CEILING SYSTEMS
FLOORING [Between us, ideas become reality.™]

2008 - 2009 Architect's Reference

for Ceilings and Suspension Systems

Armstrong

CEILING SYSTEMS

[Between us, ideas become reality.]

FROM IDEA TO REALITY IN ONE CLICK

The newly designed Armstrong Ceilings website is the fastest way to take your design from vision to creation. The interface and navigation tools are more user-friendly than ever before. It is a constant source of inspiration, giving you instant access to photo and video case studies with useful presentations. Product information is intelligently organised and searchable in just three clicks, making it much easier to find the best ceiling solutions. Recommendations for the installation and maintenance of suspended ceilings are available as downloadable PDF files. You can locate our partners and download technical documents in an instant. All from the comfort of your own office.

www.armstrong.co.in

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- ↓ Environment...

SELECTION
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Advisory note

All photographic and design elements supplied in this brochure do not necessarily reflect any recommendation by any of the companies named in this brochure as to the proper use or recommended methods of installation of suspended ceilings and are supplied only as informative material. For technical reasons in printing, differences may appear between colours printed in this brochure and the actual product. The choice of colours should always be made from a sample of the product.
All statements and technical information contained in this brochure, or any publication of the companies named in this brochure, relating to Armstrong ceilings are based on results obtained under laboratory test conditions. It is the responsability of the user to verify with the seller of the products in writting that such statements and information are appropriate to the specific use intended. Sales of the products and liability of the selling companies are in accordance with the terms and conditions of sale of the selling company.
All product specifications are subject to modifications without prior notice.

Vision: We deliver on our promises

Mission: Simpler, faster, better… together

Values: Respect, integrity, diversity, service

Each day, millions of Indians walk under an Armstrong ceiling system or on an Armstrong floor.

A Short History
Founded in 1860 in Pennsylvania USA, Armstrong is today the world's largest manufacturer of ceilings and floorings operating over 40 plants in 10 countries with more than 12,000 employees worldwide. In 2007, Armstrong revenues totaled USD 3.5 Bn.

In 1998, Armstrong World Industries commenced operations in India through a 100% subsidiary. Armstrong India pioneered the use of acoustical modular ceilings to become the market leader in the segment. The company also has a strong presence in flooring products of linoleum, vinyl, laminates and engineered wood.

The People
People are key to Armstrong's success, continued market leadership and the ability to service customer requirement across the country.

Headquartered in Mumbai, sales offices are located in Ahmedabad, Bengaluru, Bhopal, Chandigarh, Chennai, Hyderabad, Jaipur, Kochi, Kolkata, Lucknow, New Delhi and Pune.

The Market
Armstrong is committed to providing world-class, high quality products to the Indian market. Armstrong Building Products Operation was the first building material company ever to win the prestigious US Malcolm Baldrige National Quality Award (1995).

To maintain the promise of high quality, complete factory-finished systems are provided to customers. On offer is the widest choice of ceiling systems including mineral fibre, soft fibre, wooden and metal ceiling systems. And an extensive range of flooring products including vinyl tiles, vinyl rolls, linoleum, laminates, engineered and solid wood.

In ceilings, Armstrong is the only Indian company to provide the full system of ceiling tiles, grids and suspension components from its own factories, enabling the company to provide valid warranty certificates to its customers. Armstrong provides ceiling and flooring

▼ Armstrong India Head Office, Mumbai - Reception area

solutions for all types of building spaces:
- Commercial Offices
- Retail Outlets
- Hospitals
- Educational Institutions
- Hotels
- Residential Buildings
- Transportation
- Multiplexes
- Manufacturing

Distribution
With a PAN-India presence covering over 68 cities, close to 70 sales people are directly employed by Armstrong India in various locations in the country. A nation-wide reach through its more than 500 strong network of channel partners - Authorized Dealers, Distributors and Armstrong Recognized Interior Contractors (ARIC), ensures convenience to customers through timely supply and correct installation of ceiling and flooring products.

A 140,000 sq. ft state-of-the art warehouse facility in Bhiwandi, near Mumbai with a fully automated storage system enables Armstrong to provide ready-stock of materials to customers. Regional warehouses are located in each of the major metros.

The Support
An area of distinctive capability for Armstrong India is the unparalleled service advantage provided to its customers. Both flooring and ceilings are technical in nature and Armstrong provides a full gamut of advice, whether it is acoustic layouts and best practice for ceilings or full product and installation advice for flooring.

Environmental
Another area of commitment for Armstrong is the environment – with its participation in the Green Building Movement across the world. Armstrong is a founder member of US Green Building Council (USGBC) and Indian Green Building Council (IGBC). In 2004, Armstrong received the Chinese National Green Product certificate.

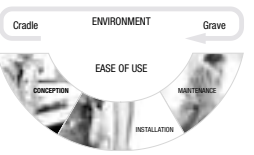
Armstrong is committed to responsible manufacturing and its products are designed to be environmentally sensitive. Armstrong products have a high percentage of recycled and renewable raw materials.

The high light reflectance of ceiling products reduces the energy consumption in buildings and the low-emitting and no-added formaldehyde products contribute to improving the environmental quality of buildings.

At Armstrong India we continue to add new products and service capabilities to provide superior ceiling and flooring solutions to our customers – because we are committed to turning your ideas into reality.

▼ Fully automated warehousing, Bhivandi

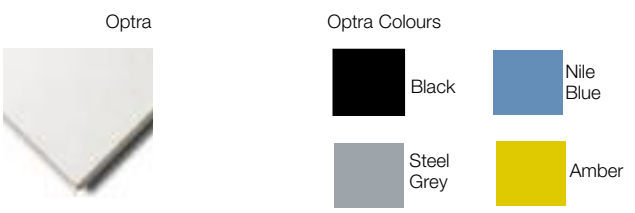
▼ Armstrong Warehouse, Bhivandi



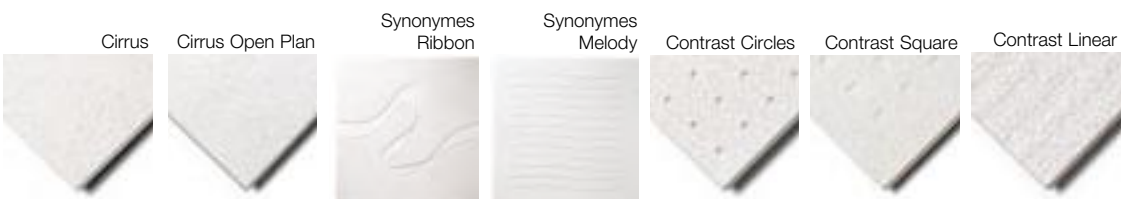
Mineral / Soft Fibre

Ultima/ Optima

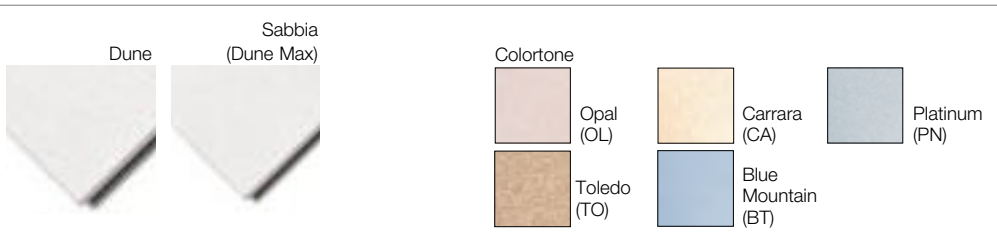
Optra



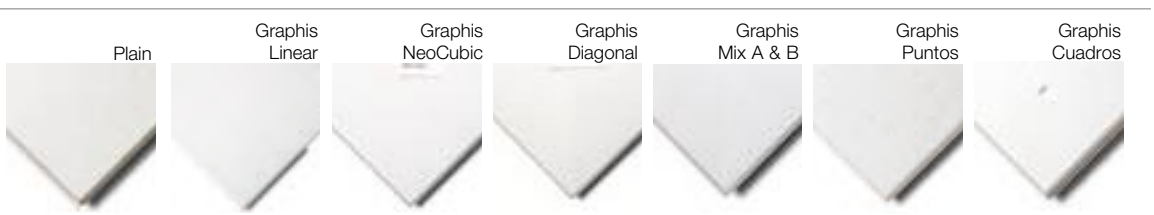
Cirrus



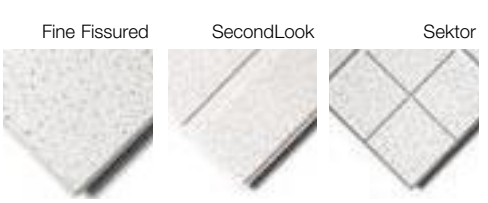
Dune



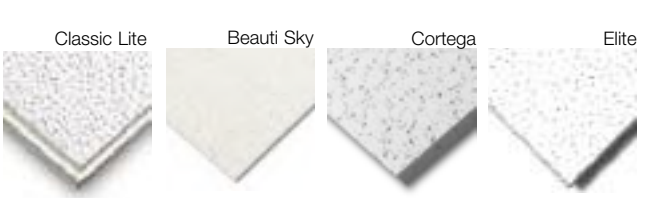
Plain



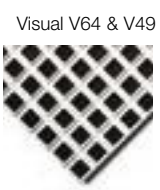
Fine Fissured



Standard



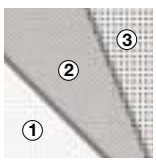
Open Cell



Metal

Orcal

Axal Vector | Clip-in | Lay-in | Planks | Cellio/Gridal



1- Extra Microperforated
2- Microperforated
3- Standard Perforated

Other RAL colours available on request.

Wood

Madera Laminates

US Maple | Beech | Maple | Wenge

Solutions for specific areas

Bioguard Plain | Ceramaguard | Mylar | Newtone

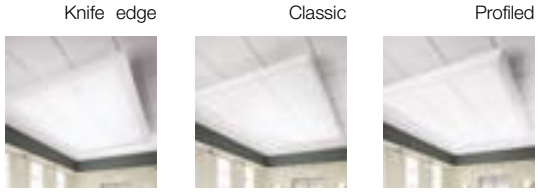
Suspension Systems

Bandraster | Prelude 24 mm | Suprafine 15 mm | Silhouette 6 mm | Interlude

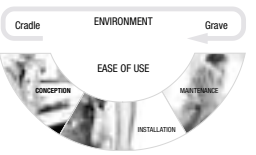
Perimeter Solutions

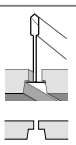
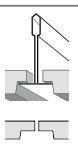
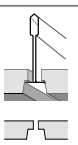
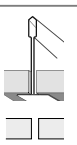
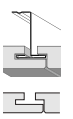
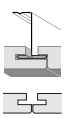
Axiom

Knife edge | Classic | Profiled



PRODUCT SELECTOR BY SUSPENSION SYSTEM



Board & Tiles			Planks			
Visible grid			Visible grid, semi-concealed & concealed			
						
MicroLook/ MicroLook BE (15 mm grid)	Tegular (24 mm grid)	Board (24 mm grid)	MicroLook/ MicroLook BE (15 mm grid)	Board (24 mm grid)	SL2 (Metric)	K2C2 (DIN)

Mineral / Soft Fibre

Ultima/Optima

Ultima	•	•	•			•	•
Ultima OP	•	•	•				
Optima	•	•	•				

Optra

Optra	•	•	•	•	•	•	•

Cirrus

Cirrus	•	•	•				
Cirrus OP		•					

Dune

Dune	•	•	•	•	•	•	•
Sabbia (Dune Max)	•	•	•				
Colortone	•	•	•				

Plain

Plain	•	•	•				
Graphis	•						

Fine Fissured

Fine Fissured	•	•	•	•	•	•	•
Fine Fissured Design*	•	•					

* SecondLook/Sektor

Standard

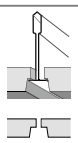
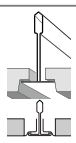
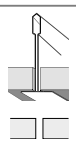
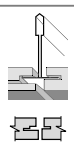
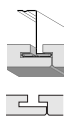
Classic Lite	•	•	•				
Beauty Sky		•	•				
Cortega	•	•	•				
Elite	•	•	•				

Open Cell

Visual/Cellio

Visual	•						

PRODUCT SELECTOR BY SUSPENSION SYSTEM

	Board & Tiles						Planks	
	Visible grid			Semi-concealed & concealed			Concealed	
								
	MicroLook/ MicroLook BE (15 mm grid)	Tegular (24 mm grid)	Board (24 mm grid)	Vector (24 mm grid)	SL2	Clip-in (3 mm)	Clip-in (3 mm)	Carrier

Metal

Extra microperforated	•			•		•	•	•
Microperforated	•			•		•	•	•
Perforated	•			•		•	•	•
Plain	•			•		•	•	•
Cellio	•							

Wood

Madera	•				•			

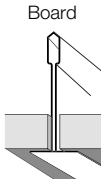
Specific Areas

Bioguard Plain	•	•	•					
Mylar			•					
Ceramaguard			•					
Newtone			•					

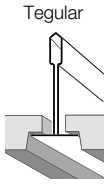
Suspension Systems

Trulok

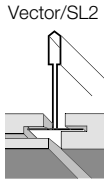
Prelude 24 Board



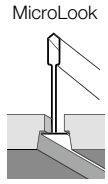
Prelude 24 Tegular



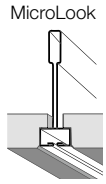
Prelude 24 Vector/SL2



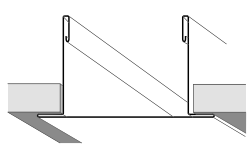
Prelude 15 MicroLook



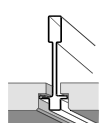
Silhouette MicroLook



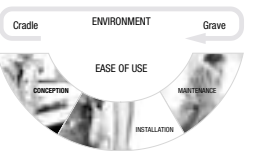
Bandraster



Interlude



PRODUCT SELECTOR BY PERFORMANCE



Mineral / Soft Fibre

	Fire reaction	Acoustic performance (see p.32)			Light reflectance (%)	Humidity resistance (% RH)	Cleanability	Anti microbial	Air quality	Scratch resistance	Impact resistance	Recycled content	Relative price index (4)
		α_w	NRC	Dnc_w (dB)									
Ultima/Optima													
Ultima	A2-s1,d0	up to .70(H)	0.75	up to 44	≥ 90	95	wipeable	BioBlock+		•		≤ 80%	$$$
Optima	A2-s1,d0	up to 1.0(H)	up to 1.0(H)	26	≥ 90	95	wipeable	Inherent		•		≤ 75%	$$$
Optra													
Optra	A2-s1,d0	0.90	0.90	26	≥ 83	95	with dry cloth	Inherent		•		54-88%	$$$
Optra Colours	A2-s1,d0	0.90	0.90	26	-	95	with dry cloth	Inherent		•		≤ 70%	$$$
Cirrus													
Cirrus	A2-s1,d0	0.70(H)	0.70	up to 36	≥ 85	95	with dry cloth	BioBlock+				47%	$$
Cirrus OP	A2-s2,d0	0.70(H)	0.75	38	≥ 85	95	with dry cloth	BioBlock+				51%	$$
Dune													
Dune	A2-s1,d0	up to 0.60	up to 0.55	33	≥ 85	99	with dry cloth	BioBlock+				38-65%	$$
Sabbia (Dune Max)	A2-s1,d0	0.65	0.70	35	≥ 85	95	with dry cloth	BioBlock+				50%	$$
Colortone	A2-s1,d0	0.55	0.55	35		95	with dry cloth	BioBlock+				≤ 30%	$$
Plain													
Plain	A2-s1,d0	0.15(L)	0.15	37	≥ 90	95	wipeable	BioBlock+				24%	$$
Graphis	A2-s2,d0	0.15(L)	0.15	36	90	70	with drycloth					47%	$$$
Fine Fissured													
Fine Fissured	A2-s1,d0	up to 0.60(H)	0.55	34	≥ 85	99	with dry cloth	BioBlock+				32-54%	$$
Fine Fissured Design*	A2-s1,d0	up to 0.55(H)	up to 0.55(H)	up to 36	≥ 85	up to 95	with dry cloth	BioBlock+				≤ 30%	$$
Standard													
Classic Lite	Cls0/Cls1		0.50	30	≥ 84	95	with dry cloth	BioBlock+				58%	$
Beauty Sky	Cls0/Cls1		0.50	30	≥ 80	70	with dry cloth					55%	$
Cortega	Cls0/Cls1		0.55	33	≥ 80	99	with dry cloth	BioBlock+				64%	$
Elite	Cls0/Cls1		0.50	30	≥ 80	99	with dry cloth	BioBlock+				57%	$$

* SecondLook/Sektor

Metal

Extra Microperforated (1)	A2-s2,d0	0.55(L)	0.65	30	76	100	wipeable	Inherent		•	•	25-50%	$$$
Microperforated (1)	A2-s1,d0	0.75	0.80	20	63	100	wipeable	Inherent		•	•	25-50%	$$$
Std. Perforated (1)	A2-s1,d0	0.70(L)	0.70	20	68	100	wipeable	Inherent		•	•	25-50%	$$$
Plain	A2-s1,d0	0.10(L)	0.10	44	77	100	high pressure water cleaning (2)	Inherent	ISO 3 (3)	•	•	25-50%	$$$
Cellio/Gridal	A2-s2,d0	up to 0.95	up to 0.90			≥ 95	wipeable	Inherent				50%	$$$

Open Cell

Visual	A2-s1,d0	up to 0.95(H)	up to 0.90			≥ 70	with dry cloth					46%	$$$

Wood

Madera Laminates	B-s2, d0				up to 75	70	with dry cloth						$$$

(1) Typical values for product with fleece acoustic inlay.
(2) Only for the Clip-In systems with silicone sealed joints.
(3) All Metal Plain products achieve ISO 3.
(4) Relative price index $ Min. $$ Mid. $$$ Max.

PRODUCT SELECTOR BY PERFORMANCE

Specific Areas

	Fire reaction	Acoustic performance (see p.32)			Light reflectance (%)	Humidity resistance (% RH)	Cleanability	Anti microbial	Air quality	Scratch resistance	Impact resistance	Recycled content	Relative price index (4)
		α_w	NRC	Dnc_w (dB)									
Bioguard Plain	A2-s1,d0	0.15(L)	0.15	37	≥ 90	95	washable	Anti-bacterial	ISO 5			≤ 40%	$$$
Mylar	A2-s1,d0	0.10(L)	0.10		80	95	washable	Inherent	ISO 4			≤ 40%	$$$
Ceramaguard	A1	0.55(MH)	0.60	39	≥ 85	100	Scrubbable	Inherent				≤ 40%	$$$
Newtone	A2-s1,d0	0.10(L)	0.10	37	≥ 85	100	washable	Inherent			•	≤ 20%	$$$

Fire

Building Regulations (where applicable) require that buildings meet appropriate Euroclass and UK standards for fire reaction performance depending on the area of application.
Armstrong products have been tested to the harmonised European fire reaction standards and meet the minimum performance criteria.

Acoustics

The occupant of a space, be it an office, a classroom, a shop, or any similar environment needs:
- Intelligibility – to hear and to be understood
- Privacy – to not be overheard
- Concentration – to not be disturbed.

The optimum acoustic climate will be obtained with the right combination of sound absorption and sound insulation, and can be supplemented by the use of active acoustics.

Light Reflectance

Light reflectance of a surface is its property of reflecting light. The measure of light reflectance is that fraction of the specified incident light which is reflected by the surface expressed as a percentage value.

Humidity resistance

Ceiling installations are facing more and more demanding humidity conditions such as: fast track programmes, buildings with intermittent heating and cooling, areas with a high concentration of people, structures which are open to the exterior environment, etc.
To meet these requirements Armstrong offers a wide range of products suitable for installation in conditions of up to 99% Relative Humidity, some of which excel in extreme conditions of up to 100% RH.

Cleanability

The frequency and method of cleaning of a ceiling varies from one application to another, from cloth to high pressure water jet and including resistance to disinfectants for healthcare premises.
See cleaning & maintenance details for full details.

Anti-microbial performance

The control of bio-contamination is essential in the healthcare sector, especially in hospitals and clinics.
Armstrong ceilings are treated with **BioBlock+™** and do not favour the development of fungi/mould or yeast and the products can be used in any general area. **The Armstrong Bioguard paint** reduces the colony size of virulent strains of bacteria, moulds and yeasts. This special paint finish can be cleaned and disinfected.

Air Quality

Armstrong offers specific solutions to limit the number of airborn particules in a clean room environment. These products are tested against ISO 14644-1.

Scratch Resistance

Superior level of surface scratch resistance, evaluated with the Hess rake test.

Impact resistance

Frequent ceiling tile removal, typically in areas where building service equipment is located, means that a higher level of impact resistance can be desired. In this category, the level of durability and impact resistance has been improved by Armstrong.

Recycled Content

A significant proportion of our products are produced using particular recycled raw materials. They are indicated in our literature in accordance with LEED requirements.

10 year guarantee

Armstrong World Industries guarantees the Armstrong 90% RH products shall be free from sag* as a direct result of defects in materials or workmanship for 10 years from the date of installation of the material subject to terms and conditions, when used with Armstrong grids.

15 year guarantee

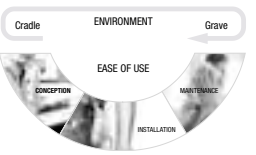
Armstrong World Industries guarantees the Armstrong 95% RH products shall be free from sag* as a direct result of defects in materials or workmanship for 15 years from the date of installation of the material subject to terms and conditions, when used with Armstrong grids.

Life Time guarantee

Armstrong World Industries guarantees the Armstrong 99% and 100% RH products shall be free from sag* as a direct result of defects in materials or workmanship for the life time of the product subject to terms and conditions, when used with Armstrong grids.

* N.B. Maximum sag as defined in EN 13964.

PRODUCT SELECTOR BY APPLICATION AREAS



	Terrace Roofing, Semi-Exterior Applications (1)	Reception Areas Showrooms, Lounges	Shops	Individual / Partitioned Offices	Prestige Offices	Rooms, Consulting Rooms	Treatment Rooms	Patient Rooms	Circulation & Traffic Areas, Corridors	Classrooms	Call Centres	Business Centre, Waiting Rooms, Meeting Rooms
INDUSTRY												
RETAIL AND LEISURE												
TRANSPORT												
HEALTHCARE												
EDUCATION												
OFFICE												

Mineral / Soft Fibre

Ultima/Optima

Ultima		•	•	•	•			•			•	•
Ultima OP		•	•								•	•
Optima		•		•	•						•	•

Optra

Optra		•	•	•	•			•			•	•
Optra Colours		•	•								•	•

Cirrus

Cirrus		•		•	•					•		•
Cirrus OP		•									•	•

Dune

Dune			•	•				•	•	•		•
Sabbia (Dune Max)				•					•	•		•
Colortone								•		•		•

Plain

Plain		•	•					•				
Graphis		•	•									•

Fine Fissured

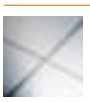
Fine Fissured				•					•			
Fine Fissured Design*									•			

* SecondLook/Sektor

Standard

Classic Lite		•					•					
Beauty Sky		•					•					
Cortega		•		•	•		•	•				
Elite		•					•					

Metal



Extra Microperforated (2)				•	•				•		•	•
Microperforated (2)			•	•	•				•	•	•	
Perforated (2)				•	•				•			
Plain	•		•					•	•			

Wood

Madera Laminates		•	•		•							

Specific Areas

Bioguard Plain						•	•	•				
Mylar			•				•	•				
Ceramaguard	•											
Newtone	•											

PRODUCT SELECTOR BY APPLICATION AREAS

	Lecture Theatres, Libraries, Languages Rooms	Restaurants, Cafeterias, Bars, Canteens	Kitchens (1)	Specific Areas, Computer Rooms	Humid Areas, Sports Rooms, Toilets, Cloakrooms (1)	Swimming Pools (1)	Food Departments	Theatres, Cinemas, Auditoria	Super markets Department Stores	Luxury Boutiques	Operating theatres (3)	Laboratories
INDUSTRY												
RETAIL AND LEISURE												
TRANSPORT												
HEALTHCARE												
EDUCATION												
OFFICE												

Mineral / Soft Fibre

Ultima

Ultima	•	•		•				•	•	•		
Ultima OP	•	•						•				
Optima	•	•				•		•				

Optra

Optra								•				
Optra Colours	•	•						•				

Cirrus

Cirrus	•							•		•		
Cirrus OP		•						•				

Dune

Dune									•			
Sabbia (Dune Max)	•	•						•	•			
Colortone	•	•						•		•		

Plain

Plain									•	•		
Graphis										•		

Fine Fissured

Fine Fissured												
Fine Fissured Design*										•		

* SecondLook/Sektor

Standard

Classic Lite												
Beauty Sky												
Cortega												
Elite												

Metal

Extra Microperforated (2)		•								•		
Microperforated (2)	•	•								•		
Perforated (2)												
Plain		•	•	•	•	•	•		•			•

Wood

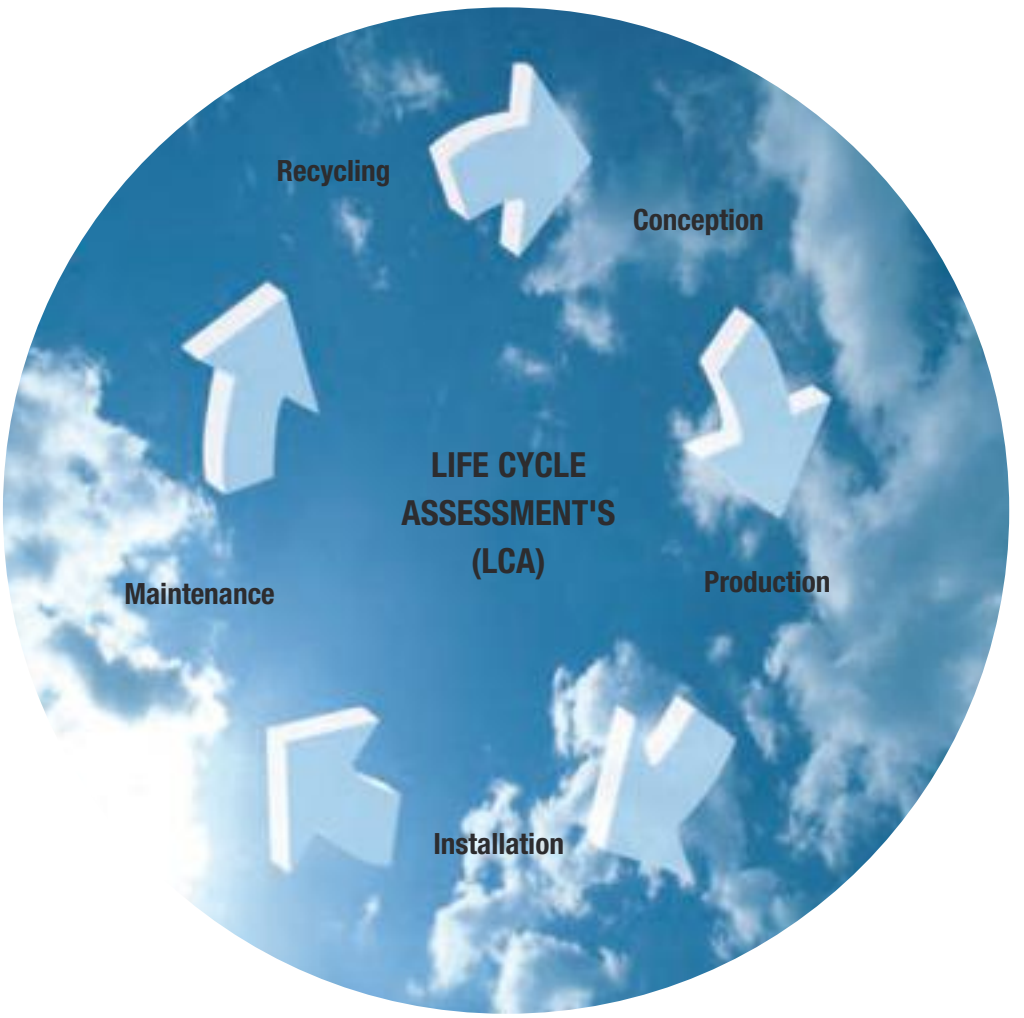
Madera Laminates												

Specific Areas

Bioguard Plain				•	•		•					•
Mylar		•	•	•			•					•
Ceramaguard				•	•	•						
Newtone		•	•		•		•					

(1) - For metal applications in exterior or high humidity areas, we would recommend that the product is back coated.
(2) - For perforated metal, recommendations are based on a product with factory fitted acoustic fleece.
(3) - Plain Clip-In tiles with the Bioguard paint finish should be installed with silicone sealed joints.

ARMSTRONG'S ENVIRONMENTAL EFFORTS IN THE LIFE-CYCLE OF OUR CEILING PRODUCTS START WITH SUSTAINABLE DESIGN.



LIFE CYCLE ASSESSMENTS

BRE/BREEAM

The BRE environmental product profiles provides a method for an independently accredited LCA's (Life Cycle Assessment's) to be developed, and the results explained through the use of an A, B, or C rating. The BRE methodology allows designers using the BREEAM type project schemes to select products and materials based on the results of these profiles.

FDES/HQE

An approach used in France is through the development of FDES (Fiche Déclaration Environnementale et Sanitaire). The information generated through this procedure is utilised in the HQE (Haute Qualité Environnementale) project accreditation approach.

LEED®

The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ encourages and accelerates global adoption of sustainable green building and development practices through the creation and implementation of universally understood and accepted tools and performance criteria. LEED is a third-party certification program and the nationally accepted benchmark for the design, construction and operation of high performance green buildings.

CONCEPTION

- Reuse of waste materials in new ceilings.
- Raw materials for ceilings are renewable and abundant in nature.

> Mineral Wool
> Natural Starch
> Perlite
> Clay
> Recycled Paper
> Recycled Tiles

- Recycled content varies by product:
  - **Mineral fibre** - commercial application mineral fibre ceilings up to 75%
  - **Fibreglass** - ceilings contain 25% post industrial recycled glass
  - **Metal** - our metal ceilings have an average of 25% recycled content
  - **Suspension system** - contain 25% recycled content
  - Logos indicate the level of recycled content:

PRODUCTION

- All in-process scrap is recycled back into the process.
- Almost all the process water is recycled. Only a minimal amount of water is discharged, and only after proper treatment.
- The panels are manufactured at several locations, thereby reducing transportation costs and environmental impacts associated with transportation.
- Suspension system main runners and cross tees are rotary stitched by a patented method to deliver extra strength and stability.
- All mineral and steel tile plants have been certified ISO 14001.

ISO 9002:2000

ISO 14001:2004 certified process

INSTALLATION

- Integrate technology to reduce installation time.
- Minimal packing material used.
- Up to 100% of the packaging is made from recycled material. In several countries, we support the recollection of packaging.

MAINTENANCE

- Improve lighting, lower cost and conserve energy with high light reflectant ceilings.
- Minimal maintenance and easy to replace.
- Armstrong has an expanding portfolio of sustainable products, these include:

> Hot-dipped galvanised suspension systems provide superior resistance to rust and corrosion.

> Damage-resistant ceilings
- Scrubbability
- Washability
- Soil resistance
- Impact & scratch resistance
- Bioguard products provide additional resistance to a large selection of bacteriological strains (more on page 106).

RECYCLING

Many of our product can be recycled at the end of their lifecycle.

WARRANTY ON USE

- A history of quality products.
- Long term warranties on ceilings systems.

LEED® Credits
An overview of how ceiling systems contribute to LEED

Energy and Atmosphere

LEED NC – Energy and Atmosphere Credit 1.1 – Optimize Energy Performance

LEED CI – Energy and Atmosphere Credit 1.1

LEED NC & LEED CI Intent: Achieve increasing levels of energy performance above the baseline standard to reduce environmental and economic impacts associated with excessive energy use.

LEED NC Requirement: Demonstrate a percentage improvement in the proposed building performance rating compared to the baseline building performance rating per ASHRAE/IESNA Standard 90.1-2004 OR Comply with the prescriptive measures of the ASHRAE Advanced Energy Design Guide for Small Office Buildings 2004. OR Comply with the Basic Criteria and Prescriptive Measures of the Advanced Buildings Benchmark™ Version 1.1.

LEED CI Requirement: Reduce connected lighting power density below that allowed by ASHRAE/IESNA Standard 90.1-2004.

Armstrong Ceiling Systems Contribution:
To aid in reducing lighting power density which lowers energy and maintenance costs, Armstrong High Light Reflectance ceilings and systems provide the same level of illuminance with fewer luminaries. This will assist in reducing lighting and HVAC energy costs up to 25% in new or existing building structures where a High Light Reflectance ceiling is installed along with indirect lighting. Also steps to reduce the number of fixtures and reduce the wattage of lamps should be taken. The number of LEED credits awarded for such improvements are different for new and existing building structures

Material and Resources

MR Credit 4.1, 4.2 – Recycled Content

(10% & 20% post-consumer + 1/2 pre-consumer)

LEED Intent: Increase the demand for building products that incorporate recycled content materials, thereby reducing impacts resulting from extraction and processing of virgin materials.

LEED Requirement: Use materials with recycled content such that the sum of the post-consumer recycled content plus one-half of the pre-consumer (post-industrial) content constitutes at least 10% or 20% of the total value of the materials in the project.

Armstrong Ceiling and Wall Systems Contribution:
Armstrong products contain 23-82% recycled content. Each product data page contains the total recycled content information. Depending on manufacturing location, certain products are available with a higher recycled content option. Armstrong products must be aggregated with all other recycled content materials in order to achieve this credit. Innovation credits are available for higher levels of recycled content used on LEED projects.

MR Credit 6.0 – Rapidly Renewable Materials

LEED NC & LEED CI Intent: Reduce the use and depletion of finite raw materials and long-cycle renewable materials by replacing them with rapidly renewable materials.

LEED NC Requirement: Use rapidly renewable building materials and products (made from plants that are typically harvested within a ten-year cycle or shorter) for 2.5% of the total value of all building materials and products used in the project, based on cost.

LEED CI Requirement: Use rapidly-renewable construction and Division 12 (Furniture and Furnishings) materials and products, made from plants that are typically harvested within a 10-year or shorter cycle, for 5% of the total value of all materials and products used in the project.

Armstrong Ceiling Systems Contribution:
Armstrong Ceilings can contribute to the rapidly renewable calculation.

Indoor Environmental Quality

EQ Credit 4.1 to 4.5 – Low-emitting Materials

LEED Intent: Reduce the quantity of indoor air contaminants that are odorous, irritating and/or harmful to the comfort and well-being of installers and occupants.

LEED Requirement: All of the adhesives and sealants used in the building must meet the requirements of the South Coast Air Quality Management District (SCAQMD) Rule #1168. Interior paints and coating applied on-site must meet the limitations and restrictions concerning chemical components set by several standards. Carpets must meet the Green Label Plus testing and product requirements. These credits pertain to adhesives & sealants, paints, carpets and composite wood.

Armstrong Ceiling Systems Contribution:
Armstrong Mineral Fiber Ceilings and Suspension Systems meet the requirements for low emissions. For additional information, refer to “The Basics of Formaldehyde & Interior Spaces” CS-3550. Low emitting products can be used as a possible innovation credit.

EQ Credit 8.1, 8.2 – Daylight and Views

LEED Intent: Provide the occupants with a connection between indoor spaces and the outdoors through the introduction of daylight and views into the regularly occupied areas of the building.

LEED Requirement: Achieve a minimum glazing factor of 2% in a minimum of 75% of all regularly occupied areas or achieve at least 25 footcandles. AND Provide daylight redirection and/or glare control devices to ensure daylight effectiveness.

Armstrong Ceiling Systems Contribution:
Armstrong High Light Reflectance ceilings can aid in extending daylighting into the space. A typical acoustical ceiling reflects just 75% of the light striking the surface, while a high light reflectance ceiling is engineered to reflect up to 90% of the light striking the surface. Recent independent studies have shown a 10-15% daylighting effectiveness increase. A separate study concluded that the High Light Reflectance ceiling could achieve the LEED credit with up to 12% less glazing than a ceiling with a reflection of 75%, when submitting for credit using daylight simulation results.

ARMSTRONG & THE ENVIRONMENT

Green Building Movement

SUSTAINABLE DESIGN

The Green Building Movement continues to grow at a rapid pace. Buildings consume 40% of energy and 71% of electricity and account for 39% of CO_2 emissions directly influencing global climate change*.

We can help to change this course by designing, building and occupying more environmentally-sensitive structures. By integrating natural resources, human health and community concerns into building design and construction, architects and designers can create buildings that are cleaner, healthier for occupants & the environment and which deplete fewer resources. Moreover a designed "green" building can yield a better return on investment over the building's lifecycle.

Armstrong is committed to providing environmentally preferable products and services to enhance these green buildings. Even as early as 1860, Armstrong has pioneered "green" practices, products and services, first in North America and then worldwide.

Our quality and process-driven culture are seeds by which we continue to innovate environmentally-responsible practices. In 1999, as evidence of this commitment, in North America we introduced the first commercial ceilings recycling programme in the industry, providing customers with 8 years of experience, resulting in a closed loop process.

*US Data

RESPONSIBLE MANUFACTURING AND MATERIALS

Our Commitment

A global leader in the building materials industry, Armstrong is committed to environmental sustainability. We fulfill this commitment by systematically reducing the environmental footprint of our operations and by providing products and services to our customers that enable you to reduce the environmental impact of the buildings you create.

Our Actions

Our Policy on the Environment articulates the operating fundamentals that support our commitment to sustainable growth. We have selected four Environmental Priorities to reduce our environmental footprint: Energy, Greenhouse Gases, Water, and Responsible Forest Management. The Environmental Management System that we have established for all of our operations includes the following goals:

- To be prepared for emergencies and to act promptly and responsibly to protect people and the environment
- To ensure all products conform to safety, environmental and quality standards
- To reduce waste and embrace recycling in all of our operations and to dispose of waste materials in an environmentally responsible manner

Our Corporate Policy on the Environment

Armstrong recognizes the importance of protecting the environment and using resources responsibly. We are committed to environmental stewardship in our dealings with customers, employees, the government and our community.

Key Requirements:

Our policy on the environment is:

- To exercise care in the selection and use of energy and raw materials.
- To provide for environmental safety in our work places and communities.
- To be prepared for emergencies and to act promptly and responsibly to protect people and the environment.
- To ensure all products conform to safety, environmental and quality standards.
- To reduce waste and embrace recycling in all of our operations and to dispose of waste materials in an environmentally responsible manner.

FOUNDING MEMBER OF THE INDIAN GREEN BUILDING COUNCIL (IGBC)

The Indian Green Building Council is the nation's foremost coalition of leaders from across the building industry, working to promote buildings that are environmentally responsible, profitable and healthy places to live and work. As a founding member of the IGBC, Armstrong participates in the development of the **LEED** (Leadership in Energy and Environmental Design) Rating System.

QUICK REFERENCE OF QUALIFYING PRODUCTS

Recycled content and, where applicable, general LEED credit information at the top right corner of each of our product pages.

Recycled Content: 66-82%

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓	✓	✓	✓	✓	✓

Energy savings and environmental benefits of high light reflectance ceilings

HIGH LIGHT REFLECTANCE CEILINGS

Lighting is the leading source of energy consumption in most buildings. As a result, energy efficient lighting systems are becoming increasingly important in corporate environments.

Lighting systems also have an effect on a building's occupants. Systems that provide a softer, more evenly distributed light can help create an environment of visual comfort in a space, reducing eyestrain and increasing employee effectiveness.

The three most common lighting options are: direct or downlighting, indirect or uplighting, and direct/indirect or a combination of task and ambient lighting. While each offers advantages and disadvantages, indirect lighting systems are growing in popularity because they overcome many of the shortcomings of direct systems by providing a light source with fewer shadows and less glare. Indirect lighting has also grown due to lower costs, more compact systems, less obtrusive designs, simplified installation, and broader and deeper product lines.

High Light Reflectance Ceilings

The ceiling is an integral part of an indirect lighting system because it must reflect the light that strikes it back into the space. The ability of a ceiling to reflect light is indicated by its Light Reflectance or LR value. LR values range from 0.00 to 1.00 and denote the percent of light striking the panel that is reflected. For example, an LR or 0.75 means the panel reflects 75% of the light striking it. Most commonly installed acoustical ceilings have an LR of 0.70 to 0.81. High light reflectance or Hi-LR ceilings have an LR of 0.83 or higher. In general, increasing the reflectance of a ceiling has a very positive impact on the lighting and energy use of a building, especially when used in conjunction with an indirect lighting system.

Energy savings and environmental benefits of high light reflectance ceilings

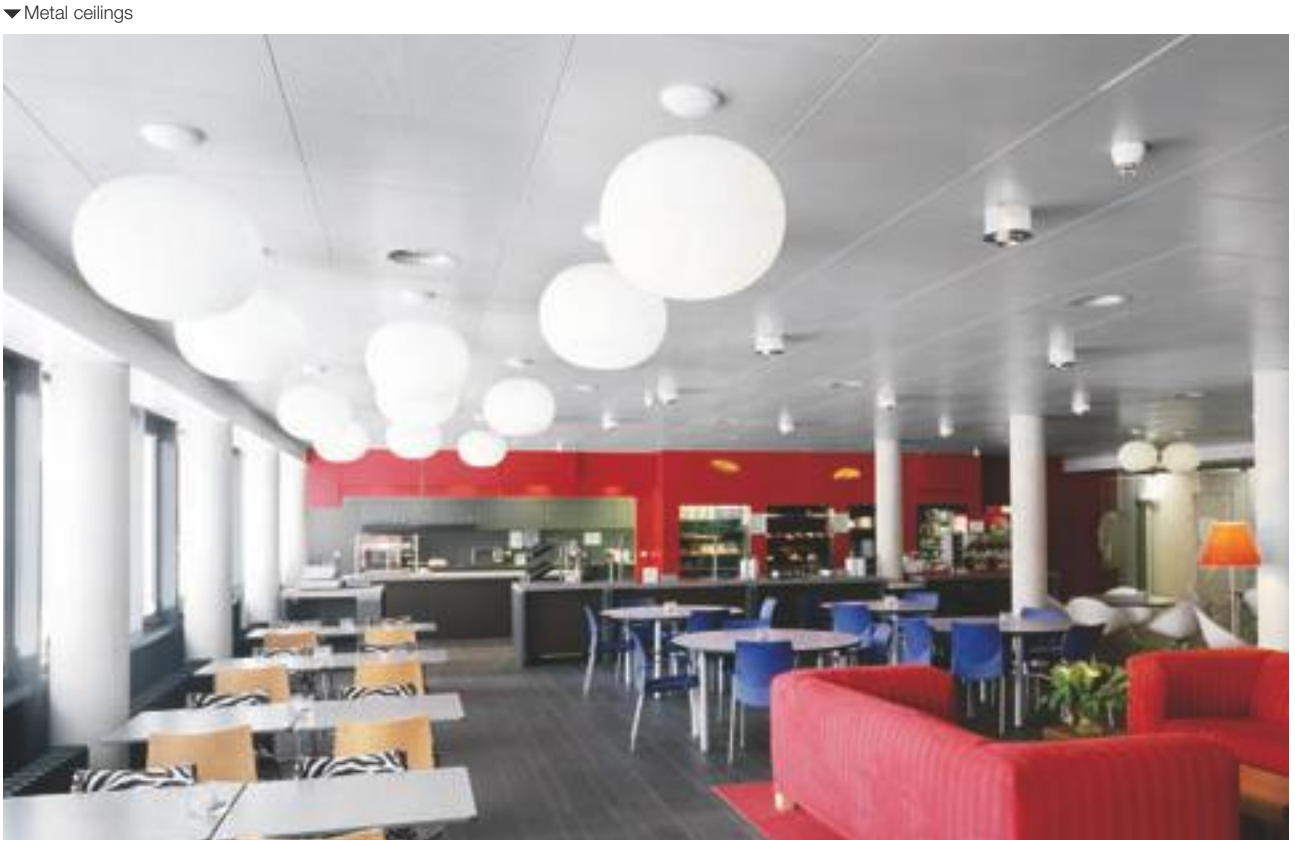
Armstrong offers **highly light reflective ceilings** which can be used to improve the overall room lighting, conserve energy and thereby reduce energy costs.

Our product ranges are developed for ease of maintenance resulting in minimum replacements.

The ceiling tile tested here is **Ultima**, but these tests can be extended to other solutions like **Metal ceilings**.

▼Ultima tiles

▼Metal ceilings



Energy savings and environmental benefits of high light reflectance ceilings

Light Reflectance Research

To substantiate the effects of increasing the ceiling reflectance in typical office plans, Brinjac Engineering, a multi-discipline consulting engineering firm, conducted two studies, one on work plane illuminance and the other on energy consumption.

In the first study, 4 room configurations were selected as typical office spaces: a 10' x 10' private office, a 100' x 30' open office, a 60' x 60' open office, and an irregular shaped open office. Two different light fixtures were used: a direct recessed 2' x 2' parabolic troffer and an indirect pendant. All variables were held constant and only the ceiling reflectance was changed from 75% up to 90%. No daylighting or task lighting was taken into effect.

Work Plane Illuminance

The study results showed that for direct fixtures, work plane illuminance achieved modest increases ranging from 2% to 5% when increasing the ceiling reflectance from 75% to 90%.
Finding: Compared to a 75% reflective ceiling, the 90% reflective ceiling achieved an average increase of nearly 22% in work plane illuminance with indirect lighting. This increase in light level means lighting costs can be lowered by using fewer fixtures in the space or by using the same number of fixtures but at lower wattage levels. Figure 1 demonstrates the difference high light reflectance ceilings can make in workplace illuminance when used with indirect lighting.

Figure 1: Work Plane Illuminance

Ceiling Reflectance	Work Plane illuminance (footcandles)	Increase in light level
75%	52.0	Reference
78%	54.3	4%
81%	56.6	9%
84%	59.0	13%
87%	61.6	18%
90%	63.3	22%

60' x 60' x 10' open office, 12' luminaire spacing

The study also showed that compared to 75% reflective ceilings, 90% reflective ceilings enhanced the benefits of indirect lighting by improving lighting uniformity. Poor uniformity leads to visual discomfort.

Energy Savings

In the second study, a new lighting design was created to optimize the layout with 90% reflective ceiling tile using the same spaces and indirect light fixtures as the first study. These results were compared against a layout of 2' x 2' recessed parabolic troffers with standard spacing. The results were then compared against each other to determine the change in energy use that was achieved with the higher value for the ceiling tile.

Finding: The 90% reflective ceiling allowed spacing between indirect luminaire sections to be increased, thus reducing the total number of luminaires needed to achieve light levels similar to the 75% ceiling.

Finding: The 90% reflective ceiling and indirect fixtures yielded a 23% lower lighting power density than the 75% reflective ceiling layout and a 21% lower lighting power density than the parabolic troffer layout. Using the same open office configurations, the effects of the reduced lighting load on the HVAC system were then modeled using two different software programs.

Finding: The reduction in lighting power density obtained by the 90% reflective ceiling enabled an average HVAC energy cost savings of up to 9% over the layout with a 75% reflective ceiling and 7% over the troffer layout. Based on these results, there is a significant impact on the HVAC system by reducing the in-room heat generated by the lighting load through the use of a high light reflectance ceiling. This impact can be positive in the form of energy savings, especially if the building is in cooling year-round, as many buildings are.

LEED® Credits

High light reflectance ceilings can also contribute to LEED points, especially in the Energy and Atmosphere category under EA Credit 1.0 (Optimize Energy Performance). In the Brinjac study, for example, energy points were achieved by nothing more than increasing the light reflectance.

Based on the spaces used in the study, the reduction in total building energy consumption as defined by LEED NC 2.2 could be as high as 10.6% when optimizing the lighting layout with 90% reflective ceilings. This savings qualifies for 1 point in a new building or 3 points in an existing building.
Hi-LR ceilings are also a factor in the Indoor Environmental Quality category by contributing to EQ Credit 8.1, 8.2 (Daylight and Views). This is because high light reflectance ceilings can "extend" natural daylighting into a space. And, Hi-LR ceiling systems can contribute in the Materials and Resources category in the following areas:
MR Credit 2.1, 2.2 (Construction Waste Management),
MR Credit 4.1, 4.2 (Recycled Content),
MR Credit 5.1,
5.2 (Local/Regional Materials), and
MR Credit 6.0
(Rapidly Renewable Materials).

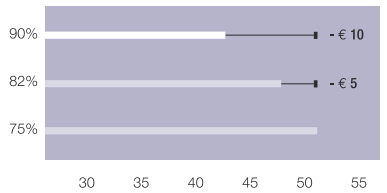
Seeing the Light

As indicated by the Brinjac study, architects and designers should look at the ceiling system as an integral element of a building's energy reduction strategy. The overall cost impact compared to potential energy savings make high light reflectance ceilings a viable solution for achieving energy reductions without the need for more costly new technology.

Energy savings and environmental benefits of high light reflectance ceilings

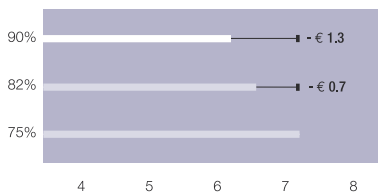
REDUCTION OF COST* OF INDIRECT LIGHTING

Reduction in cost* of indirect lighting
Light reflectance



* Cost = luminaires + installation + cables

Reduction in electricity consumption
Light reflectance



TEST RESULTS

The test demonstrates that light reflectance of the order of 90% contributes to a 20% reduction in the cost of luminaires and electricity consumption.

SOIL RESISTANCE - SIMULATED SUPPLY AIR DIFFUSER SOILING TEST

The simulated supply air diffuser soiling test evaluates this soil-resistant property.

Typical ceiling

Ultima/Ultima dB

TEST RESULTS

Dirt accumulation not only detracts from a ceilings appearance, but can cost money by requiring painting or replacement of the ceiling. In addition to reducing acoustical efficiency, soiling can cause a substantial reduction in light reflectance. Ultima provides excellent soil resistance for lasting value and performance.

SCRUBBABILITY - GARDNER TEST

The Gardner Test evaluates a ceiling's ability to withstand scrubbing.

Typical ceiling

Ultima/Ultima dB

TEST RESULTS

These photos show the excellent scrubbability of Ultima vs a typical ceiling.

Formaldehyde emissions and interior spaces

What you need to know

Increasing attention is being given to green buildings and sustainable design, especially as it pertains to the quality of the indoor environment and the concentration of formaldehyde within it.

What is Formaldehyde?

Formaldehyde is a colorless gas with a pungent odor that occurs naturally in the environment. It is also an important industrial chemical that is widely used in the manufacture of other chemicals, building materials and household products. And, it is a volatile organic compound (VOC), meaning that it vaporizes and becomes a gas at normal room temperatures. As a result, products containing formaldehyde can release it as a gas.

Why Is It a Concern?

Formaldehyde is normally present at low levels in outdoor air. However, interior spaces containing products that release formaldehyde can have levels greater than that of outdoor air. And, as formaldehyde levels increase with the installation of multiple interior finishes, possible illness or discomfortis more likely to occur.

The effect of formaldehyde on people varies widely from person to person. Some people are very sensitive to it, while others have no noticeable reaction to the same level. Depending upon an individual's sensitivity, exposure to low to moderate levels of formaldehyde can cause temporary burning or itching of the eyes or nose, stuffy nose, sore or burning throat, or headaches. Breathing high levels of formaldehyde can cause chest tightness, coughing, wheezing or a worsening of asthma symptoms.

What Affects Formaldehyde Levels?

The formaldehyde level in indoor air depends primarily on four factors:
1) The source of the formaldehyde – Building materials containing formaldehyde tend to release more of the gas when the product is new. As the product ages, formaldehyde release usually decreases. As a result, new or renovated spaces tend to have higher formaldehyde levels because they often contain a large amount of recently installed building materials.
2) Air exchange rate – Decreasing the flow of outdoor air to the inside of a building increases the formaldehyde level of the indoor air.
3) Temperature – As temperature rises, more formaldehyde is emitted.
4) Humidity – As humidity rises, more formaldehyde is released.
5) Loading Factor – If the quantity of formaldehyde emitting material is reduced, the overall concentration of formaldehyde is reduced. Loading factor is the ratio of building material surface area to the building volume.

What Are Interior Sources of Formaldehyde?

In any given space, a variety of interior products may emit formaldehyde. They include, but are not limited to, such products as:

- Composite or pressed wood products such as doors, casework, finish

...What you need to know

carpentry, and plywood and fiberboard in all applications
- Paints, coatings and other similar finishes
- Sealants and caulking
- Adhesives
- Concrete sealants
- Acoustical sealants
- Carpet
- Resilient flooring of all types
- Epoxy resin floor coverings
- Wall coverings
- Acoustical ceiling tiles
- Insulation
- Fireproofing

How Can Formaldehyde Levels Be Reduced?

A number of measures can be taken to help reduce indoor levels of formaldehyde emissions. They include:

Maintain proper levels of temperature and humidity –
Since elevated temperatures and high relative humidity increase formaldehyde release, it is vital to continually monitor and control these conditions. In addition, explore air conditioning, dehumidifiers and other moisture control measures.

Provide adequate ventilation –
Use American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 62, "Ventilation for Acceptable IAQ," and Uniform Building Code (UBC), Chapter 12, Title 24, "Energy Standards," Section 121 as guidelines.

Control emissions at the source –
Reduce formaldehyde levels by choosing products with low formaldehyde emission rates. While avoiding indoor conditions of elevated temperature and humidity and providing proper ventilation can help in controlling formaldehyde emissions, the best strategy is "source reduction." This means substituting lower-formaldehyde products for those emitting higher levels.

To further help reduce emissions at the source, it is important to "precondition" products that do have significant emissions by allowing them to off-gas without any packaging in a dry, well-ventilated space for 14 days prior to installation

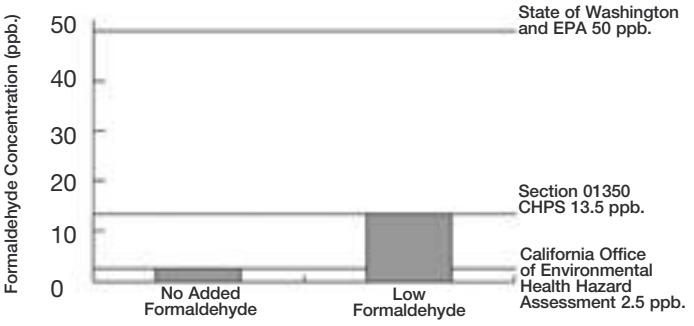
Choosing Acoustical Ceiling Systems

When selecting acoustical ceiling systems for an entire building or a specific space, it's important to know that Armstrong offers the widest selection of acoustical ceilings that satisfy stringent indoor environmental quality requirements for formaldehyde and VOC emissions — without affecting other performance properties such as acoustics, durability, sag resistance, light reflectance, fire and seismic performance, recycleability and recycled content.

All Armstrong acoustical ceiling systems meet the U.S. Department of Labor Occupational Safety & Health Administration (OSHA) requirements for formaldehyde exposure and content requirements for workers handling these materials.

Guidelines for Formaldehyde Concentrations

The chart below shows the various guidelines for formaldehyde concentrations in indoor air, and how Armstrong products meet these guidelines. These concentrations are measured in ppb. (parts per billion).



No-added/Low Formaldehyde Ceilings

No-Added Formaldehyde Ceilings

Many Armstrong acoustical mineral fiber ceilings are formulated with no formaldehyde and they outperform CHPS Section 01350 requirements on emissions. Several products in this category meet the most stringent requirements set by CA Office of Environmental Health Hazard Assessment (OEHHA), contributing less than 2.5 ppb of formaldehyde when used under typical conditions required by ASHRAE Standard 62.1- 2004, "Ventilation for Acceptable Indoor Air Quality," California Code of Regulations, Title 24, and other building types outlined in CHPS Section 01350.

Low Formaldehyde Ceilings

A few Armstrong acoustical mineral fiber and fiberglass ceilings are classified as low formaldehyde, contributing less than 13.5 ppb when used under typical conditions required by ASHRAE Standard 62.1- 2004, "Ventilation for Acceptable Indoor Air Quality," California Code of Regulations, Title 24, and other building types outlined in CHPS Section 01350.

What you need to know

Mold is receiving more attention within the construction industry than ever before. One reason is that it is becoming an increasingly visible subject in the media. Another is an increased awareness of mold by a building's occupants.

Regardless of the reason, it is important that everyone involved in the construction industry, from architects and designers to contractors, building owners and facility managers, now be familiar with the implications of mold in creating structurally sound and aesthetically pleasing spaces.
Because mold can grow on virtually any building material if necessary conditions are present, architects, designers, contractors, building owners and facility managers all have a role in identifying and preventing the conditions that permit the possibility of mold growth during the various stages of the construction process.
Fortunately, while mold can grow on virtually any surface, the use of proper building design, construction and maintenance practices can mitigate the possibility of excessive mold growth.
The relationship between mold exposure in buildings and human health is currently the subject of medical study. Exposure to most kinds of mold usually has no effect on healthy individuals. However, exposure to certain kinds of molds may cause discomfort, cause or aggravate allergies and asthmatic conditions, and increase the risk of respiratory illness or infections in susceptible or allergic individuals. Because of this, conditions that foster mold growth in an indoor environment should not be allowed to develop or persist.

The Construction Process

Before construction

When designing the building envelope, systems that not only shed water but also are capable of drying out if water does penetrate them are required to help keep moisture from infiltrating the building.
On the interior, HVAC systems that provide proper ventilation and air exchange are required to help prevent the creation of high humidity conditions and possible condensation. There is no substitute for good building design, construction and maintenance practices for preventing mold growth.
Enhanced mold resistance, however, can be achieved through the selection of specially treated products for use in a building's interior. Armstrong ceilings, for example, can be treated with two different types of antimicrobials:
BioBlock™ – Ceilings treated with BioBlock inhibit or retard the growth of mold on the painted surface when used in accordance with good design, construction and maintenance practices. The BioBlock formulation contains a fungicide that is applied to the front and back of the panels.
Intersept® – Ceilings treated with Intersept on the face of the panels inhibit the growth of odor and stain-causing bacteria on the treated surface of the panel. Bacteria, unlike mold, can grow without a living or organic food source. They thrive on chemicals in their surroundings, and do not require food or light. Intersept is a low-toxicity, broad-spectrum antimicrobial that is built into the product and protects it by destabilizing the cellular membrane of certain microorganisms, preventing them from multiplying and surviving.
When selecting acoustical ceilings, it's important to note that no standardized industry test for measuring mold and mildew growth on ceiling materials currently exists. The most common test method used today was actually developed to measure resistance to mold growth on the surface of interior coatings such as paint, not building materials. In lieu of a standardized test, Armstrong tests its products using the same test method all other members of the building materials industry use, namely ASTM D 3273. In the meantime, Armstrong is participating with key industry partners in the creation of new tests designed specifically to determine the resistance of building materials to mold growth over time in more representative test conditions.

For use in high humidity environments, Armstrong also offers sag-resistant HumiGuard™ ceilings. These ceilings resist sagging that can diminish the attractiveness of a space and cause ceilings to chip and soil more easily.
Use of a ceiling suspension system that has a hot dipped galvanized finish is another important factor in high humidity areas. This coating inhibits moisture-induced red rusting and corrosion better and longer than electrogalvanized or painted systems.
NOTE: Substituting products that are

What you need to know

treated with a moldinhibiting agent for those that are not, will not, in itself, provide an effective solution if moisture is able to infiltrate the building. Moisture control is key to mold control.

During construction

If building materials are kept dry prior to installation, the risk of mold growth is significantly reduced. Therefore, contractors should have a plan for protecting materials from water damage, paying particular attention to the way the materials are transported and unloaded, and then stored at the construction site.
To preclude the growth of mold, it is important to keep the building interior dry during construction. For example, if contractors must install interior finishes before the building envelope is enclosed or before the HVAC system is in operation because of a fast track construction schedule, it is important to cover the area in which they are working to shut out the weather and help ensure that condensation and other forms of moisture are not trapped in the building.

If the area is enclosed, contractors can use desiccant dehumidifiers or indirect-fired heaters to dry areas where they are installing or applying certain finishes, particularly if water is visible in those areas. Humidity control firms can also create a temporary humidity and temperature control system using similar equipment. If moisture is introduced during a wet construction process, such as wet concrete and masonry, poured flooring, or painting, it is important to maintain an ample level of ventilation to insure proper drying.
NOTE: Armstrong HumiGuard sag-resistant ceilings can be installed in high humidity conditions, but not in the presence of condensation. Condensation allows moisture to come in direct contact with the ceiling. This can lead to possible mold growth and also void the product warranty.

After Construction

Building operation and maintenance are no less important than building design and construction in ensuring moisture control. As buildings become tighter, the amount of air exchanged between the interior's conditioned spaces and the outdoors diminishes, resulting in significantly less dilution of moisture. Consequently, provisions must be made to provide proper ventilation. Otherwise, moisture will take longer to migrate out of the building, increasing interior relative humidity, creating a higher likelihood of condensation and reducing the drying potential.
Regular inspection and maintenance of the building envelope and interior spaces is also critical. Caulked joints are particularly important because, if ignored, leaks around windows, doors, roofs and foundations can become serious problems. On the interior, make sure the water used in cleaning and other maintenance procedures does not find its way into enclosed spaces or soak finished materials. In addition, owners and their maintenance crews must try to avoid any accumulation of water in any location where water should not be. This includes such conditions as a cracked water pipe or an overflowing toilet. In these cases, the water "event" must be immediately addressed. It also includes less obvious conditions such as condensation on windows, doors, pipes, drains or mechanical systems, all of which can provide enough moisture for mold to begin to grow. Regardless of the cause, the presence of any unwanted water in a building must be prevented.

Taking action

If a facility is shut down for an extended period of time, such as a school over summer vacation, it is important that the HVAC system continues to operate. Failure to do may cause moist, humid conditions and condensation that could lead to the growth of mold.
If mold is found, it is important to immediately identify the cause of the moisture intrusion and eliminate it. Otherwise, the mold may return. The mold itself should also be eliminated immediately.

Depending on the degree of mold infestation, this can be accomplished by a trained in-house crew or by a professional mold remediation service. In the event of an abnormal condition, such as water intrusion caused by a building leak or condensation, water-stained, damaged ceiling panels should be removed as quickly as possible. The source of the moisture should then be identified and repaired prior to installing new ceiling panels. Not only can mold grow on a waterdamaged panel in the right conditions, mold spores on a damaged panel can more easily become airborne once the panel has dried. It is also wise to monitor the plenum space above the damaged panels for potential mold growth in the future. In most cases, waterstained panels are an indication of moisture within the plenum, and should be promptly addressed.

Moisture Control Is Key to Mold Control

Building design, construction and maintenance practices that focus on eliminating water intrusion from condensation, leakage and other sources are critical to the reduction of mold and mildew in building interiors. Each party involved in the construction process plays a role in moisture control. Before construction, architects must design the building properly and select appropriate materials and systems. During construction, general contractors must sequence trades so that moisture exposure is limited, and sub-contractors must protect the materials from water damage and install them in accordance with manufacturer's requirements. After construction, building owners must operate and maintain the building properly.

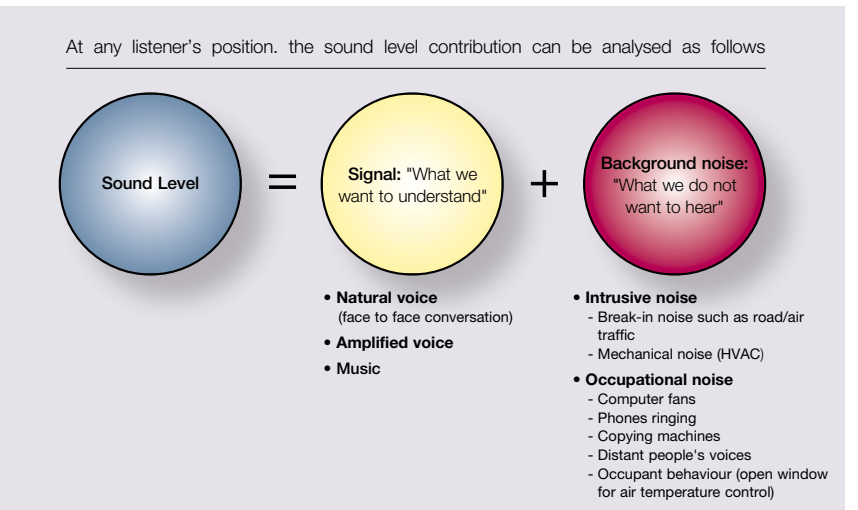
Intelligibility, confidentiality and concentration

To meet acoustical regulations, it is generally sufficient to meet the performance measures in unoccupied spaces, without office equipment switched on.
Acoustical regulations generally recommend values to be achieved for reverberation times (within a space) and sound insulation (between spaces or from outside the building).

This approach isn't satisfactory any more to **meet the expectations of occupants**, in particular with the development of open spaces in offices and the increasing hearing problems of students in the education sector.
On a day-to-day basis, any activity disturbs the initial acoustical balance, like for example group discussions, ringing phones, copy machines, music, open windows or road traffic noise.
Occupants of an office, a classroom, a shop, a hospital or any other space, need a **comfortable and healthy environment to carry out their activity under the best conditions**.

The right acoustical environment is essential and the way to achieve that is to focus on:

- **Intelligibility**
  (I want to be understood)
- **Confidentiality**
  (I don't want to be overheard)
- **Concentration**
  (I do not want to be disturbed)



RECEPTION OF A SOUND

A person who receives a sound, will consider it as necessary or unwanted depending on their activity at that moment:

- When someone needs to understand a speaker in a classroom, an amphitheatre, a conference room, music or an alert message, there necessarily needs to be good **Intelligibility.**

The signal needs to be much stronger than the background noise.

- When someone needs to work or study alone, they don't want to be disturbed by distracting sounds, to guarantee a good **Concentration.**

The background noise shouldn't be intrusive.

EMISSION OF A SOUND

A person who emits a sound, wants to be well understood or, on the contrary, wishes a certain level of discretion, depending on his activity:

- A professor or a speaker in front of a large audience wants to be well understood at any position in the room and therefore needs a good **Intelligibility.**

The signal needs to be much stronger than the background noise.

- During a discussion with their banker, doctor or during a "top secret" meeting, people wish not to be overheard by strangers and a good level of **Confidentiality** is critical.

The signal shouldn't be higher than the background noise.

- When an audio system is used to diffuse evacuation instructions in a building or public transport, publicity messages or music, these signals need to be **intelligible**, which isn't always the case.

The signal needs to be much stronger than the background noise.

The search for optimum acoustical conditions can be summarised under Intelligibility, Confidentiality and Concentration. It's all about the right difference between signal and background noise, the so-called Signal-to-Noise ratio. The following table shows some examples of spaces with the most important criteria to focus on.

	Intelligibility	Confidentiality	Concentration
 Open space Call centre		●	●
 Closed office		●	●
 Classroom Conference room	●		●
 Library		●	●
 Hospital waiting area	●	●	
 Hospital bedroom		●	●
 Retail shop	●	●	
 Retail bank agency		●	

Armstrong, global leader in acoustical ceiling systems, recommends an acoustical approach for the daily reality in two steps:

1. Use passive products

- to absorb sound within a space and block sound between spaces or coming from outside the building.

2. Use active acoustics

- to cover remaining unwanted noise
- to raise the level of speech and overcome intelligibility issues
- to play music
- to provide intelligible public announcement.

Role of ceilings in passive acoustics

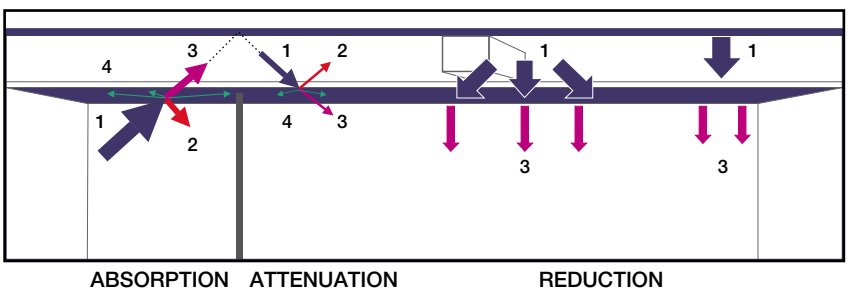
Suspended ceiling systems play a key role in the control of the acoustical environment thanks to their important surface and modularity.

Ceiling tiles provide a combination of sound absorption, attenuation and reduction:

Sound absorption is the part of incident sound that is not reflected by the tile.

Sound attenuation is the control of sound transmission between adjacent spaces with a common void above them.

Sound reduction is the control of sound generated in the plenum or coming from the floor above.



1 Incident sound
2 Reflected sound
3 Transmitted sound
4 Absorbed sound
1-2 Sound absorption

The acoustical properties of a mineral ceiling tile vary depending on the combination of **Porosity, Thickness and Density**. The following table shows the impact on acoustical performance when increasing each of these parameters.

	Sound absorption	Sound attenuation and reduction
Density ↗	↘	↗
Porosity ↗	↗	↘
Thickness ↗	↗	↗

Armstrong offers a wide range of densities and materials combining the necessary acoustical performances with an extensive range of visuals. The impact of acoustical control on occupants of spaces with passive ceilings can be summarised as follows:

	Sound absorption	Sound attenuation and reduction
Controls	Reflections within rooms	Transmission between rooms
Effect upon	Intelligibility	Confidentiality & Concentration
Benefits	Room occupants	Room neighbours

The acoustical performance of metal ceilings can be compared to mineral ceilings as follows:

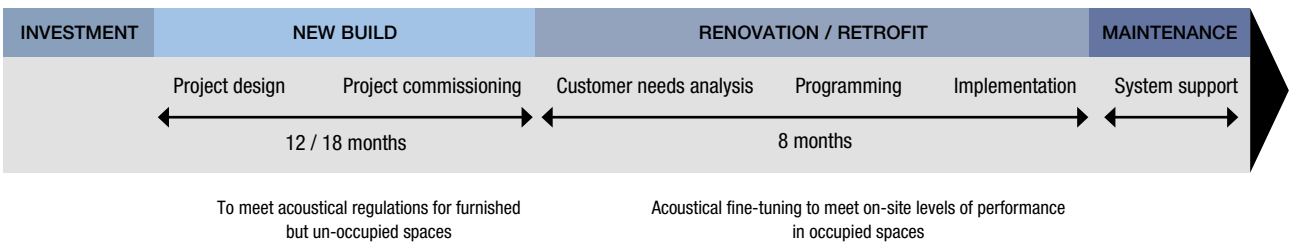
High density mineral	Medium density mineral	Low density mineral
Plain metal / Perforated metal with hard mineral infill	Extra microperforated metal with fleece	Microperforated metal with acoustic fleece or pad

The table below shows examples of spaces with the most appropriate type of mineral density and some product suggestions.

	High Density	Medium Density	Low Density
 Open space Call centre		Ultima, Sabbia	Optra, Optima, Ultima OP, Axiom Canopy with Metal Perforated
 Closed office	Ultima dB, Metal Plain	Ultima, Sabbia	
 Classroom Conference room	Cirrus	Ultima, Sabbia, Dune	
 Library		Ultima, Sabbia, Metal Extra Microperforated	Optra, Optima, Ultima OP, Metal Microperforated
 Hospital waiting area		Fine Fissured, Ultima, Sabbia, Metal Extra Microperforated	Optra, Optima, Ultima OP
 Hospital bedroom	Bioguard Plain, Metal Plain	Metal Extra Microperforated	
 Retail shop	Ultima dB, Metal Plain	Ultima, Sabbia, Dune Colortone, Metal Extra Microperforated	Optra, Optima, Ultima OP
 Retail bank agency		Ultima, Sabbia	Optra, Optima, Ultima OP, Metal Microperforated

When to choose your acoustical ceiling system?

BUILDING DESIGN & CONSTRUCTION TIMELINE



Traditionally, in a new building, the acoustical treatment focuses on meeting regulations.
The recommended values are set for furnished but un-occupied spaces.
In general, a passive ceiling system is installed.
When the end-user is known, his specific needs can be taken into account.

The trend for fine-tuning of acoustics on-site is growing, for instance:

- Occupant's growing expectations for a more comfortable and healthy environment taking into account the need for optimal intelligibility, confidentiality and concentration to meet their day-to-day reality.
- Re-configuration from closed to more open spaces in offices, schools, hospitals, introducing new constrains around communication, privacy and disturbance.
- Use of new communication technologies, like tele-conference or audio supported presentations, needing an adapted environment.

This has lead to new phenomena of retro-fitting existing spaces. Armstrong's involvement is continually growing by working with end-users, space-planners and acoustical consultants to fulfillthe acoustical needs.

Some ways to achieve the required results are:

- Replacing an existing passive ceiling by one with other acoustical characteristics.
- Adding independent passive ceiling elements, like canopies for spot acoustics.
- Introducing active acoustics.

All these critical re-configurations are more labour intensive and more expensive than if they are considered from the beginning of a project.

In general, standard passive ceiling solutions are chosen during the project design and commissioning and fine-tuning is only done at a later stage.

In order to reduce the installation cost and to speed up the process. Armstrong recommends being involved as early as possible in the design and construction lifetime.

PASSIVE ACOUSTICS

WEIGHTED SOUND ABSORPTION COEFFICIENT, α_w

A single-number rating for random incidence sound absorption coefficients determined in accordance with EN ISO 11654. With this method measured values obtained in accordance with EN ISO 20354, are converted into octave bands at 250, 500, 1000, 2000 and 4000 Hz and are plotted on a graph. A standard reference curve is then shifted towards the measured values until a “best fit” is obtained. The derived value of α_w will vary between 0.00 and 1.00 but is only expressed in multiples of 0.05 eg $\alpha_w = 0.65$.

NOISE REDUCTION COEFFICIENT, NRC

A single-number descriptor for random incidence sound absorption coefficients. Defined in ASTM 423 90a. as the arithmetical average, to the nearest multiple of 0.05, of the measured sound absorption coefficients at the four one-third octave band centre frequencies of 250, 500, 1000 and 2000 Hz.

WEIGHTED SUSPENDED CEILING NORMALISED LEVEL DIFFERENCE, D_{ncw}

A single-number rating of the laboratory measurement of room-to-room airborne sound insulation of a suspended ceiling with a plenum above it. The rating is determined in accordance with EN ISO 717-1 from measurements made in accordance with EN 20140-9 over the third-octave band frequency range 100-3150 Hz.

SOUND ABSORPTION

The conversion of sound energy into heat (by friction) when passing through or striking a material or when causing a volume of air to resonate.

SOUND ATTENUATION

A term used in relation to the transmission of sound between rooms sharing a common ceiling plenum.

ACTIVE ACOUSTICS*

MUSIC

High quality music and intelligible marketing messages in the retail environment help retain customers and improve sales. By aesthetically matching the ceiling, sound panels minimise visual distraction, keeping the customer focused on product. Other environments include: Retail banking / Supermarkets / Auditoria / Showrooms / Cafeterias.

SOUND FIELD

Achieving comfortable acoustics in learning environments can be a real challenge... If the classroom does not meet specific criteria for reverberation times and intelligibility levels, the teacher may suffer from voice strain causing a higher rate of absenteism whilst pupils may suffer from uneven learning conditions from front to back row. Armstrong ceilings provide a high performance voice reinforcement system (Sound Field) for equal levels of intelligibility across the classroom.

PUBLIC ADDRESS / VOICE ALARM

Today's office, retail, healthcare, Education environments very often integrate a public address system. As far as safety is concerned, there is also a growing trend to design building evacuation through a voice message (voice alarm), generally considered to be less stressful and more efficient than traditional horns. Armstrong ceilings support both standard public address and voice alarm applications with excellent levels of intelligibility whilst maintaining the ceiling's aesthetics.

MUSIC MASKING

Open plan layouts in retail banking and healthcare environments have triggered new acoustical issues linked to speech privacy. How can customer details and conversation content be kept private when waiting areas are in direct line of sight of the clerks' desks? Armstrong ceilings diffuse uniform levels of background music (Music Masking) providing a virtual acoustical barrier between acoustically sensitive zones.

SOUND MASKING

Today's office space design trends favour higher proportions of open plan spaces and use of glazed partitions for closed offices, resulting in poor acoustical conditions and affecting the occupants' well-being. Armstrong's exclusive in-ceiling Sound Masking solution increases speech privacy and reduces noise annoyance whilst maintaining the ceiling's aesthetics.

*Active acoustics are NOT a standard offering in India

Acoustical performance

Sound absorption

				Octave Band Centre Frequency Hz					
				α_p**					
Product Name	Cert. No.#	α_w	NRC	125	250	500	1000	2000	4000
Optra Board/Tegular/MicroLook 25	2914	1.00	1.00	0.50	0.85	1.00	0.95	1.00	1.00
Ultima OP	4765	1.00	0.95	0.55	0.85	1.00	0.95	1.00	1.00
Optra Board/Tegular/MicroLook 20	2913	0.95	0.95	0.40	0.80	1.00	0.85	1.00	1.00
Optima Vector 22	2923a	0.95	0.95	0.35	0.80	1.00	0.90	1.00	1.00
Visual V49 + Fleece + 25 mm x 20 kg/m³ fg* overlay	4360	0.95	0.90	0.35	0.80	0.95	0.90	1.00	1.00
Optra Board/Tegular/MicroLook 15	2912	0.90	0.90	0.35	0.75	1.00	0.80	0.90	0.95
Cirrus Open Plan	3597	0.70(H)	0.75	0.40	0.40	0.70	0.90	1.00	1.00
Ultima Tiles	4687	0.70(H)	0.70	0.55	0.50	0.65	0.80	0.90	0.85
Ultima Vector	3127	0.70(H)	0.75	0.35	0.40	0.70	0.90	0.90	0.85
Ultima Concealed Planks	4485a	0.65(H)	0.65	0.35	0.45	0.60	0.75	0.85	0.90
Sabbia Tile	4362	0.65	0.70	0.50	0.55	0.75	0.75	0.70	0.45
Fine Fissured Black	4441	0.60(H)	0.60	0.40	0.40	0.55	0.75	0.75	0.75
Fine Fissured Tiles	4441	0.60(H)	0.60	0.40	0.40	0.55	0.75	0.75	0.75
Ultima dB Concealed Planks	4484a	0.60(H)	0.55	0.30	0.35	0.55	0.65	0.75	0.85
Fine Fissured Board Planks/Concealed Planks	2982	0.60	0.60	0.30	0.40	0.60	0.75	0.75	0.60
Dune Board & P2 Planks (17 mm)	4486a	0.60	0.55	0.35	0.45	0.60	0.65	0.55	0.45
Dune Concealed Planks	4486a	0.60	0.55	0.35	0.45	0.60	0.65	0.55	0.45
Dune Tegular & MicroLook Planks	3298	0.60	0.55	0.50	0.45	0.60	0.65	0.60	0.50
Dune Tiles	3298	0.60	0.55	0.50	0.45	0.60	0.65	0.60	0.50
Ceramaguard Fine Fissured	2921a	0.55(H)	0.60	0.25	0.30	0.50	0.80	0.85	0.75
Cirrus Tiles 15 mm	3023	0.55(H)	0.50	0.35	0.40	0.45	0.55	0.60	0.70
Fine Fissured SecondLook IV	4435	0.55(H)	0.55	0.35	0.35	0.45	0.65	0.70	0.75
Synonymes	3023	0.55(H)	0.50	0.35	0.40	0.45	0.55	0.60	0.70
Colortone	3948	0.55	0.55	0.40	0.40	0.50	0.60	0.55	0.45
Contrast Circles, Square & Linear	3255	0.55	0.50	0.40	0.40	0.45	0.55	0.60	0.65
Ultima dB	3220	0.50(H)	0.50	0.25	0.30	0.45	0.55	0.75	0.80
Visual V49 + Fleece	4347	0.50(H)	0.50	0.10	0.30	0.40	0.50	0.75	0.90
Fine Fissured Sektor	3117	0.35(H)	0.35	0.35	0.35	0.30	0.35	0.40	0.50
Bioguard Plain	2945a	0.15(L)	0.15	0.30	0.20	0.15	0.10	0.20	0.25
Graphis (all face patterns)	3253	0.15(L)	0.15	0.35	0.20	0.10	0.10	0.15	0.25
Plain Tiles	3116	0.15(L)	0.15	0.30	0.25	0.15	0.10	0.15	0.25
Mylar	3352	0.10(L)	0.10	0.25	0.15	0.10	0.10	0.10	0.15
Newtone Residence	3349	0.10(L)	0.10	0.25	0.15	0.10	0.10	0.10	0.05

*fg: Fibreglass quilt **α_p: Termed practical sound absorption coefficient, is calculated for the octave bands at 250, 500, 1000, 2000 and 4000Hz, from the one-third octave band measurements of sound absorption. 1) All tests have been conducted in an independent third party quality assured laboratory in accordance with EN ISO 354 and with the ceiling installed over a 200 mm cavity. 2) α_w & NRC values are determined in accordance with EN ISO 11654 & ASTM C423 respectively. 3) Armstrong conducts extensive and regular acoustic tests on its ceiling tiles and planks. Inevitably slight variations occur over a range of results for the same product. The results above do not necessarily represent the highest achieved but indicate values that can be consistently and confidently offered. 4) #Tested at Sound Research Laboratories, U.K.

Sound attenuation

Product Name	Cert. No #	Dnc_w	One-Third Octave Band Centre Frequency Hz																	
			Dnc_w																	
			100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000
Ultima Tiles + 100 mm fg* overlay to both rooms	4175a	44	20.8	27.6	28.9	33.4	37.0	34.1	32.3	37.8	48.0	50.6	49.7	53.1	53.0	51.5	51.4	48.8	48.9	48.8
Ultima dB Concealed Planks	4522	43	18.8	29.9	31.4	33.8	35.4	34.3	34.7	37.1	40.4	44.1	47.0	49.8	53.4	58.3	61.5	60.9	61.8	63.0
Ultima Tiles + 100 mm fg* overlay to one room	4174a	41	17.0	25.6	29.7	29.3	32.9	32.6	31.2	35.5	42.2	44.9	46.3	49.4	51.0	50.5	50.1	47.8	48.0	48.3
Ultima Tiles + 25 mm fg* overlay to both rooms	4177a	41	15.1	25.2	26.9	29.8	31.6	31.7	31.3	35.5	41.6	47.0	48.7	51.2	52.5	52.3	51.5	49.3	49.4	49.1
Ceramaguard Fine Fissured	2954a	39	16.1	24.6	27.2	29.5	30.4	29.9	30.4	32.5	38.8	43.2	44.8	46.9	48.6	48.7	48.1	46.3	44.0	46.1
Dune Concealed Planks	3475	39	16.5	24.6	25.4	27.0	29.7	31.9	31.4	32.9	36.6	40.4	43.3	46.2	47.4	46.6	46.1	44.3	43.8	45.1
Dune dB	2519	39	17.3	24.3	27.7	27.7	30.2	32.1	32.8	33.3	36.2	39.2	41.9	43.2	44.4	45.6	43.8	44.5	44.2	43.7
Ultima Tiles + 25 mm fg* overlay to one room	4176a	39	15.0	24.9	26.7	29.2	29.6	30.4	29.2	33.4	39.3	43.2	45.8	48.8	50.9	51.0	51.3	49.1	49.4	48.7
Cirrus Open Plan	3604	38	13.8	22.1	25.0	26.6	29.1	29.1	29.8	31.2	35.6	40.0	42.2	44.9	47.5	49.7	50.4	50.8	50.7	50.6
Ultima Concealed Planks	4294	38	15.7	25.2	26.6	27.6	29.7	28.9	29.1	31.5	34.7	39.4	42.1	45.3	49.4	52.9	52.5	53.4	56.2	57.9
Ultima dB	2887	38	15.6	23.9	26.1	27.0	29.3	29.4	29.7	31.8	35.2	37.8	40.6	43.0	43.9	45.7	44.6	45.9	48.1	49.1
Bioguard Plain	2955a	37	13.3	23.2	25.8	28.2	29.4	29.4	28.3	30.6	34.2	37.9	39.1	41.2	42.8	44.0	44.0	44.2	45.3	43.9
Newtone Residence	3373	37	17.3	26.4	27.9	28.7	31.0	29.5	29.2	32.2	35.0	36.4	37.0	40.3	41.9	42.6	42.5	41.6	41.0	40.7
Plain Tiles	3133	37	17.1	25.6	27.7	27.0	28.6	28.9	29.2	32.0	34.9	37.0	38.3	40.6	42.3	42.6	42.8	42.4	42.5	41.5
Ultima Vector	3134	37	14.7	24.4	25.8	27.2	28.5	28.8	28.5	30.8	33.7	37.8	39.5	42.2	43.9	45.1	45.8	45.9	45.6	44.2
Cirrus Tiles 15 mm	2671	36	17.6	20.9	24.9	25.9	26.9	28.4	27.8	29.3	32.3	35.2	37.8	40.2	43.5	47.3	49.4	51.4	54.3	56.4
Contrast Circles, Square & Linear	3279	36	17.4	23.1	23.2	25.9	27.2	28.0	28.0	29.3	32.5	35.7	38.5	40.8	42.1	42.6	43.0	41.3	41.5	42.4
Fine Fissured SecondLook IV	3128	36	12.9	23.4	27.9	28.1	29.2	27.8	27.9	29.5	33.1	35.9	38.9	42.3	44.8	45.6	45.7	44.2	44.3	45.2
Graphis (all face patterns)	3276	36	15.4	23.5	25.1	28.8	29.9	30.3	29.8	30.9	34.0	35.8	37.6	39.4	39.8	39.9	40.1	39.2	39.0	40.4
Mylar	3367	36	13.6	24.4	26.4	28.2	29.9	28.7	29.3	31.3	34.4	36.1	37.3	39.3	40.2	40.1	39.5	37.4	35.8	36.7
Synonymes	2671	36	17.6	20.9	24.9	25.9	26.9	28.4	27.8	29.3	32.3	35.2	37.8	40.2	43.5	47.3	49.4	51.4	54.3	56.4
Ultima Tiles	4823	36	15.6	24.9	27.7	27.6	28.3	27.2	27.0	28.8	31.4	35.6	37.8	40.1	43.3	45.5	49.4	49.7	46.4	54.5
Colortone	2888	35	14.6	20.0	21.9	24.1	26.1	26.4	26.3	27.9	31.4	34.8	37.3	38.9	41.1	42.9	42.0	42.8	44.3	44.1
Fine Fissured Sektor	3129	35	15.1	22.5	26.2	26.3	27.4	26.6	27.0	28.7	32.3	34.9	36.5	38.6	40.4	41.0	41.8	41.2	41.9	42.2
Sabbia Tile	4171a	35	13.8	22.9	25.1	27.2	28.0	26.9	25.9	27.3	32.0	34.9	38.6	41.3	45.0	47.4	47.9	46.1	46.5	46.9

*fg: Fibreglass quilt

1) All tests have been conducted in an independent third party quality assured laboratory in accordance with EN 20140-9 and ISO 140-9 (both identical) and with the ceiling suspended beneath a continuous cavity.

2) Dnc_w values are determined in accordance with EN ISO 717-1.

3) Armstrong conducts extensive and regular acoustic tests on its ceiling tiles and planks. Inevitably slight variations occur over a range of results for the same product. The results above do not necessarily represent the highest achieved but indicate values that can be consistently and confidently offered.

4) #Tested at Sound Research Laboratories, U.K.

Health and cleanliness

AIR QUALITY

Air quality has become a general concern, from a minimal level of cleanliness in offices, schools, hotels etc, to a very high level of control in hospitals, clean-rooms and associated controlled environments as well as in food-prepare areas.

Limitation of dust and microbial development has become critical.

Armstrong ceilings do not favour the development of fungi/mould or yeast and the products can be used in any general area.

PARTICLE CLEANLINESS CLASS OF THE AIR

In a clean-room environment, the renewal of air into a space must maintain the air quality and particle cleanliness class of that room.
Any construction element, including ceiling tiles, should not negatively impact upon this.
In Aerospace, Nano-metric, Optical or Micro-electronics industries, the limitation of particles in the air guarantees the good quality of the finished products.
In industries directly related to the human being, like Pharmaceutics and Bio-chemistry, the control of bio-contamination is critical.
Medicine and vaccine should be protected against contamination from outside and in laboratories where dangerous viruses are manipulated, these shouldn't contaminate the environment.

In healthcare premises, dust and micro-organisms shouldn't travel by air to avoid contamination of patients.
For all these applications, a certain number of Armstrong products have been submitted to the ISO 14644-1 standard, which is the international test method to determine the particle cleanliness class. Although officially replaced by ISO 14644, the US Federal Standard 209E is still in use.
The table below shows the equivalence between the 2 norms.

Classification number ISO	Maximum allowed concentration (particles/m³ of air) of particles of identical or superior size to the ones mentioned below						US Fed Std 209E
	0,1 µm	0,2 µm	0,3 µm	0,5 µm	1 µm	5 µm	
Class ISO 1	10	2					-
Class ISO 2	100	24	10	4			-
Class ISO 3	1 000	237	102	35	8		Class 1
Class ISO 4	10 000	2 370	1 020	352	83		Class 10
Class ISO 5	100 000	23 700	10 200	3 520	832	29	Class 100
Class ISO 6	1 000 000	237 000	102 000	35 200	8 320	293	Class 1 000
Class ISO 7				352 000	83 200	2 930	Class 10 000
Class ISO 8				3 520 000	832 000	29 300	Class 100 000
Class ISO 9				35 200 000	8 320 000	293 000	Class 1 000 000

Bioguard Plain, **Metal Plain**, and **Mylar** mention the achieved ISO class next to the Air Quality icon.


F TECH 003 CERTIFICATE OF CONFORMITY
BIOGUARD ACOUSTIC CEILING TILE
N° 6 01 003 – ARMSTRONG / 1 Ver.0

BIOGUARD

For applications where bacteria are a big concern, Armstrong offers Bioguard. The special paint-finish actively combats the strains that 'land' on the surface of the tile and reduces rapidly its number to avoid aerial contamination. This control is of critical importance in the healthcare sector to limit the number of hospital acquired infections, responsible for thousands of deaths each year throughout the world.

Armstrong has tested the Bioguard paint against a wide range of bacteria (gram+, gram-, entero-, sporal…), moulds and yeasts:
- Methicilin resistant Staphylococcus aureus (MRSA)
- Escherichia coli (E-coli)
- Streptococcus pneumoniae
- Bacillus cereus
- Klebsiella pneumoniae
- Acinetobacter baumannii
- Aspergillus niger
- Candida albicans

The Anti-microbial performance can be identified by this icon. Bioguard combines a high level of particle cleanliness and anti-microbial performance. It has successfully passed the very stringent French norm for hospitals, NF S 90-351, met the HTM recommendations for the UK as well as the guidelines in other European countries.

Bioguard, with an **ISO 5** clean-room class is recommended for all areas of the hospital with an average or severe risk of infection.

Washability

This is an ASTM D-4828 test. The washability test evaluates a ceiling's ability to withstand washing. The test uses the washing action of a sponge and a non abrasive soap. This test measures a ceiling surface's resistance to repeated wash cycles. Ratings are based on either the ability of the surface to withstand up to 500 wash cycles without breakthrough, or the extent of abrasion.

Stain resistance

This test uses 3 familiar liquids: tea, coffee and cola. The test demonstrates the ceiling surfaces excellent resistance to staining. Several drops of the staining liquid are applied to the surface. After 30-60 seconds the surface is wiped with a damp cloth. The stained area is rated a 1 for 'no visible stain' to a 5 for 'severely stained'.

Water repellency

This test demonstrates the ceiling surface's resistance to water penetration. Several drops of water are applied to the surface. The shape of the water droplet demonstrates how well the surface repels the water and resists water penetration.

CLEANING AND DISINFECTION

The frequency and method of cleaning of a ceiling varies from one application to another. All products can at least be cleaned with a dry cloth or vacuum cleaner.

Wipeable with a moist cloth.

Scrubbable with water containing mild soap or diluted detergent.

Can be cleaned with disinfectants commonly used in Healthcare premises.

Washable with a sponge dampened in water containing mild soap or diluted detergent.

Can be cleaned using a high pressure water spray.

REACTION TO FIRE

The harmonisation of technical standards within Europe, and the integration of EN13964 (Suspended ceilings – Requirements and test methods) into national legislation, means that there is now one series of harmonised European test methods and classifications for the reaction to fire of suspended ceilings.

These new reaction to fire 'Euroclasses' replace the old national test methods for showing the performance of ceilings in order to meet national building regulation requirements for internal linings. As reaction to fire is one of the essential safety requirements identified for suspended ceilings, the Euroclass classification is one of the mandatory elements on the CE mark for suspended ceiling tiles and grids.

The Euroclasses rate from A1 through to F, as shown in the table opposite, with A1 being the best reaction to fire performance and F the worst. Each member state then sets the performance level required for different areas and building types within their own building regulations.

Depending upon the reaction to fire test(s) conducted, the rating may include an additional classifications for smoke production and flaming droplets. Smoke and flaming droplets are regulated in some European countries. Smoke production is rated from s1 (the least smoke produced) to s3 (no limit to amount of smoke produced). Flaming droplets is rated from d0 (no flaming droplets) to d2 (no limit to flaming droplets).

STRUCTURAL FIRE PROTECTION

Throughout Europe, there is a requirement for a building's structure to be protected from fire. This is primarily for the structure to remain stable during a fire to allow the occupants to escape and also to enable fire fighters to work without threat of the building's collapse. The duration of the required protection will usually depend upon the height of, and location within, the building (i.e. typical floor, basement, roof construction etc), whether there is any active methods of fire protection (sprinklers etc) and the type of construction to be protected (steel beams, timber or mezzanine floors etc).

A fire protecting suspended ceiling system is one of several important methods of providing the fire protection which fire degradable elements of the structure require. Ceilings can be used to enable a floor construction to meet the duration of protection required by the building regulations that it could not necessarily provide on its own.

There are many national test methods for establishing the structural fire protection performance of a suspended ceiling system, however, there are also several European norms which are acceptable in most European countries, although there is not yet one test method which is acceptable to all member states.

The complete construction and assembly of the test installation is important to the success of the test, and Armstrong test many ceiling tiles for their structural fire performance, but always on Armstrong Trulok grid.

There are many other details of the test construction that must be understood and adhered to. These include:
- main runner and hanger centres
- the type of top fixings and how the hangers are attached to them
- the minimum depth of the ceiling void
- what % of the floor design load is tested
- whether ceiling tile hold-down clips were used.

Therefore a full version of the fire test assessment and/or report should be obtained and carefully studied. These details must be included in the installation if the tested performance is to be realised and they should be taken into account when writing specifications for ceilings intended to provide structural fire protection.

Untested products may be assessed by reference to the product attributes and comparison to similar tested products, provided this is supported by an assessment report from a recognised fire expert and should be provided with the base test report that details how the product should be installed to achieve the assessed performance.

The location and type of various service elements such as lighting fittings, smoke detectors etc, are infinite and the designer and installer must satisfy themselves that they can be integrated without reducing the tested performance of the ceiling system. This will usually require a test report from the fitting manufacturer or an assessment issued by the fire authorities. Without these documents the designer or installer may assume an everlasting responsibility for the fire safety of the building and occupants.

As products may be modified or retested it is essential that their validity is always checked prior to installation. This will ensure that ceilings perform to the standard required by legislation.

All Armstrong test reports, certificates and assessments are freely available on request. A full document is always needed and must be read and any limitations understood. Abridged versions must be regarded as undesirable as they will not show the full test details and construction.

Performance comparison between old UK performance classes and the new Euroclasses.

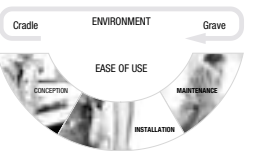
UK Building Regulations area (non-residential)	Old UK classification	Euroclass
Circulation areas	Non-combustible	A1
	Limited Combustibility	A2-s3, d2
	Class 0	B-s3, d2
Other Rooms (> 30 m²)	Class 1	C-s3, d2
Small Rooms (≤ 30 m²)	Class 2	
	Class 3	D-s3, d2
(Product cannot be used)	Class 4	E-s2, F

Summary of structural fire protection performance

Products tested to either BS 476 pts 21 or 23, or EN 1365-2

Product	Edge detail	Steel	Timber	Mezzanine
		Minutes	Minutes	Minutes
Mezzanine DL100	Board	60	60	60
Cirrus/Plain	Board	60	60	30
	Tegular		30	
	MicroLook	30	30	
Bioguard Plain	Board	60	60	30
	Tegular		30	
	MicroLook	30	30	
Fine Fissured	Board	60	60	30
	Tegular		30	
	MicroLook	30	30	
	SecondLook	60	60	60
Ultima	Board	90	60	60
	Tegular	60		60
	MicroLook		30	30
Ultima dB	Board	60		
Ceramaguard	Board	60		
Metal +16 mm/100 kg/m³ pad or B15	Board/Tegular/Flush Tegular Plain/Perforated/Microperforated/Extra Microperforated	60		
Metal +40 mm/45 kg/m³ pad or B15	Clip-In (Continental spring bar - 3 mm) Plain/Perforated/Microperforated/Extra Microperforated	30		

This table is correct at the time of publication. Please check with Internal Technical Sales for current status and for the appropriate fire test report / assessment.



PRODUCTS

Armstrong tiles, main runners, cross tees, top fixings, perimeter trims, accessories and hangers.

STORAGE

The material must be stored flat and isolated from the ground in a location which is not subject to excessive humidity or precipitation.

INSTALLATION

In any case and for the entire range of products, the installation must be carried out only if the following conditions are satisfied.

- **For all the range except Basic, Decorative, Wood & Metal** the following conditions must be respected:

1 - The room must be enclosed and the relative humidity maintained at no more than 95% during the installation.

2 - Plaster and cement surfaces must be dry.

3 - The ceiling should be installed in the conditions stipulated in Armstrong's warranty.

4 - All service fittings integrated within the suspended ceiling must be independently supported from the ceiling grid by a structure designed for the purpose.

5 - Any thermal or acoustic insulation overlays must be rigid and supported by the ceiling grid or, if soft and laying onto the ceiling tiles, must not exceed 3 kg/m^2 ie glass wool roll.

6 - When the ceiling is installed under a roof space, a study of the thermal conditions should be made with regard for the need of thermal insulation, vapour barrier, ventilated roof space etc.

7 - The ceiling tiles must not be substantially dimensionally modified.

- **For all Basic, Decorative, Wood & Metal** the following conditions must be respected:

1 - The room must be enclosed and heated with no increase in the relative humidity during the installation.

2 - Plaster and cement surfaces must be dry.

3 - The relative humidity must be maintained at no more than 70% for a temperature of 20°C. The ceiling must not be subjected to infiltration of water.

4 - When the ceiling is installed under a roof space, a study of the thermal conditions should be made with regard for the need of thermal insulation, vapour barrier, ventilated roof space etc.

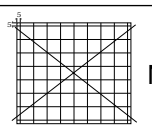
PREPARATION OF THE CEILING LAYOUT

Establish a plan of your ceiling.
General rule: layout the ceiling so that perimeter tiles are in excess of ½ a module.

NB: according to the dimension of the cut tiles the central axis of the ceiling will either be in the middle of a row of tiles or at their edge.

- The reference mark Y corresponds to the first whole tile.

Begin the layout so that the main runners are every 1200 mm apart and hangers are every 1200 mm along the main runners.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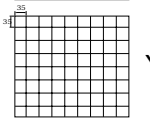
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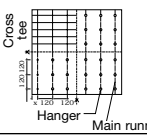


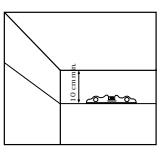
INSTALLATION

Follow the 5 successive steps and illustrations (eg for a 600 x 600 mm exposed grid ceiling):

1 - Mark the Perimeter Trim Lines

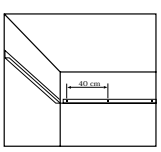
Determine the ceiling height and level at the perimeter with a suitable levelling device and draw a (blue) chalk line.

NB: the minimum height of the ceiling cavity has to be 100 mm.



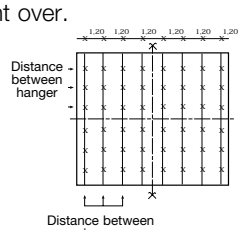
2 - Installation of Perimeter Trims

Fix the perimeter trims with fixings suitable for the structure at not more than 400 mm.



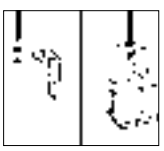
3 - Installation of Hangers

Establish the location of the top fixings (1200 x 1200 mm centres) and fix with regard to the soffit material and load to be carried. Engage the threaded rod into the top fixing and with bottom nuts ready to receive the suspension clip. Alternatively use Quick-Hangers/ hanger wire with top and bottom rods bent over.

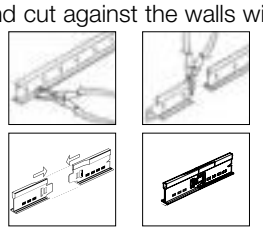


4 - Installation of Main Runners & Cross Tees

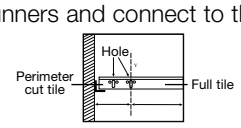
a - Engage the suspension clips/ hanger wire onto the main runner (and slide along).



b - If the dimension of the room is greater than the length of a main runner join two or more sections together, by engaging their end clips, and cut against the walls with snips.



c - Make sure that the edge of the first tile corresponds well with the rout hole to be aligned.
All rout holes should be aligned with a string or laser. Then level all main runners and connect to the hangers.

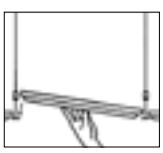


d - Every 600 mm connect a 1200 mm cross tee into the rout holes of the main runner and lock them against the adjoining cross tees. Then position the 600 mm cross tee in the rout holes in the centre of the 1200 mm cross tees to obtain a 600 x 600 mm layout.
Cut perimeter cross tees with snips.

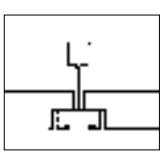
5 - Installation of Tiles

a - Engage the tiles into the grid by lifting them diagonally upwards through the grid before being laid down onto the grid flanges.

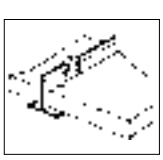
NB: Vector edged tiles are only engaged from below the grid.



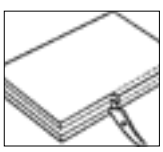
b - Example of edge detail for MicroLook tiles on Silhouette grid.



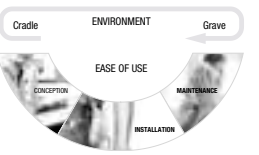
c - If the tile has to be fixed in place eg for fire protection, smoke extract or to counteract excessive wind pressure, hold-down clips should be installed.



d - Cut and reshaped edges of mineral fibre tiles should be done with a sharp craft knife.



Post installation



The building can remain unoccupied following the ceiling installation. Therefore all precautions must be taken to prevent condensation which could damage the ceiling. Air conditioning should be provided at the minimum level to protect the installed product. If necessary a study of the thermal conditions should be made to establish the dew point and need to ventilate the ceiling cavity.

MAINTENANCE AND CLEANING

Maintenance operations on the suspended ceiling must only be done after the technical impact on the ceiling has been completely evaluated. Armstrong ceilings do not need more maintenance than a normal painted ceiling. However when cleaning is necessary some precautions must be taken to preserve the technical and aesthetic features of the ceiling.

CLEANING

Dust and superficial dirt can easily be removed with a soft brush or by use of a vacuum cleaner. In this case use a nozzle designed for textile surfaces and do not brush in one direction only to avoid ingraining the dirt into the ceiling surface. Pencil or similar marks may be removed with a rubber eraser. A lightly dampened cloth or sponge can also be used but take note:

- Never use abrasive products
- Ceramaguard and Newtone are 100% RH and can be washed without risk.
- Some companies specialise in chemical cleaning solutions. These should only be undertaken after a test on a small hidden area of the ceiling proves acceptable.

REPLACEMENT OF TILES AND PANELS

Substantial damage to the ceiling tiles or panels can be corrected by installing replacements. However new products may show a colour variation when compared to the old. In this case it is better to use replacements from another existing area which is not visually significant and locate the new tiles or panels there.

REPAINTING THE CEILING

Most acoustical mineral fibre ceilings can be repainted without loss of acoustic performance if the following conditions are observed:

- Spray application is the most popular. It is economic and can cover non-flat surfaces better than by brush or roller.
- Roller is adequate for flat surfaces
- The fire reaction performance of the face surface can be affected by repainting.
- If the grid has to be repainted, tiles must be removed beforehand.
- Due to their composition tiles with a scrimmed or laminated surface ie Ultima, Bioguard, Mylar, and some 95 RH products are not suitable for repainting.

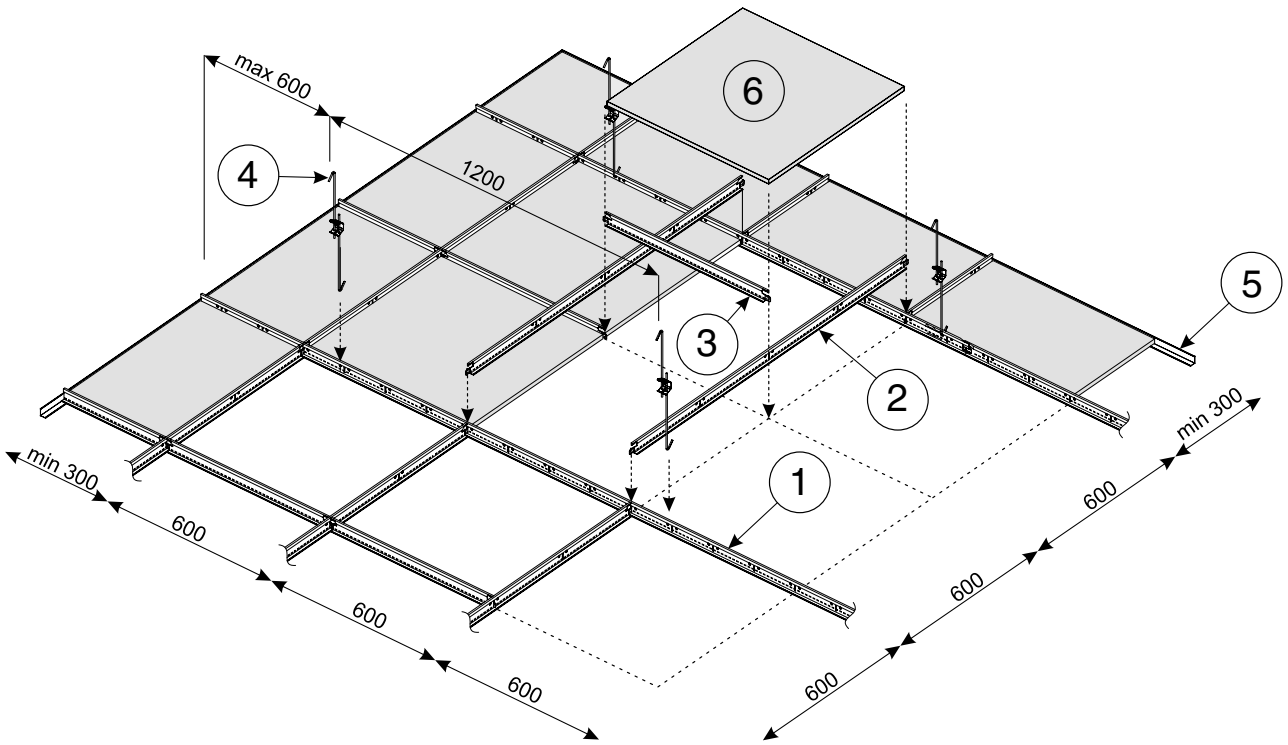
TYPE OF PAINT

Whatever the application method, the paint used must be of the highest quality. In the case of water based paints, the manufacturers instructions regarding thinning and application should be followed.

PRECAUTIONS

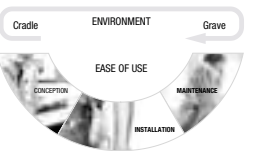
When repainting acoustical products, take care not to block or seal perforations or fissures otherwise the performance could be adversely affected.
For both the installation and removal of suspended ceilings care must be taken to avoid generation of excessive dust. The same applies to entry through the ceiling into the void via access panels or by removing tiles.
Tiles should be cut with a sharp craft knife of electric tools. If the latter they must be used with a vacuum dust extractor and suitable protection masks should be worn if the dust concentration exceeds 5 mg/m^3.

Tile installation



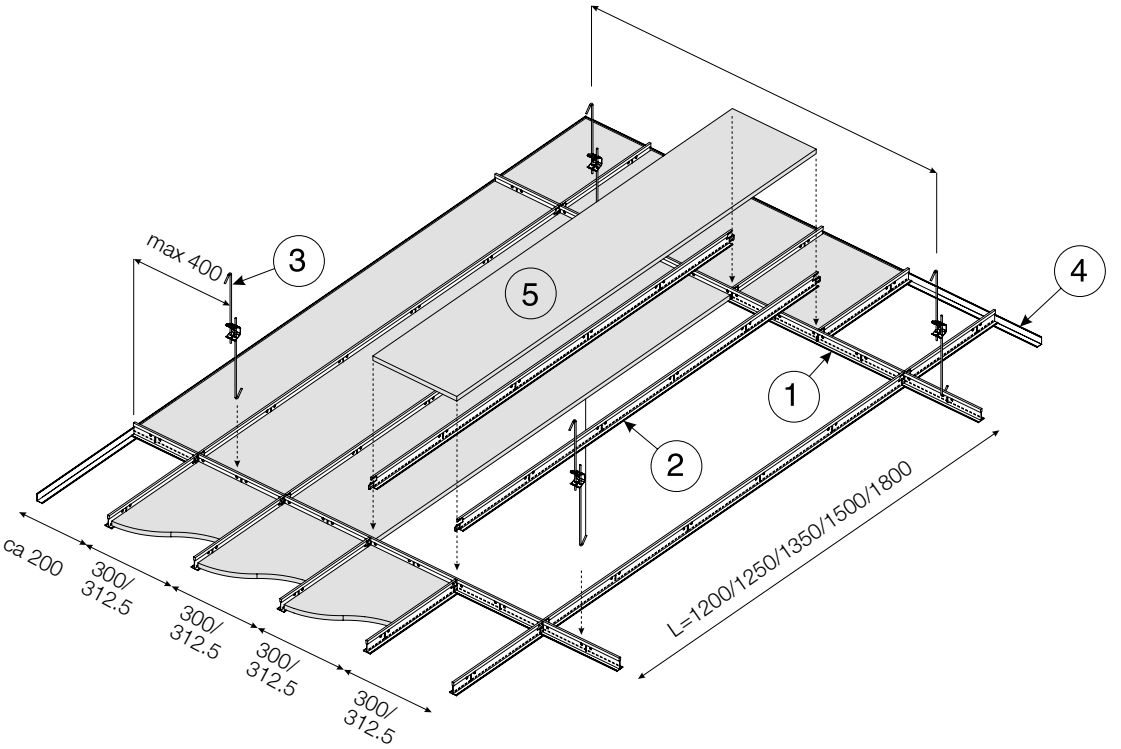
MATERIAL	600 X 600 MM TILES	600 X 1200 MM TILES
1 Main runner	0.84 ml	0.84 ml
2 Long cross tee 1200	1.67 ml	1.67 ml
3 Short cross tee 600	0.84 ml	
4 Hanger	0.7 unit	0.7 unit
5 Perimeter trim	According to room size	

NB: For SL2, because of the variable length of the grids and their use in directionnal buildings, quantities to be installed vary and have to be estimated for each jobsite.



Board, Tegular
(Prelude 24)

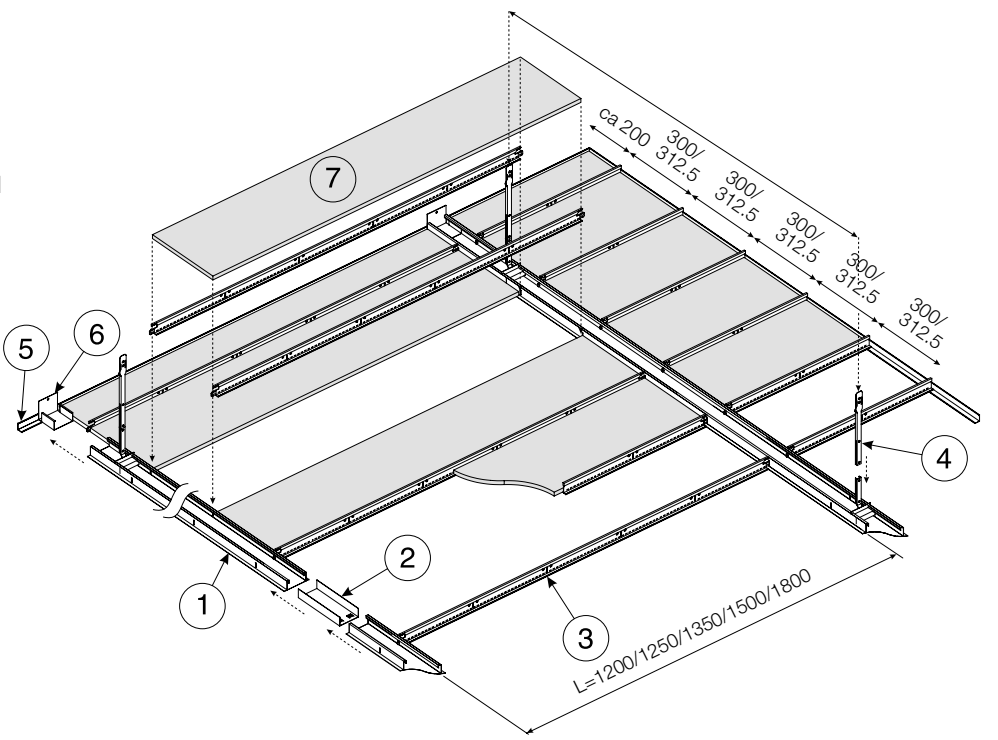
1 - Main runner
2 - Long cross tee
3 - Hanger
4 - Perimeter trim
5 - Plank



Board, Tegular, MicroLook*
(Bandraster)

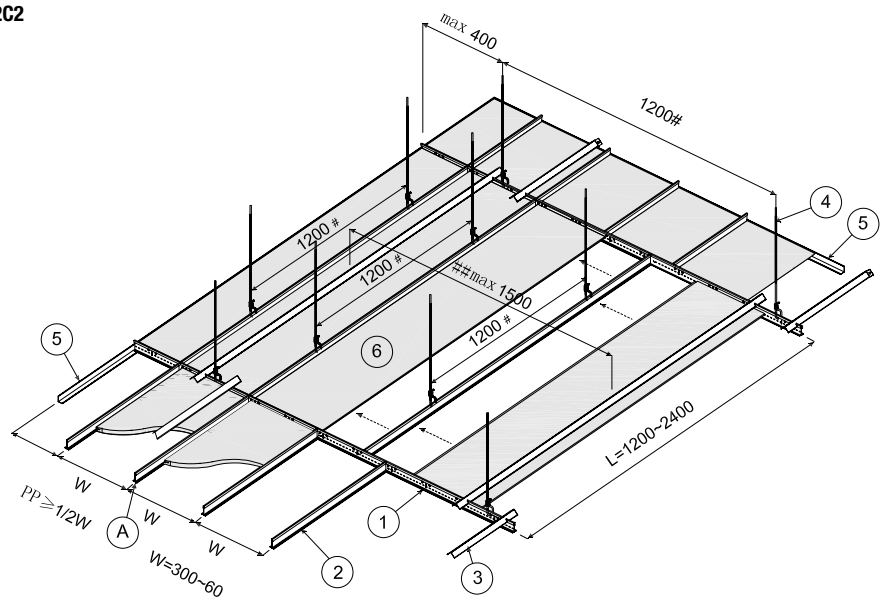
*Specific MicroLook cross tee needs to be specified to fit with slotted Bandraster. Please contact Internal Technical Sales for complete information.

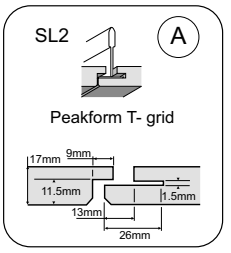
1 - Bandraster
2 - Splice
3 - Long cross tee
4 - Nonius hanger
5 - Perimeter trim
6 - Wall connector
7 - Plank



Semi-concealed SL2/K2C2
(Prelude 24, Main runners or Bandraster)

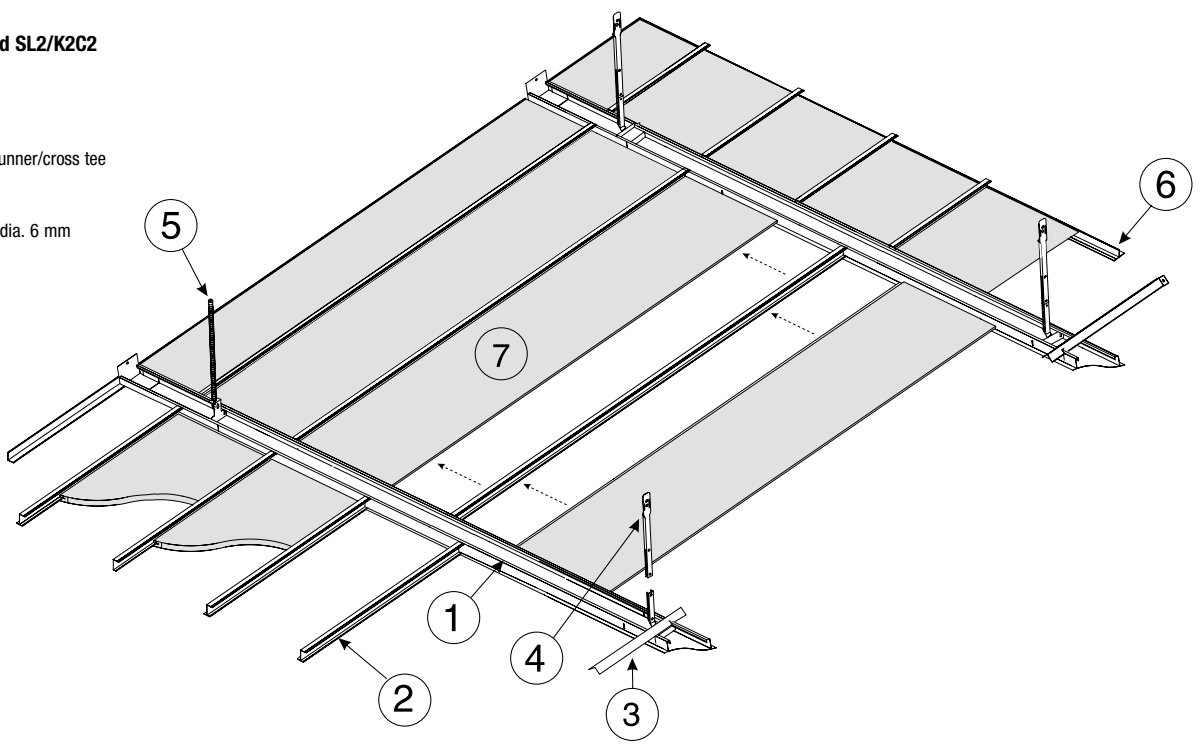
1 - Main runner
2 - Cross Tee
3 - Stabiliser bar##
4 - Hanger wire#
5 - Wall molding
6 - Plank

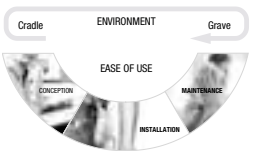




Semi-concealed SL2/K2C2
(Bandraster)

1 - Bandraster
2 - 24 mm main runner/cross tee
3 - Spacer bar
4 - Nonius hanger
5 - Threaded Rod dia. 6 mm
6 - Perimeter trim
7 - Plank



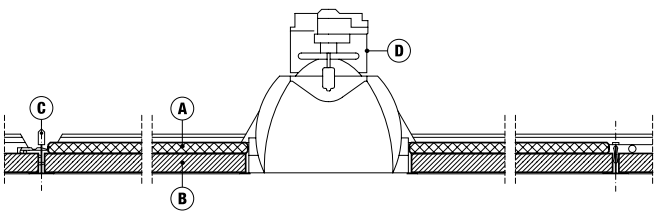


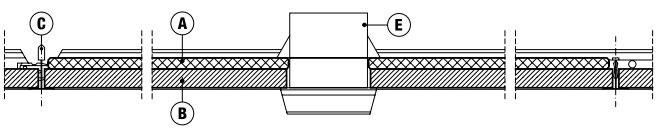
TILE MOUNTED SERVICE FITTINGS

Smaller service fittings (downlighters, smoke detectors, sprinklers, loudspeakers etc) if required to be integrated in the ceiling, will have to be installed within the ceiling tile.

Mineral tiles in particular, are not capable of sustaining weighty fittings without permanent damage and failure. In most instances the load of such fittings must be distributed by use of either a ceiling pattress or else by being independently supported.

The following generic details show how service fittings may be integrated within the ceiling tile and have their load transferred on to the grid.



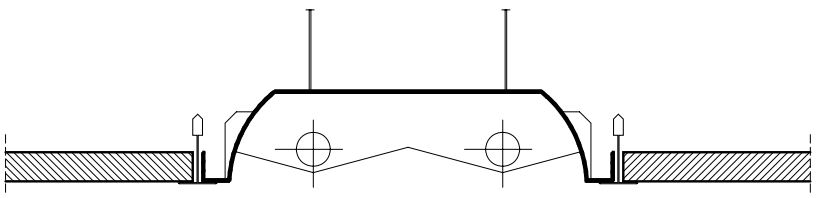


A - Pattress
B - Ceiling Tile
C - Grid Profile
D - Downlighter
E - Smoke Detector

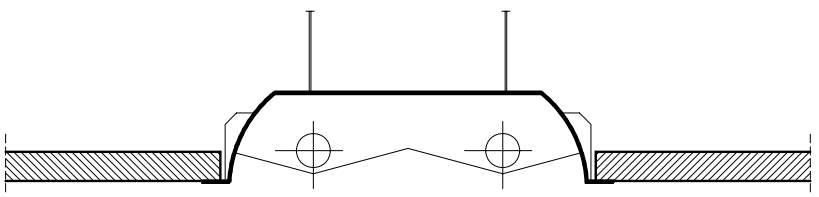
Notes:
- The above details are only indicative. It is the responsibility of the specifier or contractor to ensure that the fittings can be supported without damage or excessive deflection of the tiles and grid.
- A pattress may be formed from gypsum board or similar thin rigid sheet. It is essential to ensure that the material chosen has a fire reaction performance equivalent to that of the reverse face of the ceiling tile.

TILE MOUNTED SERVICE FITTINGS

Ceiling layouts often include linear (continuous) lighting systems for both functional and aesthetic reasons. Integration of this type of lighting into a modular exposed T or semi-concealed plank ceiling grid system is possible and there are several alternate ways in which it can be accomplished.



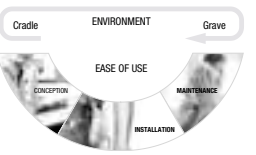
1. The linear lighting is a continuous (independently supported) lighting trough located between areas of modular ceiling grid. Alongside the edge of each trough are main runners that form the boundary of the modular ceiling which will be comprised of either tiles or planks.



2. The linear lighting is a continuous (independently supported) lighting trough located between areas of modular ceiling grid. The edges of each trough are turned out so as to form a ledge upon which the ceiling system, comprised of tiles or planks, is supported. SL2 planks may be able to span between the lighting troughs without the aid of intermediate support. With this system spacer bars or similar ties will be needed to ensure that the spacing between parallel troughs is maintained.

Notes:

The above details are only indicative. It is the responsibility of the specifier or installer to ensure that the lighting fittings are compatible with the ceiling system and that the fittings can be supported onto the grid without damage or excessive deflection.



BULKHEADS (UPSTANDS)

(Please also refer to the Axiom and Trulok brochure for additional details)

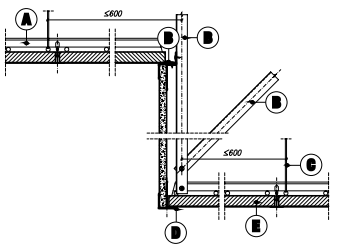
Bulkheads, otherwise known as upstands, are required when it is necessary to form a change in level between two adjacent ceilings, or to construct a blind box or lighting recess.

Depending upon the height and angle of the upstand, the transition material may be constructed from ceiling tiles, Axiom profiles or building boards (by others).

The following generic details show how each of the three suggested materials may be used.

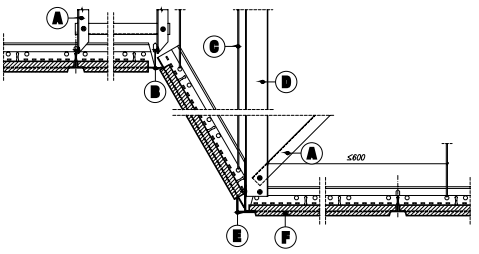
Notes:

Special care must be taken when upstands are formed in fire resisting ceilings as the change of level represents
a weakness (when grids expand under fire conditions) and may contravene tested fire reports. Particular advice should be obtained from your local internal technical sales centre. Aluminium Axiom profiles cannot be used in fire resisting ceilings.



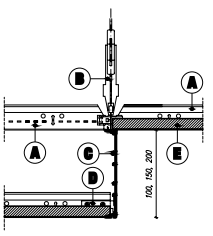
Vertical upstand using building boards

A - Grid Profiles
B - Suspension Angle 19 x 19 mm
C - Suspension
D - "F" Upstand Trim
E - Ceiling Tile



Sloping upstand using ceiling tiles

A - Suspension Angle 19 x 19 mm
B - Main Runner
C - Suspension
D - C Channel
E - "F" Upstand Trim
F - Ceiling Tile



Vertical upstand or blind box using Axiom

A - Grid Profiles
B - Suspension
C - Axiom Profile
D - T-Bar Connector Clip
E - Ceiling Tile

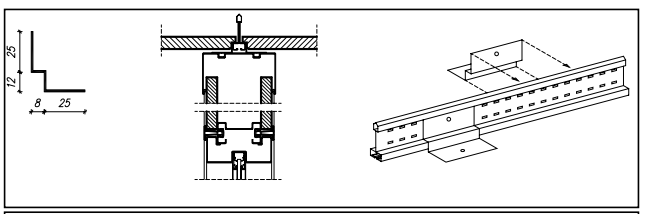
PARTITION CONNECTIONS

Partitions may be mechanically fixed to Armstrong ceiling grid in order to provide lateral restraint and also effect an efficient acoustic seal. Various methods are available depending upon the grid being used and the need for and frequency of partition relocation.

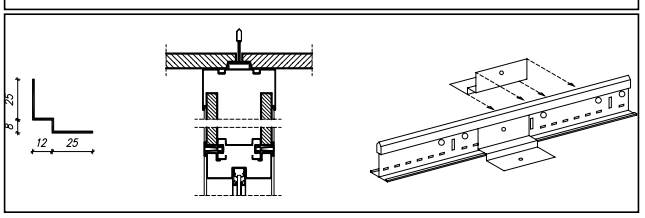
Partitions should never be 'hung' from the ceiling but merely located against it by means of suitable bolts and clips, some of which are available from Armstrong and shown in the following details.

Notes:

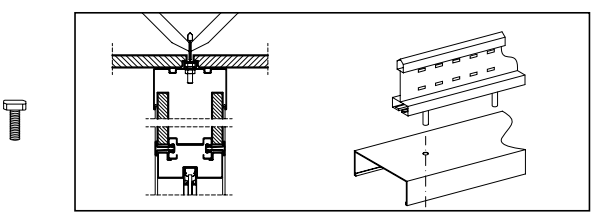
- Partitions which are subject to horizontal static or dynamic loads may require additional bracing. This may be achieved (as shown in the above detail) by using steel angles which are mechanically fixed to the grid section and then secured to a suitable point of structure above. The angle formed between the bracing and the horizontal plane should not be greater than 45°degrees. Two bracing angles are normally required to provide opposing lateral restraint.
- Further details may be obtained from the Partition manufacturer and contractor.



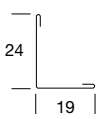
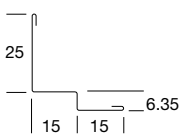
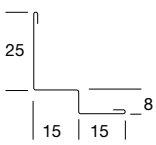
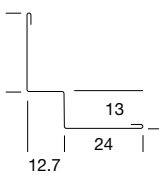
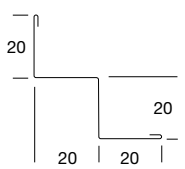
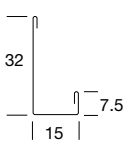
Universal Partition clip used with Silhouette



Universal Partition clip used with Prelude 15 or Prelude 24



Silhouette Partition Bolt

Section	Applicable Tile Edge Details
'L' Angle 	1) Board (site cut or full tile) for wet-felt or soft 2) Tegular or MicroLook (site cut square) for wet-felt, soft or wood with cross tee supported by perimeter fill-in block 3) Tegular or MicroLook (site recut to recess edge) for wet-felt or soft with cross tee supported by perimeter trim 4) MicroLook (site cut square) on Silhouette grid with cross tee supported by perimeter trim
'L' Angle 	1) Board (site cut or full tile) for Ceramaguard or Newtone used in 100% RH areas and other applications using corrosion resistant grid
Shadowline 	1) Tegular or MicroLook (site cut square) for 6.5 mm recess wet-felt tiles with cross tee supported by perimeter upper ledge
Shadowline 	1) Tegular or MicroLook (site cut square) for 7.5 - 8 mm recess wetfelt, soft or wood tiles with cross tee supported by perimeter upper ledge 2) MicroLook (site cut square) on Silhouette grid with cross tee supported by perimeter lower ledge
Shadowline 	1) Vector (site cut square) for Ultima wet-felt or Optima soft tiles with cross tee supported by perimeter upper ledge
Shadowline 	1) Board (site cut square) for wet-felt or soft with cross tee supported on perimeter trim lower ledge 2) Tegular or MicroLook (site cut square) for wet-felt, soft or wood with cross tee supported by perimeter fill-in block on lower ledge 3) Tegular or MicroLook (site recut to recess edge) for wet-felt or soft with cross tee supported by perimeter trim on lower ledge 4) MicroLook (site cut square) on Silhouette grid with cross tee supported by perimeter trim on lower ledge
Unequal U 	1) MicroLook (site cut square) on Prelude 15 grid with cross tee supported by perimeter trim ledge 2) MicroLook (site cut square) on Silhouette grid with notched cross tee supported by perimeter trim ledge

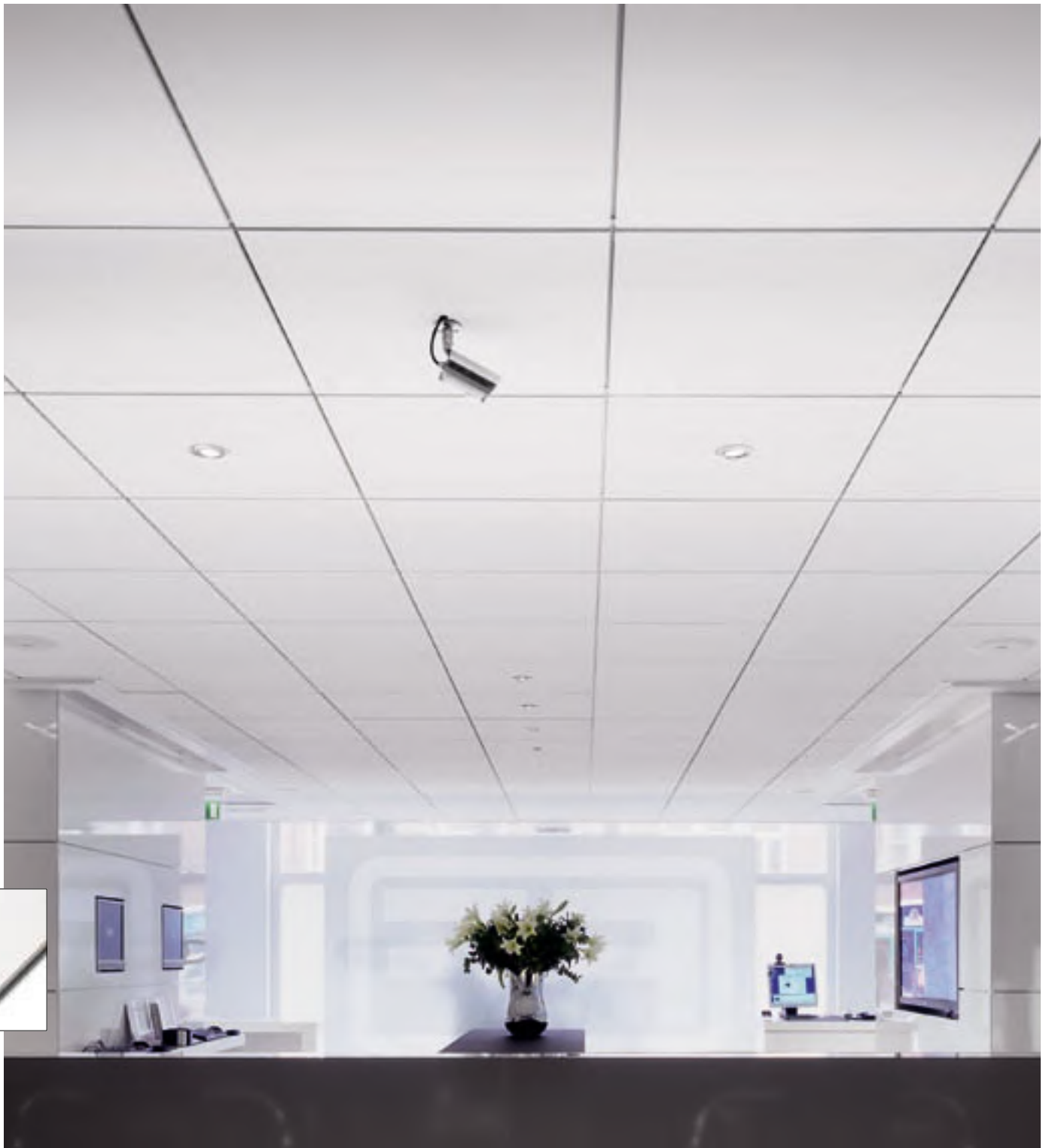
ULTIMA

Board & tiles

Ultima is a **high performance Armstrong product** which meets the most demanding requirements by **combining excellent sound absorption, sound attenuation, high light reflectance, good humidity resistance and superior durability**. Additionally, with its patented "DURABRITE ™" surface, Ultima's elegant design makes it ideal for today's requirements.

- Reinforced scratch resistant surface
- Extra durability and improved handling
- Excellent acoustical qualities
- Refined visual appearance
- High light reflectance (≅ 90%)
- Durable edge treatment
- Ultima is also available in planks

▼ Ultima Vector



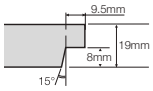
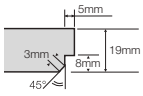
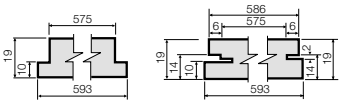
Ultima

Recycled Content: 70% - 80%

LEED Credits

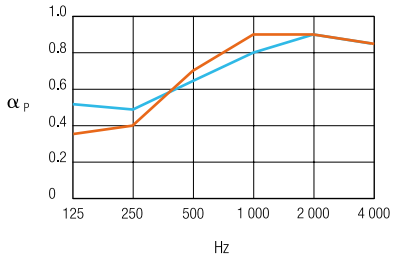
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓	✓	✓	✓

15 YEAR guarantee With Armstrong Grid

ULTIMA	BOARD	TEGULAR	MICROLOOK BE	VECTOR
	Prelude XL 24 mm	Prelude XL 24 mm	Suprafine 15 mm/ Silhouette	Prelude XL 24 mm
				
300 x 600 x 19 mm		1917M	1916M	1921M
600 x 600 x 19 mm	1910M	1911M	1912M	1920M
600 x 1200 x 19 mm	1913M	1914M	1915M	
750 x 750 x 19 mm			1905M	

EN 20354 & EN 11654

		Hz						
α_w	**NRC**	125	250	500	1000	2000	4000	
• Board/Tegular/MicroLook BE								
0.70(H)	**0.70**	0.55	0.50	0.65	0.80	0.90	0.85	α_p
• Vector								
0.70(H)	**0.70**	0.35	0.40	0.70	0.90	0.90	0.85	α_p



EN 20140-9 & EN 717-1

Board/Tegular/MicroLook BE
Dnc_w = 36 dB
Vector
Dnc_w = 37 dB
Ultima Tiles + 100 mm 20 kg/m³ fibre glass overlay to both rooms
Dnc_w = 44 dB

EEA	Euroclass A2-s1, d0 (Board, Tegular, MicroLook BE) Euroclass A2-s2,d0 (Vector)	CH	6q3 (TA VKF)	RUS	Hard combustible (G1): GOST 30244-94;
		N	In 1 (NBK 14)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)

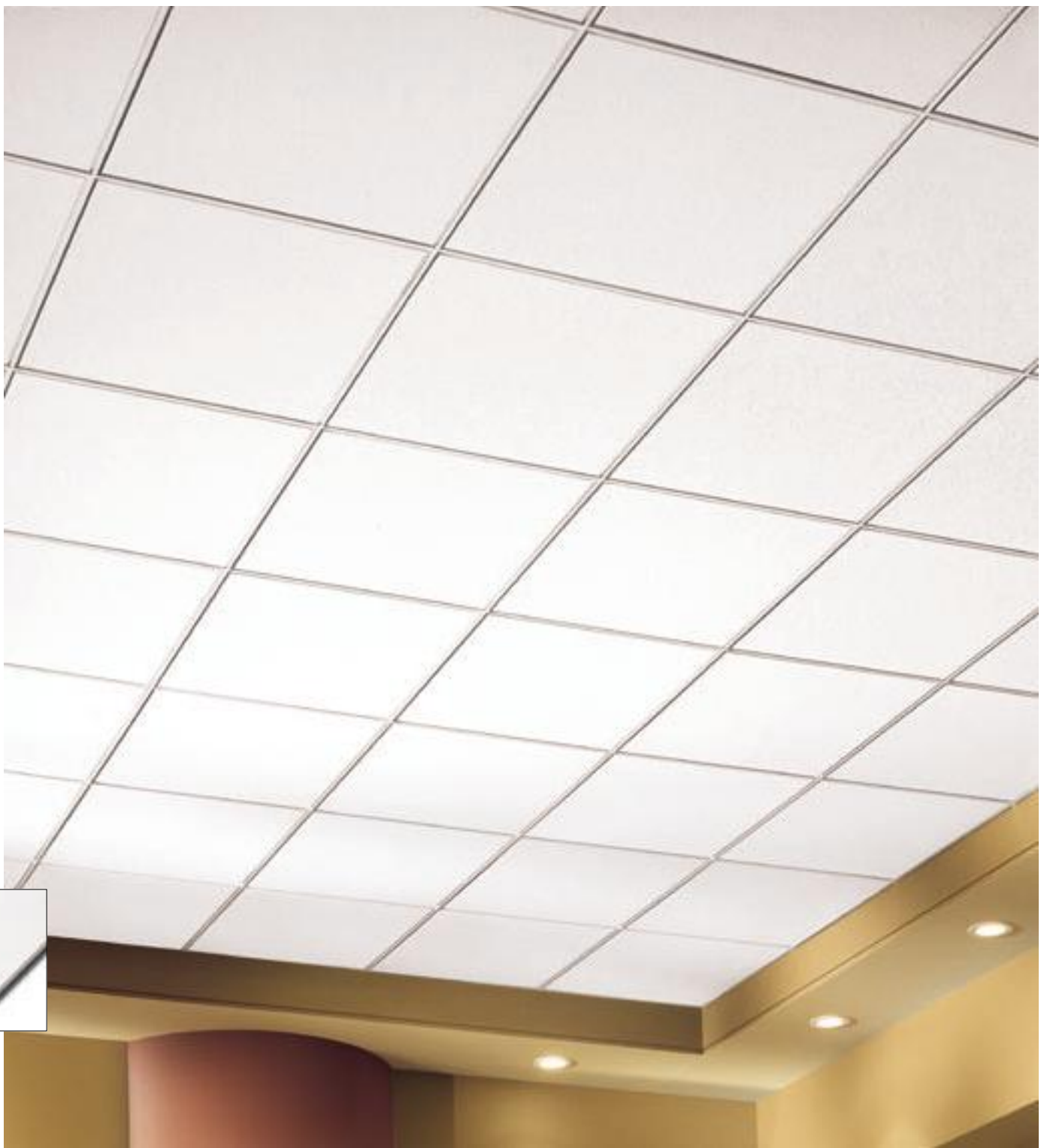
λ = 0.052 - 0.057 W/mK ≅ 90% 95% RH ≅ 5.2 kg/m²

ULTIMA OPEN PLAN

Board & tiles

Ultima Open Plan provides **superior sound absorption** (NRC = 0.75) without compromising other features like **light reflectance, humidity resistance, durability and sound attenuation.** Ultima Open Plan is ideal for large open office spaces, classrooms, conference rooms and open plenum areas (e.g. acoustical clouds like Axiom Canopy).

▼ Ultima Open Plan



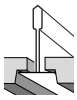
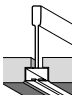
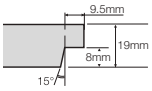
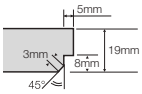
Ultima

Recycled Content: 70%

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓	✓	✓	✓

15 YEAR guarantee With Armstrong Grid

ULTIMA	TEGULAR	MICROLOOK BE
	 Prelude XL 24 mm	 Suprafine 15 mm/ Silhouette
		
600 x 600 x 19 mm	1941M	1942M
600 x 1200 x 19 mm	1944M	1945M

NRC=0.75

Tegular/MicroLook BE

Dnc_w = 35 dB

EEA	Euroclass A2-s1, d0 (Board, Tegular, MicroLook BE) Euroclass A2-s2,d0 (Vector)	CH	6q3 (TA VKF)	RUS	Hard combustible (G1): GOST 30244-94;
		N	In 1 (NBK 14)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)

λ = 0.052 - 0.057 W/mK ≅ 89% 95% RH ≅ 5.2 kg/m²

ULTIMA
Planks

Modern commercial construction often has a requirement to reflect the building module into the ceiling design, allowing flexible segmentation of the interior.
In combination with the existing attributes of Ultima, Ultima planks provide a solution for this demand, as well as being suitable for use in corridors.

▼ Ultima Planks SL2

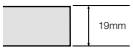
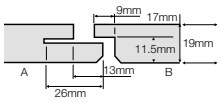
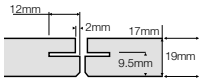
Ultima

Recycled Content: 41%

LEED Credits

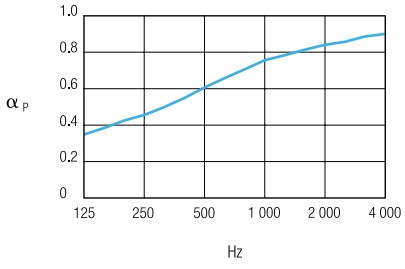
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

15 YEAR guarantee With Armstrong Grid

ULTIMA PLANKS	BOARD	SL2	K2C2
	 Prelude XL²/TL 24 mm		
			
mm	300 x 1500 x 19 mm		9954 M
	312.5 x 1500 x 19 mm		9957 D
	300 x 1720 x 19 mm	2732 M	2736 M
	300 x 1800 x 19 mm		9955 M
	312.5 x 1800 x 19 mm		9958 D
	300 x 2500 x 19 mm		9956 M
	312.5 x 2500 x 19 mm		9959 D

EN 20354 & EN 11654

Hz							
α_w	**NRC**	125	250	500	1000	2000	4000
0.65(H)	**0.65**	0.35	0.45	0.60	0.75	0.85	0.90 α_p



EN 20140-9 & EN 717-1

Board	
Dnc_w = 37 dB	
K2C2/SL2	
Dnc_w = 38 dB	

EEA	Euroclass A2-s1, d0	N	In 1 (NBK 14)	RUS	Hard combustible (G1): GOST 30244-94;
CH	6q3 (TA VKF)				UK Class 0/Class 1 (BS 476 Pt - 6,&7)

λ = 0.052 - 0.057 W/mK ≅ 90% 95% RH ≅ 5.2 kg/m²

OPTIMA

Board & Tiles

Optima is a low density product with glass wool as core material. Its white and strong surface is obtained by the application of an abrasion resistant paint on a glass fibre face scrim. The Board edges are painted to avoid the dispersion of fibres. To provide an excellent **mechanical strength**, all products have a fibre glass fleece at the back and the Tegular & MicroLook edges are reinforced and painted.

Optima provides the highest levels of **sound absorption** with an α_w up to 1.00. This makes it an ideal product for open plan offices, cafeterias, or any other places where too much noise can be disruptive.

Its fine textured white surface, similar to the Ultima finish, makes it an ideal solution in terms of **aesthetics**.

Furthermore, Optima, with its patented "DURABRITE ™" surface, provides high light reflectance and good cleanability.

The Vector edge detail results from Armstrong's advanced technology. It conceals the grid and gives the impression that tiles are freely suspended from wall to wall.

In addition, Optima ceilings are available in large variety of size and edge detail combinations.

▼ Optima Vector

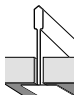
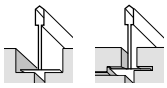
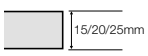
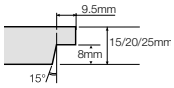
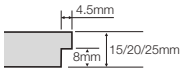
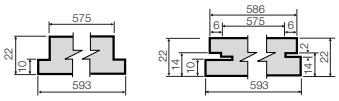
Optima

Recycled Content: 70-75%

LEED Credits

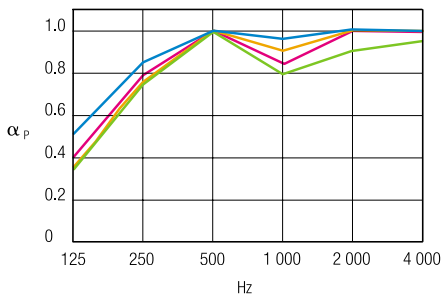
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓	✓	✓		✓	✓

10 YEAR guarantee

OPTIMA	BOARD	TEGULAR	MICROLOOK	VECTOR
				
	Prelude XL 24 mm	Prelude XL 24 mm	Prelude XL 15 mm	Prelude XL 24 mm
				
Optima 15 mm				
600 x 600 x 15 mm	2327 M	2329 M	2331 M	
600 x 1200 x 15 mm	2328 M	2330 M	2332 M	
Optima 20 mm				
600 x 600 x 20 mm	2335 M	2349 M	2363 M	
600 x 1200 x 20 mm	2336 M			
600 x 1800 x 20 mm	2337 M			
1200 x 1200 x 20 mm	2338 M			
300 x 1720 x 20 mm	2339 M			
300 x 1800 x 20 mm	2340 M			
Optima 22 mm				
600 x 600 x 22 mm				2387 M
Optima 25 mm				
600 x 600 x 25 mm	2379 M	2381 M	2383 M	
600 x 1200 x 25 mm	2380 M			

EN 20354 & EN 11654

α_w	NRC	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	
• Board/Tegular/MicroLook 15 mm								
0.90	**0.90**	0.35	0.75	1.00	0.80	0.90	0.95	α_p
• Board/Tegular/MicroLook 20 mm								
0.95	**0.95**	0.40	0.80	1.00	0.85	1.00	1.00	α_p
• Board/Tegular/MicroLook 25 mm								
1.00	**1.00**	0.50	0.85	1.00	0.95	1.00	1.00	α_p
• Vector 22 mm								
0.95	**0.95**	0.35	0.80	1.00	0.90	1.00	1.00	α_p



EEA Euroclass A2-s1, d0

UK Class 0/Class 1 (BS 476 Pt - 6,&7)

RUS Hard combustible (G1): GOST 30244-94; V2, D1, T1 NPB 244-97

≅ 90%

95% RH

15 mm: 1.8 kg/m²
20 mm: 2.3 kg/m²
22 mm: 2.9 kg/m²
25 mm: 2.8 kg/m²

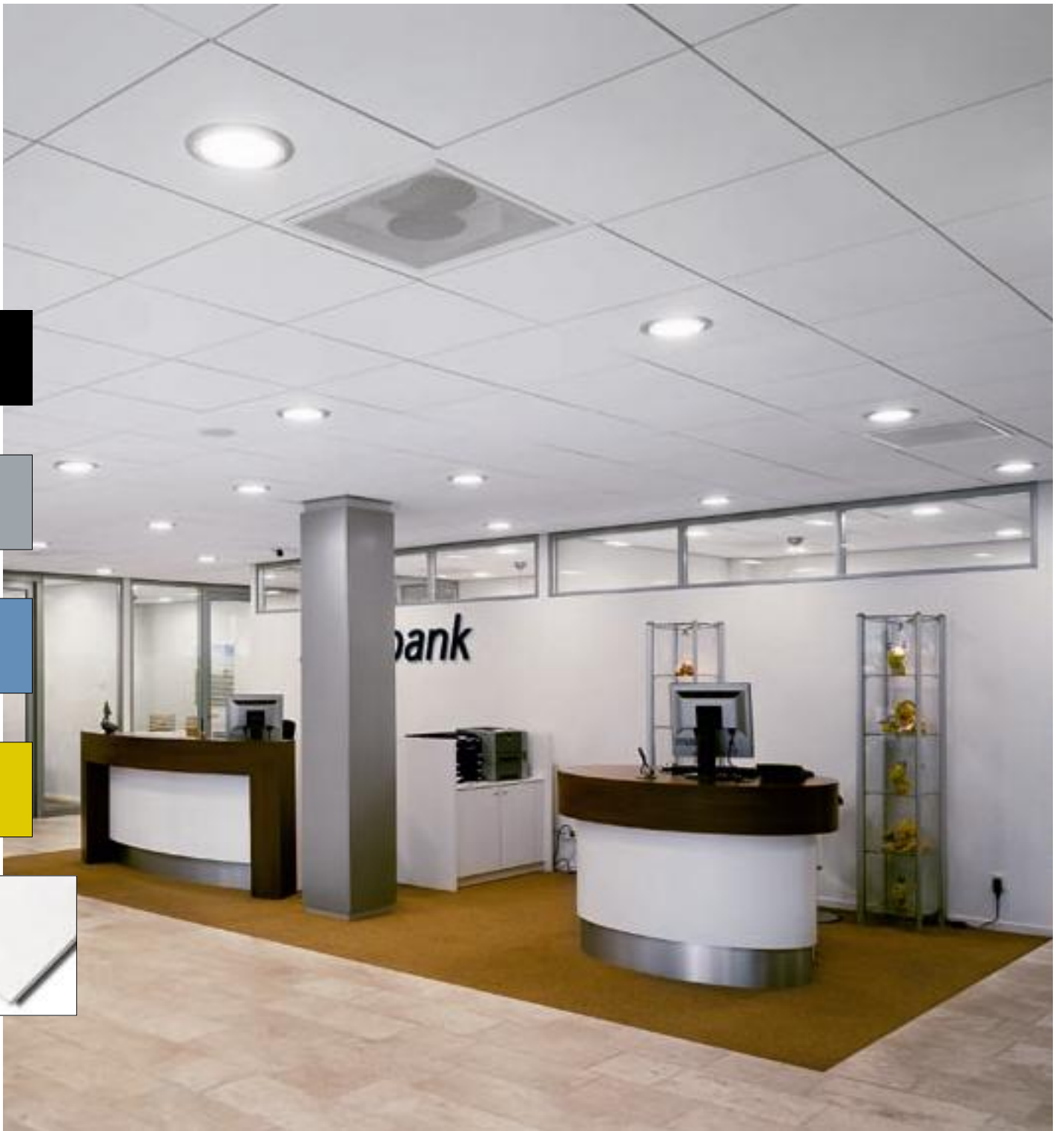
OPTRA

Tiles & Planks

Optra is a soft fibre ceiling solution for high acoustic spaces with glass fibre (Optra FG) and rockwool (Optra RW) as core material.
The ideal product for modern office environments, its excellent sound absorption properties (high NRC of 0.9 up to 1.0) helps in creating noise free open plan offices, cafeterias, or any other places where too much noise can be disruptive. This improves comfort and increases productivity by reducing ambient noise.

Its fine textured white surface makes it an ideal solution in terms of **aesthetics**. To provide an excellent **mechanical strength,** all products have a fibre glass fleece at the back. All board and tile edges are painted to avoid dispersion of fibres, ensuring longer life. In addition, Optra ceilings are available in a large variety of size, colour, pattern and edge detail combinations.

▼ Optra Microlook



Black

Steel Grey

Nile Blue

Amber

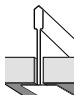
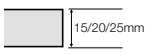
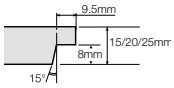
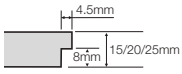
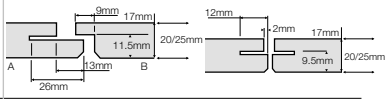
Optra

Recycled Content: 88% (FG) & 54% (RW)

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

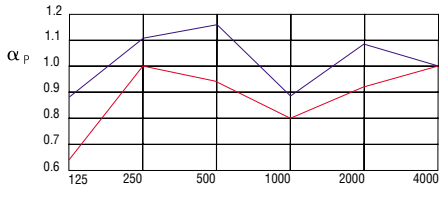
15 YEAR guarantee With Armstrong Grid

OPTRA	BOARD	TEGULAR	MICROLOOK	SL2/K2C2
				 
	Prelude 24 mm	Prelude 24 mm	Suprafine 15 mm/ Silhouette	XL 24 mm
				
Optra FG Classic, Pebble and Pearl				
600 x 600 x 15 mm	✓	✓	✓	
600 x 1200 x 15 mm	✓	✓	✓	
600 x 600 x 20 mm	✓	✓	✓	✓
600 x 1200 x 20 mm	✓	✓	✓	✓
600 x 1800 x 20 mm	✓			✓
600 x 2400 x 20 mm	✓			✓
600 x 1200 x 25 mm	✓			✓
600 x 1800 x 25 mm	✓			✓
600 x 2400 x 25 mm	✓			✓
600 x 2700 x 25 mm	✓			✓
1200 x 1200 x 25 mm	✓			✓
Optra FG Classic Black				
600 x 600 x 20 mm	✓	✓	✓	✓
600 x 1200 x 20 mm	✓	✓	✓	✓
600 x 1800 x 20 mm	✓			✓
600 x 2400 x 20 mm	✓			✓
600 x 1200 x 25 mm	✓			✓
600 x 1800 x 25 mm	✓			✓
600 x 2400 x 25 mm	✓			✓
600 x 2700 x 25 mm	✓			✓
1200 x 1200 x 25 mm	✓			✓

Optra FG Colour: White, Black (standard)
Steel Grey, Nile Blue, Amber (on request)

EN 20354 & EN 11654

		Hz						
α_w	**NRC**	125	250	500	1000	2000	4000	
• OPTRA FG WHITE CLASSIC 15 mm								
0.90	**0.90**	0.64	1.00	0.96	0.80	0.92	1.00	α_p
• OPTRA FG WHITE PEARL 15 mm								
1.0	**1.0**	0.88	1.12	1.16	0.88	1.08	1.00	α_p



≅ 85%

95% RH

UK Class 0/Class 1 (BS 476 Pt - 6,&7)

China CH Class A

15 mm: 1.8 kg/m²
20 mm: 2.3 kg/m²
25 mm: 2.8 kg/m²

CIRRUS

Board & Tiles

Cirrus tiles provide a warm, smooth textured visual along with good acoustical properties and a range of edge details particularly suited to the designer range of grid systems.

▼ Cirrus MicroLook

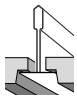
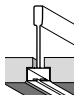
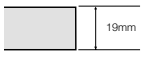
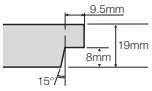
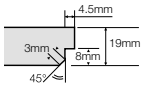
Cirrus

Recycled Content: 47%

LEED Credits

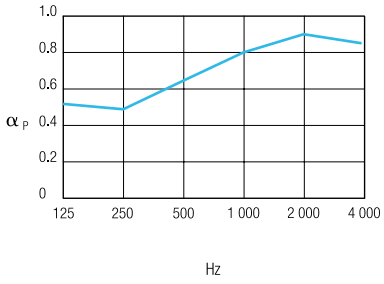
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

15 YEAR guarantee With Armstrong Grid

CIRRUS	BOARD	TEGULAR	MICROLOOK BE
	 Prelude XL 24 mm	 Prelude XL 24 mm	 Suprafine 15 mm/ Silhouette
			
600 x 600 x 19 mm	574M	584M	589M
600 x 1200 x 19 mm	533M	535M	539M
600 x 600 x 22 mm		534M	538M

EN 20354 & EN 11654

		Hz						
α_w	**NRC**	125	250	500	1000	2000	4000	
0.70(H)	**0.70**	0.55	0.50	0.65	0.80	0.90	0.85	α_p



EN 20140-9 & EN 717-1

CAC = 35 dB (19 mm)

CAC = 38 dB (22 mm)

EEA	Euroclass A2-s1, d0	N	In 1 (NBK 14)	RUS	Hard combustible (G1): GOST 30244-94; V1,D1,T1 NPB 244-97
CH	6q3 (TA VKF)			UK	Class 0/Class 1 (BS 476 Pt - 6,&7)

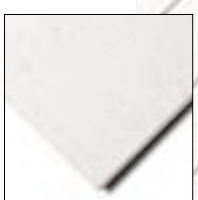
λ = 0.052 - 0.057 W/mK ≅ 85% 95% RH ≅ 4.0 kg/m²

CIRRUS

SecondLook

Cirrus SecondLook tiles with geometric scored visuals provide a semblance of planks without their actual use. Cirrus SecondLook provides fairly good acoustical properties and are treated with anti-microbial properties.

▼ Cirrus SecondLook



Cirrus

mineral — fine textures — cirrus

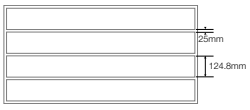
Recycled Content: 71%

LEED Credits

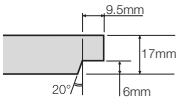
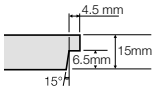
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓	✓	✓	✓

15 YEAR guarantee

With Armstrong Grid



Fine Fissured
SecondLook III

CIRRUS SECONDLOOK III	TEGULAR	MICROLOOK
	 Prelude XL 24 mm	 Suprafine 15 mm
		
600 x 1200 x 19 mm	514M	511M

NRC=0.65

α_w

Dnc_w = 35 dB

dB

EEA	Euroclass A2-s1, d0	N	In 1 (NBK 14)	RUS	Hard combustible (G1): GOST 30244-94; V1, D1, T1 NPB 244-97
CH	6q3 (TA VKF)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)		

λ = 0.052 - 0.057 W/mK

≅ 85%

70% RH

≅ 4.2 kg/m²

CIRRUS OPEN PLAN

Board & Tiles

Cirrus Open Plan tiles provide a high level of sound absorption, whilst featuring
a delicate texture of contemporary design. The microperforations are virtually imperceptable when installed.

▼ Cirrus 75

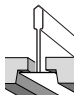
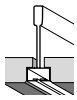
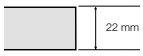
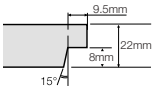
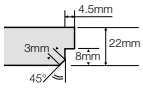
Cirrus 75

Recycled Content: 51%

LEED Credits

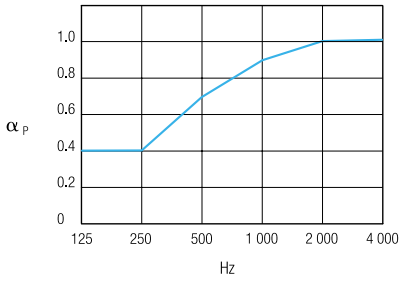
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

15 YEAR guarantee With Armstrong Grid

CIRRUS OPEN PLAN	BOARD	TEGULAR	MICROLOOK BE
	 Prelude XL 24 mm	 Prelude XL 24 mm	 Suprafine 15 mm/ Silhouette
			
600 x 600 x 22 mm	563M	556M	558M
600 x 1200 x 22 mm	565M	551M	568M

EN 3597

α_w	NRC	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
0.70(H)	0.75	0.40	0.40	0.70	0.90	1.00	1.00 α_p



EN 3604

Dnc_w = 35 dB

EEA	Euroclass A2-s2, d0	RUS	Hard combustible (G1): GOST 30244-94; V1,D1,T1 NPB 244-97
CH	5.3 (TA VKF)		
		UK	Class 0/Class 1 (BS 476 Pt - 6,&7)

λ = 0.052 - 0.057 W/mK ≅ 85% 95% RH ≅ 6.5 kg/m²

SYNONYMES

Design - Ribbon, Melody

Ribbon and Melody offer a **choice of patterns to suit the specifier's design requirements** with Cirrus as the common surface texture. A Synonymes Plain tile is also available to combine with any one of the above designs.

▼ Synonymes Ribbon

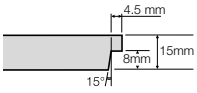
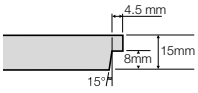
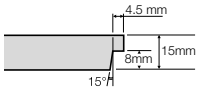
Ribbon

Melody

Recycled Content: 47%

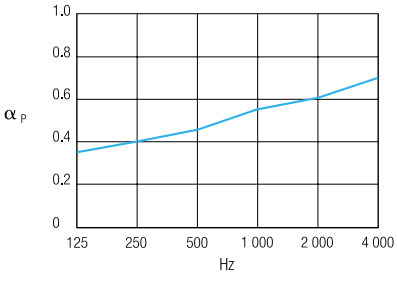
LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
		✓		✓	

SYNONYMES	RIBBON A	RIBBON B	RIBBON C	RIBBON D	PLAIN	MELODY
						
	MICROLOOK				MICROLOOK	MICROLOOK
	 Suprafine 15 mm				 Suprafine 15 mm	 Suprafine 15 mm
						
600 x 600 x 15 mm	2022 M	2023 M.	2024 M	2025 M	2034 M	2021 M

EN 20354 & EN 11654

α_w	NRC	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
0.55(H)	**0.50**	0.35	0.40	0.45	0.55	0.60	0.70 α_P



EN 20140-9 & EN 717-1

Dnc_w = 36 dB

EEA	Euroclass A2-s1, d0	RUS	Hard combustible (G1): GOST 30244-94; V1,D1,T1 NPB 244-97
CH	6q3 (TA VKF)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)

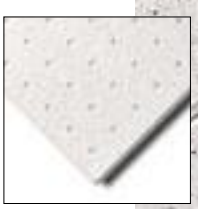
λ = 0.052 - 0.057 W/mK ≅ 80% 70% RH ≅ 4 kg/m²

CONTRAST

Design - Circles, Squares, Linear

The geometric patterns of Contrast Circles, Squares and Linear are recommended for areas requiring good acoustical absorption, combined with aesthetical requirements.

▼ Contrast Circles



Circles

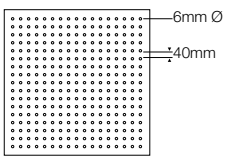
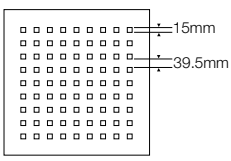
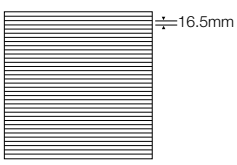
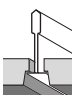
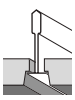
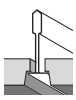
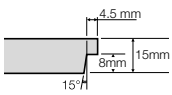
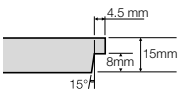
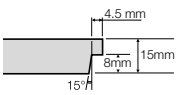
Squares

Linear

Recycled Content: 47%

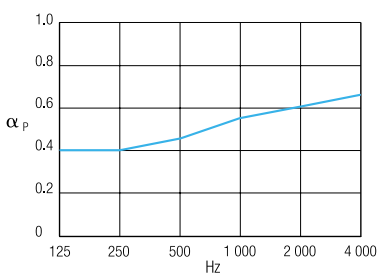
LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
		✓		✓	

CONTRAST	Circles	Squares	Linear
			
	MICROLOOK	MICROLOOK	MICROLOOK
			
	Suprafine 15 mm/Silhouette	Suprafine 15 mm/Silhouette	Suprafine 15 mm/Silhouette
			
600 x 600 x 15 mm	9902 M	9903 M	9904 M

EN 20354 & EN 11654

Hz							
α_w	NRC	125	250	500	1000	2000	4000
0.55	**0.50**	0.40	0.40	0.45	0.55	0.60	0.65 α_P



EN 20140-9 & EN 717-1

Dnc_w = 36 dB

EEA	Euroclass A2-s1, d0	N	In 1 (NBK 14)	RUS	Hard combustible (G1): GOST 30244-94; V1,D1,T1 NPB 244-97
CH	6q3 (TA VKF)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)		

λ = 0.052 - 0.057 W/mK ≅ 80% 95% RH ≅ 4 kg/m²

DUNE

Board & tiles

The Dune family features a **micro-perforated, finely granulated surface texture** and is available in a wide variety of size and edge details. Dune, Sabbia will allow you to find a solution to your requirements whatever your technical constraints.

The Dune range offers improved durability and enhanced acoustical absorption.

▼ Dune Tegular

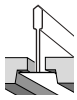
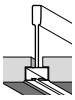
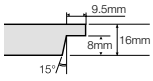
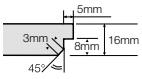
Dune

Recycled Content: 63%

LEED Credits

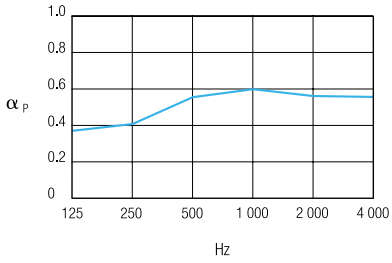
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	

15 YEAR guarantee With Armstrong Grid

DUNE RH99	BOARD	TEGULAR	MICROLOOK BE
	 Prelude XL 24 mm	 Prelude XL 24 mm	 Prelude XL 15 mm Silhouette
			
Dune RH99			
600 x 600 x 16 mm	3643B	3646B	3651B
600 x 1200 x 16 mm	3641B	3645B	3649B

EN 20354 & EN 11654

		Hz						
α_w	**NRC**	125	250	500	1000	2000	4000	
• Dune RH 99 Board/Tegular/MicroLook BE								
0.60	**0.50**	0.35	0.40	0.55	0.60	0.55	0.55	α_p



EN 20140-9 & EN 717-1

Dune RH99 Board/Tegular/MicroLook BE

Dnc_w = 33 dB

EEA Euroclass A2-s1, d0

UK Class 0/Class 1 (BS 476 Pt - 6,&7)

λ = 0.052 - 0.057 W/mK

≅ 83%

99% RH

≅ 3.9 kg/m²

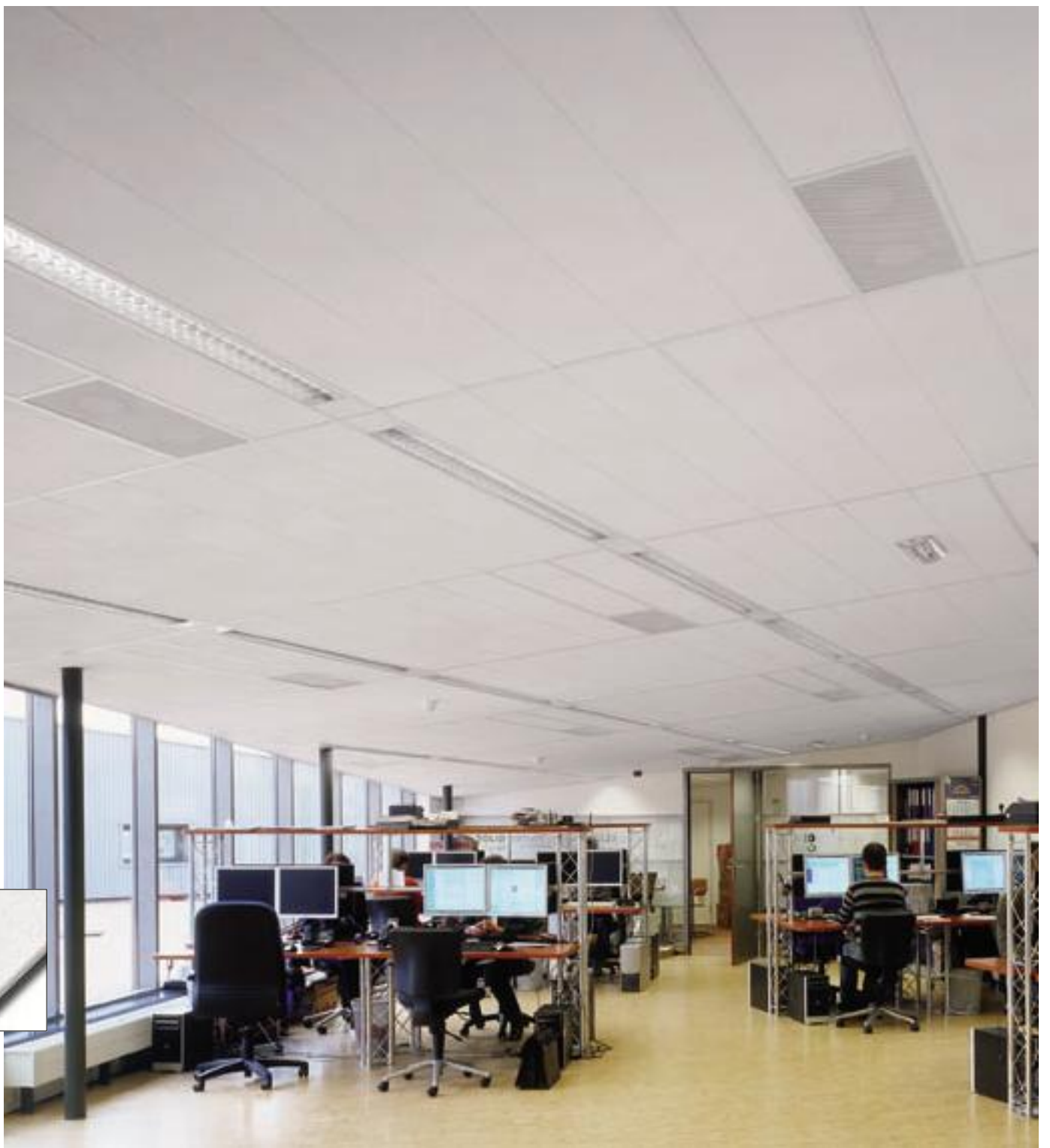
DUNE

Planks

Armstrong plank systems allow the ceiling to integrate with the building module and when featuring the SL2 edge detail these systems provide full accessablity whilst minimising the visible grid. Combining excellent sound absorption and sound attenuation performance, our Dune plank range also offers a variety of sizes to suit the flexible requirements of modern office buildings.

Dune planks also provide a solution for corridor areas where the different lengths can accomodate a variety of corridor widths whilst retaining access and providing high levels of light reflectance and sound absorption.

▼ Dune SL2



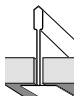
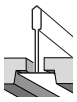
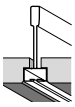
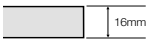
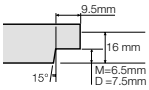
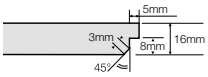
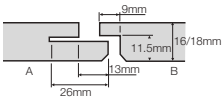
Dune

Recycled Content: 63%

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	

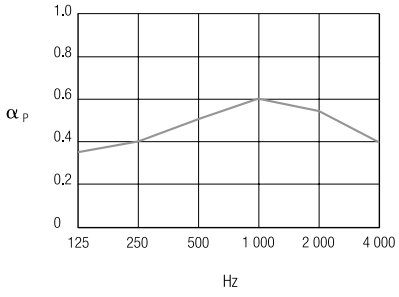
15 YEAR guarantee With Armstrong Grid

DUNE PLANKS	BOARD	TEGULAR P2	MICROLOOK BE	SL2
				
	Prelude XL 24 mm	Prelude XL 24 mm		
				
300 x 1200 x 16 mm	H4640	H4641	H4642	
300 x 1200 x 18 mm				H4648
300 x 1500 x 18 mm				H4649
300 x 1800 x 18 mm				H4650
400 x 1200 x 18 mm				H4661
400 x 1500 x 18 mm				H4662
400 x 1800 x 18 mm				H4663

EN 20354 & EN 11654

Dune Planks 16 mm

α_w	NRC	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	
0.55	**0.50**	0.35	0.40	0.50	0.60	0.55	0.40	α_p



EN 20140-9 & EN 717-1

Board/Tegular P2

Dnc_w = 38 dB

EEA Euroclass A2-s1, d0

UK Class 0/Class 1 (BS 476 Pt - 6,&7)

λ = 0.052 - 0.057 W/mK

≅ 83%

99% RH

≅ 4.5 kg/m² (17 mm)

SABBIA/DUNE MAX

Board & Tiles

The world of education requires ceilings with **good levels of sound absorption and sound attenuation.** Sabbia combines the two performances, which optimises the quality of listening while eliminating the noise coming from the other rooms.

Featuring the highly popular **lightly granulated texture**, Sabbia provides an **ideal solution for classroom** and general teaching conditions.

▼ Sabbia MicroLook

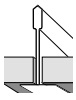
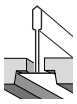
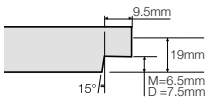
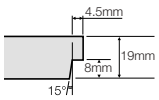
Sabbia

Recycled Content: 50%

LEED Credits

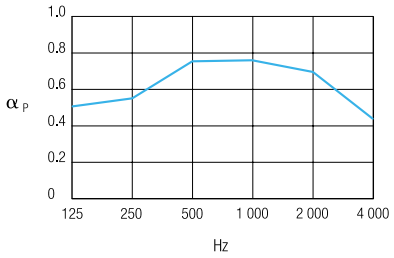
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

15 YEAR guarantee With Armstrong Grid

SABBIA/DUNE MAX	BOARD	TEGULAR	MICROLOOK
	 Prelude XL 24 mm	 Prelude XL 24 mm	 Suprafine 15 mm/Silhouette
			
600 x 600 x 19 mm (3/4")	2103 M	2260 M	2261 M
600 x 1200 x 19 mm (3/4")	2104 M		

EN 20354 & EN 11654

Hz							
α_w	NRC	125	250	500	1000	2000	4000
0.65	**0.70**	0.50	0.55	0.75	0.75	0.70	0.45 α_p



EN 20140-9 & EN 717-1

Dnc_w = 35 dB

EEA Euroclass A2-s1, d0

UK Class 0/Class 1 (BS 476 Pt - 6,&7)

λ = 0.052 - 0.057 W/mK

≅ 85%

95% RH

≅ 4.16 kg/m²

COLORTONE

Design

All Armstrong mineral ceilings are available in white. In addition we offer a range of options for specifiers who wish to introduce colour.

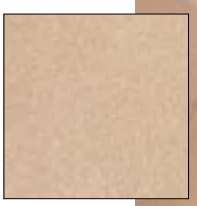
Colortone Dune offers a simple way to play with colour in ceilings. Choose from a range of colours to create vibrant and cheerful interiors.

▼ Colortone

Opal (OL)

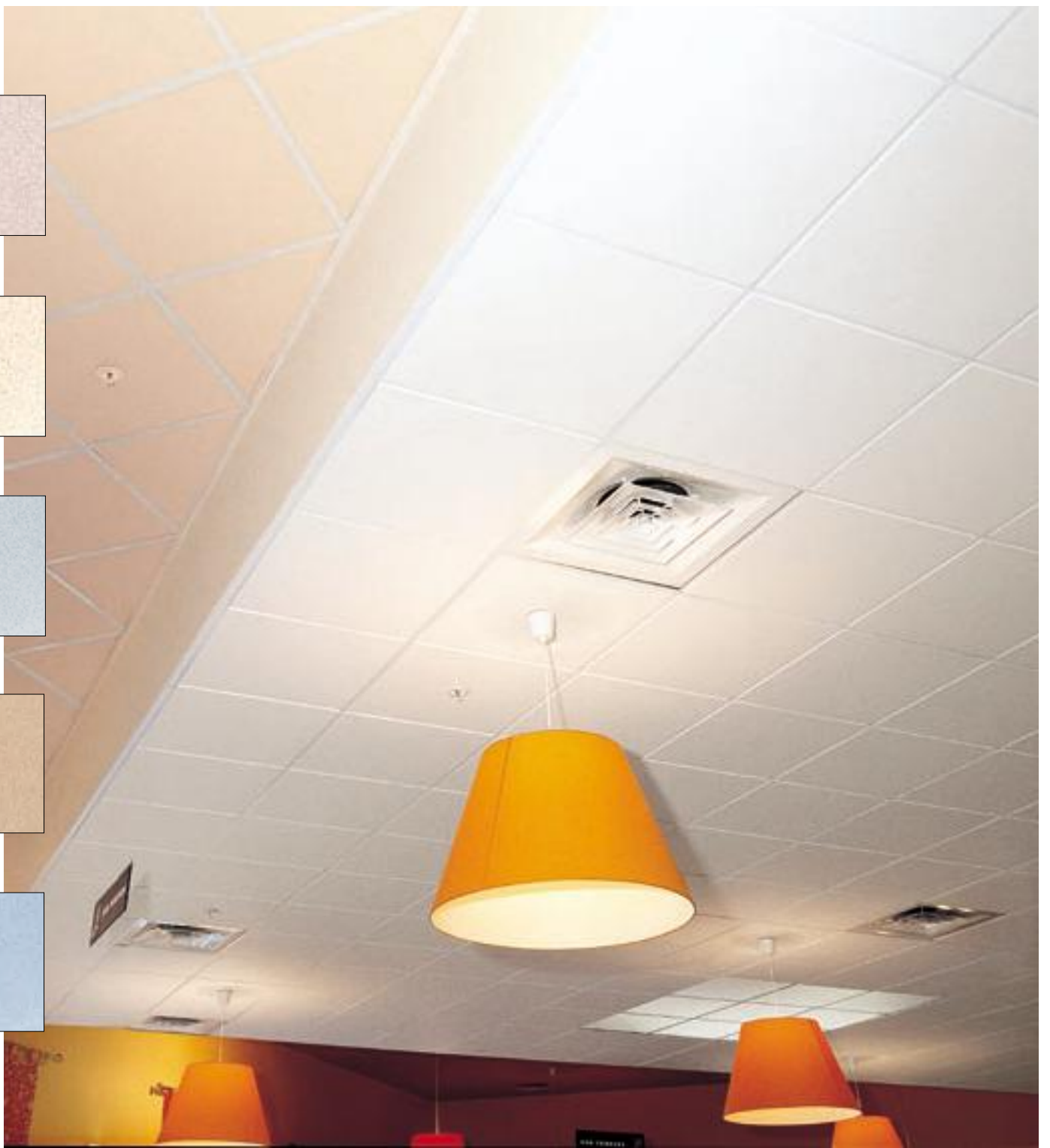
Carrara (CA)

Platinum (PN)



Toledo (TO)

Blue Mountain (BT)



Recycled Content: 28 - 30%

LEED Credits

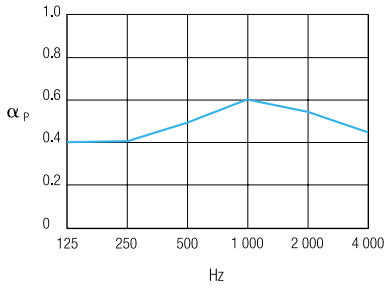
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
		✓		✓	

COLORTONE	OPAL (OL)	CARRARA (CA)	PLATINUM (PN)	TOLEDO (TO)	BLUE MOUNTAIN (BT)
Board					
600 x 600 x 15 mm	9095 MOL.	9095 MCA	9095 MPN.	9095 MTO.	9095 MBT.
600 x 1200 x 15 mm	9090 MOL.	9090 MCA	9090 MPN.	9090 MTO.	9090 MBT.
Tegular					
600 x 600 x 15 mm	9163 MOL.	9163 MCA	9163 MPN.	9163 MTO	9163 MB
MicroLook					
600 x 600 x 15 mm	9113 MOL.	9113 MCA	9113 MPN.	9113 MTO	9113 MBT.

Colours: available in Opal (OL), Carrara (CA), Platinium (PN), Toledo (TO), Blue Mountain (BT).

EN 20354 & EN 11654

		Hz					
α_w	NRC	125	250	500	1000	2000	4000
0.55	**0.55**	0.40	0.40	0.50	0.60	0.55	0.45 α_P



EN 20140-9 & EN 717-1

Dnc_w = 35 dB

Note: Prelude XL 24 mm suspension systems are available in the following colours as a special request: Opal (OL), Carrara (CA), Platinum (PN), Black (BK), Red (RD), Blue (BE), Green (GN), Ivory (IY), Silver Grey RAL9006 (SG), Brass (BS), Chrome (CE), Brown (BN), White RAL9010 (WR).

EEA	Euroclass A2-s1, d0	RUS	Hard combustible (G1): GOST 30244-94; V1, D1, T1 NPB 244-97	UA	Hard combustible (4.3 GOST 12.1.044.89)
CH	6q3 (TA VKF)			UK	Class 0/Class 1 (BS 476 Pt - 6,&7)

λ = 0.052 - 0.057 W/mK

95% RH

≅ 3.9 kg/m²

PLAIN

Board & Tiles

The smooth white surface of Plain meets today's trends for cleaner finishes whilst maximising light reflectance for rooms featuring uplighters and indirect lighting, resulting in cost savings and increased levels of comfort.

▼ Plain Tegular

Plain

Recycled Content: 24%

LEED Credits

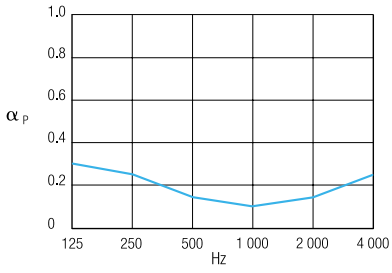
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

15 YEAR guarantee With Armstrong Grid

PLAIN	BOARD	TEGULAR	MICROLOOK
	Prelude XL 24 mm	Prelude XL 24 mm	Suprafine 15 mm / Silhouette
	15mm	9.5mm, 15mm, 15°, M=6.5mm D =7.5mm	4.5 mm, 8mm, 15mm, 15°
600 x 600 x 15 mm	9587 M	9589 M	9590 M
625 x 625 x 15 mm	9587 D	9589 D	9590 D
600 x 1200 x 15 mm	9588 M		
625 x 1250 x 15 mm	9588 D		

EN 20354 & EN 11654

Hz							
α_w	**NRC**	125	250	500	1000	2000	4000
0.15(L)	**0.15**	0.30	0.25	0.15	0.10	0.15	0.25 α_p



EN 20140-9 & EN 717-1

Dnc_w = 37 dB

EEA	Euroclass A2-s1, d0	N	In 1 (NBK 14)	RUS	Hard combustible (G1): GOST 30244-94; V1,D1,T1 NPB 244-97
CH	6q3 (TA VKF)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)		

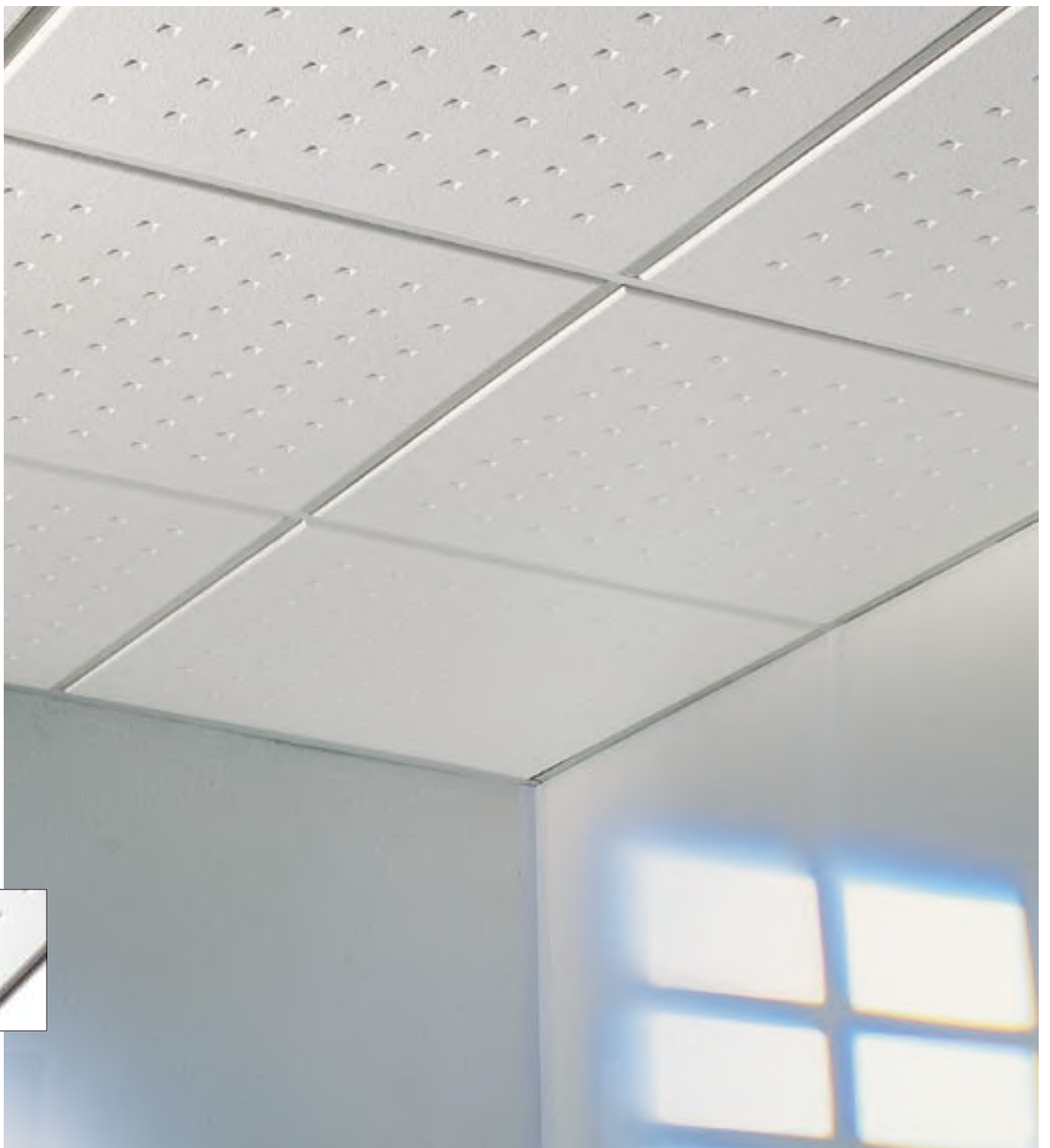
λ = 0.052 - 0.057 W/mK ≅ 90% 95% RH ≅ 4 kg/m²

GRAPHIS

Design - Puntos, Cuadros

The crisp, plaster like design of Graphis Puntos and Cuadros, is suitable for areas requiring high light reflectance and a soothing atmosphere. Unobtrusively these designs add a quiet elegance to your required finish, and are particularly suited to areas such as receptions, shops, concourses or conference rooms.

▼ Graphis Cuadros

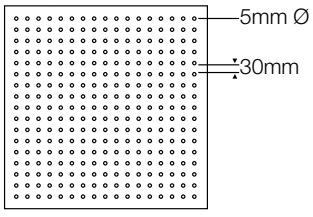
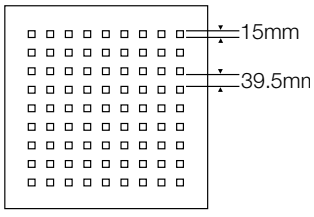
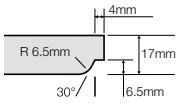
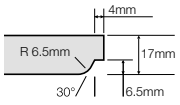


Graphis Cuadros

Recycled Content: 47%

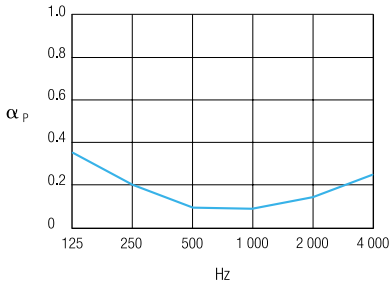
LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

GRAPHIS	Puntos	Cuadros
		
	MICROLOOK	MICROLOOK
	 Suprafine 15 mm/Silhouette	 Suprafine 15 mm/Silhouette
		
600 x 600 x 17 mm	9900 M	9901 M

EN 20354 & EN 11654

α_w	NRC	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz
0.15(L)	**0.15**	0.35	0.20	0.10	0.10	0.15	0.25 α_p



EN 20140-9 & EN 717-1

Dnc_w = 36 dB

EEA	Euroclass A2-s2, d0	N	In 1 (NBK 14)	RUS	Hard combustible (G1): GOST 30244-94; V1,D1,T1 NPB 244-97
CH	6q3 (TA VKF)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)		

λ = 0.052 - 0.057 W/mK ≅ 90% 70% RH ≅ 6 kg/m²

GRAPHIS

Design - Linear, Neocubic, Diagonal, Mix A & B

The geometric designs of the Graphis range enable the creation of subtle shadow effects. With a single texture, a variety of patterns can be obtained.

▼ Graphis Diagonal

Linear

Neocubic

Diagonal

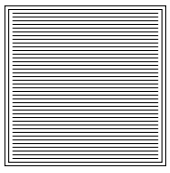
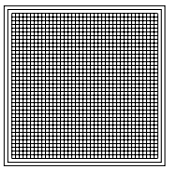
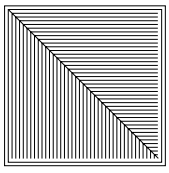
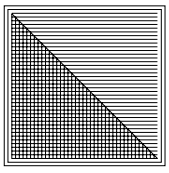
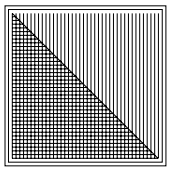
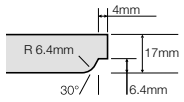
Mix A

Mix B

Recycled Content: 47%

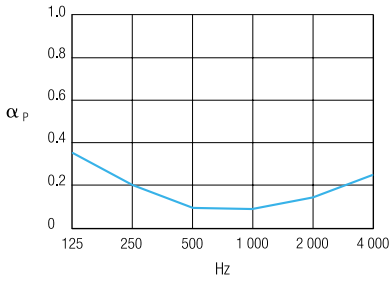
LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

GRAPHIS	Linear	Neocubic	Diagonal	Mix A	Mix B
					
	MICROLOOK				
	 Suprafine 15 mm/Silhouette				
					
600 x 600 x 17 mm	9220 M	9221 M	9222 M	9223 M	9224 M

EN 20354 & EN 11654

	Hz						
α_w	**NRC**	125	250	500	1000	2000	4000
0.15(L)	**0.15**	0.35	0.20	0.10	0.10	0.15	0.25 α_p



EN 20140-9 & EN 717-1

Dnc_w = 36 dB

EEA	Euroclass A2-s2, d0	N	In 1 (NBK 14)	RUS	Hard combustible (G1): GOST 30244-94; V1,D1,T1 NPB 244-97
CH	6q3 (TA VKF)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)		

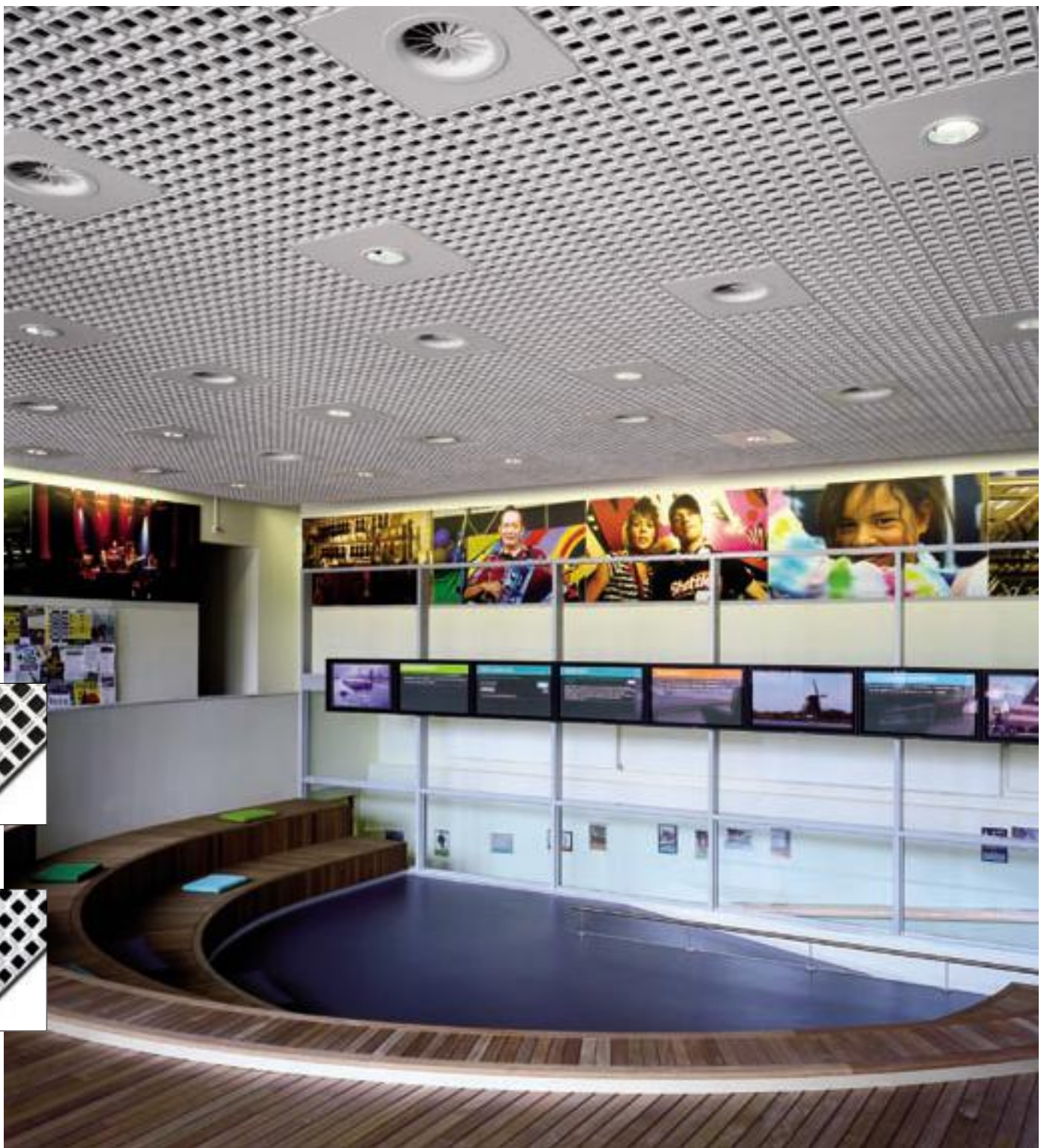
λ = 0.052 - 0.057 W/mK ≅ 90% 70% RH ≅ 6 kg/m²

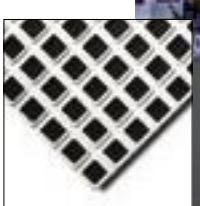
VISUAL

Open Cell - V49, V64

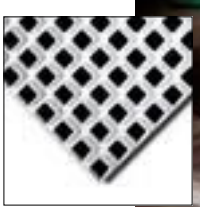
Armstrong's Visual ceilings are available in two open cell options and are designed for installation on 15 mm suspension systems. As well as enhancing the ceiling design, product integration can be arranged to provide specific acoustic requirements in areas such as conference or meeting rooms. Visual tiles provide a monolithic ceiling appearance and effectively integrate with recessed luminaires, custom-made downlighters and air handling diffusers.

▼ Visual V49





Visual V49



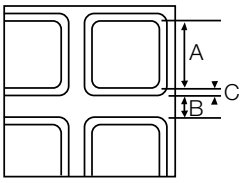
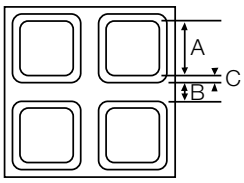
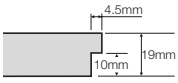
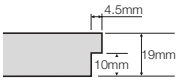
Visual V64

Recycled Content: 46%

LEED Credits

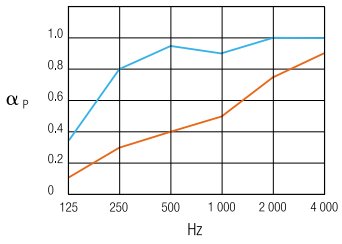
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
		✓		✓	

mineral ■ open cell ■ visual ■

VISUAL	V49	V64
	 A/58 mm B/15 mm C/6.50 mm Open area: 45.6 % Cut off angle: 18°	 A/47.20 mm B/15 mm C/6.35 mm Open area: 39.6 % Cut off angle: 22°
	MICROLOOK	MICROLOOK
	 Suprafine 15 mm/Silhouette	 Suprafine 15 mm/Silhouette
		
600 x 600 x 19 mm	8580 M	8581 M

EN 20354 & EN 11654

α_w	NRC	125	250	500	1000	2000	4000	Hz
• V49 + fleece								
0.50(H)	**0.50**	0.10	0.30	0.40	0.50	0.75	0.90	α_p
• V49 + fleece + 25 mm x 20 kg/m³ fibreglass overlay								
0.95(H)	**0.90**	0.35	0.80	0.95	0.90	1.00	1.00	α_p



EEA Euroclass A2-s1, d0

UK Class 0/Class 1 (BS 476 Pt - 6,&7)

RUS Hard combustible (G1): GOST 30244-94; V1,D1,T1 NPB 244-97

λ = 0.052 - 0.057 W/mK

70 % RH

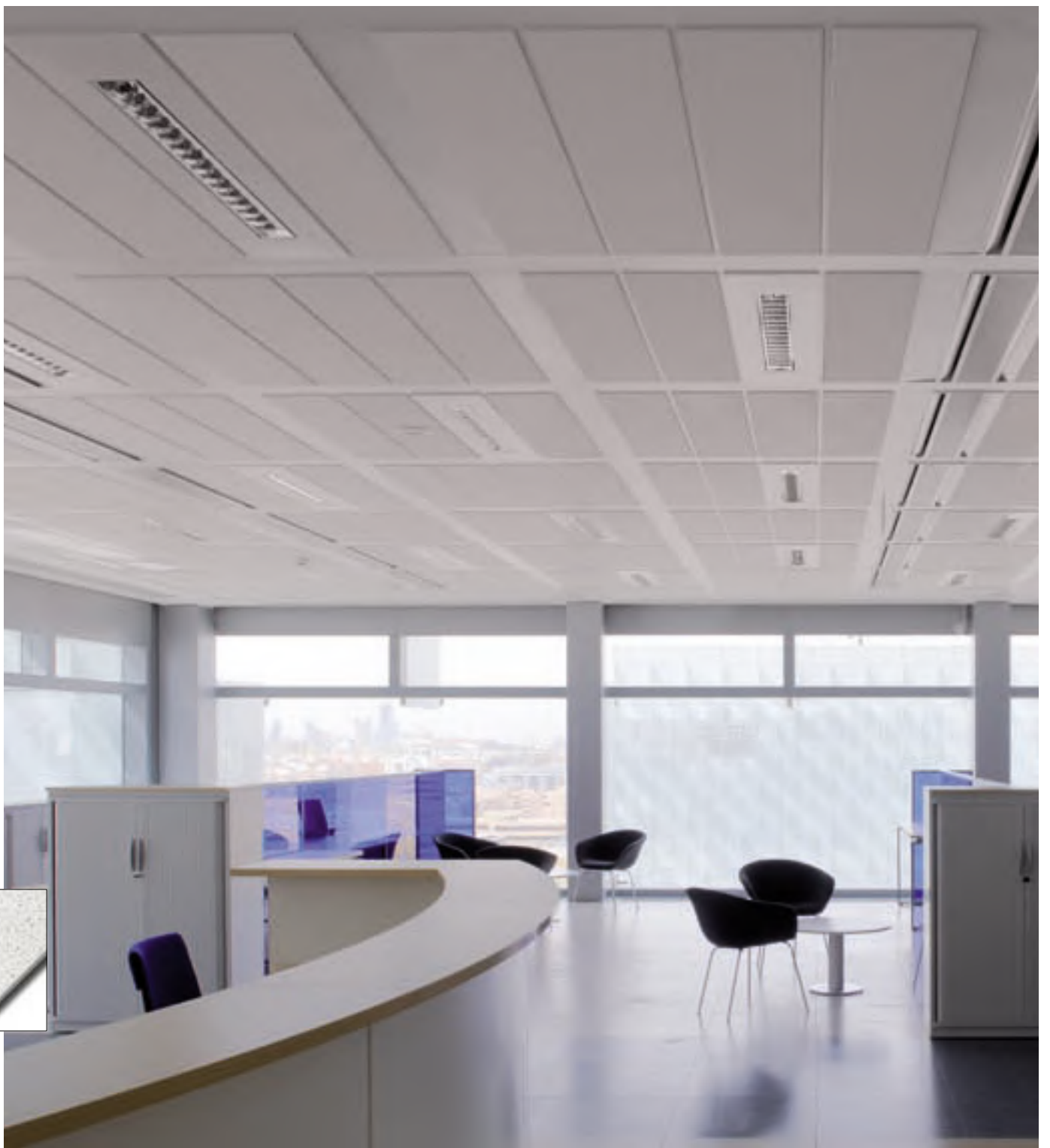
≅ 4 kg/m²

FINE FISSURED

Tiles & Planks

The non-directional Fine Fissured surface is designed for effective sound absorption. The SecondLook option allows the supporting suspension system to be integrated into the ceiling pattern.

▼ Fine Fissured Tegular



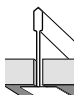
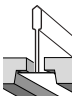
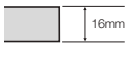
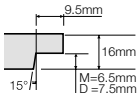
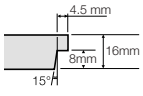
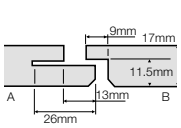
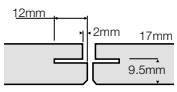
Fine Fissured

Recycled Content: 63%

LEED Credits

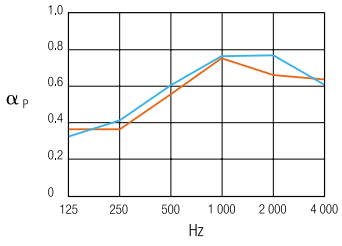
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

15 YEAR guarantee With Armstrong Grid

FINE FISSURED	BOARD	TEGULAR	MICROLOOK	SL2	K2C2
					
	Prelude XL 24 mm	Prelude XL 24 mm	Suprafine 15 mm/ Silhouette		
					
Board & Tiles					
600 x 600 x 16 mm	3510	1833 M	1734 M		
600 x 1200 x 16 mm	3570	3574			
Planks					
300 x 1200 x 16 mm	H4840	H4841	H4842		
300 x 1200 x 17 mm				H4848	H4843
300 x 1500 x 17 mm				H4849	H4844
300 x 1800 x 17 mm				H4850	H4845
400 x 1200 x 17 mm				H4861	H4856
400 x 1800 x 17 mm				H4863	H4858

EN 20354 & EN 11654

		Hz						
α_w	**NRC**	125	250	500	1000	2000	4000	
• Board/Tegular/MicroLook								
0.50(H)	**0.55**	0.35	0.34	0.55	0.72	0.65	0.62	α_p
• Planks								
0.60	**0.55**	0.30	0.40	0.60	0.75	0.75	0.60	α_p



EN 20140-9 & EN 717-1

Board/Tegular/MicroLook
Dnc_w = 34 dB
Planks Board
Dnc_w = 35 dB
SL2/K2C2
Dnc_w = 40 dB

EEA	Euroclass A2-s1, d0	RUS	Hard combustible (G1): GOST 30244-94; V1,D1,T1 NPB 244-97	N	In 1 (NBK 14)
EEA	Euroclass A2-s2, d0 (Black)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)		
CH	6q3 (TA VKF)				

*Colortone Black: Special fire tests, please contact ITS.

λ = 0.052 - 0.057 W/mK

≅ 84% (white)

99% RH

Board/MicroLook/ Tegular ≅ 3.5 kg/m²
SL2/K2C2 ≅ 4.5 kg/m²

FINE FISSURED

Design - SecondLook, Sektor

This acoustical texture combined
with profiled edges, contributes
to a more refined looking space.
Four geometrically scored visuals
allow SecondLook & Sektor to be used
in any type of building and in
any size of room: corridors, offices,
classrooms, lobbies…

▼ Fine Fissured SecondLook IV / Fine Fissured Tegular

Fine Fissured
SecondLook

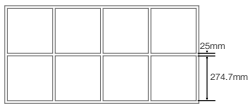
Fine Fissured
Sektor

Recycled Content: 25 - 30%

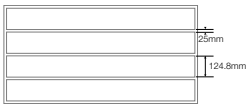
LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

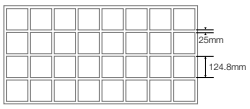
15 YEAR guarantee With Armstrong Grid



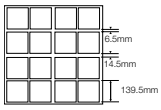
Fine Fissured
SecondLook I



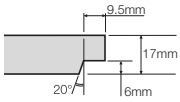
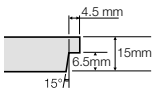
Fine Fissured
SecondLook III



Fine Fissured
SecondLook IV



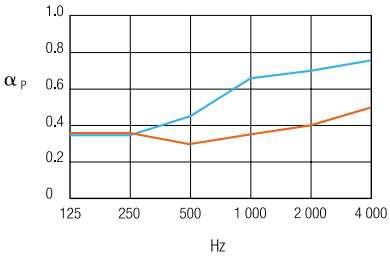
Fine Fissured
Sektor

FINE FISSURED	SECONDLOOK			MICROLOOK
	I	III	IV	SEKTOR
		Prelude XL 24 mm		Suprafine 15 mm
				
mm	600 x 600 x 15 mm			9700 M
	600 x 1200 x 17 mm	9616 M	9617 M	9618 M

EN 20354 & EN 11654

Hz

α_w	NRC	125	250	500	1000	2000	4000
• SecondLook							
0.55(H)	**0.55**	0.35	0.35	0.45	0.65	0.70	0.75 α_P
• MicroLook Sektor							
0.35(H)	**0.35**	0.35	0.35	0.30	0.35	0.40	0.50 α_P



EN 20140-9 & EN 717-1

SecondLook	
Dnc_w = 36 dB	
MicroLook Sektor	
Dnc_w = 35 dB	

EEA	Euroclass A2-s1, d0	N	In 1 (NBK 14)	RUS	Hard combustible (G1): GOST 30244-94; V1, D1, T1 NPB 244-97
CH	6q3 (TA VKF)	UK	Class 0/Class 1 (BS 476 Pt - 6,&7)		

λ = 0.052 - 0.057 W/mK

≅ 85%

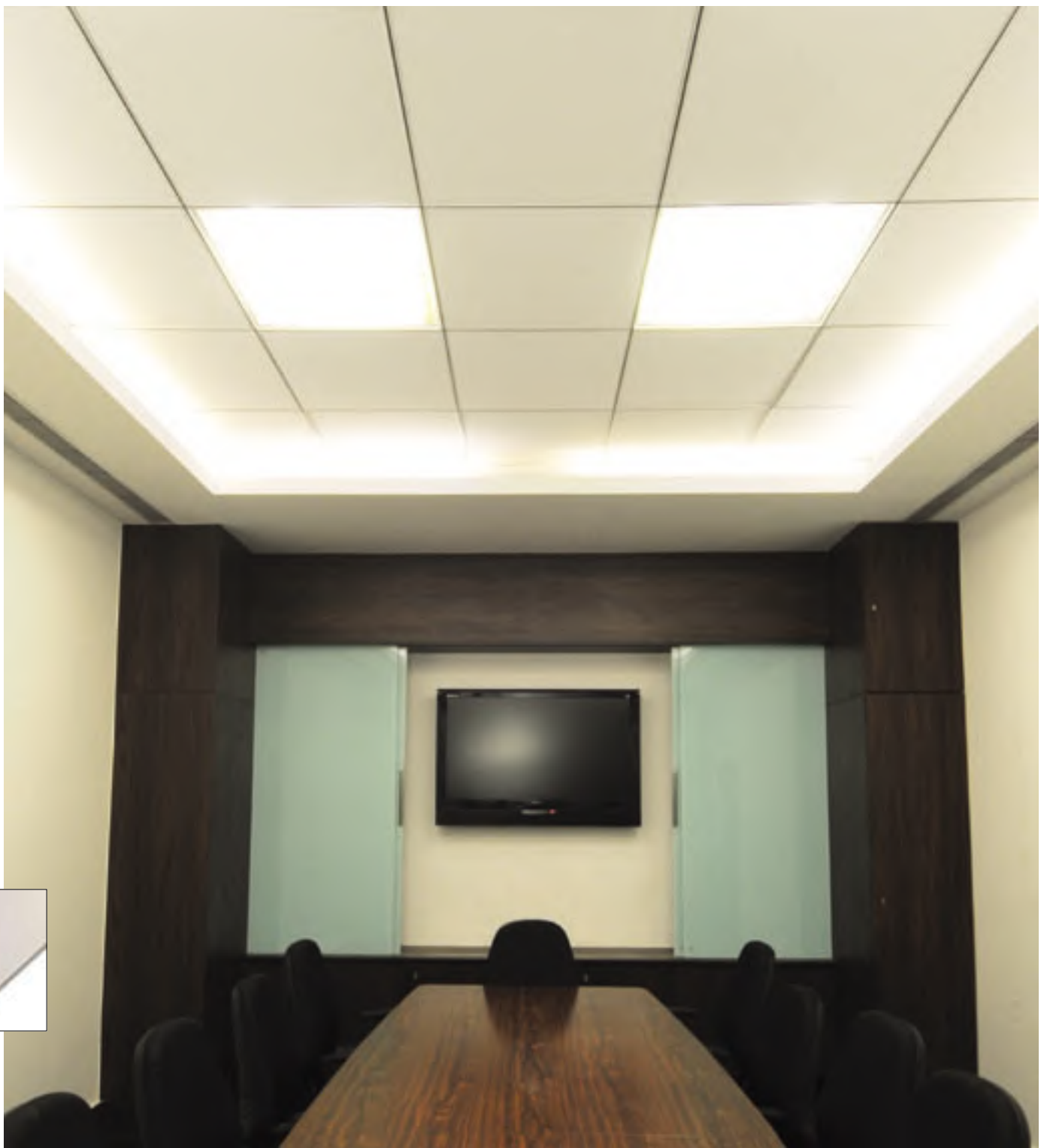
95% RH (SecondLook)
70% RH (MicroLook Sektor)

≅ 4.2 kg/m² (SecondLook)
≅ 4 kg/m² (MicroLook Sektor)

ELITE RH99

Elite has a uniform non-directional pin hole visual which limits wastages. The HumiGuard performance is formulated to withstand conditions where temperature reaches up to 49°C and relative humidity up to 99%. BioBlock paint inhibits or retards surface growth of mold/mildew on painted surface.

▼ Elite RH99



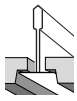
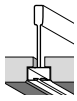
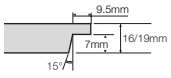
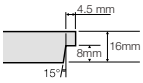
Elite RH99

Recycled Content: 57%

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
		✓		✓	

With Armstrong Grid

ELITE RH 99	BOARD	TEGULAR	MICROLOOK
	 XL 24 mm	 XL 24 mm	 XL 15 mm
			
ELITE RH 99			
600 x 600 x 16 mm	3690M	3698M	3697M
600 x 1200 x 16 mm	3691M		
600 x 600 x 19 mm		SC97053	SC97054
600 x 1200 x 19 mm	SC97049		

α_w NRC=0.55 (Elite 16 mm)

NRC=0.60 (Elite 19 mm)

dB Dncw=30 dB

UK: Class 0/Class 1 (BS 476) Part 6&7

λ = 0.052 - 0.057 W/m°K

≅ 80%

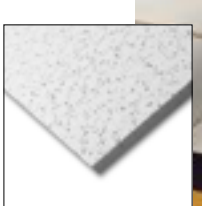
99% RH

3.47 kg/m²

CORTEGA RH99

Cortega's non directional visual reduces installation time and scrap. The humidity-resistant **HumiGuard Plus (RH99)** performance inhibits panel sag. This product is formulated to withstand conditions where temperature reaches up to 49°C and relative humidity up to 95%.

▼ Cortega RH99



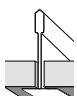
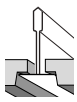
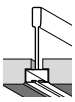
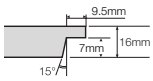
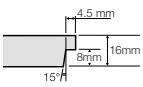
Cortega RH99

Recycled Content: 64%

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
		✓		✓	

15 YEAR guarantee With Armstrong Grid

CORTEGA RH 99	BOARD	TEGULAR	MICROLOOK
	 XL 24 mm	 XL 24 mm	 XL 15 mm
			
CORTEGA RH 99			
600 x 600 x 16 mm	3523	3529	3553
600 x 1200 x 16 mm	3521	3531	

α_w NRC=0.55

dB Dncw=33 dB (Board)
35 dB (Tegular/Microlook)

Class 0/Class 1 (BS 476)

λ = 0.052 - 0.057 W/m²K

≅ 80%

99% RH

Kg 3.19 kg/m²

CLASSIC LITE RH 95

Fine Texture

Classic Lite is a pin hole visual product that combines good acoustics and light reflectance. Its non-directional visual reduces installation time and wastage. This product is formulated to withstand conditions where temperature reaches up to 49°C and relative humidity up to 95%.

▼ Classic Lite RH 95 Fine Texture

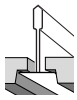
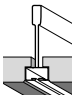
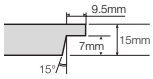
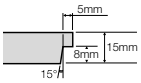
Classic Lite
RH 95
Fine Texture

Recycled Content: 58%

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

15 YEAR guarantee With Armstrong Grid

CLASSIC LITE RH 95 Fine Texture	BOARD	TEGULAR	MICROLOOK
			
	XL 24 mm	XL 24 mm	XL 15 mm/ Silhouette
			
CLASSIC LITE RH 95 Fine Texture			
600 x 600 x 15 mm	1670M	1672M	1673M
600 x 1200 x 15 mm	1671M		

α_w NRC=0.50

dB Dncw=30dB

UK: Class 0/Class 1 (BS 476) Part 6&7

λ = 0.052 - 0.057 W/m²K

≅ 84%

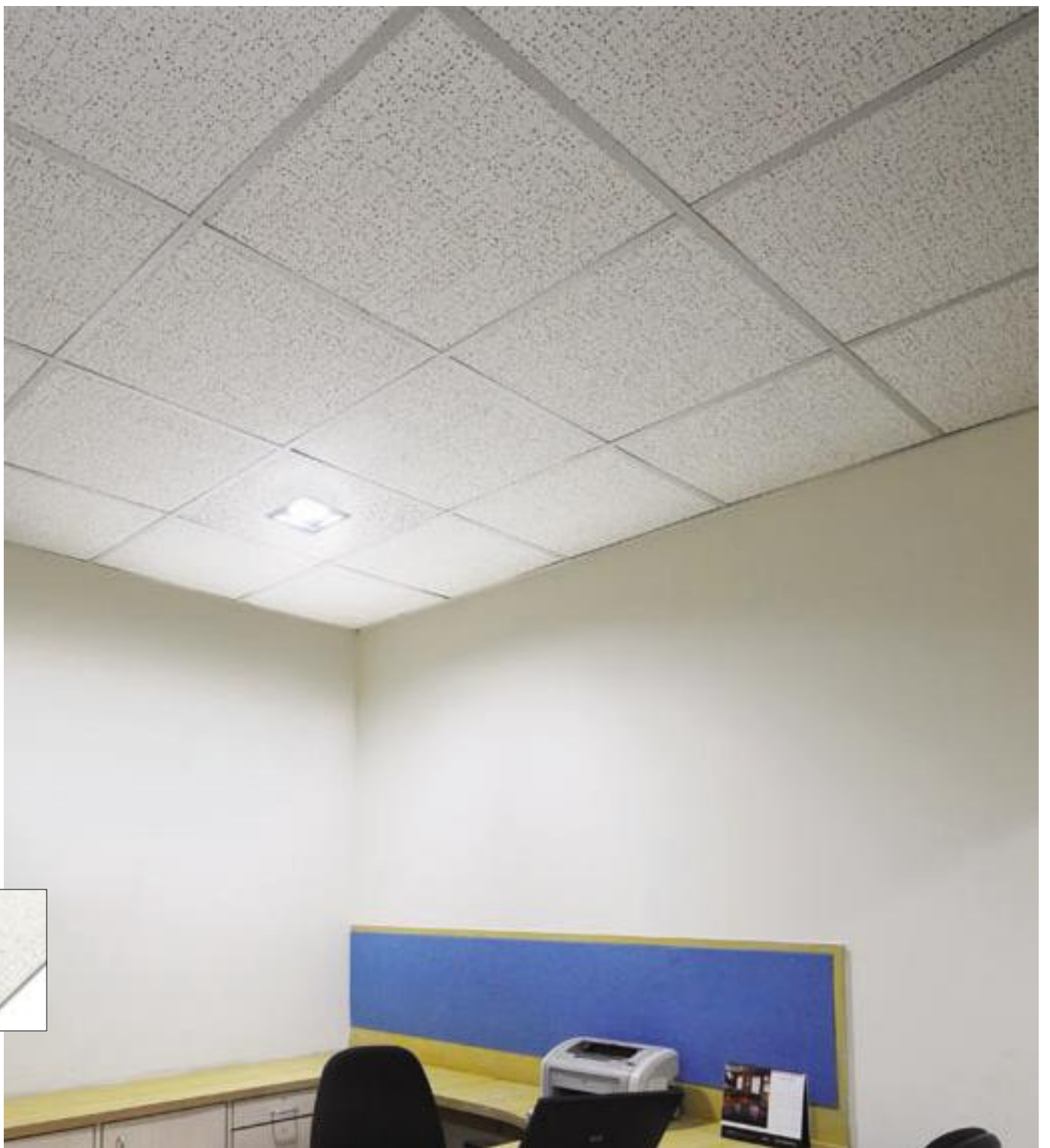
95% RH

Kg ≅ 3.1 kg/m²

BEAUTI-SKY

Economical, easy to install and maintain, Beauti-Sky is appropriate for relative humidity up to 70% and temperature up to 30°C.

▼ Beauti-Sky

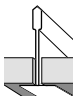
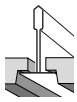
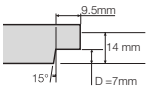


Beauti-Sky

Recycled Content: 55%

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
		✓		✓	

BEAUTI-SKY	BOARD	TEGULAR	
	 XL 24 mm	 XL 24 mm	
			
600 x 600 x 14 mm	H390	H392	
600 x 1200 x 14 mm	H391		

NRC=0.50

CAC = 30 dB

UK Class 0/Class 1 (BS 476)

λ = 0.052 - 0.057 W/m° K

= 80%

70% RH

2.6 kg/m²

BIOGUARD

ISO 5 (CLASS 100)

The Bioguard paint provides an excellent anti-microbial performance against strains such as MRSA (Methicilin Resistant Staphylococcus Aureus), E-Coli (Escherichia coli) and Streptococcus pneumoniae. Directly applied to the smooth Plain surface it provides a 90% light reflectance.
Its ISO 5 clean-room performance makes the product suitable for installation in hospital areas with average or severe risk of infection or any other clean-room environment where anti-microbial performance is required. Thanks to its enhanced water repellency, the product can be washed.
The surface resists to disinfectants using the most common active agents, Quaternary Ammonium, Hydrogen Peroxide and Chlorine.
Bioguard Acoustic provides a combination of performance solutions for the healthcare environment.
With its acoustically transparent face scrim, the product provides a 0.60 α_w, meeting acoustical requirements in hospitals.

▼ Bioguard Plain Board

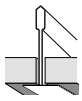
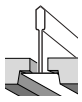
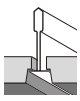
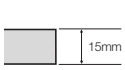
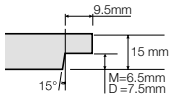
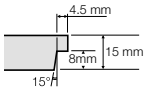
Bioguard Plain

Recycled Content: 24%

LEED Credits

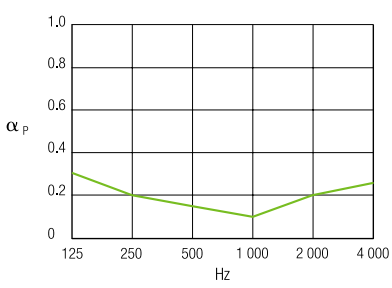
Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	✓

10 YEAR guarantee

BIOGUARD	BOARD	TEGULAR	MICROLOOK
	 Prelude XL 24 mm	 Prelude XL 24 mm	 Suprafine 15 mm/Silhouette
			
Bioguard Plain			
600 x 600 x 15 mm	2221 M	2223 M	2224 M
625 x 625 x 15 mm	2221 D	2223 D	2224 D
600 x 1200 x 15 mm	2222 M		
625 x 1250 x 15 mm	2222 D		

Hz

α_w	**NRC**	125	250	500	1000	2000	4000
• Bioguard Plain							
0.15 (L)	**0.15**	0.30	0.20	0.15	0.10	0.20	0.25



Dnc_w = 37 dB

EEA Euroclass A2-s1, d0

UK Class 0/Class 1 (BS 476 Pt - 6,&7)

Quarternary Ammonium, Hydrogen Peroxide, Chlorine

Fungicide & bactericide

500 wash cycles according to ASTM D-4828

λ = 0.052- 0.057 W/mK

≅ 90%

ISO 5 (CLASS 100)

95 % RH

≅ 4.5 kg/m²

MYLAR

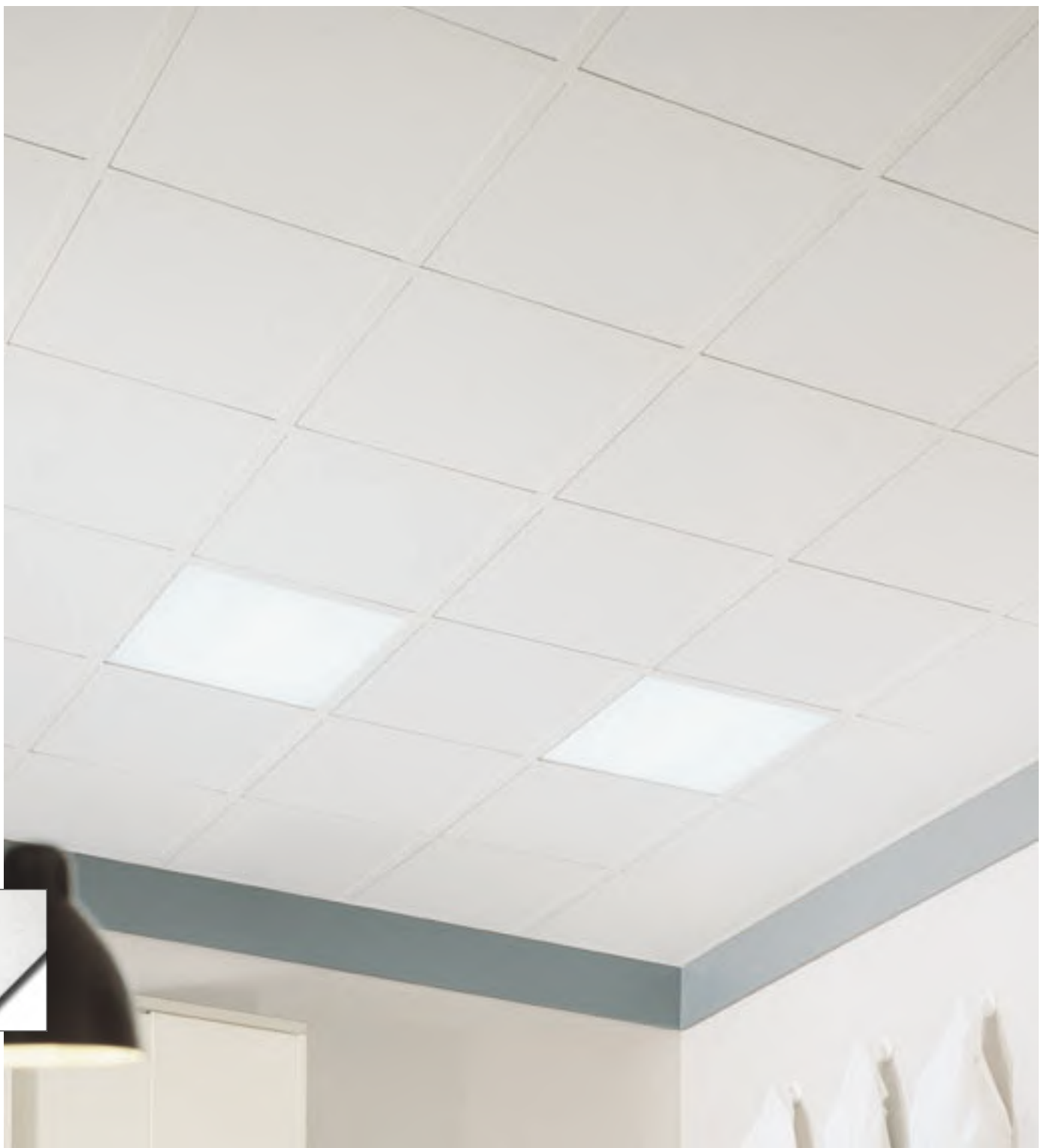
ISO 4 (CLASS 10)

The high density mineral tile is sealed by a polyester film covering its surface and edges providing excellent surface strength.

The film doesn't attract dust and is particularly adapted to regular washing.

At the ISO 14644-1 test, the international test method to determine the particle cleanliness class, the product achieves an ISO 4 class (equivalent to CLASS 10 as per US Fed. Std. 209E) without hold-down clips and is eminently suitable for installation in a clean-room environment.

▼ Mylar Board



Mylar

Recycled Content: 35%

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
		✓		✓	

10 YEAR guarantee

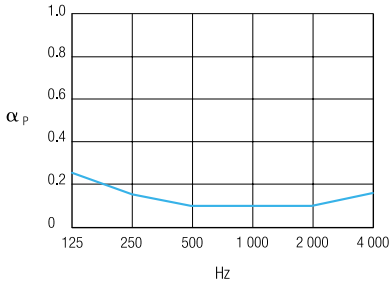
MYLAR	BOARD
	Prelude XL 24 mm
	15mm

600 x 600 x 15 mm . . . . . 9527 M

600 x 1200 x 15 mm . . . . . 9529 M

EN 20354 & EN 11654

		Hz						
α_w	NRC	125	250	500	1000	2000	4000	
0.10(L)	0.10	0.25	0.15	0.10	0.10	0.10	0.15	α_p



EN 20140-9 & EN 717-1

Dnc_w = 36 dB

EEA	Euroclass A2-s1, d0
CH	6q3 (TA VKF)
UK Class 0/Class 1 (BS 476 Pt - 6,&7)	

λ = 0.067 W/mK

≅ 80%

ISO 4 (CLASS 10)

95% RH

≅ 5 kg/m²

CERAMAGUARD

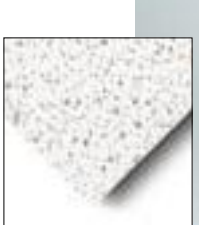
100% RH

Due to its unique high density mineral fibre composition Ceramaguard is steam resistant and will retain its physical integrity even when subjected to 100% RH. It also features a washable finish lightly fissured to provide acoustic performance.

With Ceramaguard and Newtone, Armstrong offers a choice between two products which excel in extreme conditions of up to 100% Relative Humidity, whilst presenting alternative features and benefits.

Note: Ceramaguard must be installed on Trulok NC grid where humidity regularly exceeds 95% RH.

▼ Ceramaguard Fine Fissured Board



Ceramaguard
Fine Fissured

Recycled Content: 34%

LEED Credits

Energy	Waste Mgmt	Recycled Content	Renewable Materials	Low-emitting Materials	Daylight & Views
✓		✓		✓	

10 YEAR guarantee

CERAMAGUARD FINE FISSURED BOARD

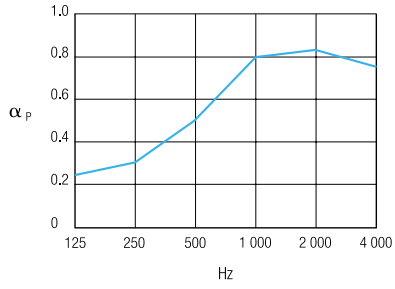
Prelude TL 24 mm

600 x 600 x 15 mm . . . . . 607 M

600 x 1200 x 15 mm . . . . . 608 M

EN 20354 & EN 11654

		Hz						
α_w	**NRC**	125	250	500	1000	2000	4000	
0.55(MH)	**0.60**	0.25	0.30	0.50	0.80	0.85	0.75	α_p



EN 20140-9 & EN 717-1

Dnc_w = 39 dB

EEA Euroclass A1

UK Class 0/Class 1 (BS 476 Pt - 6,&7)

λ = 0.052-0.057 W/mK

≅ 85%

100% RH

≅ 7 kg/m²
20 kg/m² if wet

NEWTONE

100% RH

Newtone is a hydrated calcium silicate ceiling tile particularly suitable for use in areas subject to extremes of temperature.
In addition it is ideal for use in industrial or semi-exposed locations or where condensation and resistance to damage are important considerations.

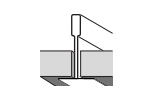
Note: Newtone must be installed on Trulok NC grid where humidity regularly exceeds 95% RH.

▼ Newtone Board

Newtone

NEWTONE BOARD

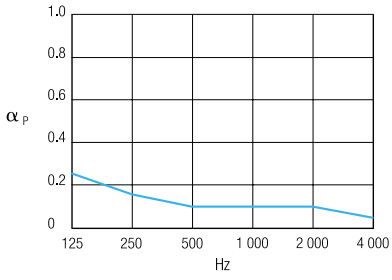
Prelude TL 24 mm



600 x 600 x 6 mm . . . . . 1201 M.
600 x 1200 x 6 mm . . . . . 1200 M.

EN 20354 & EN 11654

		Hz						
α_w	**NRC**	125	250	500	1000	2000	4000	
0.10(L)	**0.10**	0.25	0.15	0.10	0.10	0.10	0.05	α_p



EN 20140-9 & EN 717-1

Dnc_w = 37 dB

EEA Euroclass A2-s1, d0

UK Class 0/Class 1 (BS 476 Pt - 6,&7)

λ = 0.17 W/mK ≅ 85% ISO 5 100% RH ≅ 6 kg/m²

MADERA

Tiles & Planks

Madera, a range of wood-finished ceiling systems with exquisite shades enables designers to create premium, rich, warm and breathtaking interiors. Available in 600 x 600 mm and 300 x 1200 mm in Micro Look – edge and SL2 concealed grid, made of medium density wood fibre and surface-treated to resist fire, the surface is plain and easy to install. Its smooth texture allows for clean perimeter finishes.

GRID COORDINATION

MicroLook: For better coordination between grid and tile, Suprafine 15 mm grid system is recommended.

Silhouette: Silhouette in Black, provides an aesthetically enhanced support grid with specific benefits where partition head locating positions are required.

Concealed Grid System – SL2: The Madera SL2 ceiling range provides a monolithic visual by hiding the grid system.

Installation recommendations

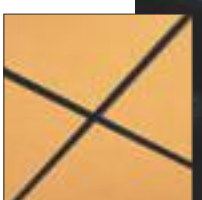
To obtain best results, it is advised to:

1. Display all the tiles before fitting.
2. Arrange them aesthetically with regard to their shade and grain.
3. Install the ceiling tiles accordingly. With each order do allow for some extra tiles to accommodate visual variations.

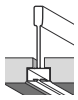
APPLICATION

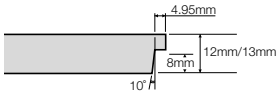
Madera is the favoured choice for exclusive projects in Retail & Entertainment, Hospitality, Restaurants, Offices, Conference Rooms and Speciality Stores.

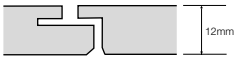
▼Madera MicroLook Maple



Madera MicroLook and Silhouette in Black

MADERA	MICROLOOK	SILHOUETTE	SL2
			
	XL 15 mm	XL 15 mm	Peakform 24 mm





	Wenge	US Maple	Beech	Maple
Laminates: (SL2 edge)				
600 x 600 x 12 mm	2219SL	2303SL	2324SL	2024SL
300 x 1200 x 12 mm	2219PSL	2303PSL	2324PSL	2024PSL
Laminates: (Microlook edge)				
600 x 600 x 12 mm	2219ML	2303ML	2324ML	2024ML

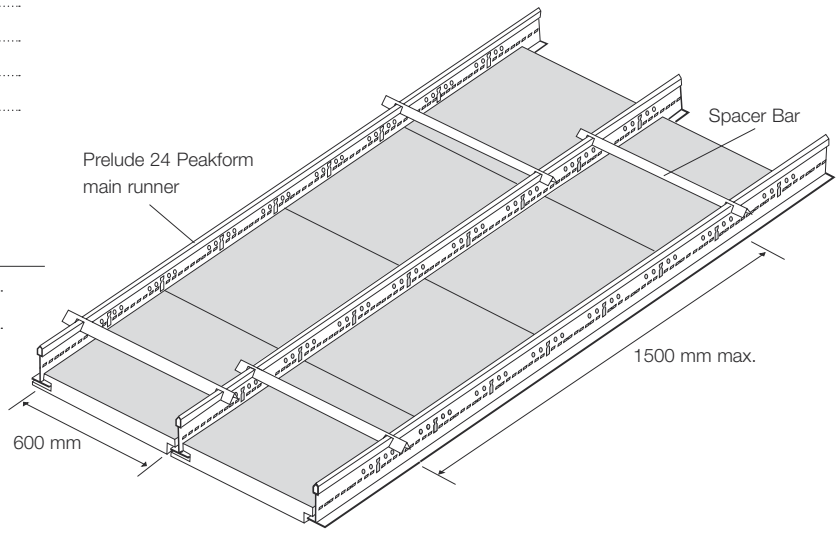
Laminates

Wenge

US Maple

Beech

Maple



UK Class 2 (BS476)

λ = 0.12 W °/mK

70% RH

≅ 10.1 kg/m²

US Maple


Beech


Maple


Wenge

ARMSTRONG METAL CEILINGS

FORM

Armstrong offers a full range of plank and tile metal ceiling options:
- Standard tiles for installation in conventional grid systems
- Special options in metal for signature spaces, e.g. Curved metal ceilings, Open Cell ceilings and Mesh lay-in panels.

FUNCTION

Armstrong's metal tiles and planks can be specified with a range of acoustic treatments depending on the balance between intelligibility and confidentiality you wish to achieve.
These treatments include Armstrong's **Premium B15** high attenuation solution on special request.

All these products come with a durable coil coat finish.

▲ Premium B15

▼ Armstrong Axal Vector

ARMSTRONG METAL CEILINGS

INSTALLATION

All Armstrong metal ceilings are designed for simple and economical installation on standard exposed systems or purpose designed grids.

ENGINEERING STANDARDS

All Armstrong metal ceilings are manufactured to meet or exceed EN 13964.

FLEXIBILITY

Armstrong offers a range of different module sizes to suit different room scales and building modules. For more information about our capabilities, call Internal Technical Sales.

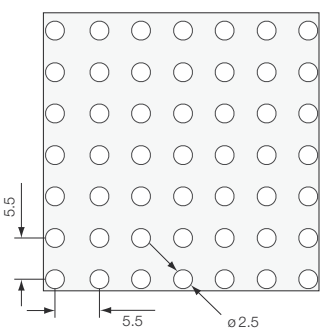
▲Armstrong metal planks

PERFORATIONS

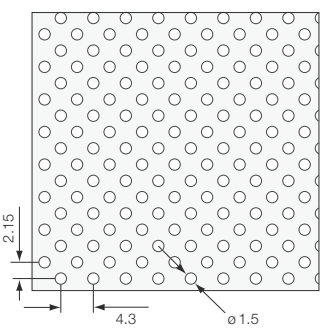
Products are offered in Plain, Perforated, Microperforated and Extra Microperforated. Most Perforated and Microperforated items are produced with a nominal 10 mm plain border. Extra Microperforated products have an overall perforation.

Apart from defining the visual appearance of the product, the perforation will also influence the acoustic performance of the ceiling.

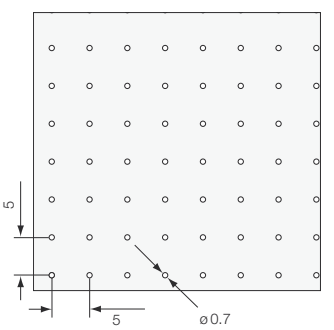
STANDARD PERFORATION PATTERNS



Standard Perforated
16% free area



Microperforated
22% free area



Extra Microperforated
1% free area

LIGHT REFLECTANCE

Orcal products offer a range of light reflectance values between 63 & 87%. Please refer to technical section for full details.

COLOUR

Standard colour

Global White (12% gloss)

Colours available on request

RAL 9010

Special colours

Other RAL colours available on request

MATERIALS

Products are made of zinc coated steel, aluminium or stainless steel. Gauge of steel used varies as is appropriate to product type, size and configuration.

FINISH

Products are finished with a durable, electrostatic factory applied polyester powder or coil coat.

RAL 9010

Global White

RAL 9006
Silver grey

RAL 9007
Gunmetal grey

Sprinkler head fitted through circular cut-out

SECURITY

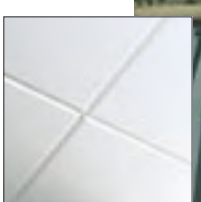
Armstrong metal ceiling products are naturally strong and impact resistant. For additional security, Armstrong Axal and Clip-In products can be secured to their supporting grid structures making them suitable for areas where preventing unauthorised access to the ceiling plenum is a requirement.

ARMSTRONG METAL CEILINGS

Clip-In Tiles & Planks

- Plain, monolithic surface
- Minimum plenum clearance
- Choice of dimensions
- Easy to clean
- Swing down option for easy access

▼Armstrong Clip-In



Armstrong
Clip-In

Recycled Content: Steel - 25%; Aluminium - 50%

(1)

CLIP-IN TILES & PLANKS	Plain	Standard Perforated	Microperforated	Extra Microperforated
	No perforation	2.5 mm dia. holes 16% Open area	1.5 mm dia. holes 22% Open area	0.7 mm dia. holes 1% Open area

Orcal 3000 suspension system

Clip-In 3 mm Bevel				
STEEL				
600 x 600 mm	4156M6A1WH	4166M6A2WH	4166M6B2WH	4166M6C2WH
300 x 300 mm	4153M6A1WH	4163M6A2WH	4163M6B2WH	4163M6C2WH
300 x 1200 mm	4156M6A1WH	4164M6A2WH	4164M6B2WH	4164M6C2WH
600 x 1200 mm	4150M6A1WH	4160M6A2WH	4160M6B2WH	4160M6C2WH
ALUMINIUM				
600 x 600 mm	4177M6A1WH	4187M6A2WH	4187M6B2WH	4187M6C2WH
300 x 300 mm	4173M6A1WH	4183M6A2WH	4183M6B2WH	4187M6C2WH
300 x 1200 mm	4174M6A1WH	4184M6A2WH	4184M6B2WH	4184M6C2WH
600 x 1200 mm	4171M6A1WH	4181M6A2WH	4181M6B2WH	4181M6C2WH

Armstrong Clip-in system ▲

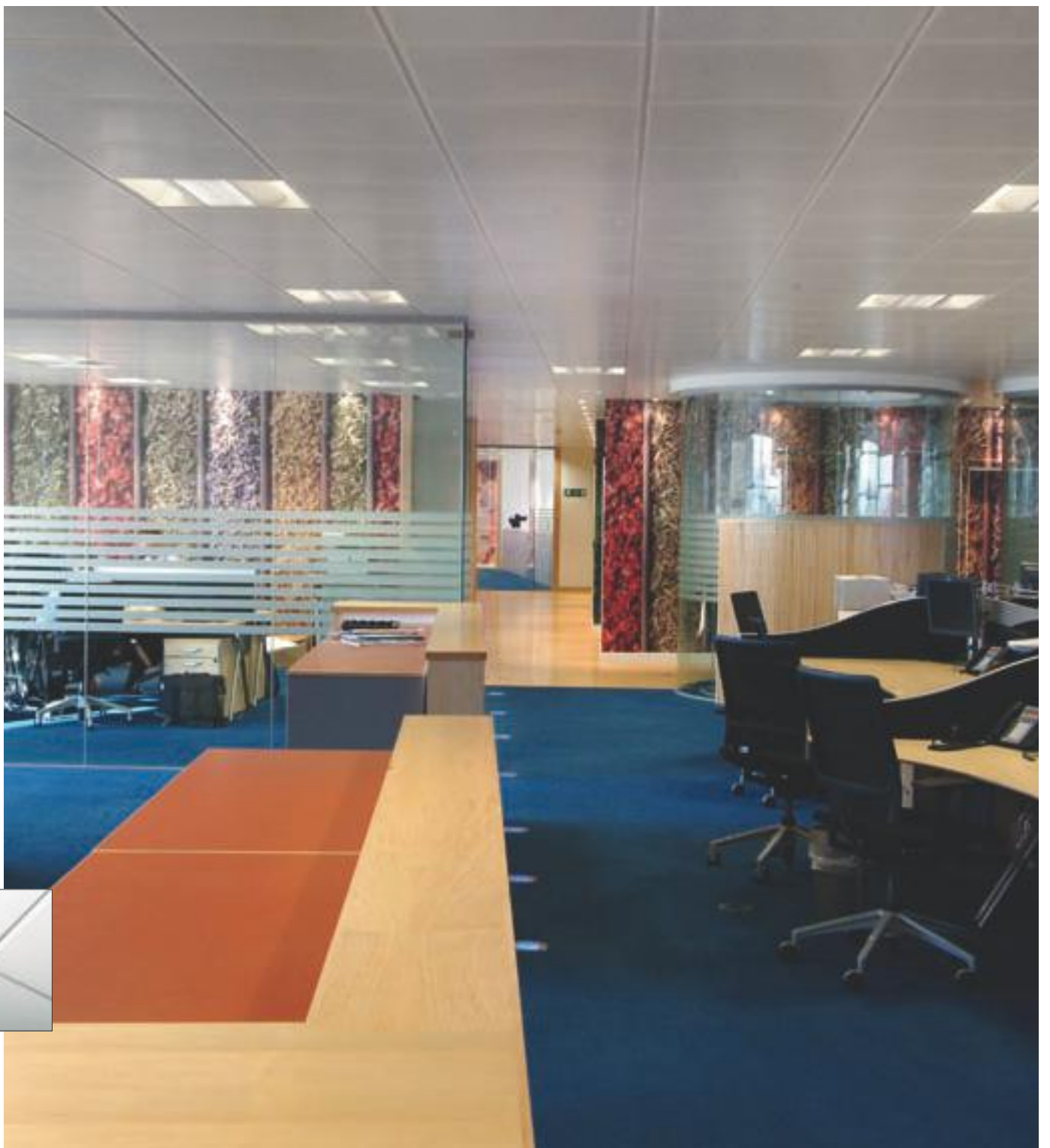
(1) For short term exposure or back painted products.

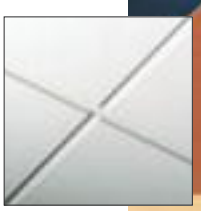
ARMSTRONG METAL CEILINGS

Lay-in

- Fully demountable
- Easy to replace
- MicroLook to be installed either on Suprafine 15mm or Silhouette
- Easy access to plenum

▼Extra Microperforated - MicroLook with Silhouette

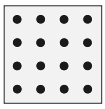
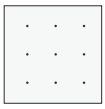


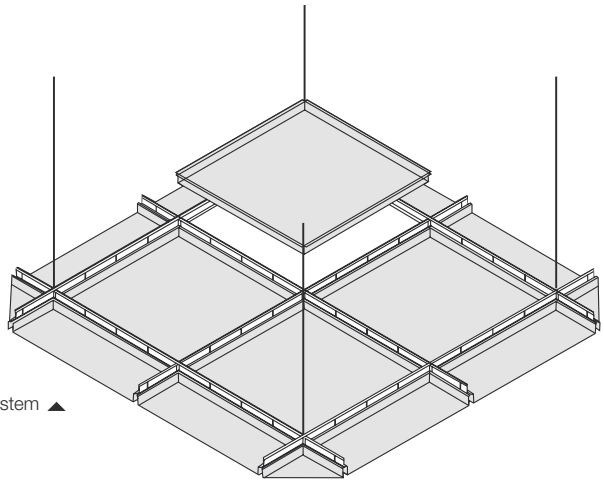


MicroLook

Recycled Content: Steel - 25%; Aluminium - 50%

(1)

BOARD, TEGULAR, FLUSH TEGULAR, MICROLOOK	Plain	Perforated	Microperforated	Extra Microperforated
	 No perforation	 2.5 mm dia. holes 16% Open area	 1.5 mm dia. holes 22% Open area	 0.7 mm dia. holes 1% Open area
STEEL				
600 x 1200 mm	4250M6A1WH	4260M6A2WH	4260M6B2WH	4260M6C2WH
600 x 600 mm	4256M6A1WH	4266M6A2WH	4266M6B2WH	4266M6C2WH
ALUMINIUM				
600 x 1200 mm	4271M6A1WH	4281M6A2WH	4281M6B2WH	4281M6C2WH
600 x 600 mm	4277M6A1WH	4287M6A2WH	4287M6B2WH	4287M6C2WH



Armstrong Lay-in system ▲

(1) For short term exposure or back painted products.

ARMSTRONG METAL CEILINGS

Planks

Armstrong metal planks are available in lengths between 900 mm and 3000 mm.

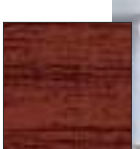
Choose between Clip-in system (1200 x 300 mm) and Carrier bar systems (ideal for external application)

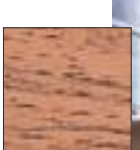
The concealed appearance of planks minimises the visbility of the grid making for a smooth or contiguous appearance.

Three Perforation options are available enabling a fine balance between appearance and acoustics.

The wood visual option available in Planks provides for greater visual warmth in spaces.

▼Armstrong metal Planks





Recycled Content: Steel - 25%; Aluminium - 50%

(1)

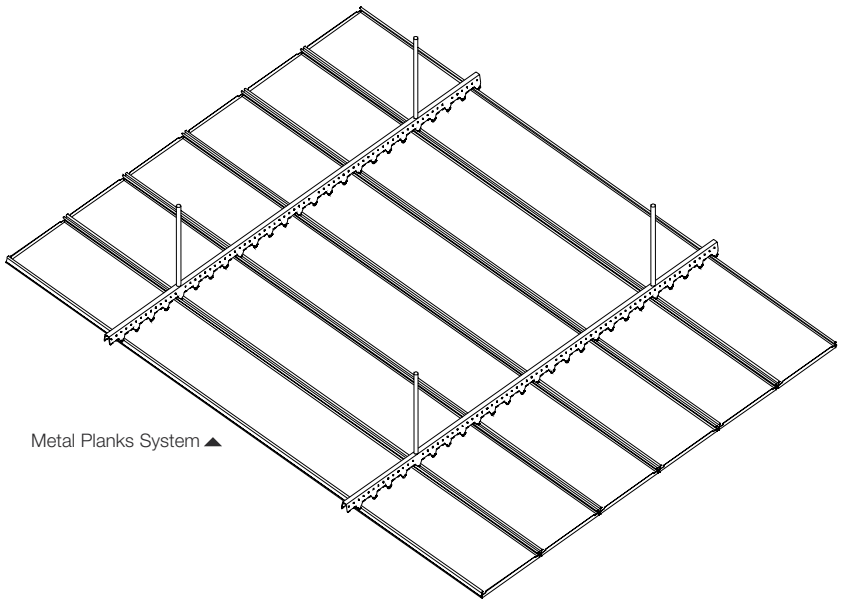
METAL PLANKS	Plain	Perforated	Microperforated	Extra Microperforated
	No perforation	2.5 mm dia. holes 16% Open area	1.5 mm dia. holes 22% Open area	0.7 mm dia. holes 1% Open area

Edge detail long sides

Edge detail short sides

STEEL				
300 x 1200 mm	4356M6A1WH	4366M6A2WH	4366M6B2WH	4366M6C2WH
300 x 2400 mm	4351M6A1WH	4361M6A2WH	4361M6B2WH	4361M6C2WH
300 x 3000 mm	4352M6A1WH	4362M6A2WH	4362M6B2WH	4362M6C2WH
ALUMINIUM				
300 x 1200 mm	4376M6A1WH	4386M6A2WH	4386M6B2WH	4380M6C2WH
300 x 2400 mm	4371M6A1WH	4381M6A2WH	4381M6B2WH	4381M6C2WH
300 x 3000 mm	4372M6A1WH	4382M6A2WH	4382M6B2WH	4382M6C2WH

Planks of width 300 mm and varying lengths can be made available against special request



Metal Planks System ▲

(1) For short term exposure or back painted products.

ARMSTRONG METAL CEILINGS

Axal Vector

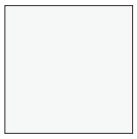
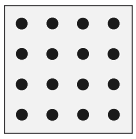
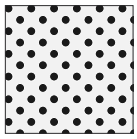
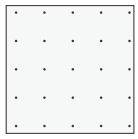
- Can be installed with a very low void depth
- Clean crisp detailing of 6 mm reveal
- Easy to install and remove without tools
- Downwardly accessible
- Minimal disruption
- Strongly formed edge resists damage
- Ideal for renovation and upgrading existing ceilings installed on Prelude 24 XL exposed grid
- Partially covers old grid

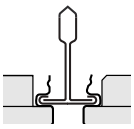
▼Armstrong Axal Vector

Axal Vector

Recycled Content: Steel - 25%; Aluminium - 50%

(1)

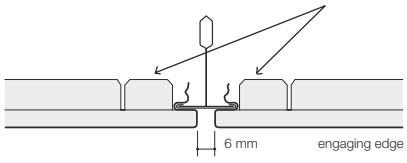
AXAL VECTOR	Plain	Perforated	Microperforated	Extra microperforated
				
	No perforation	2.5 mm dia. holes 16% Open area	1.5 mm dia. holes 22% Open area	0.7 mm dia. holes 1% Open area

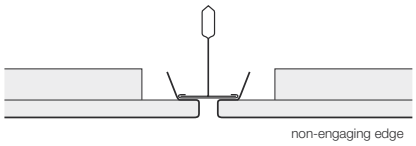


Prelude XL² 24 mm

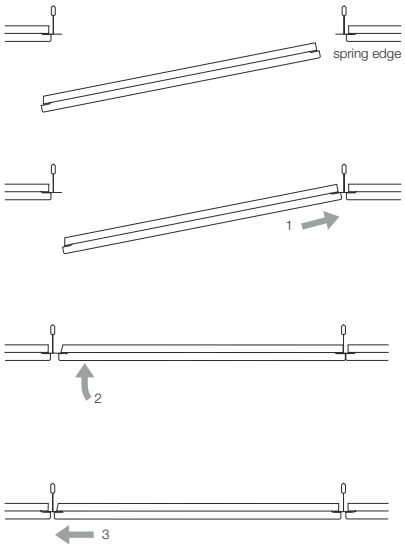
STEEL				
600 x 300 mm	4056U6A1WH	4066U6A2WH	4066U6B2WH	4066U6C2WH
ALUMIMIUM				
600 x 600 mm	4077U6A1WH	4087U6A2WH	4087U6B2WH	4087U6C2WH

Fold down lock tubs





Installation Sequence



CELLIO

Open Cell

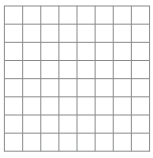
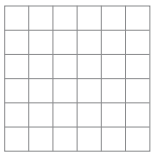
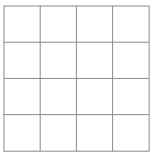
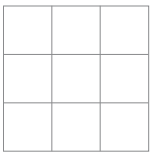
Cellio, Armstrong's open cell metal ceiling, is suitable for all types of areas and is available in a number of cell sizes. The monolithic appearance of Cellio is achieved by the integration of the grid into the ceiling design.
As Cellio is installed on Armstrong Prelude 15 mm exposed grid it is compatible with all Armstrong MicroLook ceiling tiles.

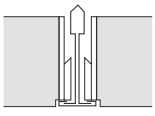
This concept allows for unlimited design scope and flexible functional benefits. Detailing at the junction of wall and ceiling is a good example of this flexibility.
Cellio is particularly ideal for refurbishing projects where a 15 mm exposed grid is already in place or in large areas where a perfect cell alignment is required.

▼Cellio

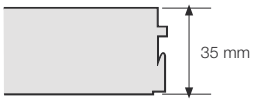
Cellio

Recycled Content: 50%

CELLIO	Cellio C64 8 x 8	Cellio C36 6 x 6	Cellio C16 4 x 4	Cellio C9 3 x 3
				
Open area	64%	72%	81%	85%
Cut off angle	31°	23°	15°	11°
Weight kg/m²	5.10 kg	3.85 kg	2.60 kg	2.10 kg



Suprafine 15 mm



600 x 600 x 35 mm . . . . . 9002 M . . . . . 9004 M. . . . . 9006 M . . . . . 9007 M

Colours: Cellio is available in white and black (BK) and is compatible with our standard Trulok colour range.

INSTALLATION

The flexibility of the Suprafine 15 mm exposed grid system, together with Cellio's variety of open cell sizes, makes integration of services such as lighting, sprinklers and air grilles easy.

ACOUSTIC PERFORMANCE

Careful selection of acoustic overlays, which may be laid onto the Cellio panels, will result in noise reduction benefits to meet a broad range of requirements.

FIRE AND MOISTURE RESISTANCE

Made of prepainted aluminium, Cellio systems achieve fire reaction class A2-s2, d0 and can be used safely in areas of temporary high humidity.
Usage is not recommended where subject to external weather conditions.

EASY TO INSTALL AND DEMOUNTABLE

All Cellio items are installed on Suprafine 15 mm grid. Each individual full Cellio panel is easily removable from the grid.
Cell alignment is maintained throughout the ceiling area, despite frequent removal and replacement, due to the stable framework provided by the Prelude suspension system.

GRIDAL

Open Cell

Gridal is a ceiling system comprising runners specially designed to interlock with the open cell tiles. The simple geometrical construction, featuring 10 mm wide blade width, allows its installation in every type of room.

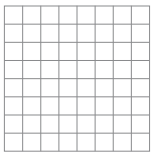
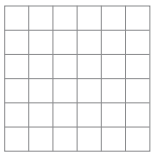
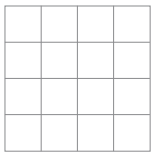
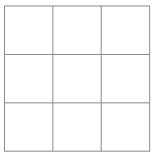
Gridal offers a wide choice of cell sizes from which selection can be made to coordinate with room dimensions.

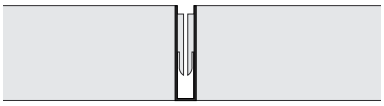
All standard cell configurations exceed the 70% minimum open area required for installation below sprinkler systems with outlet heads mounted in the ceiling void.

▼Gridal

Gridal

Recycled Content: 50%

GRIDAL	8 x 8	6 x 6	4 x 4	3 x 3
				
Open area	64%	72%	81%	85%
Cut off angle	35°	27°	18°	13°
Weight kg/m²	5.10 kg	3.85 kg	2.60 kg	2.10 kg



600 x 600 x 45 mm ..... 9575 M ..... 9510 M..... 9515 M ..... 9520 M

Colours: Gridal is available in white, black (BK) as well as any RAL on request.

INSTALLATION

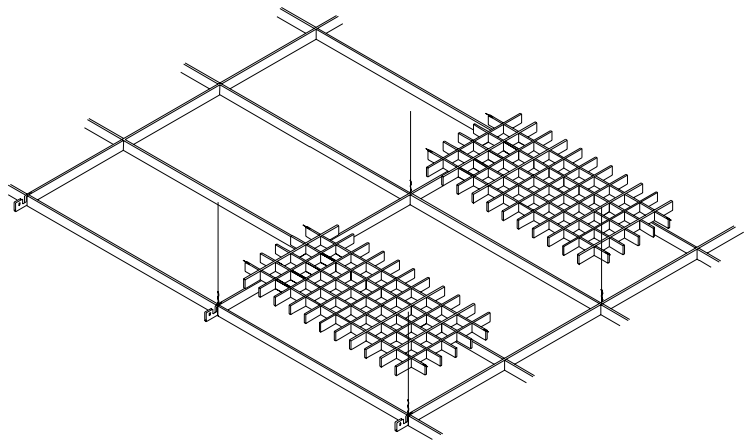
The Gridal manufacturing process ensures all elements are interlocked in order to provide a monolithic appearance - yet fully demountable ceiling.

ACOUSTIC PERFORMANCE

Careful selection of acoustic overlays, which may be laid onto the Gridal panels, will result in noise reduction benefits to meet a broad range of requirements.

FIRE AND MOISTURE RESISTANCE

Made of prepainted aluminium, Gridal products are non-combustible and can be used safely in areas of temporary high humidity. Usage is not recommended where subject to external weather conditions.



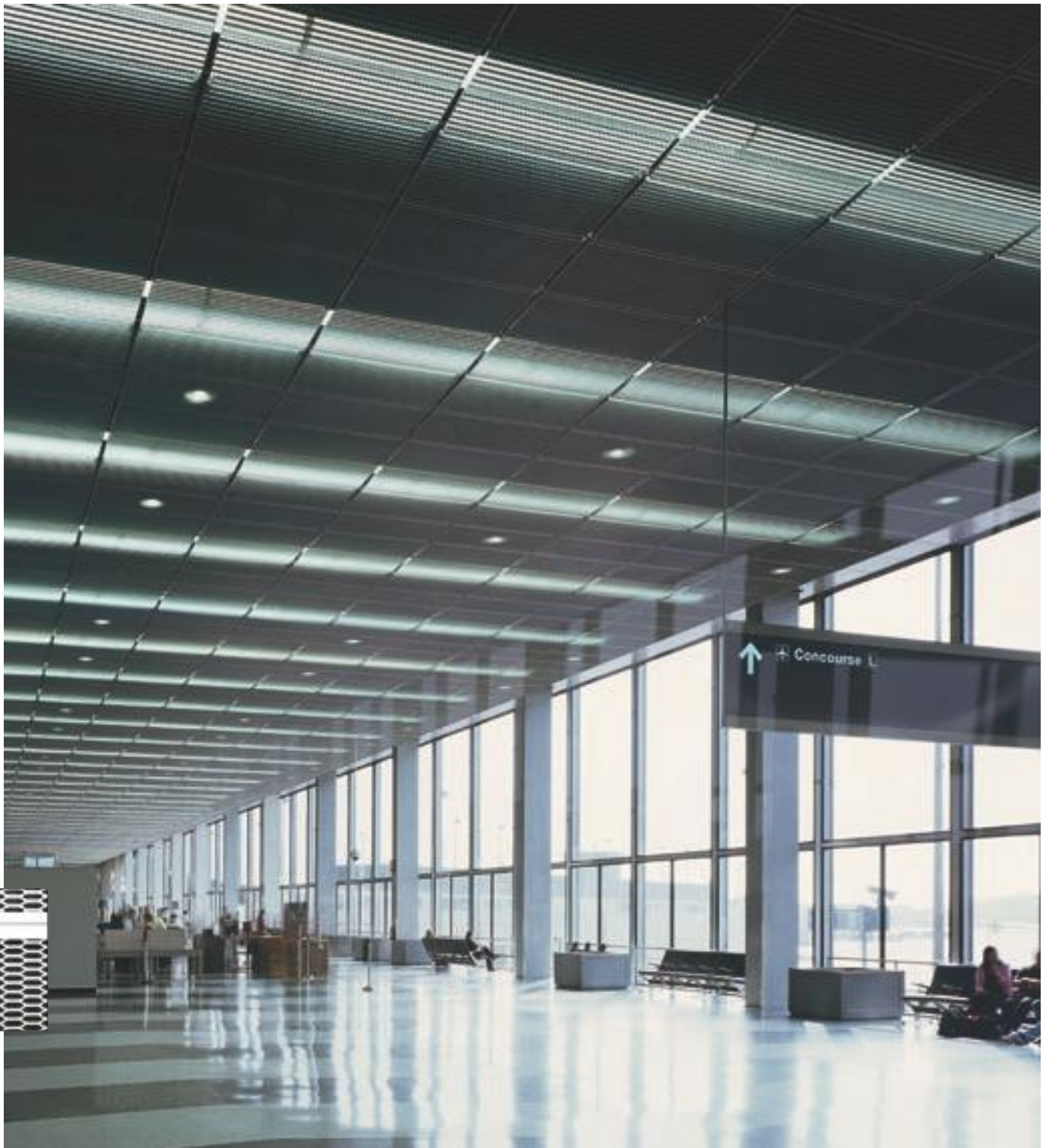
ARMSTRONG METAL CEILINGS

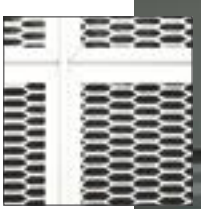
Mesh Lay-in

This ceiling provides a sense of openness and beautiful aesthetics, creating a unique visual identity for your space. With benefits such as
- Ease of installation
- Superior aesthetics and
- Easy installation and removal without tools,

Mesh Lay-in panels are ideal for
- Retail stores
- Hospitality
- Transportation and
- Break out zones in offices

▼Mesh Lay-in Panels

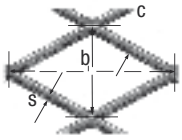
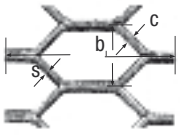


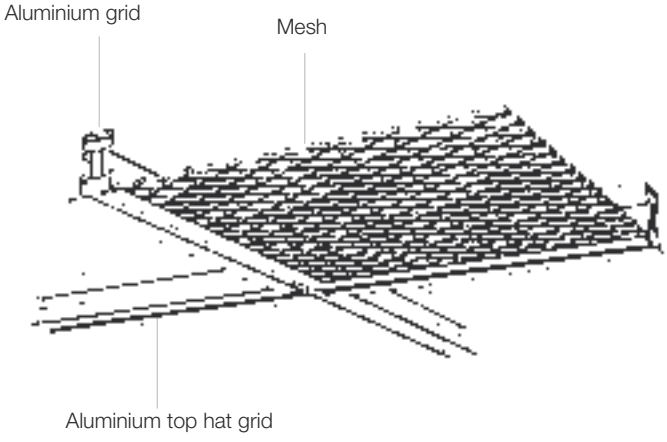


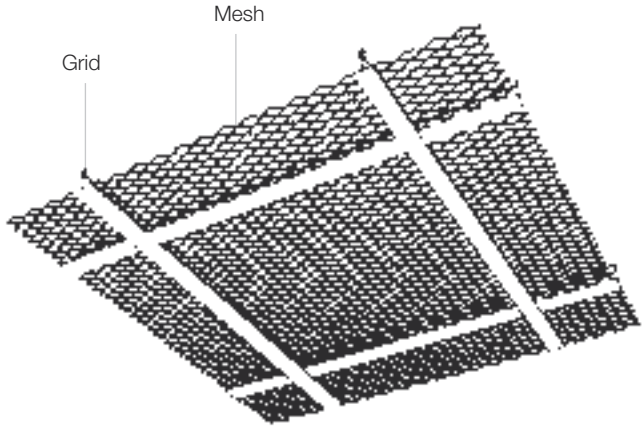
Mesh Lay-in Panels

Recycled Content: Steel - 25%; Aluminium - 50%

(1)

	Rhombus					Hexagon				
										
STEEL	B	l	C	S	kg/m²	B	l	C	S	kg/m²
	2	3	0.5	0.5	3.0	8	16	1.0	1.0	2.9
	2.2	4	0.5	0.5	3.5	8.5	16	1.0	1.0	2.9
	2.5	4.5	1.0	1.0	3.5	9	20	1.0	1.0	2.9
	3	6	0.5	0.5	3.5	12	20	1.0	1.0	2.9
	3.3	6	0.5	0.5	3.5	15	25	1.5	1.5	3.6
	4	8	0.8	0.8	3.5	12.5	30.5	1.2	1.2	3.6
	2.8	8	0.5	0.5	3.5	22	50.8	2.5	2.5	4.9
	4	9	0.8	0.8	3.5	25	60	2.5	2.5	4.9
	4	10	0.5	0.5	3.5	26	60	2.0	2.0	5.5
	4	10	0.5	0.5	3.5	28	60	3.0	3.0	5.5
	5	10	1.0	1.0	3.5	25	48	2.0	2.0	8.4
	4.5	12.5	1.0	1.0	3.5	36	64	3.0	3.0	8.4
	5	12.5	0.8	0.8	3.5	32	80	4.0	4.0	8.4
	6	12.5	0.8	0.8	3.5	50	100	5.0	5.0	9.8
	5.6	12.5	1.0	1.0	3.5	40	100	4.0	4.0	9.8
	5	14	1.0	1.0	3.5	36	100	4.0	4.0	13





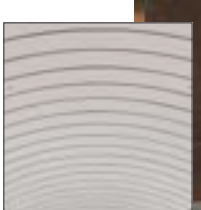
ARMSTRONG METAL CEILINGS

Concave and Convex Ceilings

Curved ceilings are available in convex and concave shaped patterns, with a variety of perforation options for acoustics, three different colour options and no visible grid for unique design solutions.
With benefits such as
- Ease of installation
- Superior aesthetics and
- Easy to install and remove without tools
- Rust-free performance,

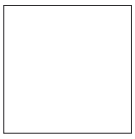
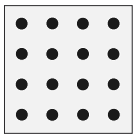
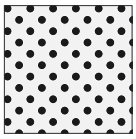
Convex and concave ceilings are ideal for
- Modern work spaces - Break out zones in offices
- Clean rooms
- Kitchens
- Hospitals and
- Transportation

▼Armstrong Concave and Convex ceilings



Recycled Content: 50%

(1)

CONCAVE AND CONVEX CEILINGS	Plain	Standard Perforated	Microperforated
			
	No perforation	2.5 mm dia. holes 16% Open area	1.5 mm dia. holes 22% Open area

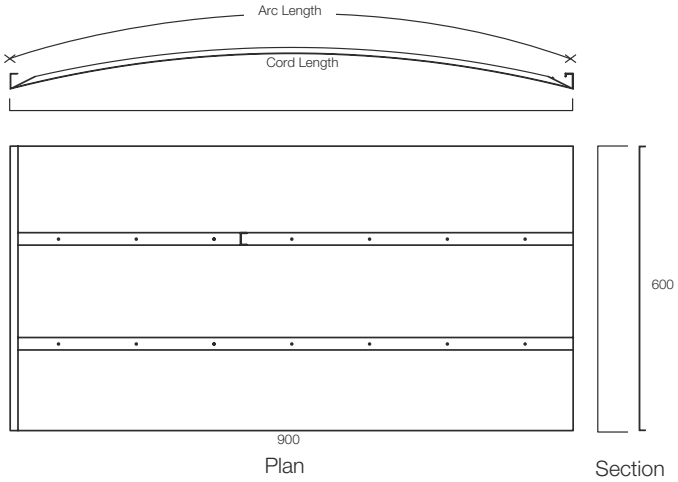
ALUMINIUM CONCAVE

900 x 600 x 1 mm. . . . . VR12P0000T10W. . . . . VR12P2516T10W. . . . . .VR12P1522T10W . . .

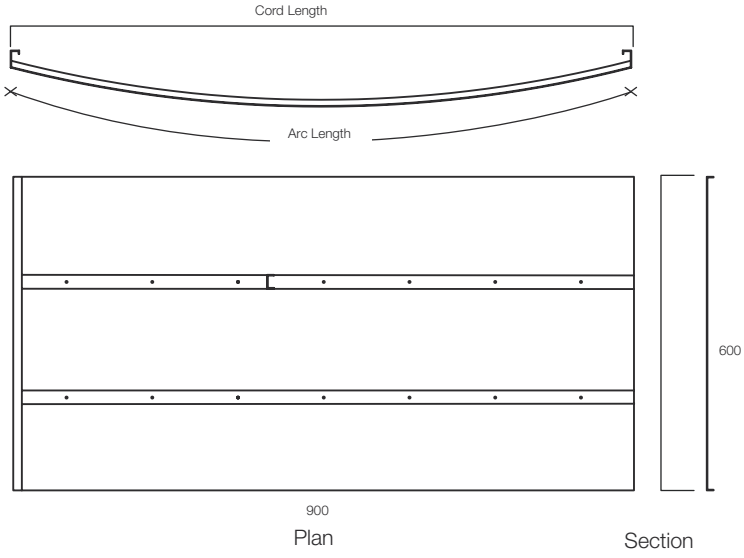
ALUMINIUM CONVEX

900 x 600 x 1 mm. . . . . XR12P0000T10W. . . . . XR12P2516T10W. . . . . .XR12P1522T10W . . .

Concave Panel



Convex Panel



ARMSTRONG METAL CEILINGS

S-Curved Ceilings

S-Curved ceiling options are available in plain and perforated options to create signature spaces. Use perforated panels to combine functionality with aesthetics.

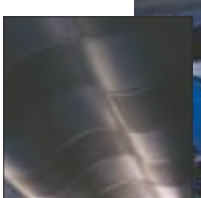
With benefits such as

- Ease of installation
- Superior aesthetics and
- Easy installation and removal without tools
- Rust-free performance,

S-Curved ceilings are ideal for

- Corridors
- Private offices
- Lobbies
- Retail and
- Accent areas

▼S-Curved ceilings



Recycled Content: 50%

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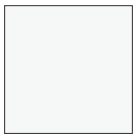
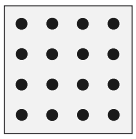
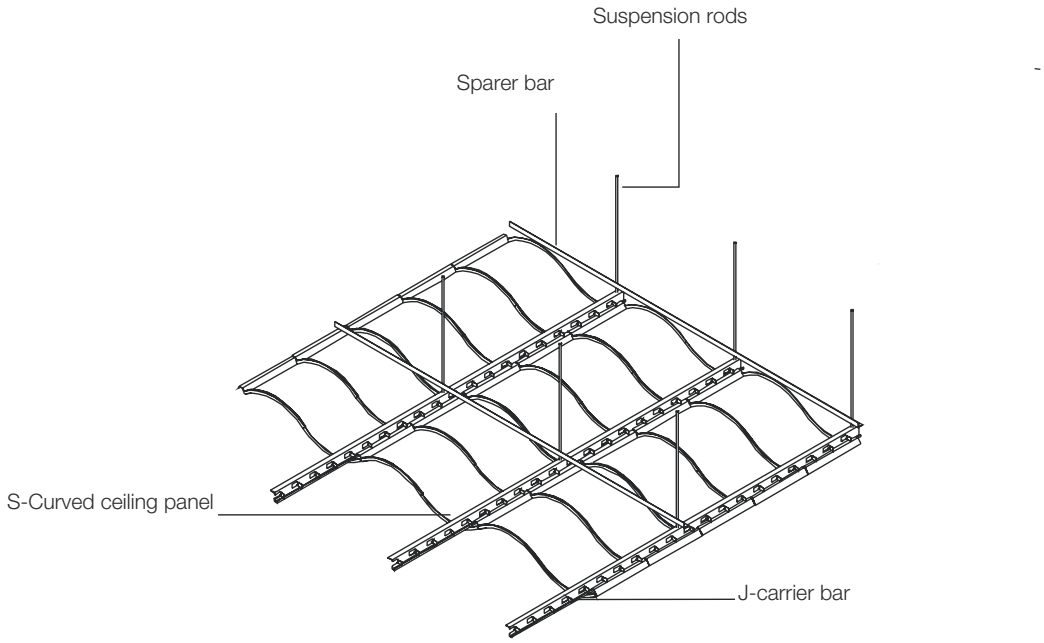
S-CURVED CEILINGS	Plain	Perforated
	 No perforation	 8 mm dia. holes 41.5 % Open area
mm **ALUMIMIUM** 670 x 300 x 1.5 mm	SR02P0000T15S	SR02P8042T15S



ACOUSTIC PERFORMANCE

Orcal products have been tested for acoustical absorption and attenuation performance. All Extra Microperforated products are supplied complete with acoustic infill material factory fitted. Consult details below.

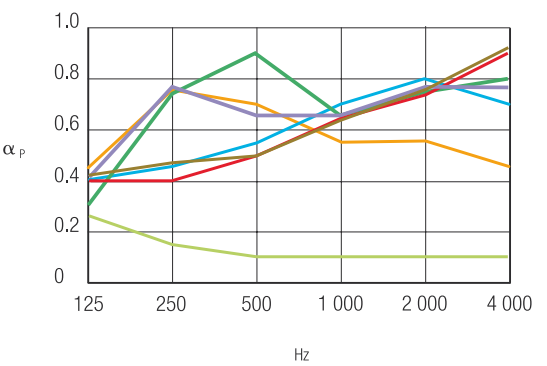
ORCAL PREMIUM B15

A range of acoustic inlays for use with Orcal metal ceiling panels. Orcal Premium acoustic solutions have been developed to achieve a wide range of performance values for both sound absorption and sound attenuation.
For example, room to room attenuation of up to 47 dB, and sound absorption of up to α_w 0.65. For further information please contact Internal Technical Sales.

▲Tile with acoustic fleece

EN 20354
& EN 11654

		Hz					
α_w	**NRC**	125	250	500	1000	2000	4000
• **Extra Microperforated with fleece (EN 2253)**							
0.55(L)	**0.65**	0.45	0.75	0.70	0.55	0.55	0.45 α_p
• **Extra Microperforated with B15 (EN 2334)**							
0.65	**0.60**	0.40	0.45	0.55	0.70	0.80	0.70 α_p
• **Microperforated with fleece (EN 2175)**							
0.75	**0.80**	0.30	0.75	0.90	0.65	0.75	0.80 α_p
• **Microperforated with B15 (EN 2337)**							
0.60(H)	**0.60**	0.40	0.40	0.50	0.65	0.75	0.90 α_p
• **Perforated with fleece (EN L/2463)**							
0.70(L)	**0.70**	0.40	0.75	0.65	0.65	0.75	0.75 α_p
• **Perforated with B15 (EN 2340)**							
0.60(H)	**0.60**	0.40	0.45	0.50	0.65	0.75	0.90 α_p
• **Plain - no infill (EN 2206)**							
0.10(L)	**0.10**	0.25	0.15	0.10	0.10	0.10	0.10 α_p



Plain without acoustic infill

EEA Euroclass A1 (RAL 9010)
EEA Euroclass A2-s2, d0 (other colours)

No acoustic infill

Perforated ø ≤ 2.5 mm
EEA Euroclass A1 (RAL 9010)
EEA Euroclass A2-s1, d0 (other colours)

With acoustic Fleece, ABBTF pad or B15 infill

Perforated ø ≤ 2.5 mm (acoustic fleece)
EEA Euroclass A2-s2, d0
Perforated ø ≤ 2.5 mm (ABBTF pad)
EEA Euroclass A1
Perforated ø ≤ 2.5 mm (Premium B15 infill)
EEA Euroclass A2-s1, d0
Perforated ø ≤ 2.5 mm
EEA Euroclass C-s2, d0

LIGHT REFLECTANCE

Pattern	RAL 9010	Global White
Plain (unperforated)	87%	77%
Extra Microperforated with black acoustic fleece	85%	76%
Perforated with black acoustic fleece	75%	68%
Microperforated with black acoustic fleece	71%	63%

Measured in accordance with ASTM 1477-98

THE TRULOK RANGE

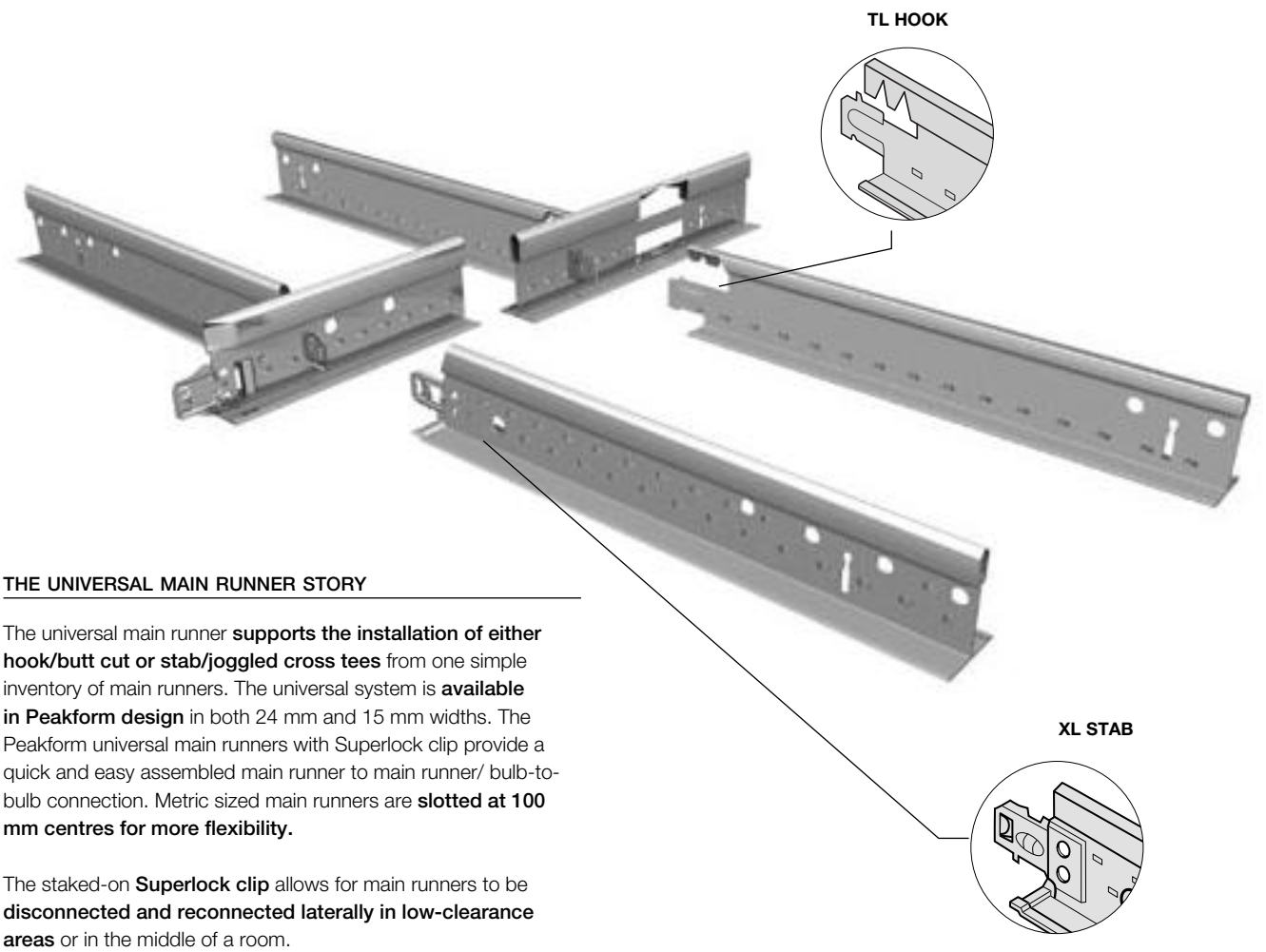
The Trulok range includes the innovative **Peakform** universal main runners with the staked-on **Superlock** clip both in 24mm and 15mm widths. A selected range of standard Prelude 24 XL long cross tees, standard Suprafine 15 XL cross tees and Silhouette cross tees are available with the **Peakform** feature.

All key module sizes are supported and special size options are available in many of the ranges. Lower cost options are a part of each of the most commonly used systems. Fire rated options are available only on special request. Stab and hook type systems are available to meet the preferences of every installer.
Trulok suspension systems are designed for use with the wide variety of Armstrong ceiling products, mineral, soft fibre, metal, wood and special solutions.

PEAKFORM

Peakform is an innovative design for main runners and cross tees. **Peakform profiles** are engineered to create a **stronger, more stable suspension system** making **installation both faster and easier. Superlock** is an industry first **staked-on clip** for main runners which provide **tighter, secure bulb-to-bulb connections**; connections are confirmed by an audible click; main runners are easily disconnected and reconnected laterally.

UNIVERSAL MAIN RUNNER



THE UNIVERSAL MAIN RUNNER STORY

The universal main runner **supports the installation of either hook/butt cut or stab/joggled cross tees** from one simple inventory of main runners. The universal system is **available in Peakform design** in both 24 mm and 15 mm widths. The Peakform universal main runners with Superlock clip provide a quick and easy assembled main runner to main runner/ bulb-to-bulb connection. Metric sized main runners are **slotted at 100 mm centres for more flexibility.**

The staked-on **Superlock clip** allows for main runners to be **disconnected and reconnected laterally in low-clearance areas** or in the middle of a room.

XL "STAB" INSTALLATION

The XL stab end is precision stamped from a separate piece of high grade steel permitting an increased accuracy and economy of production over the more conventional integral forming of the cross tee ends. A selected range of standard Prelude 24, Suprafine 15 XL and Silhouette cross tees feature the **Peakform** design.

TL "HOOK" INSTALLATION

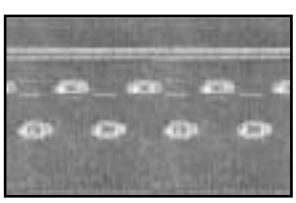
TL cross tees in both **24 mm and 15 mm widths** feature an integrally formed hook nose. This popular installation system has been a feature of Armstrong Trulok suspension systems for over 20 years and its proven ease of assembly and **precise butt cut joint** has been a favourite of installers. **Cross tee alignment is ensured** by locating the tees to the right hand side of the adjoining section.

FULL RANGE OF ACCESSORIES AND PERIMETER SOLUTIONS

Trulok suspension systems are offered with a complete range of commonly required accessories and perimeter solutions.

STITCHING

All grid components feature "stitched" construction. The two metal layers of the vertical web are mechanically locked together in a sophisticated in-line process. Stitching enhances the torsional resistance and general "feel" of the grid components.



COLOUR

Trulok suspension system components are manufactured in Global White and Black. Other colours are available only on special request.Contact your local representative for availability.

DESIGNER SERIES

Armstrong offers a sophisticated range of visual designer grid systems.
Bandraster: large profiles to create large modules.
Silhouette: a 6 mm reveal grid to create a level ceiling surface, providing a flush appearance. With Silhouette, you can also play with black and white.
Interlude: provides a unique double reveal, with its 3-dimensional rounded flange.
Axiom Profiles and Axiom Transitions provide a technical and aesthetical solution for changes in level and flush transitions with plaster.
With Axiom Canopy, create floating ceiling providing both aesthetics and acoustics!

ENVIRONMENT

As with all its solutions, Armstrong produces and distributes grid systems in line with its commitment to the environment. Armstrong's suspension systems contain up to 25% of recycled content. Up to 100% of the packaging is made from recycled material. Moreover, Armstrong pays attention to the quality of all its products to enhance their durability, maintenance and longevity.

NON CORROSIVE

Armstrong offers a full non corrosive system with 24 mm exposed suspension system and retaining clips.
Armstrong grids and metal ceiling systems have passed the 500 hours salt spray test.

PHYSICAL DETAIL

All grids are made from double-web hot dipped galvanized steel with a surface finish of baked polyester paint.

AXIOM PERIMETER TRIM

AXIOM Perimeter Trim can give your space a unique, crisp feel. The AXIOM family offers dramatic visuals with a variety of flat vertical trims and design profiles.

Armstrong AXIOM is a custom perimeter trim system designed for use with any Armstrong acoustical or plasterboard suspension system.

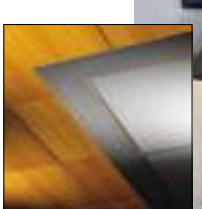
Knife Edge AXIOM is a one-of-a-kind profile with a thin, weightless look – the perfect alternative to a traditional, flat vertical profile.

AXIOM is made from extruded aluminium and offers precise detailing and quality that you can't get with steel. Pre-mitred corners make installation easy for custom geometric designs like rectangles, squares or serrated edges.

Selecting the right visual around the ceiling perimeter is as important as choosing the right frame for a work of art. AXIOM is more than a solution for light coves and transitions. Used straight, subtle or sharp, the refined look of the prefinished extruded aluminium is functional and visionary.

With three unique designs to choose from, Classic, Knife Edge and Profiled, AXIOM Perimeter Trims provide "simple to install" and cost effective perimeter solutions to any Armstrong ceiling system.

▼ AXIOM™ Perimeter Trim



Knife Edge AXIOM™ with Tegular edge panel

AXIOM PERIMETER TRIM

Knife Edge Axiom

Get the creative edge with Knife Edge AXIOM from Armstrong. Knife Edge AXIOM is a sharp contrast to traditional vertical profiles. The sleek edge detail gives floating ceilings a thin, weightless feel to make a dramatic visual statement.

Like all AXIOM profiles, Knife Edge is designed for seamless integration with plasterboard or any Armstrong ceiling system, lay-in or tegular.

KnifeEdge AXIOM

- Unique profile provides a refined alternative to traditional flat vertical trims
  - – KnifeEdge AXIOM for traditional acousti cal lay-in and tegular panels, as well as plasterboard
- Standard prefinished, 300mm x 90-degree factory welded inside and outside corners
- AXIOM sections are produced in standard 3,000mm lengths.

Typical Applications

- Retail
- Hospitality (clubs, restaurants, hotels)
- Offices (reception areas, lobbies, board rooms)
- Healthcare
- Education

Knife Edge profile

Standard factory welded corners for Knife Edge

Knife Edge AXIOM™ with Tegular edge panel

Knife Edge AXIOM™ with Plasterboard Trim (AXDWT)

T-Bar Connector Clip (AXTBC) with Knife Edge AXIOM™

Knife Edge Alignment Plate (AXKEALIGN)

Hanging Clip (AX2HGC)

▲ Knife Edge AXIOM™ with SUPRAFINE grid and ULTIMA® panel

PHYSICAL DATA

Material
Trim Channel: Extruded aluminium, alloy 6063
Hanging Clip: Galvanised steel
T-Bar Connection Clip: Galvanised steel
Splice Plate: Galvanised steel

Colours
Coordinate with Armstrong Global White ceiling and suspension systems. Custom colours are available upon request based on minimum quantity

Surface Finish
Durable polyester powdercoat

Cross Tee/Main Beam Interface
Flush fit

End Detail
Splice Plate and set screws

AXIOM PERIMETER TRIM

Classic Axiom

Classic AXIOM offers you the tools to visually define a ceiling. The extruded aluminum process provides crisp, refined detail. And with four different profile heights, there are a wide range of possibilities. It also provides easy solutions for design challenges like ceiling height transitions, soffits, and light coves as well as air supply and return functions. Whether your needs are form or function, you'll add aesthetic value and increase the visual effect of your design.

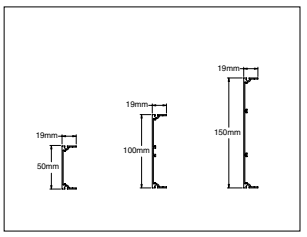
Classic AXIOM

- Design flexibility
- Four profile heights available: 50 mm, 100mm, 150mm, and 200mm
- Finely articulated plasterboard trim with beaded edge integrates with all AXIOM profiles for pre-engineered plasterboard transition
- Standard Prefinished, 300mm x 90-degree factory mitered inside and outside corners
- AXIOM sections are produced in standard 3,000mm lengths.

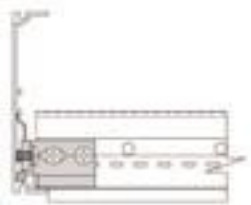
Typical Applications

- Retail
- Hospitality
- Offices
- Healthcare
- Education

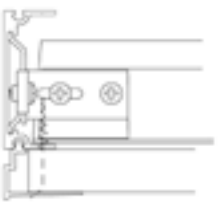
Field cut/factory mitered corners assembled using Axiom Splice Plate



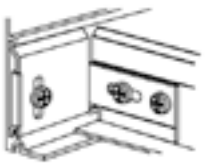
Classic AXIOM Trim profiles



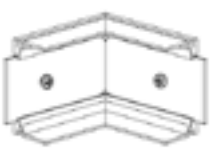
Classic AXIOM™ with Tegular edge panel



Classic AXIOM™ with Plasterboard Trim (AXBT)



T-Bar Connector Clip (AXTBC) with Classic AXIOM™



Field mitre cut corner with Splice Plate (AXSPLICE)

Splice Plate (AX4SPLICE)

Classic AXIOM™ with SUPRAFINE grid and ULTIMA® panel

PHYSICAL DATA

Material
Trim Channel: Extruded aluminium, alloy 6063
Hanging Clip: Galvanised steel
T-Bar Connection Clip: Galvanised steel
Splice Plate: Galvanised steel

Colours
Coordinate with Armstrong Global White ceiling and suspension systems. Custom colours are available upon request based on minimum quantity

Surface Finish
Durable polyester powdercoat

Cross Tee/Main Beam Interface
Flush fit

End Detail
Splice Plate and set screws

AXIOM PERIMETER TRIM

Profiled Axiom

Let your vision take shape with the articulate design of Profiled AXIOM. The two distinctive contours add a touch of refinement to any light cove, pocket, floating ceiling or large scale coffer. The convex and concave profiles provide a uniquely coordinated, elegant look. Profiled AXIOM is crafted from extruded aluminium for crisp edge detailing you simply can't get with steel or traditional plasterboard framing and finishing.

Profiled AXIOM

- Finely articulated plasterboard trim with beaded edge integrates with both AXIOM profiles for pre-engineered plasterboard transition
- Standard Prefinished, 300mm x 90-degree factory welded inside and outside corners
- AXIOM sections are produced in standard 3,000mm lengths.

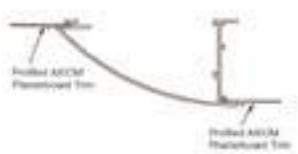
Typical Applications

- Retail
- Hospitality (clubs, restaurants, hotels)
- Offices (reception areas, lobbies, board rooms)
- Healthcare
- Education

Profiled AXIOM convex

Profiled AXIOM concave

Profiled AXIOM with Tegular Edge panel



Profiled AXIOM with Plasterboard Trim (AXDWT)

T-Bar Connector Clip (AXTBC) with Profiled AXIOM

Alignment Clip and Splice Plate (AXALIGN and AX4SPLICE)

▲ Profiled AXIOM™ with SUPRAFINE grid and ULTIMA® panel

PHYSICAL DATA

Material
Trim Channel: Extruded aluminium, alloy 6063
Hanging Clip: Galvanised steel
T-Bar Connection Clip: Galvanised steel
Splice Plate: Galvanised steel

Colours
Coordinate with Armstrong Global White ceiling and suspension systems. Custom colours are available upon request based on minimum quantity

Surface Finish
Durable polyester powdercoat

Cross Tee/Main Beam Interface
Flush fit

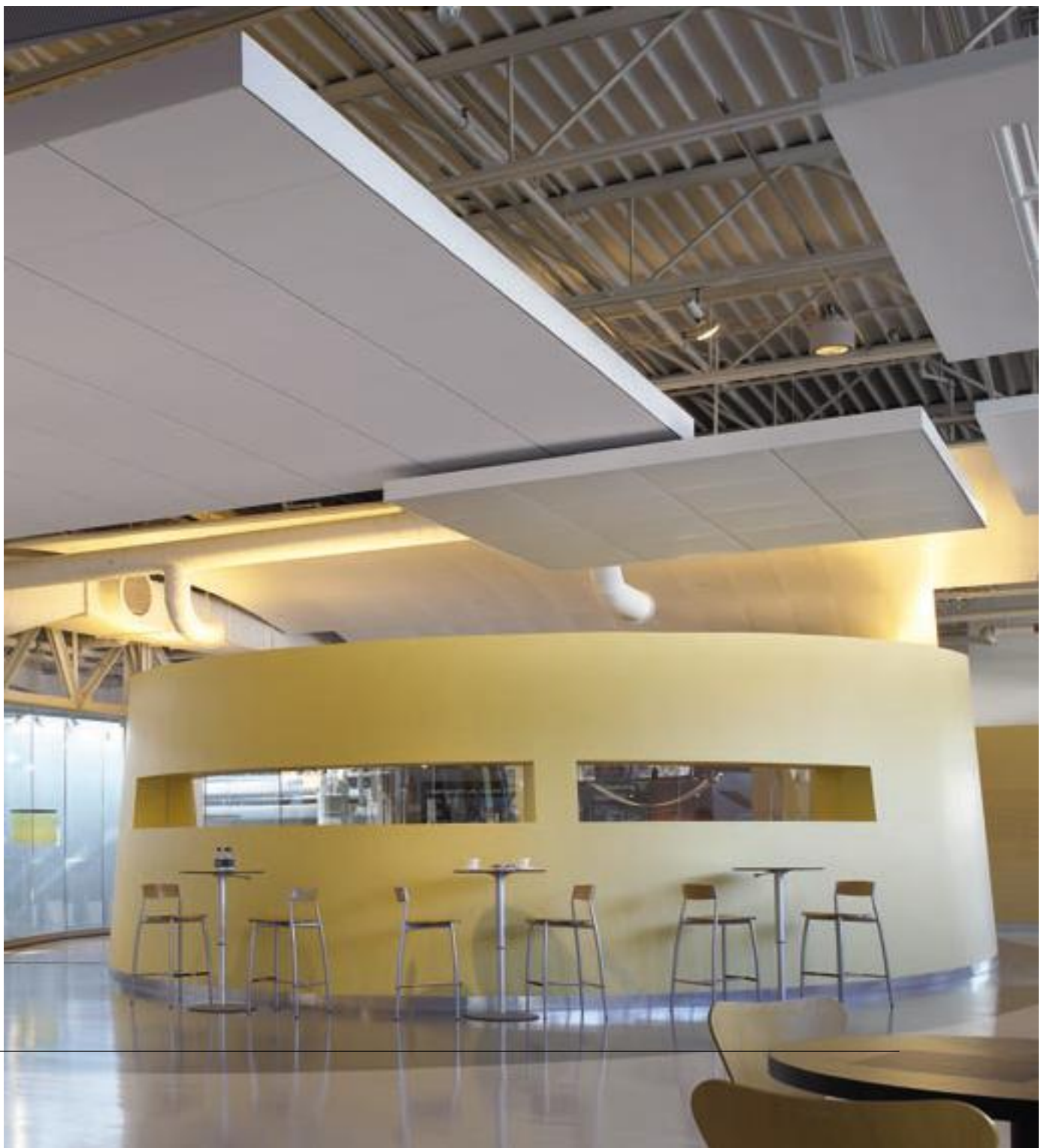
End Detail
Splice Plate and set screws

AXIOM CANOPY

With Axiom canopy, enhance acoustics without sacrificing design. Now both form and function thrive with Armstrong's Axiom Canopy!

- Axiom Canopy is a perimeter trim system designed to create “ceiling clouds” from full size tiles. Made from standard ceiling panels and Axiom components, Axiom Canopies will define and individualise reception areas, work stations, meeting areas within open spaces.
- Create floating ceilings whilst improving acoustics, reduce noise levels in spaces, and increase speech intelligibility over a specific area.
- Ideal for acoustically challenged or open plenum spaces.

▼ Axiom Canopy & Ultima



AXIOM CANOPY CLOUDS – ABSORPTION DATA – Sabines (average 500, 1k, 2k, 4k Hz)*

	UNIT SIZE		
Tile type	**1.80 x 1.80 m = 3.24 m²**	**2.40 x 2.40 m = 5.76 m²**	**3.00 x 3.00 m = 9.00 m²**
Sabbia	2.9	5.1	7.9
Optra 15 mm	3.9	6.9	10.8
Ultima	2.7	4.9	7.6
Orcal Microperforated with fleece or B15	2.3	4.0	6.3

* Tested in accordance with EN 20354 at 1000 mm height.
Note: The above values are extrapolated from a tested unit size of 8.64 m²

FIRE PERFORMANCE

Axiom Canopies, as with other architectural features located in the ceiling plane, may obstruct or skew the existing or planned fire sprinkler water distribution pattern, or possibly delay the activation of the fire sprinkler or fire detection system. Designers and installers are advised to consult a fire protection engineer for guidance on the proper installation techniques where fire detection or suppression systems are present.

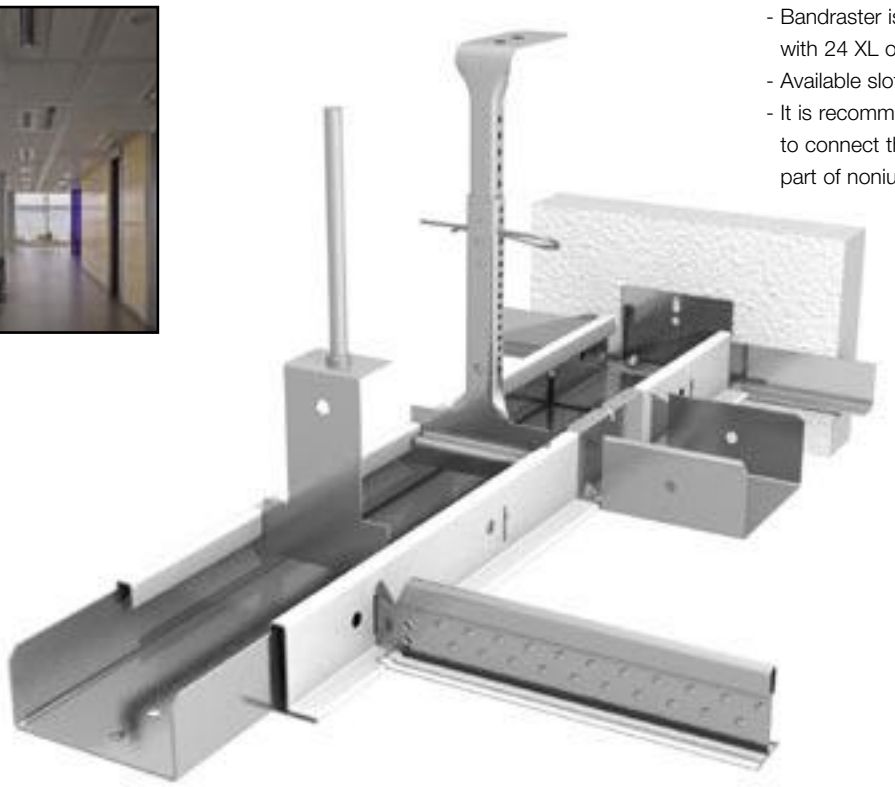
RECOMMENDATIONS

Axiom Canopies should always be installed in accordance with all applicable building codes and regulations.

- Axiom Canopies should only be installed on a horizontal plane. They are not approved for exterior installations.
- Axiom Canopy kits should always be installed by a minimum of 2 people.
- Read the installation instructions carefully before starting the installation.
- Make sure the installation is clean and safe.
- Any additional weights (such as luminaires) must be independently suspended from the soffit.

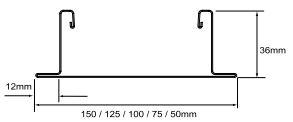
▼ Axiom Canopy & Ultima

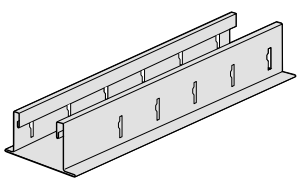
BANDRASTER

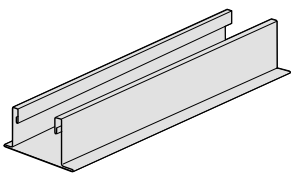


- Bandraster is compatible either with 24 XL or 24 TL cross tees
- Available slotted and unslotted
- It is recommended to use 2 pins to connect the bottom & upper part of nonius

BANDRASTER SECTIONS

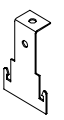


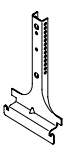


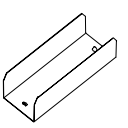


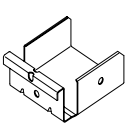
Item Nr.	Dimensions length (mm)	width (mm)
Slotted at 300 mm		
BP 36 10 50 A	3600	50
BP 36 10 75 A	3600	75
BP 36 11 00 A	3600	100
BP 36 11 25 A	3600	125
BP 36 11 50	3600	150
Slotted at 312.50 mm		
BP 36 2100 B	3750	100
Slotted at 100 mm		
BP 36 30 50	3600	50
BP 36 30 75	3600	75
BP 36 31 00 WR	3600	100
BP 36 31 25	3600	125
BP 36 31 50	3600	150
Unslotted		
BP 36 00 50 A	3600	50
BP 36 00 75 A	3600	75
BP 36 01 00 A	3600	100
BP 36 01 25 A	3600	125
BP 36 01 50	3600	150

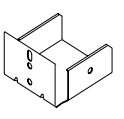
BANDRASTER ACCESSORIES

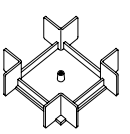












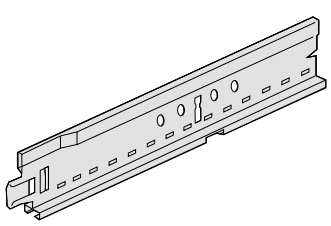
Item Nr.	Description	Dimension width (mm)
BPA 36 05 01	Strip / rod connector	50
BPA 36 07 51		75
BPA 36 10 01		100
BPA 36 05 02 G	Nonius hanger	50
BPA 36 07 52 G		75
BPA 36 10 02 G		100
BPA 36 12 52 G		125
BPA 36 15 02 G		150
BPA 36 05 03 G	Splice	50
BPA 36 07 53 G		75
BPA 36 10 03 G		100
BPA 36 12 53 G		125
BPA 36 15 03 G		150
BPA 36 05 04 G	Cross connector	50
BPA 36 07 54 G		75
BPA 36 10 04 G		100
BPA 36 12 54 G		125
BPA 36 15 04 G		150
BPA 36 05 05 G	Wall connector	50
BPA 36 07 55 G		75
BPA 36 10 05 G		100
BPA 36 12 55 G		125
BPA 36 15 05 G		150
BPA 36 05 06 G	Crossing element	50
BPA 36 07 56 G		75
BPA 36 10 06 G		100

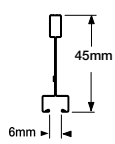
Please contact your Armstrong office for more information. All sizes are nominal.

SILHOUETTE XL 15 MM (NOMINAL) DESIGNER GRID

Silhouette with 6 mm reveal is available either in Armstrong Global White or Global White with black reveal (BI).

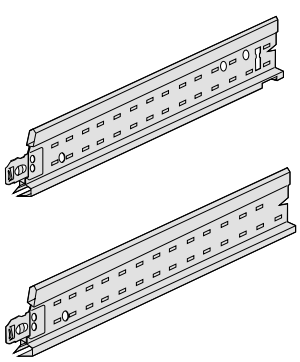
MAIN RUNNER SILHOUETTE 15 (BY-PASS CONNECTION)

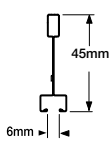




Item Nr.	Dimensions length (mm)	height (mm)
with 6 mm reveal*		
BP 80 42 112 B1	3000	45
BP 80 42 112	3000	45

SILHOUETTE 15 XL² CROSS TEES (STAB SYSTEM)





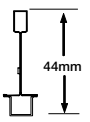
with 6 mm reveal*		
BP 80 30 112 B1	1200	45
BP 80 30 112	1200	45
BP 80 20 112 B1	600	45
BP 80 20 112	600	45

* Also available with 35 mm web height. Contact your local representative.

INTERLUDE XL 15 MM (NOMINAL)

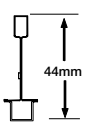
Interlude XL with its 3 dimensional rounded flange is available in Armstrong Global White.

INTERLUDE XL MAIN RUNNER



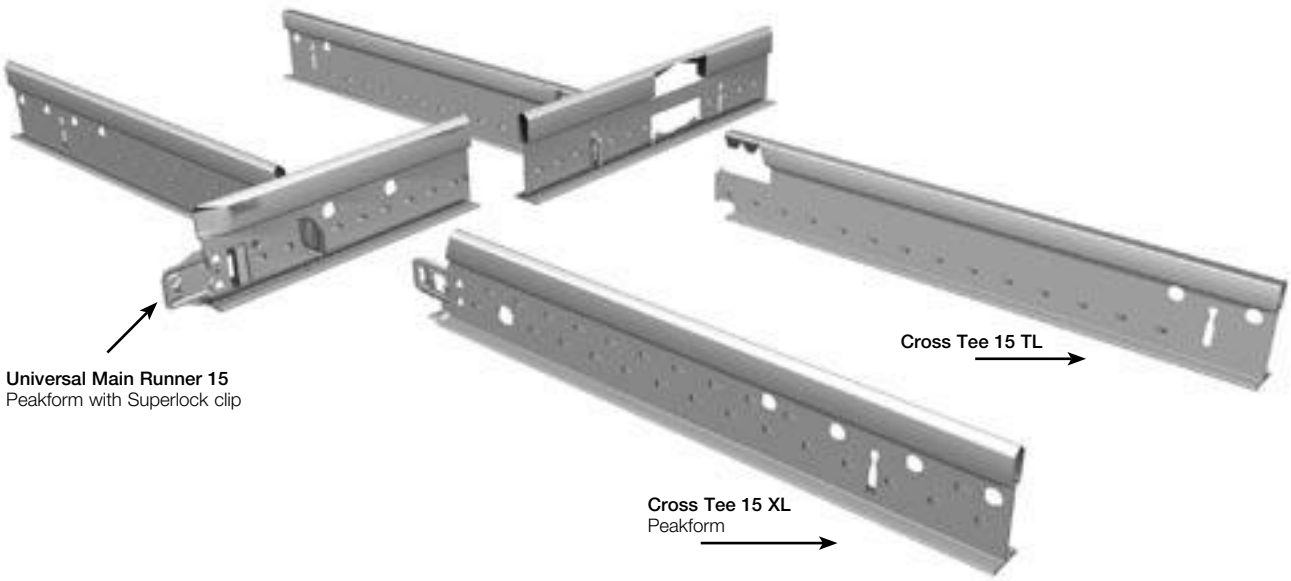
Dimensions	
length (mm)	**height** (mm)
3600	44

INTERLUDE XL CROSS TEES (STAB SYSTEM)

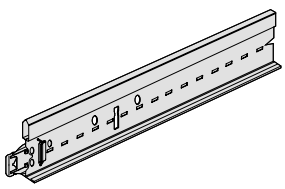


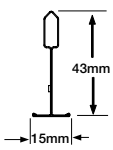
1200	44
600	44
300	44

SUPRAFINE 15 - EXPOSED SUSPENSION SYSTEM 15 MM (NOMINAL)

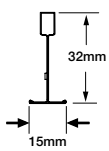


UNIVERSAL MAIN RUNNER 15 PEAKFORM AND SUPERLOCK CLIP (BULB-TO-BULB CONNECTION)



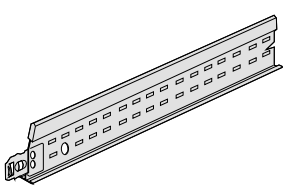


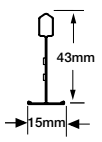
Item Nr.	Dimensions length (mm)	height (mm)
BP 75 40 42	3000	43



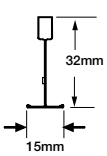
BP 75 42 102	3000	32

SUPRAFINE 15 XL CROSS TEES (STAB SYSTEM, OVERRIDE)



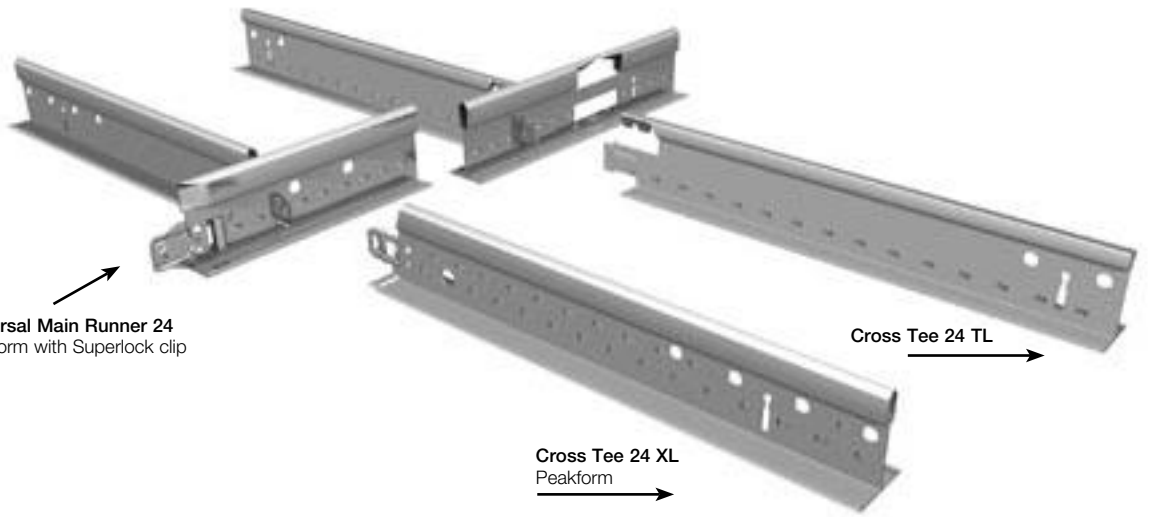


BP 75 30 33	1200	43
BP 75 30 102	1200	32

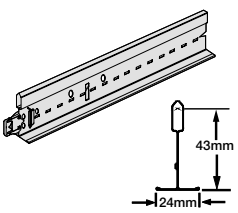


BP 75 20 32	600	43
BP 75 20 102	600	32

PRELUDE 24 - EXPOSED SUSPENSION SYSTEM 24 MM (NOMINAL)

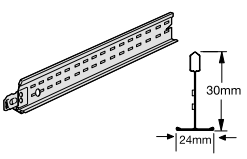


UNIVERSAL MAIN RUNNER 24 PEAKFORM AND SUPERLOCK CLIP (BULB-TO-BULB CONNECTION)

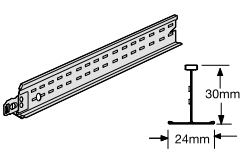


Item Nr.	Dimensions length (mm)	height (mm)
BP 73 40 42	3600	43
BP 73 42 52 P	3000	35

PRELUDE 24 XL CROSS TEES (STAB SYSTEM, OVERRIDE)

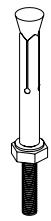


BP 31 30 32	1200	30

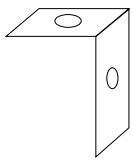


BP 31 20 22	600	30
BP 31 30 61	1200	27
BP 31 20 61	600	27

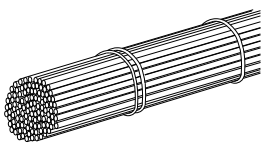
SUSPENSION HANGERS



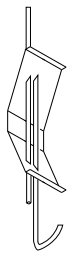
BPGM 6065Anchor Fastener
Used to secure the ceiling suspension hanger wire to the structural soffit/deck



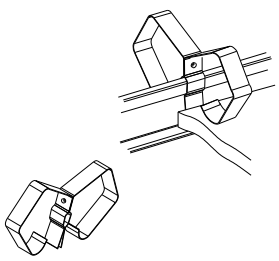
BPGM2626 – Vertical Hanger
Connects Anchor Fastener and steel wire.



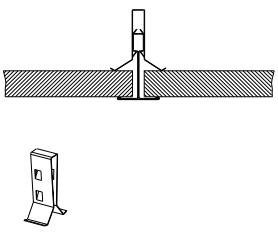
BP 7891 6bd10 – 12 Gauge Soft Hanger Wire (∅2.6/2.8mm, L 1800/3600mm)
Used to hang suspended ceilings from structural deck



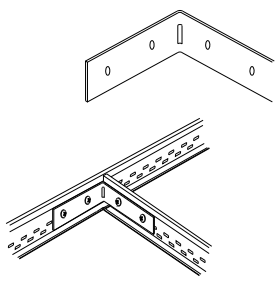
BPGM2010 – Hook Clip
Splices 2.6/2.8 mm hanger wire; recommended for renovation & fast track applications; provides easy adjustment of ceiling height



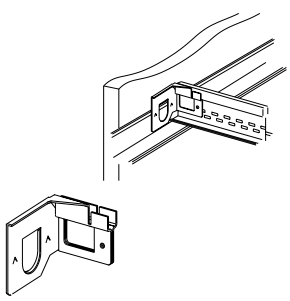
414 – Retention Clip
Attaches to main beams and cross tees behind lay-in ceiling; helps prevent accidental panel displacement by basketballs and other forces from below ceiling



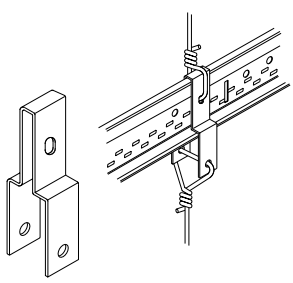
UHDC – Universal Hold Down Clip
Clip attaches to top bulb of grid to hold 1/16" to 3/4" lay-in tile in place; helps to prevent ceiling tile fluttering at entryways



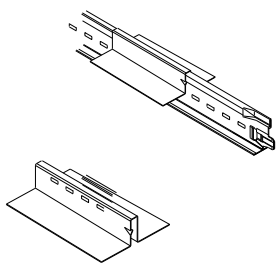
XTAC – Cross Tee Adapter Clip
Used to attach field cut cross tees to main beams



BERC – Beam End Retaining Clip
Joins main beam or cross tee to wall molding and web of grid with no visible pop rivets



DLCC – Direct Load Ceiling Clip
To hang suspension system below existing 15/16" grid face, transferring weight directly to hanger wire; may be used to preserve the fire rating of an existing ceiling and to support heavy accessories



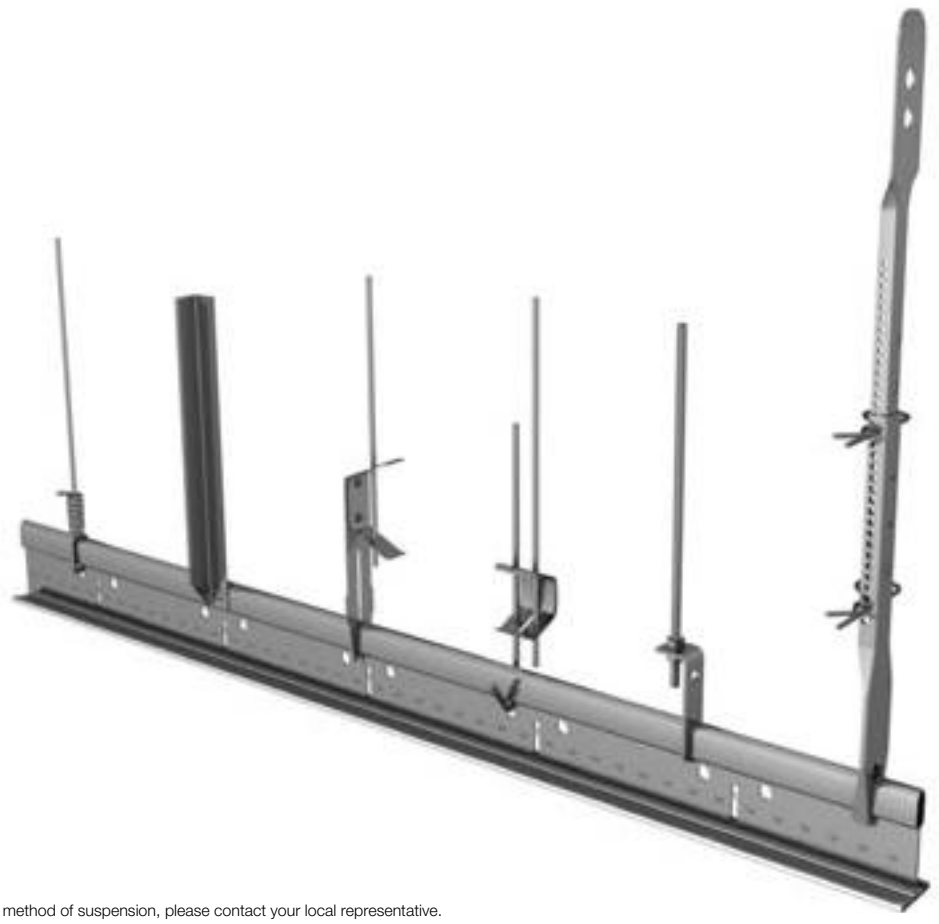
EHDC50 – Exterior Hold Down Clip for 1/2" lay-in ceiling panels and drywall

EHDC58 – Exterior Hold Down Clip for 5/8" lay-in ceiling panels and drywall

EHDC75 – Exterior Hold Down Clip for 3/4" lay-in ceiling panels and drywall

Locks under bulb of grid member to prevent upward movement; UL approved for Wind Uplift Classifications 15 and 90

SUSPENSION HANGERS



In order to ascertain the method of suspension, please contact your local representative.

SYSTEM INTEGRATION

The chart below presents the Trulok grid systems with their related ceiling product families.

	AXIOM (Transition/Profile)	SILHOUETTE 6 mm	SUPRAFINE 15	PRELUDE 24	BANDRASTER
Vector				●	
MicroLook	●	●	●		
SecondLook	●			●	
Tegular	●			●	
Board	●			●	
SL2/K2C2	●			●	●
Orcal Axal	●			●*	
Orcal MicroLook	●	●	●		
Orcal Flush Tegular	●			●	
Orcal Tegular	●			●	
Orcal Board	●			●	
Orcal Planks	●			●	●

* Only in 6 mm reveal.

Contact us:

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E-mail: helpdesk@armstrongindia.com

Ahmedabad
C/o Queens Emporium
4, Jilla Panchayat Bhavan,
Near Apna Bazar,
Ahmedabad 380 001.
Tel: 079-2550 7333/2550 6533

Bengaluru
#96/4 Raghu Dulari Arcade,
South End Road,
South End Circle, Basvanagudi,
above Honda Showroom,
Bengaluru 560 004.
Tel: 080-2657 6367, 2573 3466.
Telefax: 2573 3416

Bhopal
Cell: 93296 82944

Chandigarh
SCO 371-372, 2nd floor,
Sector 35 B,
Chandigarh 160 036.
Tel: 0172-262 1081

Chennai
E 2nd Floor,
Jamal Fazal Chambers,
New No 26, Greams Road,
Thousand Lights,
Chennai 600 006.
Tel: 044-4217 5303, 3297 4323,
Telefax: 044-2829 1213

Hyderabad
H. No. 6-3-350, Ganga Estates,
2nd Floor, Road No. 1,
Banjara Hills,
Hyderabad 500 034.
Tel: 040-3200 9868,
Telefax: 040-2335 8485/6
Cell: 93930 43137

Jaipur
Tel: 0141-242 1384,
Cell: 93525 69512

Kochi
Cell: 93889 39252

Kolkata
P-10 Taratolla Road,
Shed No. 03 & 04,
Kolkata 700 088.
Cell: 93390 73133

Lucknow
51/2 Shivaji Marg,
U.G.F. (Upper Ground Floor, below
Bank of Baroda),
Lucknow 226 018.
Telefax: 0522-220 1143,
262 6097, 323 2986

New Delhi
A-31 Naraina Industrial Phase1,
New Delhi, 110 028.
Tel: 011-2589 3262/3278/3287,
Fax: 011-2589 3262/78/87

Pune
Ishanya 02, 2nd Floor,
Arcade No.2,
Opp. Golf Course,
Off Airport Road,
Yerawada, Pune 411 006.
Tel: 020-3250 2404,
Telefax: 020-4128 0396,
Cell: 93722 23149

Surat
Tel: 0261- 224 0173/224 0295,
Cell: 93245 72813

Armstrong