches from the ceiling. Spacing units at least 18 inches apart also ensures better sound absorption.



Positioning clouds toward the middle of the space allows them to absorb sound from the source as well as sound reflected from the deck above, making them more efficient than clouds installed close to the deck.

CREATIVE APPLICATIONS

From this simple principle, you can let your creativity take over. Clouds of any shape and color can be installed in layers, on angles, at any depth you choose to create anything from minimalist acoustic control to dramatic sculptural installations.

HOW MUCH PRODUCT DOES IT TAKE?

UNITS REQUIRED TO ACHIEVE 30 - 60% COVERAGE IN A 1,000 SQ. FT. SPACE:

□	19 - 38 units of Solo Square (≈ 4′ x 4′)
▭	10 - 19 units of Solo Rectangle (≈ 4′ x 8′ size)
○	56 - 110 units of Solo Circle (≈ 32″ diameter size)
⬭	15 - 29 units of Solo Ellipse (≈ 40″ x 95″)
△	43 - 86 units of Solo Triangle (≈ 41″ x 48″)

Note: Panel dimensions are approximate

Photo: Gianforcaro Architects, Engineers and Planners

Ecophon® Solo™ Clouds

MORE STANDARD COLORS, SHAPES AND SIZES FOR CREATIVE FREEDOM

- 10 standard shapes and 12 sizes
- 16 new standard colors selected to reflect current color trends and customer demand
- Premium painted surface on both sides and edges is standard for a finished look from every angle

WHITE	DARK DIAMOND	CLOUDY DAY	GOLDEN FIELD
SILK SLATE	SILVER STONE	HIGHLAND FOG	MOONLIGHT SKY
MORNING DRIZZLE	OCEAN STORM	SILENT STREAM	SUMMER BREEZE
PALE PEARL	RUBY ROCK	SUNSET HEAT	VOLCANIC ASH

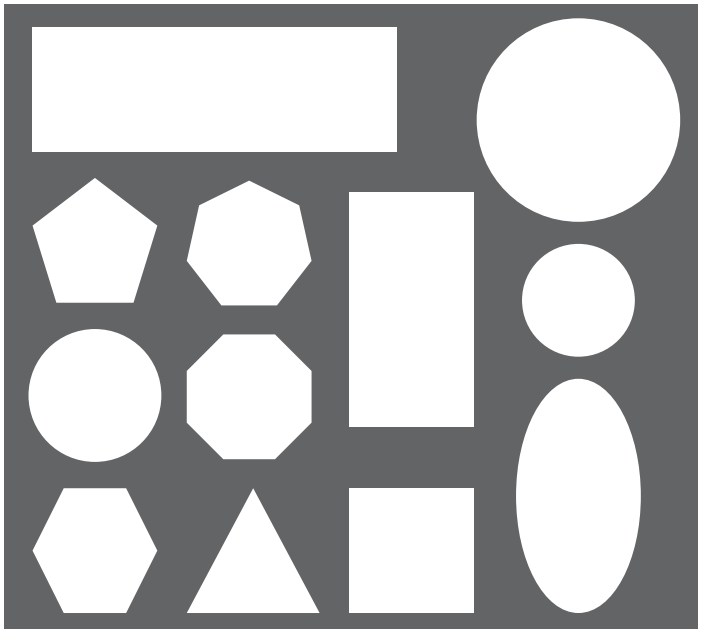
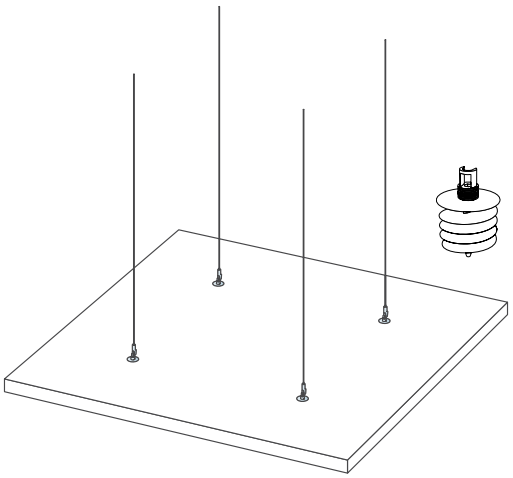
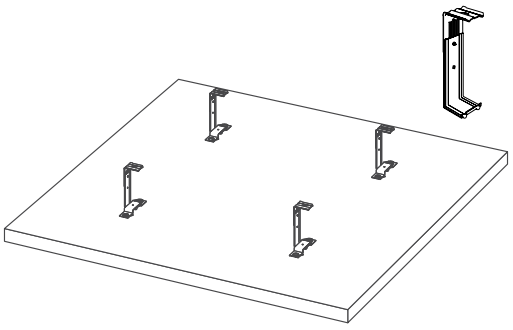


Photo: Eric Laignell

VERSATILE INSTALLATION FOR DESIGN FLEXIBILITY

- Lightweight and resilient high-density fiberglass is easy to handle, yet robust enough to be used in large panels without risk of sagging or requiring extra support.
- Two suspension system options:
  - Adjustable hanger wires
  - Brackets
- One wire can connect to and support up to four layered panels
- Can be angled up to 60° for creative installations
- Lighting fixtures can be installed directly in panels — no sagging or extra support*



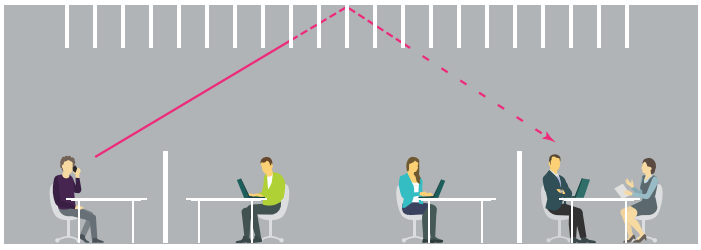


*Size and weight limits apply and vary with panel shape. See installation guide for details.

Designing with baffles

Baffles are distinct from clouds in that they are installed vertically. In spaces with standard proportions and average ceiling heights, baffles can create a uniquely modern linear visual, providing excellent sound absorption with a relatively shallow system depth.

COVERAGE AND PLACEMENT



Like clouds, the square footage of baffles should equal 30 - 60% of the ceiling square footage. Baffles also perform best when they are positioned to allow sound to move between and bounce off them. In the case of baffles, that placement has to do with the distance between them. Sound absorption is optimized when rows or checkerboard patterns are spaced a minimum of 24 inches apart.

CREATIVE APPLICATIONS

In large atriums and clerestory spaces, suspended baffles are an even better option than clouds, as they visually maintain the magnitude of the space without disrupting sight lines to the top of the building.

HOW MUCH PRODUCT DOES IT TAKE?

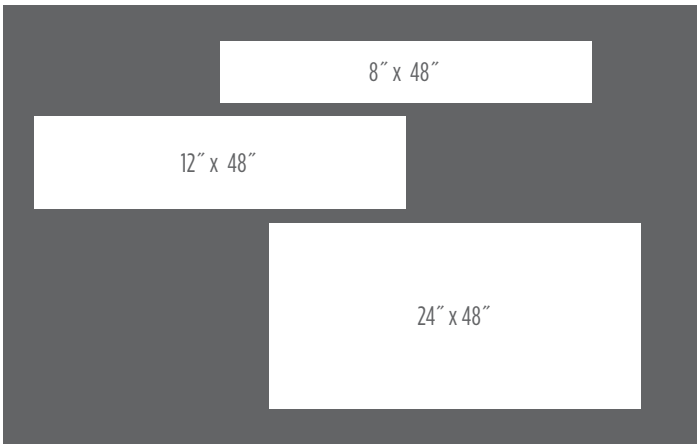
UNITS REQUIRED TO ACHIEVE GOOD SOUND ENVIRONMENT (RT 1 SEC) IN A 20,000 CUBIC FT. SPACE:

	250 units of Solo Baffles (8″ x 48″ size)
	235 units of Solo Baffles (12″ x 48″ size)
	115 units of Solo Baffles (24″ x 48″ size)

Ecophon® Solo™ Baffles

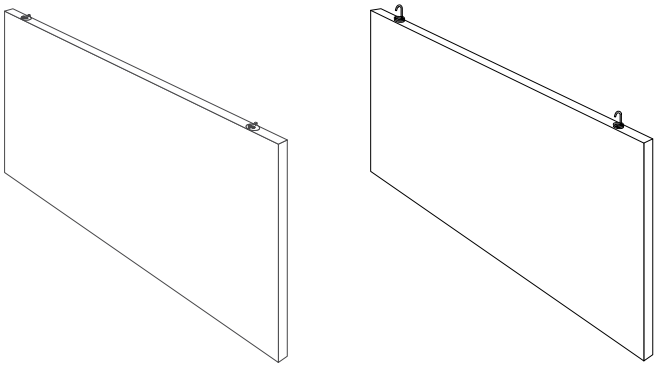
ELEGANT LINES IN A VARIETY OF COLORS AND SIZES

- 16 new standard colors selected to reflect current color trends and customer demand (See page 8 for palette)
- Premium painted surface on both sides and edges standard for a finished look from every angle
- Three size options, one thickness (1.5″ or 40mm)



EASY INSTALLATION

- Lightweight and resilient high-density fiberglass is easy to handle
- Two installation options:
  - Direct anchors
  - Suspended hooks
- Demountable for accessibility



Designing with direct-to-deck panels

With the popularity of adaptive reuse projects in urban areas across the country, it is not surprising that roughly 40% of ceilings are destined for remodeling projects. Remodels, renovations and adaptive reuse projects can be especially challenging. Existing building systems may not allow for suspended ceilings and may even make the placement of clouds and baffles difficult.

Fire suppression systems in particular may dictate ceiling solutions, as they are essential to the space and reconfiguring them is cost-prohibitive. Upright sprinkler heads are one of the main reasons to use a direct-to-deck solution. These panels are also ideal for spaces with low ceilings, angled ceilings, or exposed wood or metal beams.

COVERAGE AND PLACEMENT

Whether the panels are mounted with glue or screws, with an NRC range of 0.75 - 0.80, they have absorption levels similar to high-performance suspended ceiling panels. As a result, they should cover as much of the ceiling as possible.

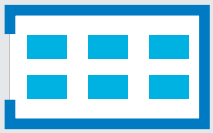
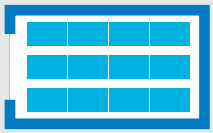
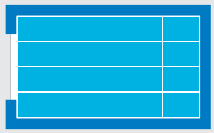
CREATIVE APPLICATIONS

When applied to the entire ceiling, direct-to-deck panels can simulate a monolithic drywall finish while providing excellent sound absorption.

Applied in fields or as individual panels, they can also be used for acoustic remediation in existing spaces like offices, retail and restaurants without causing major interruption to occupied areas.

CHOOSING THE RIGHT PANEL FOR THE APPLICATION

THE RIGHT DIRECT-TO-DECK PANEL FOR THE SPACE DEPENDS ON THE PLACEMENT (AS INDIVIDUAL TILES, FIELDS, OR FULL COVERAGE) AND THE CONDITION OF THE ATTACHMENT SURFACE.

SYSTEM	SINGLE TILES	FIELDS	FULLY COVERING
			
Focus B, glue	●	●	●
Focus SQ, glue	●	●	●
Focus F, screw or glue		●*	●

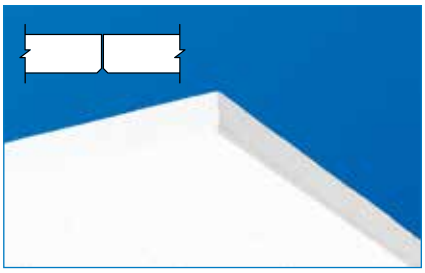
ATTACHMENT SURFACE	FOCUS B	FOCUS SQ	FOCUS F
Even	●	●	●
Slightly uneven		●	●
Uneven			●**

*Require an edge covering trim
**For very uneven surfaces, attach Focus F to pre-mounted furring

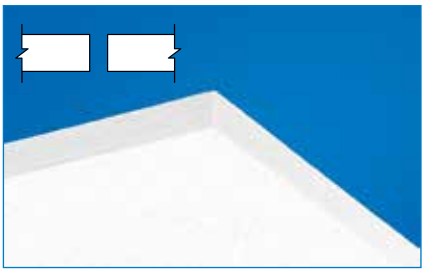
Direct-to-Deck Ecophon® Focus™ Panels

CHOICE OF COLORS AND EDGE DETAILS

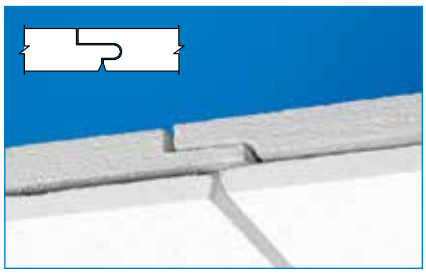
• 16 new standard colors selected to reflect current color trends and customer demand (See page 8 for palette)



• **Focus B** – 24″ x 24″
beveled edge panels



• **Focus SQ** – 24″ x 24″ | 24″ x 48″
square edge panels



• **Focus F** – 24″ x 24″ | 24″ x 48″
tongue and groove panels
(available in white only)

QUICK, CLEAN INSTALLATION

• Lightweight and resilient high-density fiberglass is easy to handle

• Painted, reinforced edges resist damage from handling

• Choice of installation options, all of which are less labor-intensive than hanging grid and panels:

  – Direct-to-deck with adhesive

  – Direct-to-deck with concrete screws*

  – Indirect attachment to wood furring*

*Focus F only

Designing with wall panels

You can boost the effectiveness of suspended ceilings and free-hanging units like Ecophon® Solo™ Clouds and Baffles with the addition of acoustic wall panels.

COVERAGE AND PLACEMENT

The amount of wall panel coverage required depends on the use of the space. In educational settings, panels should be equal to 10 - 25% of the floor area. In smaller spaces such as dining rooms or conference rooms, panels equal to as little as 8 - 13% of the floor area will significantly improve speech clarity and reduce reverberation time.

Ideally, wall panels should be positioned in alignment with the sound source, and as close to it as possible. In an open plan office or classroom setting, panels should be placed at the height of a seated employee or student. Placing panels on two adjacent walls will prevent echoes between parallel reflecting walls.

CREATIVE APPLICATIONS

Aesthetically, the latest vertical sound absorption solutions are a long way from the acoustic tack-boards of the past. Frameless panels with a smooth surface and clean painted edge are available in a variety of shapes, sizes and colors.

Wall panels are particularly helpful in reducing echoes and improving speech intelligibility in spaces with high ceilings and/or highly reflective walls.

HOW MUCH PRODUCT DOES IT TAKE?

UNITS REQUIRED FOR A 750 SQ. FT. CLASSROOM (SELECT ONE SOLUTION BELOW)

☐	19 - 47 Akusto One SQ square panels (24″ x 24″)
▭	9 – 23 Akusto One SQ rectangle panels (48″ x 24″)
◯	6 – 15 Akusto One SQ circle panels (48″ diameter)

UNITS REQUIRED FOR A 300 SQ. FT. CONFERENCE ROOM (SELECT ONE SOLUTION BELOW)

☐	6 - 10 Akusto One SQ square panels (24″ x 24″)
▭	3 - 5 Akusto One SQ rectangle panels (48″ x 24″)
◯	1 - 4 Akusto One SQ circle panels (48″ diameter)

Akusto™ One SQ Wall Panels

COMBINE COLORS, SHAPES AND SIZES FOR CREATIVE PATTERNS

- 3 standard shapes in a range of sizes
- 13 standard colors in a smooth fabric surface
- Fully painted edges in white or gray
- Special order panels with the Akutex™ FT surface can be used to turn artwork and photography into decorative acoustic panels*

*Contact your sales representative for more details

EASY INSTALLATION AND LASTING PERFORMANCE

- Lightweight panels have two mounting options:
  - Connect trim for larger panels
  - Connect hook for smaller panels
- 0.95 NRC for maximum sound absorption

To learn more, contact your CertainTeed Ceilings representative, call 800-233-8990 or visit CertainTeed.com/AcousticalDesign.

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For more information, contact us at 800-233-8990 CertainTeedCeilings.com