ARMSTRONG EDUCATION SEGMENT SOLUTIONS
ENHANCING THE LEARNING ENVIRONMENT THROUGH BETTER ACOUSTICS

Inspiring Great Spaces®
Armstrong World Industries, a global leader in design and manufacture of ceilings and has a history of more than 150 years; our innovative product designs, solutions and services enable our customers to deliver the exceptional interior spaces they envision. Armstrong offers innovative interior solutions that help to enhance comfort, save time, improve building efficiency, overall performance and create beautiful spaces.

Our India office has been serving the market for more than 50 years and is headquartered in Mumbai. Armstrong has presence in more than 100 cities across the length and breadth of India and has sales offices in a few cities that are strategically located close to our customers. Armstrong has a joint venture suspension system manufacturing plant (WAVE) located in Pune. We service our customers through our 5 regional warehouses supported by our state-of-the-art central warehousing facility at Bhiwandi, near Mumbai. Armstrong offers the broadest portfolio of acoustical ceilings in mineral fibre, metal, wood, soft fibre and translucents. We endeavour to offer a ceiling products for every space and can offer custom solutions to meet your design and aesthetic needs.
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On average, students hear only 3 out of 4 words in the Classroom*

Poor acoustic design in classrooms results in high reverberation. As a result, at least 25% of what a teacher says is lost to the students. Trying to hear in a poor acoustical environment is like trying to read in a room with the lights off: stress increases, concentration decreases and learning is impaired. This is especially true for younger students for whom English is a second language and for those with hearing impairments. The correct reverberation time is achieved by having the correct amount of sound absorbing material within the space for its intended purpose. *Acoustical Society of America [ASA], 2000

Sound gets transmitted between classrooms from corridors outside and from the floors above.

We need to have proper walls and partitions to avoid sound travel between the classrooms and from corridor to classroom. Ceiling inside the classroom will provide extra 35dB sound insulation for noise above the classroom. Apart from sound blocking, sound absorption of the surfaces of the space becomes important in open plan area, lobby and corridor to reduce noise in the classroom.

Many teachers are losing significant life expectancy by teaching in stressful environments day after day.

The average noise in a classroom in India is 65 decibels. In order to make themselves heard over the noise in the classroom, teachers need to talk at 75 db. As noise goes up, the teacher’s heart rate goes up. This is not good for the teacher, as 65 decibels is the threshold for the danger of myocardial infarction or a heart attack. In fact many teachers are losing significant life expectancy by teaching in environments like this day after day.
What is reverberation?
A reverberation is a prolonged reflection of sound energy off the surfaces and objects of a given space. The harder the surface, the longer it takes for reverberation to subside.

What is reverberation time (RT)?
A measure for rating the quality of the sound environment within an architectural space, and it appropriateness for various uses. Specifically, the reverberation time is the time it takes for reflected sound within a space to decrease by 60 dB after the sound was made, for instance, the time it takes before you cannot hear a loud clap. An RT60 < 1 sec. is beneficial for good speech intelligibility, whereas RT60 > 2.5 sec is appropriate for symphony music.

Why is it important?
It is an indicator of quality of sound with lower RT’s preferred for speech intelligibility (means the degree to which speech can be understood) and relatively longer RT’s preferred while listening music. Teachers and students will do their best in an environment that is conducive to learning. A poor acoustical environment (Read: Room with inappropriate RT) will often increase stress and decrease concentration, especially with younger children.

Direct Sound
The sound of a teacher’s voice traveling directly from the teacher to the student is direct sound. It is always beneficial in terms of speech intelligibility because it is not affected by anything in the room, making it clear and distinct.

Reflected Sound
Reflected sound takes longer to reach the listener than direct sound because its path to the listener is longer. Reflected sound can be good or bad depending on the time delay. Shorter reflections are preferred for spaces meant for teaching.

Background Noise
Any sound that is generated outside the building, such as playground activity, traffic and planes can be considered background noise. It generally intrudes in the classroom by way of the windows. Within the building, an HVAC system, fan and corridor noise can contribute to background noise.

Are the students getting same quality learning, while paying the same fees?
Unlike background noise which remains relatively constant around a room, the teacher’s voice (signal) varies greatly depending on where that teacher is located and where the SNR (Signal to Noise Ratio) is being measured. This is because sound decreases over distance; specifically it drops 6 decibels for every doubling of distance. It is called “Inverse Square Law” for sound. What the teachers are also to be mindful is that they need to raise their voice level to ensure that the last benchers are hearing and understanding. Which make her voice not only harsh but she compromise on articulation of words / voice modulation in her delivery of a session. Which affects the quality of learning.
REVERBERATION TOOL: HEAR THE DIFFERENCE

To help demonstrate the beneficial effect of acoustical treatment in classrooms, we’ve developed a web-based, interactive Reverberation Calculator that allows you to actually hear the difference in sound quality before and after treatment.

It will even provide recommendations for a new space or an upgrade to an existing space.

To access the calculator, simply log on to www.armstrong.co.in/reverbtool and follow the prompts regarding a description of the space and its surface materials. The program will first calculate the current reverberation time and allow you to hear the quality of the sound. Following selection of acoustical treatment options, it will then allow you to hear the difference in sound quality and reverberation time.

MODEL CLASSROOM STUDY CONDUCTED IN INDIA

# Study conducted by Jost’s Engineering Company Limited with Bruel & Kjaer instruments. This is a Denmark based firm.

The procedure followed to conduct Model classroom study:

Stage 1 – Acoustical parameters for existing classroom and objective feedback of the occupants
1. Measuring back-ground noise in the classroom during the school hours.
2. The RT of current un-treated classroom, will be measured either before 6 o’clock in the morning or after 11 o’clock in the night with instruments shown below.

Stage 2 – After a weeks’ time by then the students have studied in the classroom with ceiling, we will repeat the four steps procedure in Stage 1, followed by feedback of teachers and students.

## Name of Institute / School | Room Size (m³) | RT Before | RT After | BNL Before | BNL After | Ceiling Solution
---|---|---|---|---|---|---
Saraswati Mandir - Mumbai | 181 | 1.63 | 0.57 | 59 | 49.6 | Fine Fissured Hi NRC
Central University of Rajasthan - 2nd Floor | 588 | 2.97 | 0.88 | 49.3 | 40.4 | Fine Fissured Hi NRC
Christ Church - Mumbai | 134 | 2.2 | 0.63 | 37.5 | 34.9 | Fine Fissured
Cygnus School - Vadodara | 206 | 1.92 | 1.11 | 44.2 | 43.6 | ANF
Mahaveer Public School - Jaipur | 183 | 2.19 | 0.6 | 56.2 | 49.9 | Fine Fissured
Vani Vidyalaya - Mumbai | 192 | 2.21 | 0.67 | 72.9 | 63.2 | Fine Fissured
Vibgyor – Navi Mumbai | 134 | 1.4 | 0.51 | 32.7 | 31.3 | Fine Fissured
Resonanne - Kota | 281 | 1.45 | 0.73 | 38.2 | 27 | Fine Fissured
Vibgyor - Bangalore | 96 | 0.95 | 0.6 | 58 | 49 | Fine Fissured
Central University of Rajasthan - 1st Floor | 299 | 2.88 | 0.9 | 59.6 | 51 | Fine Fissured

Source 4292

Power Amplifier 2716 Flight Case KE-0368

2250 (with BZ-7208 Building Acoustics Module)

PULSE Reflex Building Acoustics

Image courtesy of “Brüel & Kjær”
GRIHA, an acronym for Green Rating for Integrated Habitat Assessment, is the National Rating System of India. GRIHA has been conceived by The Energy and Resources Institute and developed jointly with the Ministry of New and Renewable Energy, Government of India. Armstrong India is the first organisation which has its mineral fibre modular ceiling tiles listed in the GRIHA product catalogue.

GRIHA – Prakriti Rating for Existing Day Schools
The first rating system for existing buildings under the GRIHA rating system has been jointly developed by Association for Development and Research for Sustainable Habitats (ADaRSH) and The Energy and Resources Institute (TERI) to evaluate the environmental performance of existing day schools in India.

Need
Globally several studies have shown that sustainable schools offer better and more comfortable learning environments for students which, in turn, improves their performance. Key among characteristics of sustainable schools are: noise-free classrooms with ample daylight and thermal comfort and good indoor air quality.

<table>
<thead>
<tr>
<th>Criterion - 6</th>
<th>Intent as per National Building Code 2005</th>
<th>How Armstrong products can contribute</th>
<th>Points that can be earned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustic comfort on campus</td>
<td>To ensure acoustic comfort for students in the school</td>
<td>Armstrong High NRC ceilings and wall panels absorb most of the sound falling on them, providing acoustic comfort inside classrooms.</td>
<td>2</td>
</tr>
</tbody>
</table>

**INDIAN STANDARDS FOR ACOUSTICS IN SCHOOL**

<table>
<thead>
<tr>
<th>Room</th>
<th>Reverberation Times</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assembly halls</td>
<td>Usual for Acoustic Reasons (Full): 1.0 - 1.25 according to size, Maximum for Noise Control (Empty): 1.5 - 2.5 according to volume of hall</td>
</tr>
<tr>
<td>Music teaching rooms</td>
<td>0.75 - 1.25</td>
</tr>
<tr>
<td>Gymnasium and indoor swimming pools</td>
<td>-</td>
</tr>
<tr>
<td>Dining rooms</td>
<td>-</td>
</tr>
<tr>
<td>Classrooms</td>
<td>0.75</td>
</tr>
<tr>
<td>Headmasters room and staff rooms</td>
<td>0.5 - 1.00</td>
</tr>
</tbody>
</table>

Shorter reverberation times are desirable for noise control whenever possible.

**National Building Code:**
6.2.3.1 Special attention should be given to noise reduction in schools for the deaf and schools for the blind. Deaf children are taught by means of hearing aids which cannot be used satisfactorily in high noise levels or in reverberant conditions. Blind children depend on good hearing for understanding speech and for detecting changes in environment. In both these types of schools, noise levels should be kept low and reverberation times short. As an example, the reverberation times in empty class-rooms should not exceed one second in schools for the blind or 0.5 second in schools for the deaf.

**Global Standards for acoustics in school:**
Under current ANSI standards, the maximum reverberation time in an unoccupied, furnished classroom with a volume under 10,000 cubic feet is 0.6 seconds, and 0.7 seconds for a classroom between 10,000 and 20,000 cubic feet. The maximum level of background noise allowed in the same classroom is 35 decibels (dBA).
# A CEILING FOR EVERY SPACE

<table>
<thead>
<tr>
<th>Type of Space</th>
<th>Acoustical Design Considerations</th>
<th>Acoustic Ceiling Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Classroom</td>
<td>To ensure a superior acoustical environment the problem of sound reverberation time inside classrooms children often can’t hear their teachers clearly and therefore, can’t learn effectively.</td>
<td>High-performance, sound-absorbing ceilings with NRC of 0.6 or more and minimum CAC 33dB &amp; above. <strong>Products recommended:</strong> Fine Fissured, Fine Fissured Hi-NRC, Dune Max, Classic Max.</td>
</tr>
<tr>
<td>Media Centres/ Libraries</td>
<td>Acoustics – sound absorption and blocking are both important. Considered landmark areas in school buildings, where architects can infuse a sense of fun, energy, and whimsy.</td>
<td>High-performance, sound-absorbing ceilings. Metalworks ceilings in selected spaces give designers an opportunity to add a sense of sophistication. <strong>Products recommended:</strong> Optra Ceilings, Optra Wall Panels, Hi Impact Soundsoak Walls, SoundScapes Shapes, Canopies and Blades, MetalWorks.</td>
</tr>
<tr>
<td>Auditoria</td>
<td>Reducing late reflections time inside the room is critical, as is limiting transmission of noise to adjoining rooms. If music is played, some early reverberation is needed to hear the richness of music - reverberation time is higher here than in classrooms.</td>
<td>Depending on the acoustical needs of the space, a number of ceiling options - mineral fibre, fibreglass or glasswool products are often considered. <strong>Products recommended:</strong> Absorptive: Optra Ceilings, Optra Wall Panels, Hi Impact Soundsoak Walls, SoundScapes Shapes, Canopies and Blades. Reflective: Woodworks Plain</td>
</tr>
<tr>
<td>Corridors</td>
<td>Acoustics – limiting transmission of noise to adjoining rooms is important. Another area where architects can infuse a sense of fun, energy, and whimsy. Without compromising on need for maintenance.</td>
<td><strong>Products recommended:</strong> Open corridors: MetalWorks Aluminium or GI ceilings. Closed corridors: Ultima+, MetalWorks, etc.</td>
</tr>
<tr>
<td>Gymnasiums</td>
<td>Acoustics – sound absorption and blocking are both important. Might be used by the local community for multipurpose functions, thereby requiring good acoustics. Ceiling treatments also need to have good impact resistance</td>
<td><strong>Products recommended:</strong> MetalWorks Baffles and SoundScapes Shapes, Canopies and Blades, Open Cell.</td>
</tr>
<tr>
<td>Administrative offices/ Counselling room</td>
<td>Acoustical concerns are relevant due to sensitive conversations in offices of administrator, counselor, and nurse. More aesthetically pleasing ceiling options are often considered.</td>
<td>Good sound-absorbing and noise-blocking ceilings and walls need to be installed. <strong>Products recommended:</strong> All Mineral fibre tiles and planks, MetalWorks Tiles, etc.</td>
</tr>
<tr>
<td>Laboratories</td>
<td>Acoustic concerns are the same as classrooms. There may be additional requirement of resistance to chemical fumes and humidity especially in chemistry and biology laboratories.</td>
<td>Ceilings should have RH100 performance. Suspension systems in aluminium or stainless steel. <strong>Products recommended:</strong> Ceramaguard and Metalworks Clip-in, Stainless Steel and Lay-in.</td>
</tr>
<tr>
<td>Residential block/Hostels</td>
<td></td>
<td><strong>Products recommended:</strong> MetalWorks Plain and Perforated</td>
</tr>
<tr>
<td>Canteen</td>
<td>Vibrant, lively color palettes are often selected. Typical design goal is a space that gives occupants the sense of a change of pace. Need to manage the high ambient noise during dinner hours.</td>
<td><strong>Products recommended:</strong> SoundScapes Shapes, Canopies and Blades, MetalWorks Baffles and MetalWorks, etc.</td>
</tr>
</tbody>
</table>
Cygnus World School, Gujarat, India
Awarded IGBC’s LEED INDIA NC PLATINUM rating by Indian Green Building Council

Overview:
Cygnus World School is a new-age, co-educational school with modern academic, co-curricular and sports facilities. Spread across 7.3 acres, the school's green campus is modeled like an educational village.

The Challenge:
To make state of art education facility which will be environmently sustainable & able to achieve LEED rating from Indian Green Building Council.

The Solution:
Armstrong partnered with the customer to provide environmentally responsible options without sacrificing the functional requirements and overall design intent of each space in the school.

Message from the Cygnus World School:
“We are extremely pleased to inform you that our school project – ‘Cygnus World School’ has been awarded IGBC’s LEED INDIA NC PLATINUM rating by Indian Green Building Council”.

“This is an excellent accomplishment and we would like to congratulate as it could not have been possible without your efforts and dedication to this project. It has been a team effort and achievement” - Cygnus World School

<table>
<thead>
<tr>
<th>Product</th>
<th>Quantity</th>
<th>Application Area's</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fine Fissured</td>
<td>1040 m2</td>
<td>Classroom, passage and Library</td>
</tr>
<tr>
<td>MetalWorks Micro Perforated Ceiling</td>
<td>450 m2</td>
<td>Multipurpose hall</td>
</tr>
<tr>
<td>MetalWorks Open Cell Cellio</td>
<td>340 m2</td>
<td>Multipurpose hall</td>
</tr>
<tr>
<td>Dune</td>
<td>470 m2</td>
<td>Classroom and passage</td>
</tr>
<tr>
<td>Classic Lite</td>
<td>445 m2</td>
<td>Classroom and passage</td>
</tr>
<tr>
<td>Optra Wall Panel</td>
<td>220 m2</td>
<td>Conference hall</td>
</tr>
</tbody>
</table>
Project: Indian Institute of Science Education and Research (IISER), Pune, India

Overview:
IISER Pune is declared as an Institute of National Importance through an act of Parliament.

IISER Pune is located on a 98-acre land. The campus has 37,000 m² of academic space and 80,000 m² of residential space. It is modern, with energy efficient and environmentally friendly buildings, conforming to GRIHA 4 star rating.

The Challenge:
Being a research center, the challenge was to maintain hygiene in laboratories with good acoustical comfort. The customer understood the need for acoustics and required us to create aesthetically brilliant spaces that were fully functional.

The Solution:
The focus was to provide combination of aesthetics and acoustics without compromising the functional needs. Armstrong suggested different products for different application such as classroom’s, laboratory, office area etc.

SUCCESS STORIES

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>QTY IN SQM</th>
<th>APPLICATION AREA’S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dune</td>
<td>900</td>
<td>Administration area and offices</td>
</tr>
<tr>
<td>MetalWorks Axial Vector</td>
<td>2,000</td>
<td>Bathrooms and Washrooms of Chemistry laboratory &amp; lobby</td>
</tr>
<tr>
<td>MetalWorks Aluminum Planks</td>
<td>3,465</td>
<td>Lecture theatre lobby area</td>
</tr>
<tr>
<td>MetalWorks GI Clip In Plain</td>
<td>3,000</td>
<td>Chemistry laboratory</td>
</tr>
<tr>
<td>MetalWorks Open Cell Cellio</td>
<td>2,250</td>
<td>Library &amp; Biology laboratory lobby</td>
</tr>
<tr>
<td>Woodworks Wall Panel</td>
<td>3,900</td>
<td>Classrooms - 500 seater, 200 seater and 50 seater &amp; auditorium</td>
</tr>
<tr>
<td>Woodworks Ceiling</td>
<td>572</td>
<td>Classrooms - 200 seater</td>
</tr>
<tr>
<td>Optra SL2</td>
<td>1,000</td>
<td>Lecture theatre and auditorium</td>
</tr>
<tr>
<td>Bioguard</td>
<td>3,000</td>
<td>Physics, Chemistry and Biology laboratory</td>
</tr>
<tr>
<td>MetalWorks Lay in Plain</td>
<td>500</td>
<td>Biology laboratory</td>
</tr>
</tbody>
</table>
Mill Hill School, Derbyshire, UK

The Challenge:

1. In a review at Mill Hill School in Ripley, Derbyshire had found teaching accommodation to be considerably lacking: the existing buildings were worn out and a new building was required to house IT facilities and drama teaching, as well as providing a new base for the school’s sixth form.

2. The work included replacing an existing block which housed several classrooms and technology rooms, with eight science laboratories, five art rooms, seven technology rooms, a media room and seven classrooms. An existing single-story building containing the main hall, kitchen, gym and some technology rooms was also renovated.

3. A key aspect of the project was to ensure that the new buildings complied with Building Bulletin 93, which recognises that teaching and learning are acoustically demanding activities that require low ambient noise levels and high levels of sound insulation.

The Solution:

1. Dune Max ceiling tiles from Armstrong were selected and installed over a total area of 3,500m². Dune Max produces a calculated reverberation time of 0.6 seconds for a typical 200m³ classroom.

2. “Dune Max tiles have long been a favourite among contractors and specifiers for education projects,” explains Jonathan Griffiths UK & AME Sales Director for Armstrong. “Their robust handling properties, clean visual, and excellent structural fire performance are perfect for a school environment, but it is their ability to control reverberation within classrooms and reduce the noise transfer between adjacent spaces that makes them the stand-out choice in education.”

3. Frank Shaw Associates had used Armstrong tiles for past projects and were happy that Dune Max was the best tile for the Mill Hill School renovation. It wasn’t an easy project, the buildings that had to be renovated were run down, the roof structures were complex and we encountered problems with sloping soffits. But the flexibility of Armstrong’s designs meant we were able to overcome all these challenges.”

4. The pupils and staff at Mill Hill are now benefiting from the new modern environment and enhanced teaching spaces. “As a specialist centre for performing, visual and media arts, communication is key to the very fabric of the school and what it stands for. It is therefore fitting that the new ceiling tiles have provided the best possible environment for communication to take place within the school’s buildings,”
**REFERENCE PROJECTS IN INDIA**

**West India:**
- Adani institute, Ahmedabad, Gujarat
- Aditya International School, Mumbai, Maharashtra
- Agharkar Research Institute, Pune, Maharashtra
- Balaji Institute of Management, Pune, Maharashtra
- Chandwad Engineering College, Nashik, Maharashtra
- Education Leadership University, Lonavala, Maharashtra
- Flame Institute, Pune, Maharashtra
- Indian Institute of Management (IIM), Indore, MP
- Jaipuria Institute of Management, Indore, MP
- L & T Training Centre, Mumbai, Maharashtra
- Maliba College, Surat, Gujarat
- Malwa Institute of Science & Technology, Indore, MP
- Pride Housing School, Pune, Maharashtra
- Pune University, Pune, Maharashtra
- Shail Education Society, Indore, MP
- TIT College, Bhopal, MP
- IIT Gandhinagar, Gujarat
- Jamnabai Narsee School, Mumbai, Maharashtra

**East India:**
- Army Institute of Management Technology, Kolkata, WB
- BJB Engg College, Bhubaneswar, Orissa
- Indian Institute of Technology (IIT), Kharagpur, WB
- Mizoram University, Aizawl, Mizoram
- Om Dayal Educational & Research Institute, Kolkata, WB
- St. Xavier Institute of Management, Bhub’war, Orissa

**South India:**
- GRD Educational Trust, Coimbatore, Tamil Nadu
- Jain College, Bangalore, Karnataka
- Manipal Institute, Manipal, Karnataka
- Oxford Institute, Bangalore, Karnataka
- PIMS, Chennai, Tamil Nadu
- Rajagiri Business School, Kochi, Kerala

**North India:**
- Allen’s Institute of Engineering & Technology, Kanpur, UP
- Anand International College of Engineering, Jaipur, Rajasthan
- Asia School of Engineering & Management, Lucknow, UP
- Axis College, Kanpur, UP
- Birla Education, Kishangarh, Rajasthan
- Chitkara University Baddi, Baddi, Himachal Pradesh
- G D Goenka School, Gurgaon, Haryana
- G D Goenka School, Amritsar, Punjab
- G D Goenka School, Lucknow, UP
- Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, UP
- Genesis School, Noida, UP
- IAS Academy, Mussoorie, UP
- Indian Institute of Petroleum, Dehradun, UP
- Indian Institute of Remote Sensing, Dehradun, UP
- JMIIT Yamunanagar, Haryana
- JVM School, Gurgaon, Haryana
- Kanodia College, Jaipur, Rajasthan
- Kendriya Vidyalaya No 1, Jaipur, Rajasthan
- Library Hall (Punjabi University), Chandigarh
- Institute of Technology & Management, Lucknow, UP
- Maharshi Dayanand University, Rohtak, Haryana
- Maharaja Agresen College, Gurgaon, Haryana
- Mody Institute, Laxmangarh, Rajasthan
- Naraina Institute, Kanpur, UP
- NIIT, Mughalsarai / Varanasi, UP
- NIT-Hamirpur, Hamirpur, Himachal Pradesh
- Raffles Design Institute, Chandigarh
- St.Theresa Convent School, Karnal, Haryana
- Unison World School, Dehradun, UP
- Universal Group of Colleges, Panchkula, Haryana

500+ projects executed till Now
DO MORE WITH YOUR CEILINGS

Auditorium

Kingswood Art Center, New Hampshire, USA
Solution: MetalWorks Linear and Optima Wall Panel

University of Rhode Island, Rhode Island, USA
Solution: Ultima with Classic Axiom

Cafeteria

Mount St. Mary’s College, California, USA
Solution: Ultima Microlook

University of Tampa, Florida, USA
Solution: Metalworks Lay-in Micro-perforated, Axiom Classic

Secchia Center - MSU College of Human Medicine, Michigan, USA
Solution: Optima

Secchia Center - MSU College of Human Medicine, Michigan, USA
Solution: MetalWorks Open Cell

Tidewater Community College, Virginia, USA
Solution: MetalWorks Vector

Winter Hall, Westmont College, California, USA
Solution: SoundScapes Shapes
DO MORE WITH YOUR CEILINGS

**Corridors**

- Shelton State Community College, Alabama, USA
  - Solution: Ultima and Infusions
- Winter Hall at Westmont College, California, USA
  - Solution: Soundscapes Shapes

**Classrooms**

- EAC Classroom Armstrong Campus, Georgia, USA
  - Solution: Ultima
- Shadow Hills High School Performing Arts Center, California, USA
  - Solution: Woodworks Ceiling and Wall Panel
- Martin Luther King Elementary, Florida, USA
  - Solution: Soundsoak Baffles
- University of Rhode Island, Rhode Island, USA
  - Solution: MetalWorks Open Cell
- University of Houston, Texas, USA
  - Solution: WoodWorks Vector
- University of New Hampshire Law, New Hampshire, USA
  - Solution: SoundScapes Shapes Custom