



HEATED AND CHILLED CEILINGS

PHYSICAL PERFECTION



ADD.VANTAGE RETHINKING SPACES

Over the years, Lindner Group has developed into a technologically leading, solution-oriented and reliable partner with a solid economic basis. Our comprehensive range of products and services for the building envelope, interior fit-out and insulation fits almost any field of application. True to the motto "Rethinking Spaces", we develop tailor-made and yet versatile solutions and concepts for your construction project. Being a completely family-owned business, we particularly care about our environment. With new concepts such as Cradle to Cradle[®], low-emission products and well-considered spatial concepts, we create Add.Vantage for the people and their environment. As a service provider and an employer, we put the people in focus. The customer is bound to notice this, too: We enjoy our work, are convinced of what we do and proud about what we are capable of.

STABILITY AND GROWTH

Since the founding of the company by Hans Lindner in 1965, our headquarters is located in Lower Bavarian Arnstorf, where we have grown enormously during the last decades. With about 7,100 employees around the world, we are proud to be the largest employer in the district of Rottal-Inn. Every day we work on 2,500 projects which revolve for the most part around our core business, the construction industry. It is complimented by our Hans Lindner Foundation, the mk | hotels, the in-house breweries and more recently a sustainable agriculture and forestry.



HEATED AND CHILLED CEILINGS PHYSICAL PERFECTION

Our proven technologies create a healthy indoor climate in every room. Plafotherm® Heated and Chilled Ceilings offer impressively high capacities and good heat transfer. Our own accredited test laboratory guarantees further development of our Ceilings, which are tested as a complete system. The sophisticated Ceiling Systems are low-maintenance, energy-efficient solutions that also contribute to sound protection. Our wide range of surfaces offers a unique choice of design options. Integrated Lindner Luminaires perfectly complete the ceiling construction.

- + innovative Plafotherm® Heated and Chilled Ceilings offer impressively high capacities and good heat transfer
- + proven technologies ensure comfort and a healthy, pleasant room climate
- + all individual components are tested as a complete system in our own accredited test laboratory
- + low-maintenance and energy-efficient solutions for many application areas
- + acoustically effective Heated und Chilled Ceilings meet sound protection requirements
- + various architecturally appealing design and layout possibilities
- + one-stop service: easy integration of Lindner Luminaires possible

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Acoustic Inlays





**LONG-STANDING
PRODUCT EXPERIENCE**

LONG-STANDING PRODUCT EXPERIENCE

In 1970, we started producing our own ceiling and partition systems at our first workshop in Arnstorf. We now manufacture products for fit-out, building envelope and insulation in various locations in Europe and China. Arnstorf is the largest production site; nearly all the products in the Lindner range are manufactured here. The headquarters also houses numerous specialised departments that assist in production, such as procurement, logistics, quality assurance, research and development – including a test workshop – and last but not least, a training centre for all the industrial occupations.

OUR PRODUCTION SITES FOR CEILINGS

ARNSTORF – GERMANY

ceiling, floor and partition systems, luminaires, facades and clean rooms are produced here as well as high-quality carpentry for fitting out interiors of buildings and ships
64,250 m² production area
200,000 m² company site

TAICANG – CHINA

production of ceiling and partition systems
14,000 m² production area
30,000 m² company site

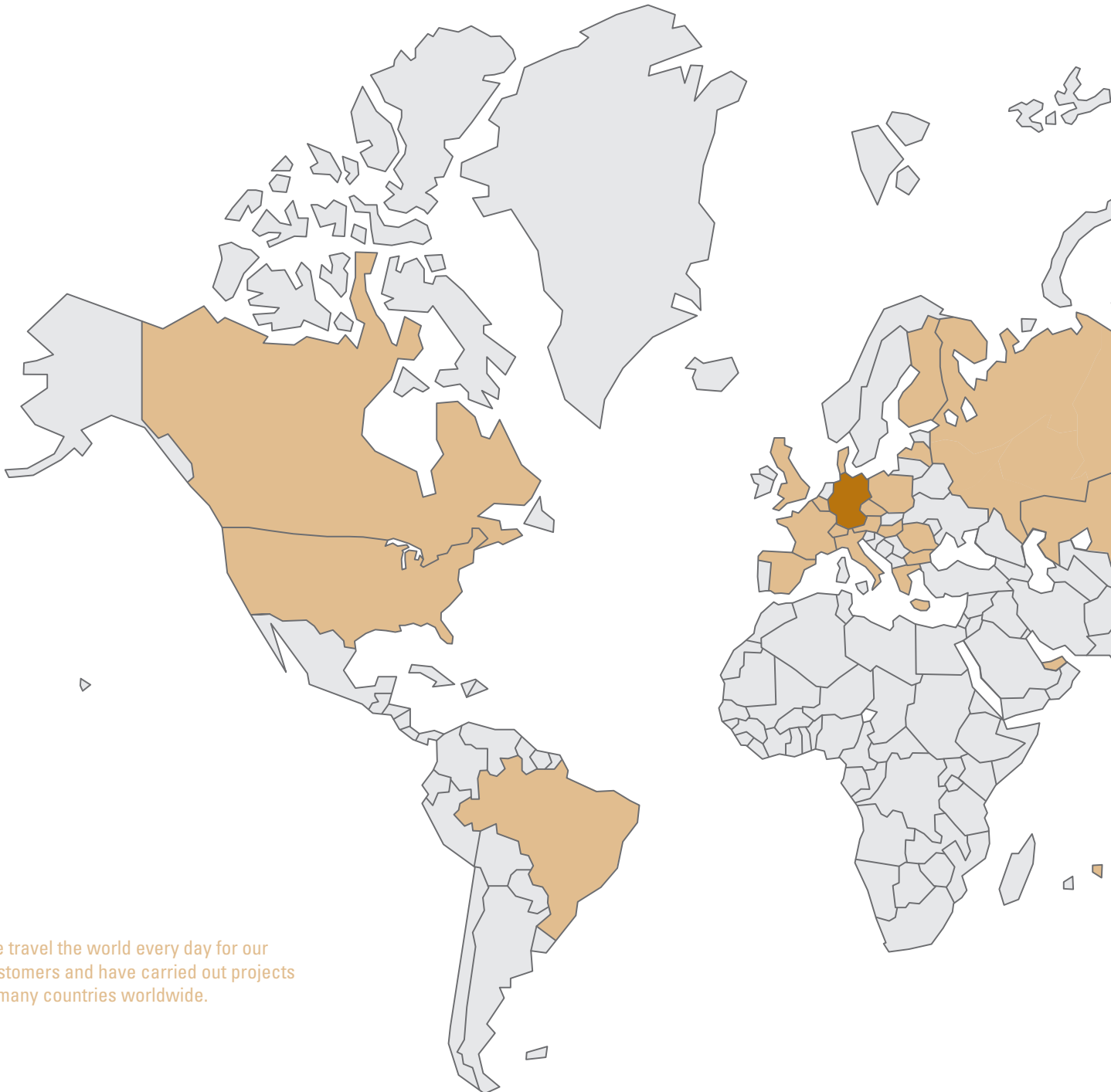


A GLOBAL PLAYER... WITH ROOTS IN ARNSTORF

Globally we realise countless projects for our customers, meet challenges and grow with them. A worldwide network of reliable partners and established subsidiaries supports us in doing our work. In the following pages, you'll find an overview of our extensive range of Metal Ceiling Solutions.

Contact us at our headquarters in Arnstorf or visit www.Lindner-Group.com to find your local point of contact.

Lindner Group | Heated and Chilled Ceilings
Bahnhofstrasse 29 | 94424 Arnstorf | Germany
+49 8723 20-3680 | heating.cooling@Lindner-Group.com



We travel the world every day for our customers and have carried out projects in many countries worldwide.

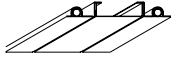


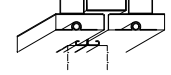


PLAFOTHERM® HEATED/CHILLED CEILINGS – REFERENCES WORLDWIDE




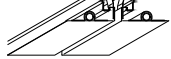
Alashrafy JLT Offices, U.A.E
Allianz Suisse, Wallisellen, Switzerland
Billa Headquarters, Czech Republic
Chandris House, Greece
DR Byen – Danish Radio, Copenhagen, Denmark
E.ON Ruhrgas AG, Essen, Germany
European Parliament Berlaymont 2000, Brussels, Belgium
Federation Tower, Moscow, Russia
FIFA World Football Museum, Zurich, Switzerland
Havenhuis, Antwerpen, Belgium
Headquarters Fa. Häring, Piotrków Trybunalski, Poland
High Apart, Ulanbator, Mongolia
Jans Bureaux, Eschweiler, Luxembourg
JTI Kazakhstan LLC, Almaty, Kazakhstan
Jupiter Centre, Riga, Latvia
Kasarmikatu 21, Helsinki, Finland
Kellogg School of Management | Northwestern University, Chicago, USA
La Grande Arche, Puteaux, France
Library of Trento University, Italy
Lujiazui Financial Tower, Shanghai, China
Multivac, Sofia, Bulgaria
Petrobras, Vitoria, Brazil
Petrom City, Bucharest, Rumania
Quai Ouest, Boulogne Billancourt, France
Schulich School of Business, Toronto, Canada
Seeparkcampus West, Vienna, Austria
SilverTower Frankfurt, Germany
Television Centre TVC, London, Great Britain
THE SQUAIRE, Frankfurt, Germany
Torre Espacio, Madrid, Spain
YBL Palais, Budapest, Hungary
World Trade Centre Path Station New York, USA

HEATED AND CHILLED POST CAP CEILINGS

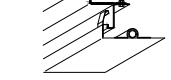
Room Acoustics





<p>Plafotherm® B 100 Linear Heated and Chilled Post Cap Ceiling visible C-post cap profiles, lay-in or swing-down option</p>		<p>up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated in acc. with ASTM C 423</p>
<p>Plafotherm® B 100 SD Linear Heated and Chilled Post Cap Ceiling, Longitudinally Sound-Reduced visible C-post cap profiles, lay-in sandwich elements</p>		<p>up to $\alpha_w = 0.55$ (M), sound absorption class D in acc. with EN ISO 354, up to NRC = 0.65 in acc. with ISO 354, rated in acc. with ASTM C 423</p>
<p>Plafotherm® B 110 Heated and Chilled Post Cap Ceiling with Cross Noggins visible C-post cap profiles and cross noggins, lay-in or swing-down option</p>		<p>up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated in acc. with ASTM C 423</p>
<p>Plafotherm® B 147 SD Heated and Chilled Post Cap Ceiling Concealed, Longitudinally Sound-Reduced concealed post cap, removable sandwich elements, partition fastening in joint</p>		<p>up to $\alpha_w = 0.70$, sound absorption class C in acc. with EN ISO 354, up to NRC = 0,75 in acc. with ISO 354, rated in acc. with ASTM C 423</p>

HEATED AND CHILLED HOOK-ON CEILINGS

<p>Plafotherm® E 200 Heated and Chilled Hook-On Ceiling concealed supporting profiles, removable ceiling panels</p>		<p>up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated in acc. with ASTM C 423</p>
<p>Plafotherm® E 210 Heated and Chilled Hook-On Ceiling with Butt Joints concealed supporting profiles, removable ceiling panels</p>		<p>up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated in acc. with ASTM C 423</p>
<p>Plafotherm® E 213 Heated and Chilled Hook-On Ceiling with Accentuated Joints concealed hook-on construction with accentuated joints, removable ceiling panels with swing-down option</p>		<p>up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated in acc. with ASTM C 423</p>
<p>Plafotherm® E 214 Heated and Chilled Hook-On Ceiling with Open Joints concealed supporting profiles, removable ceiling panels with swing-down option</p>		<p>up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated in acc. with ASTM C 423</p>

HEATED AND CHILLED CORRIDOR CEILINGS

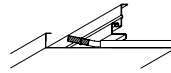
<p>Plafotherm® E 312 Heated and Chilled Hook-On Corridor Ceiling concealed hook-on construction, removable ceiling panels with swing-down option</p>		<p>up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated in acc. with ASTM C 423</p>
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	 FIRE PROTECTION	 CLIMATIC REGULATION	 STATICS	 SUSTAINABILITY
Longitudinal Sound Reduction	Building Material Class	Heating and Cooling	Seismic Safety	
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037	–	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804
up to $D_{n,f,w} = 62$ dB in acc. with ISO 10848-2	–	nominal cooling capacity (10 K): 104 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 116 W/m ² in acc. with EN 14037	–	–
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037	–	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804
up to $D_{n,f,w} = 60$ db in acc. with ISO 10848-2	–	nominal cooling capacity (10 K): 104 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 116 W/m ² in acc. with EN 14037	–	EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037	possible	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037	–	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037	possible	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037	–	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037	–	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804

HEATED AND CHILLED CANOPY CEILINGS

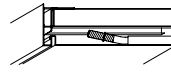
Room Acoustics

Plafotherm® DS 312
Heated and Chilled Canopy Ceilings without Frame
 without circumferential frame, removable ceiling panels



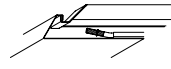
equivalent sound absorption area per canopy
 in acc. with EN ISO 354

Plafotherm® DS 313
Heated and Chilled Canopy Ceilings with Frame
 with circumferential frame, removable ceiling panels with
 swing-down option



equivalent sound absorption area per canopy
 in acc. with EN ISO 354

Plafotherm® DS 320
Heated and Chilled Canopy Ceiling in Filigree Optics
 large format canopy ceiling, expandable on the short side



equivalent sound absorption area per canopy
 in acc. with EN ISO 354

Plafotherm® DS Tabs
Metal Canopy Ceiling for Concrete Core Activation
 large format canopy ceiling for thermally activated
 components



up to $\alpha_w = 1.00$ (L),
 sound absorption class A in acc. with EN ISO 354,
 up to NRC = 1.10 in acc. with ISO 354,
 rated in acc. with ASTM C 423

HEATED AND CHILLED BAFFLE CEILINGS

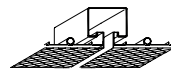
Plafotherm® L 608
Heated and Chilled Metal Baffle Ceiling, Hook-On/Slide Baffle
 with substructure made of double hook-on profile, hook-on/
 slide baffle



up to $\alpha_w = 0.60$ (MH),
 sound absorption class C in acc. with EN ISO 354,
 up to NRC = 0.65 in acc. with ISO 354,
 rated in acc. with ASTM C 423

HEATED AND CHILLED EXPANDED METAL CEILINGS

Plafotherm® St 213
**Heated and Chilled Expanded Metal Hook-On Ceiling with
 Accentuated Joints**
 concealed hook-on construction with accentuated joints,
 removable expanded metal ceiling panels



up to $\alpha_w = 0.50$ (L),
 sound absorption class D in acc. with EN ISO 354,
 up to NRC = 0.65 in acc. with ISO 354,
 rated in acc. with ASTM C 423

CONVECTION ELEMENTS

Plafotherm® KN
Convection Element
 Convection element for single installation or concealed
 installation in ceiling void







—

HEATED AND CHILLED PLASTERBOARD CEILINGS

Plafotherm® GK HEKDA
**Heated and Chilled Plasterboard Ceilings,
 Heat Conducting Profile as Secondary Grid**
 suspension channel as primary grid and heating/cooling
 technology as secondary grid



up to $\alpha_w = 0.45$ (L),
 sound absorption class D in acc. with EN ISO 354,
 up to NRC = 0.50 in acc. with ISO 354,
 rated in acc. with ASTM C 423

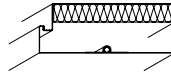
	 FIRE PROTECTION	 CLIMATIC REGULATION	 STATICS	 SUSTAINABILITY
Longitudinal Sound Reduction	Building Material Class	Heating and Cooling	Seismic Safety	
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 135 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 163 W/m ² in acc. with EN 14037	–	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 135 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 163 W/m ² in acc. with EN 14037	–	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 135 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 163 W/m ² in acc. with EN 14037	possible	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	occupancy 30 %: efficiency factor 94 - 98 %, occupancy 50 %: efficiency factor 90 - 97 %	–	EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 21.1 W/lfm in acc. with EN 14240, nominal heating capacity (15 K): 21.7 W/lfm in acc. with EN 14037	–	–
–	A2 - s2, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): 96.6 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 122 W/m ² in acc. with EN 14037	–	–
–	–	nominal cooling capacity (10 K) exceeding 65 % open area: 149 W/m ² in acc. with EN 14240 nominal heating capacity (15 K) exceeding 65 % open area: 142 W/m ² in acc. with EN 14037	–	–
–	A2 - s1, d0 in acc. with EN 13501-1	nominal cooling capacity (10 K): up to 95.8 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): up to 108 W/m ² in acc. with EN 14037	–	self-declaration in acc. with ISO 14021

HEATED AND CHILLED HYBRID CEILINGS

))) ACOUSTICS

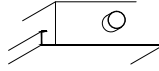
Room Acoustics

Plafotherm® DS TAS
Heated and Chilled Hybrid Canopy Ceiling
 thermo-active canopy ceiling for subsequent concrete core working



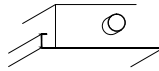
equivalent sound absorption area per canopy
 in acc. with EN ISO 354

Plafotherm® AirHybrid
Hybrid Ventilation Components in Metal Ceilings
 heated/chilled ceiling with hybrid ventilation component on the rear side







up to $\alpha_w = 0.65$, sound absorption class C
 in acc. with EN ISO 354

Plafotherm® DS AirHybrid
Hybrid Ventilation Components in Canopy Ceiling
 heated/chilled ceiling with hybrid ventilation component on the rear side



equivalent sound absorption area per canopy
 in acc. with EN ISO 354

	 FIRE PROTECTION	 CLIMATIC REGULATION	 STATICS	 SUSTAINABILITY
Longitudinal Sound Reduction	Building Material Class	Heating and Cooling	Seismic Safety	
–	A2 - s2, d0 in acc. with EN 13501-1	total hybrid cooling capacity (8 K): 152 W/m ² , indirect working of the concrete core: up to 40 W/m ²	–	EPD in acc. with ISO 14025 and EN 15804
–	A2 - s2, d0 in acc. with EN 13501-1	waterside nominal cooling capacity (10 K): up to 159 W/m ² following EN 14240, waterside nominal heating capacity (15 K): up to 161 W/m ² following EN 14037	–	–
–	A2 - s2, d0 in acc. with EN 13501-1	waterside nominal cooling capacity (10 K): up to 192 W/m ² following EN 14240, waterside nominal heating capacity (15 K): up to 165 W/m ² following EN 14037	–	–

A modern conference room with large windows and a long wooden table. The room features a white ceiling with recessed lighting and a grey carpet. The windows offer a view of a city building.

HEATED AND CHILLED POST CAP CEILINGS THE FOUNDATION FOR FLEXIBLE ROOMS.

The heating and cooling technology integrated in the Post Cap Ceilings is an efficient way to provide a comfortable atmosphere that suits your specific requirements. Passive areas can also be combined. Heated and Chilled Post Cap Ceilings are perfect for fastening partitions. This ensures design freedom for your room layout. Linear Post Cap Ceilings and Systems with Cross Noggins as well as visible and concealed Post Cap Profiles come with a variety of design options. Our range also includes longitudinally sound-reduced solutions.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + individual room layout thanks to the possibility of fastening partitions to post caps
- + linear Post Cap Ceilings and Systems with cross noggins as well as longitudinally sound-reduced solutions enable a flexible room design
- + range of design options with visible or concealed post cap profiles possible



PLAFOTHERM® B 100

LINEAR HEATED AND CHILLED POST CAP CEILING

This cost-effective system with visible linear Post Caps comfortably heats and cools your room by means of radiation. This heated/chilled ceiling system with low construction height can be adapted to building shapes and combined with thermally passive components. Partitions can be fastened to the linear Post Cap – thus, flexible room layouts are possible. The Post Cap can also be used for the integration of installations. For maintenance works in the ceiling void, each ceiling panel can be removed or swung down.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + visible linear Post Caps as design elements
- + individual room layout thanks to the possibility to fasten partitions to Post Caps
- + Post Caps can be used for technical installations or luminaires
- + space-saving ceiling system with low construction height
- + round, curved building shapes can be realised thanks to radially installed Post Caps and trapezoidal ceiling panels
- + easy maintenance option due to ceiling panels that can be individually operated, swung down and slid
- + cost-effective heated/chilled ceiling system as economic solution

TECHNICAL DATA

Construction

- 1 metal ceiling panel
- 6 L-profile 28
- 8/9/55 vernier suspension
- 54 C-post cap profile
- 78 drilling screw hexagon head
- 437 heating/cooling coil
- 479 connecting/connection hose
- 505 fit-up aid

Wall Connection Options from page 112

- L-angle
- shadow gap trim
- open wall connection




ADDITIONAL EQUIPMENT page 154

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Ventilation Components

Pleasant supply air distribution possible by ventilation components on the rear side:

- AirBox S  from page 163
- AirBox E  from page 163
- AirBeam  page 161


Luminaires

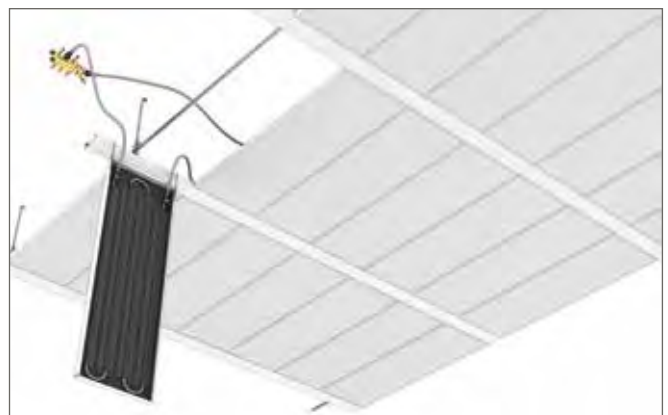
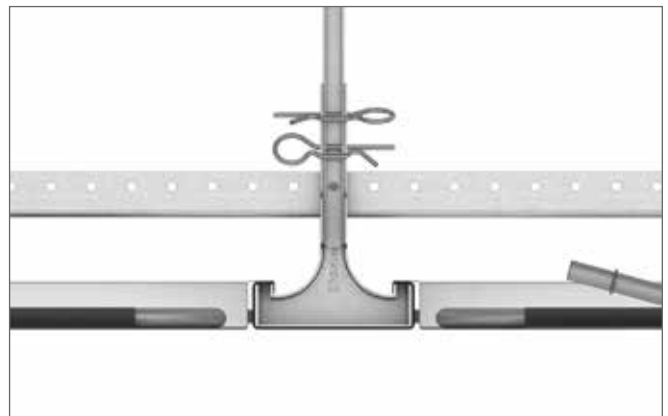
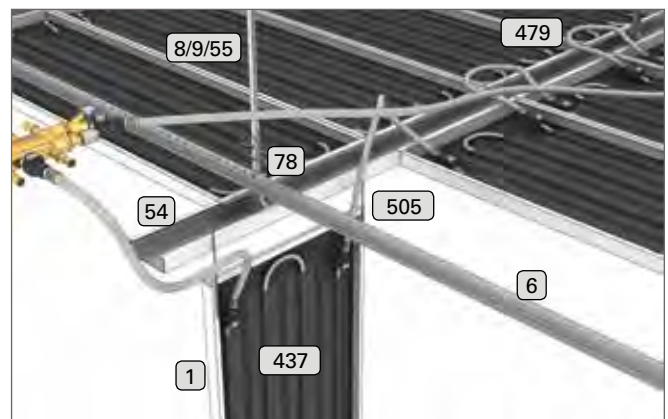
Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.

Longitudinal Sound Reduction

System with tested longitudinal sound reduction is available:
Plafotherm® B 100 SD  page 20



PLAFOTHERM® B 100

TECHNICAL DATA

	Ceiling Panel	Installation Detail
Plafotherm® B 100 Type 2 Lay-In with Hook-On Edge length: 250 - 3,000 mm width: 200 - 1,250 mm		
Plafotherm® B 100 Type 3 Lay-In with Hook-On Notch length: 250 - 3,000 mm width: 200 - 1,250 mm		
Plafotherm® B 100 Type 4 Lay-In, Swing-Down and Slide Option on Longitudinal Side length: 250 - 3,000 mm (depending on the length-to-width ratio) width: 200 - 1,250 mm (depending on the length-to-width ratio)		
Plafotherm® B 100 Type 6 Lay-In, Swing-Down and Slide Option on Short Side length: 250 - 3,000 mm (depending on the length-to-width ratio) width: 200 - 1,250 mm (depending on the length-to-width ratio)		
ACOUSTICS ↘ from page 139	Room Acoustics up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated to ASTM C 423	
FIRE PROTECTION ↘ from page 137	Building Material Class A2 - s2, d0 in acc. with EN 13501-1	
CLIMATIC REGULATION ↘ from page 118	Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K): 112 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 126 W/m ² in acc. with EN 14037:2003 heat conducting profile perforated with Cu-pipe: nominal cooling capacity (10 K): 102 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 118 W/m ² in acc. with EN 14037:2003 heat conducting profile with V2A-pipe: nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037:2003 graphite panel with Cu-pipe: nominal cooling capacity (10 K): 120 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 133 W/m ² in acc. with EN 14037:2003	
CORROSION PROTECTION ↘ from page 147	exposure class A (interior) in acc. with EN 13964, table 8 and 9	
SUSTAINABILITY ↘ from page 148	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804	
SURFACES ↘ from page 80	Powder Coatings COLOURline, MOODline, ARTline, GRAPHICline Perforations BASICline, REGULARline, SPREADline	

PLAFOTHERM® B 100 SD

LINEAR HEATED AND CHILLED POST CAP CEILING, LONGITUDINALLY SOUND-REDUCED

This longitudinally sound-reduced Post Cap Ceiling creates a pleasant room climate. It is the perfect solution to fasten partitions and offers great freedom in office design. The visible linear Post Caps can be used as design element or for the integration of installations. The space-saving system can easily be opened without the need for any tools. Even round or curved building shapes can be realised. A combination of thermally active and passive areas is possible.

- + Post Cap Ceiling with tested longitudinal sound reduction
- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + visible linear Post Caps as design elements
- + individual room layout thanks to the possibility to fasten partitions to Post Caps
- + Post Caps can be used for technical installations or luminaires
- + space-saving ceiling system with low construction height
- + round, curved building shapes can be realised thanks to radially installed Post Caps and trapezoidal ceiling panels
- + easy maintenance option due to ceiling panels that can be individually operated without tools

TECHNICAL DATA

Construction

- 1 metal ceiling panel
- 6 L-profile 28
- 8/9/55 vernier suspension
- 54 C-post cap profile
- 78 drilling screw hexagon head
- 479 connecting/connection hose
- 791 installation hook

Wall Connection Options from page 112

- L-angle
- shadow gap trim

ADDITIONAL EQUIPMENT page 154

Hydraulic Components

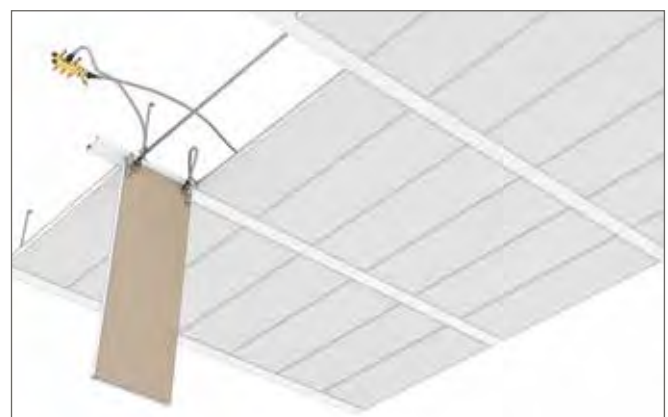
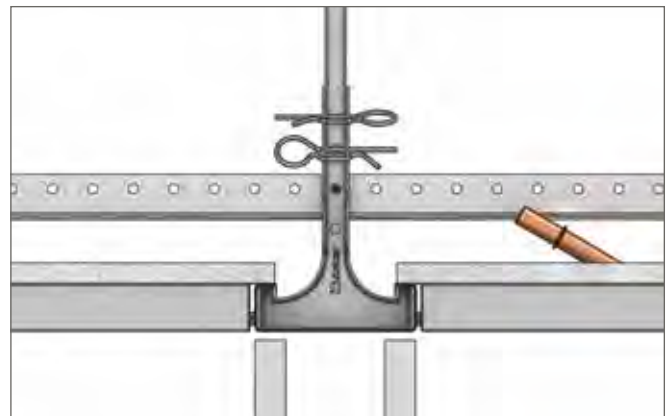
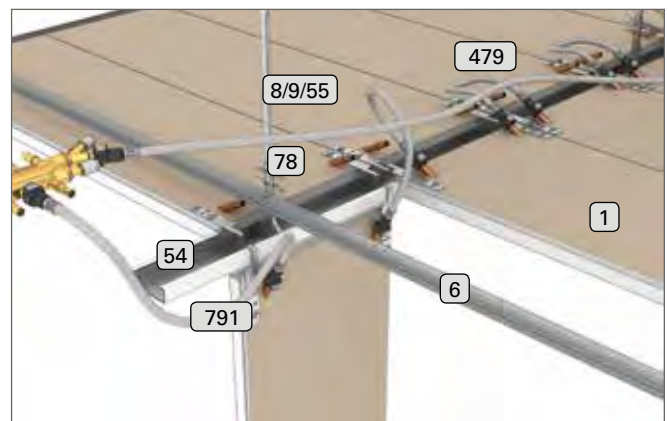
Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® B 100 SD

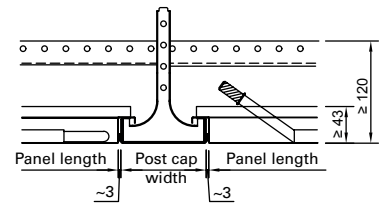
TECHNICAL DATA

Ceiling Panel

Installation Detail

Plafotherm® B 100 SD Type 2 Lay-In with Hook-On Edge

length: 250 - 1,800 mm
(depending on the length-to-width ratio)
width: 200 - 700 mm
(depending on the length-to-width ratio)



))) **ACOUSTICS** ↘ from page 139

Room Acoustics

up to $\alpha_w = 0.55$ (M), sound absorption class D in acc. with EN ISO 354,
up to NRC = 0.65 in acc. with ISO 354, rated to ASTM C 423

Longitudinal Sound Reduction

up to $D_{n,f,w} = 62$ dB in acc. with ISO 10848-2

☀️ **CLIMATIC REGULATION** ↘ from page 118

Heating and Cooling

heat conducting profile with Cu-pipe:
nominal cooling capacity (10 K): 104 W/m² in acc. with EN 14240,
nominal heating capacity (15 K): 116 W/m² in acc. with EN 14037:2003

💧 **CORROSION PROTECTION** ↘ from page 147

exposure class A (interior) in acc. with EN 13964, table 8 and 9

📄 **SURFACES** ↘ from page 80

Powder Coatings

COLOURline, MOODline, ARTline, GRAPHICline

Perforations

BASICline, REGULARline, SPREADline

PLAFOTHERM® B 110

HEATED AND CHILLED POST CAP CEILING WITH CROSS NOGGINS

This Post Cap Ceiling creates an ideal indoor climate thanks to radiant heating and cooling. Cross Noggins define the visual appearance of this system and offer many advantages: partitions can be fastened to Post Caps in both directions. Moreover, possible future room sizes can be identified. Luminaires or technical installations can be integrated into the Post Caps. The Post Cap Ceiling with Cross Noggins has a low construction height and is maintenance-friendly thanks to ceiling panels that can individually be operated. Thermally active and passive areas can be combined.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + visible Cross Noggins as design elements
- + individual room layout thanks to the possibility to fasten partitions to Post Caps in both directions
- + Post Caps can be used for technical installations or luminaires
- + space-saving ceiling system with low construction height
- + easy maintenance option due to ceiling panels that can be individually operated, swung down and slid
- + possible future room sizes can be identified

TECHNICAL DATA

Construction

- 1 metal ceiling panel
- 8/9/55 vernier suspension
- 54 C-post cap profile
- 61 post cap cross noggin
- 78 drilling screw hexagon head
- 437 heating/cooling coil
- 479 connecting/connection hose
- 505 fit-up aid

Wall Connection Options from page 112

- L-angle
- shadow gap trim
- open wall connection

ADDITIONAL EQUIPMENT page 154

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Ventilation Components

Pleasant supply air distribution possible by ventilation components on the rear side:

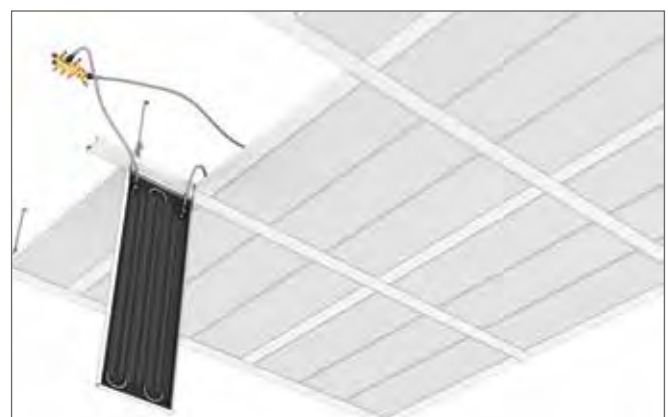
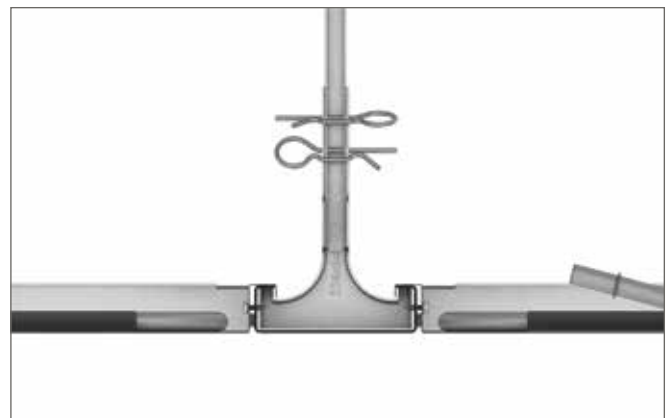
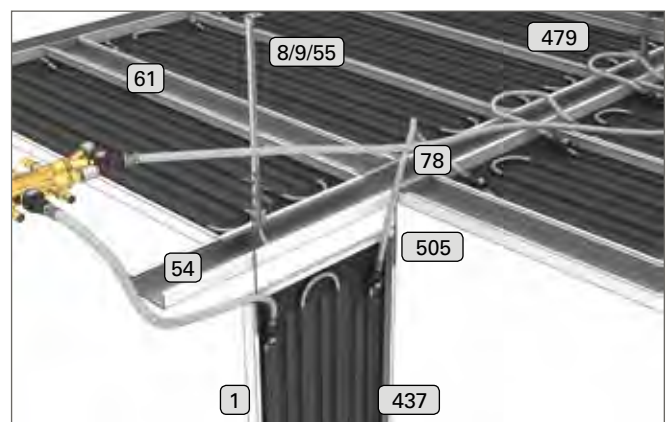
- AirBox S  from page 163
- AirBox E  from page 163
- AirBeam  page 161

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.


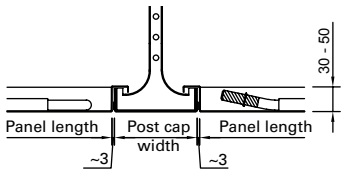

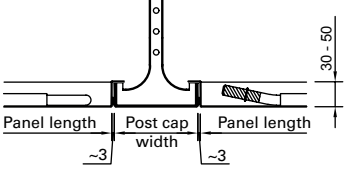

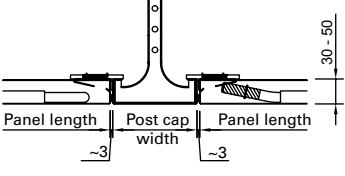

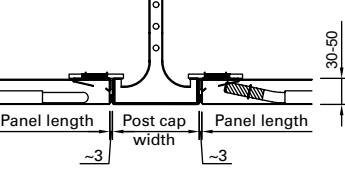






Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® B 110

TECHNICAL DATA

	Ceiling Panel	Installation Detail
Plafotherm® B 110 Type 2 Lay-In with Hook-On Edge length: 250 - 3,000 mm width: 200 - 1,250 mm		
Plafotherm® B 110 Type 3 Lay-In with Hook-On Notch length: 250 - 3,000 mm width: 200 - 1,250 mm		
Plafotherm® B 110 Type 4 Lay-In, Swing-Down and Slide Option on Longitudinal Side length: 250 - 3,000 mm (depending on the length-to-width ratio) width: 200 - 1,250 mm (depending on the length-to-width ratio)		
Plafotherm® B 110 Type 6 Lay-In, Swing-Down and Slide Option on Short Side length: 250 - 3,000 mm (depending on the length-to-width ratio) width: 200 - 1,250 mm (depending on the length-to-width ratio)		
 ACOUSTICS ↘ from page 139	Room Acoustics up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated to ASTM C 423	
 FIRE PROTECTION ↘ from page 137	Building Material Class A2 - s2, d0 in acc. with EN 13501-1	
 CLIMATIC REGULATION ↘ from page 118	Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K): 112 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 126 W/m ² in acc. with EN 14037:2003 heat conducting profile perforated with Cu-pipe: nominal cooling capacity (10 K): 102 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 118 W/m ² in acc. with EN 14037:2003 heat conducting profile with V2A-pipe: nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037:2003 graphite panel with Cu-pipe: nominal cooling capacity (10 K): 120 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 133 W/m ² in acc. with EN 14037:2003	
 CORROSION PROTECTION ↘ from page 147	exposure class A (interior) in acc. with EN 13964, table 8 and 9	
 SUSTAINABILITY ↘ from page 148	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804	
 SURFACES ↘ from page 80	Powder Coatings COLOURline, MOODline, ARTline, GRAPHICline Perforations BASICline, REGULARline, SPREADline	

PLAFOTHERM® B 147 SD

HEATED AND CHILLED POST CAP CEILING CONCEALED, LONGITUDINALLY SOUND-REDUCED

This longitudinally sound-reduced system guarantees best climate in your rooms – furthermore, luminaires can easily be integrated. Concealed Post Cap profiles offer you the possibility to reversibly fasten partitions and create a homogeneous ceiling appearance. Thus, you are flexible in your room layout. The ceiling elements of Plafotherm® B 147 SD have an easy maintenance option.

- + Post Cap Ceiling with tested longitudinal sound reduction inclusive integrated luminaire
- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + homogeneous ceiling surface due to concealed Post Caps
- + easy maintenance option of ceiling elements
- + individual room layout thanks to the possibility to fasten reversible partitions to Post Caps

TECHNICAL DATA

Construction

1	metal ceiling panel
6	L-profile 28
8/9/55	vernier suspension
54	C-post cap profile
479	connecting/connection hose
689	hollow chamber sealing
974	partition connection profile
977	drilling screw

Wall Connection Options from page 112

- L-angle
- shadow gap trim
- with shadow gap

ADDITIONAL EQUIPMENT page 154

Hydraulic Components

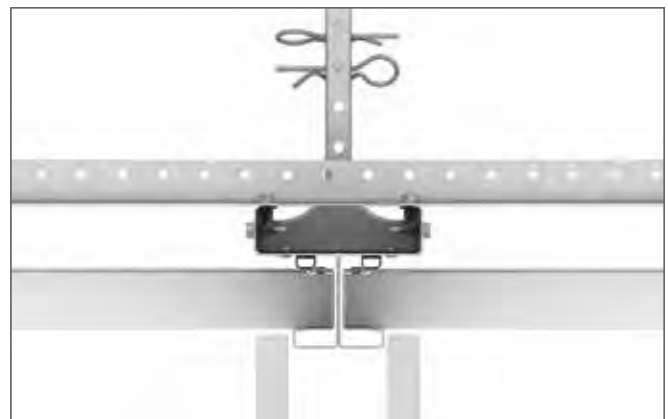
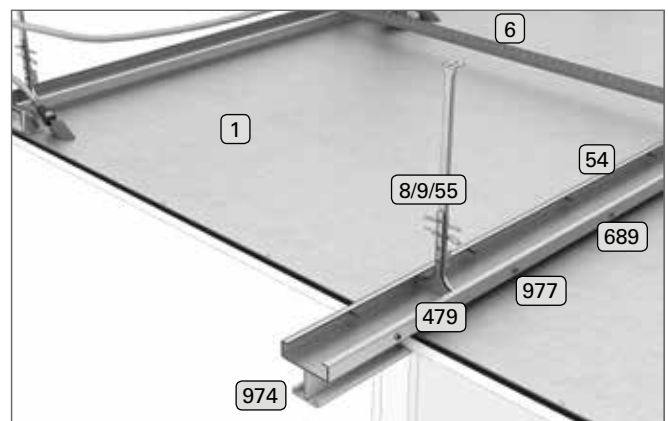
Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® B 147 SD

TECHNICAL DATA

Ceiling Panel

Installation Detail

Plafotherm® B 147 SD Type 1

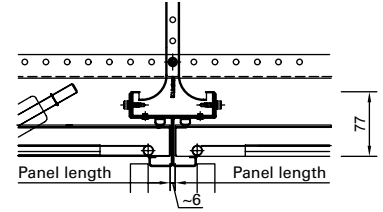
Lay-In with Locking Technology

length: 300 - 2,000 mm

(depending on the length-to-width ratio)

width: 200 - 900 mm

(depending on the length-to-width ratio)



ACOUSTICS ↘ from page 139

Room Acoustics

up to $\alpha_w = 0.70$, sound absorption class C in acc. with EN ISO 354,

up to NRC = 0.75 in acc. with ISO 354, rated to ASTM C 423

Longitudinal Sound Reduction

up to $D_{n,f,w} = 60$ dB in acc. with ISO 10848-2

CLIMATIC REGULATION ↘ from page 118

Heating and Cooling

heat conducting profile with Cu-pipe:

nominal cooling capacity (10 K): 104 W/m² in acc. with EN 14240,

nominal heating capacity (15 K): 116 W/m² in acc. with EN 14037:2003

CORROSION PROTECTION ↘ from page 147

exposure class A (interior) in acc. with EN 13964, table 8 and 9

SUSTAINABILITY ↘ from page 148

EPD in acc. with ISO 14025 and EN 15804

SURFACES ↘ from page 80

Powder Coatings

COLOURline, MOODline, ARTline, GRAPHICline

Perforations

BASICline, REGULARline, SPREADline



HEATED AND CHILLED HOOK-ON CEILINGS VERSATILE SOLUTIONS.

Heated/Chilled Hook-On Ceilings combine efficient heating and cooling by means of radiation with versatile design options. The Ceiling Systems with concealed substructure impress with their visual and functional adaptability. Ceiling panels in different shapes and sizes offer design freedom – rectangular, square, trapezoidal, triangular as well as curved panels can be realised. Thermally active and passive areas can of course be combined.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + uniform ceiling surface due to concealed substructure
- + individual design thanks to flexible panel shapes and sizes



OVA-Areal, Affoltern am Albis, Switzerland

PLAFOTHERM® E 200

HEATED AND CHILLED HOOK-ON CEILING

This Hook-On Ceiling economically creates a pleasant room climate thanks to heating and cooling by means of radiation. Overlapping metal ceiling panels generate a homogeneous ceiling surface with concealed substructure. Different panel shapes and sizes can be realised and offer design freedom. For maintenance works, the ceiling panels can easily be removed without the need for any tools. On demand, thermally active and passive areas can be combined.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + homogeneous ceiling surface due to concealed substructure
- + individual design thanks to flexible panel shapes and sizes
- + easy maintenance option of ceiling panels without tools
- + cost-effective heated/chilled ceiling system as economic solution

TECHNICAL DATA

Construction

- 1 metal ceiling panel
- 7/8/9 vernier suspension
- 18 self-tapping screw trapezoidal head
- 23 Z-hook-on profile 48
- 24 connector for suspension channel 60 to Z-hook-on profile 48
- 26 suspension channel 60
- 437 heating/cooling coil
- 479 connecting/connection hose
- 505 fit-up aid

Wall Connection Options from page 112

- L-angle
- shadow gap trim
- open wall connection

ADDITIONAL EQUIPMENT page 154

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Ventilation Components

Pleasant supply air distribution possible by ventilation components on the rear side:

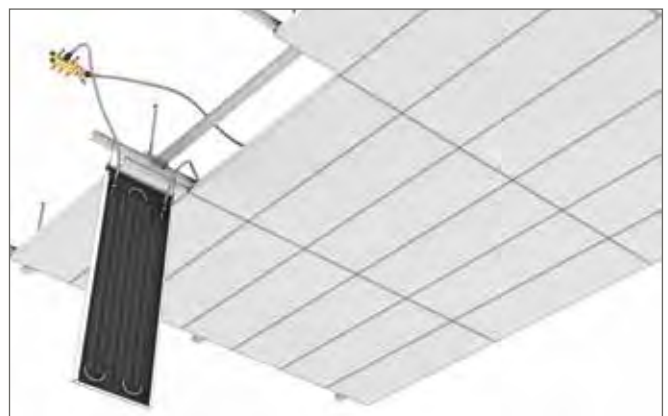
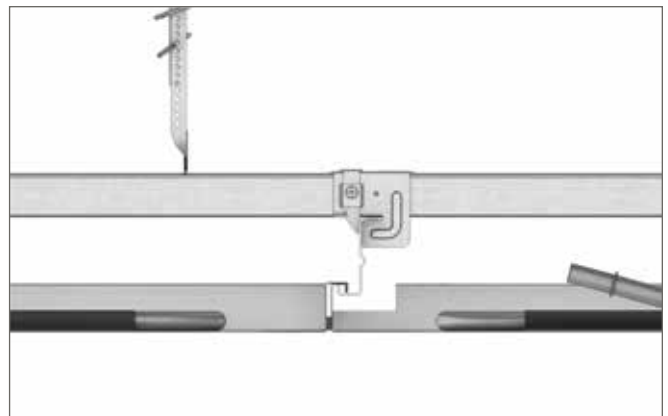
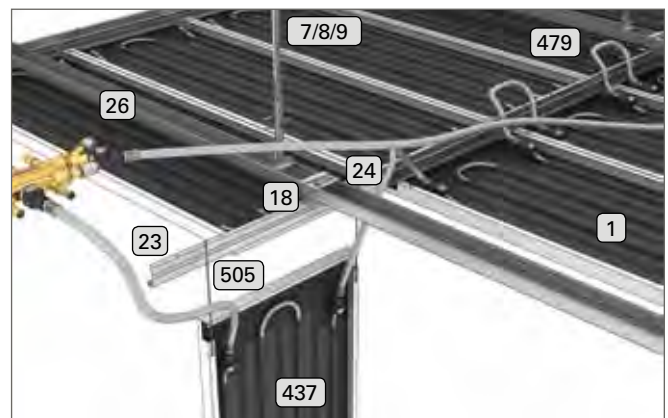
- AirBox S  from page 163
- AirBox E  from page 163
- AirBeam  page 161

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.


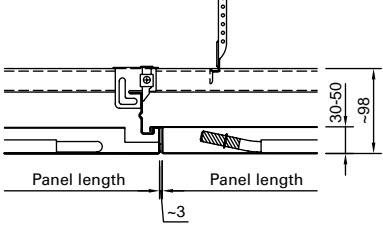

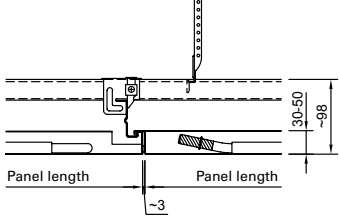

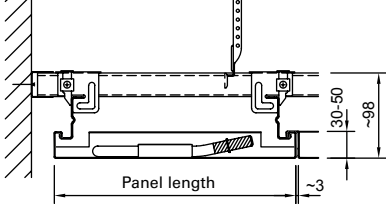







Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® E 200

TECHNICAL DATA

	Ceiling Panel	Installation Detail
Plafotherm® E 200 Type 2 Hook-On/Lay-On length: 250 - 3,000 mm width: 200 - 1,250 mm		
Plafotherm® E 200 Type 3 Hook-On/Lay-On Self-Aligning length: 250 - 3,000 mm width: 200 - 1,250 mm		
Plafotherm® E 200 Type 4 Hook-On on Both Sides length: 250 - 3,000 mm width: 200 - 1,250 mm		
 ACOUSTICS ↘ from page 139	Room Acoustics up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to $NRC = 0.80$ in acc. with ISO 354, rated to ASTM C 423	
 FIRE PROTECTION ↘ from page 137	Building Material Class A2 - s2, d0 in acc. with EN 13501-1	
 CLIMATIC REGULATION ↘ from page 118	Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K): 112 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 126 W/m ² in acc. with EN 14037:2003 heat conducting profile perforated with Cu-pipe: nominal cooling capacity (10 K): 102 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 118 W/m ² in acc. with EN 14037:2003 heat conducting profile with V2A-pipe: nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037:2003 graphite panel with Cu-pipe: nominal cooling capacity (10 K): 120 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 133 W/m ² in acc. with EN 14037:2003	
 CORROSION PROTECTION ↘ from page 147	exposure class A (interior) in acc. with EN 13964, table 8 and 9	
 SUSTAINABILITY ↘ from page 148	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804	
 SURFACES ↘ from page 80	Powder Coatings COLOURline, MOODline, ARTline, GRAPHICline Perforations BASICline, REGULARline, SPREADline	
 STATICS ↘ from page 136	Seismic Safety an earthquake-proof construction is possible	

PLAFOTHERM® E 210

HEATED AND CHILLED HOOK-ON CEILING WITH BUTT JOINT

The ceiling system with concealed substructure and continuous butt joints creates a pleasant climate and homogeneous ceiling surface in your rooms. Self-adjusting ceiling panels that can individually be removed without tools ensure an automatic joint alignment. The maintenance-friendly Hook-On Ceiling with low construction height is an economic solution. You are very flexible in the combination of thermally active and passive areas.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + homogeneous ceiling surface due to concealed substructure
- + ceiling layout with continuous butt joints
- + automatic joint alignment thanks to self-adjusting ceiling panels
- + space-saving ceiling system with low construction height
- + easy maintenance option due to ceiling panels that can be individually operated without tools
- + cost-effective heated/chilled ceiling system as economic solution

TECHNICAL DATA

Construction

1	metal ceiling panel
6	L-profile 28
8/9/114	vernier suspension
14/15/65	screw connection
78	drilling screw hexagon head
437	heating/cooling coil
479	connecting/connection hose
510	T-hook-on profile

Wall Connection Options from page 112

- L-angle
- shadow gap trim
- open wall connection

ADDITIONAL EQUIPMENT page 154

Hydraulic Components

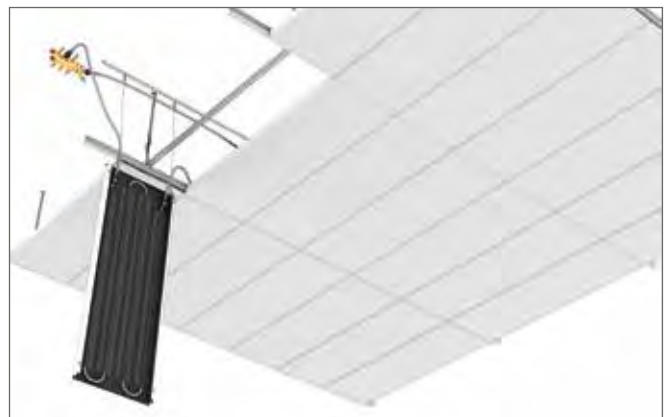
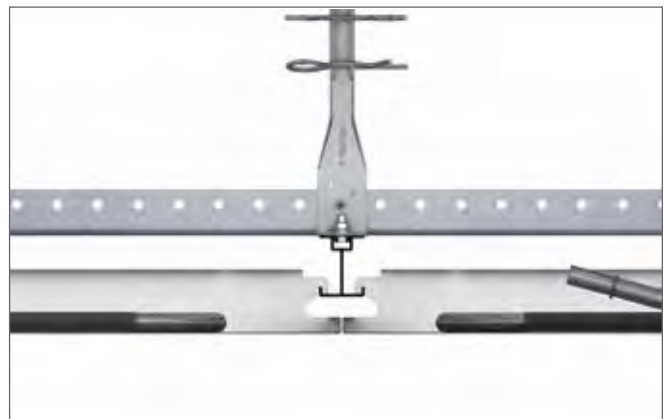
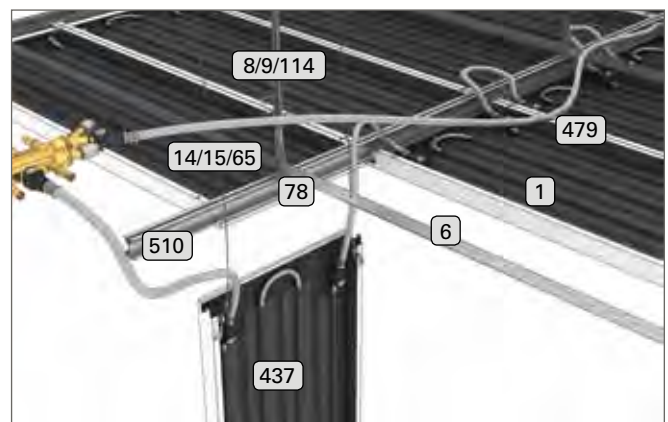
Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® E 210

TECHNICAL DATA

Ceiling Panel

Installation Detail

Plafotherm® E 210 Type 1

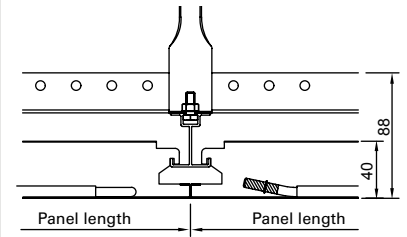
Hook-On

length: 250 - 1,900 mm

(depending on the length-to-width ratio)

width: 200 - 600 mm

(depending on the length-to-width ratio)



))) **ACOUSTICS** ↘ from page 139

Room Acoustics

up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354,
up to NRC = 0.80 in acc. with ISO 354, rated to ASTM C 423

🔥 **FIRE PROTECTION** ↘ from page 137

Building Material Class

A2 - s2, d0 in acc. with EN 13501-1

☀️ **CLIMATIC REGULATION** ↘ from page 118

Heating and Cooling

heat conducting profile with Cu-pipe:

nominal cooling capacity (10 K): 112 W/m² in acc. with EN 14240,

nominal heating capacity (15 K): 126 W/m² in acc. with EN 14037:2003

heat conducting profile perforated with Cu-pipe:

nominal cooling capacity (10 K): 102 W/m² in acc. with EN 14240,

nominal heating capacity (15 K): 118 W/m² in acc. with EN 14037:2003

heat conducting profile with V2A-pipe:

nominal cooling capacity (10 K): 109 W/m² in acc. with EN 14240,

nominal heating capacity (15 K): 123 W/m² in acc. with EN 14037:2003

graphite panel with Cu-pipe:

nominal cooling capacity (10 K): 120 W/m² in acc. with EN 14240,

nominal heating capacity (15 K): 133 W/m² in acc. with EN 14037:2003

🛠️ **CORROSION PROTECTION** ↘ from page 147

exposure class A (interior) in acc. with EN 13964, table 8 and 9

🌱 **SUSTAINABILITY** ↘ from page 148

self-declaration in acc. with ISO 14021,

EPD in acc. with ISO 14025 and EN 15804

📦 **SURFACES** ↘ from page 80

Powder Coatings

COLOURline, MOODline, ARTline, GRAPHICline

Perforations

BASICline, REGULARline, SPREADline

PLAFOTHERM® E 213

HEATED AND CHILLED HOOK-ON CEILING WITH ACCENTUATED JOINT

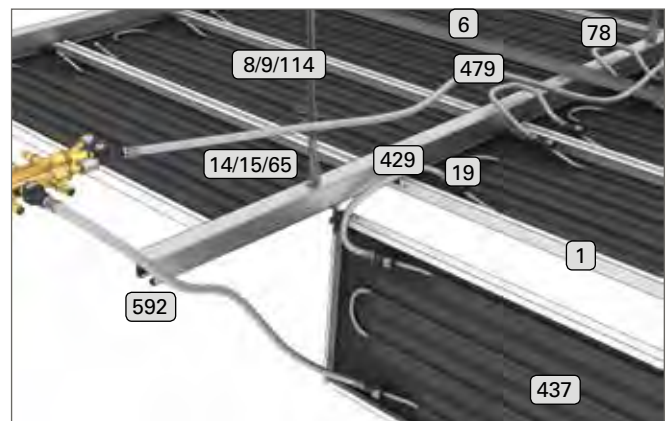
The Heated/Chilled Hook-On Ceiling Plafotherm® E 213 is characterised by a homogeneous ceiling surface with accentuated joints. Your rooms are effectively heated and chilled by means of radiation. Thus, a pleasant room climate is created. The Hook-On ceiling panels can be designed individually and with large variety: a multitude of panel sizes and shapes is possible. The ceiling panels can be removed or swung down and slid without tools to guarantee a quick access to the ceiling void for maintenance works. A combination of thermally active and passive areas is possible.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + homogeneous ceiling surface due to concealed substructure
- + individual design thanks to flexible panel shapes and sizes
- + ceiling layout with accentuated joints in both directions possible
- + easy maintenance option due to ceiling panels that can be individually operated, swung down and slid without tools

TECHNICAL DATA

Construction

1	metal ceiling panel
6	L-profile 28
8/9/114	vernier suspension
14/15/65	screw connection
19	drilling screw fillister head
78	drilling screw hexagon head
429	spacer for double hook-on profile 54
437	heating/cooling coil
479	connecting/connection hose
505	fit-up aid
592	double hook-on profile 54



Wall Connection Options from page 112

- L-angle
- shadow gap trim
- open wall connection

ADDITIONAL EQUIPMENT page 154

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Ventilation Components

Pleasant supply air distribution possible by ventilation components on the rear side:

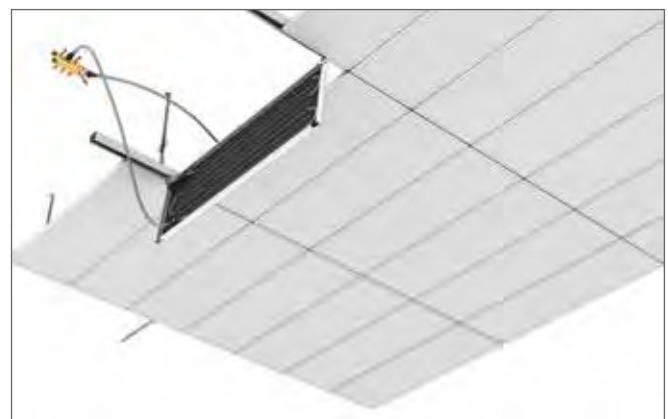
- AirBox S  from page 163
- AirBox E  from page 163
- AirBeam  page 161

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.


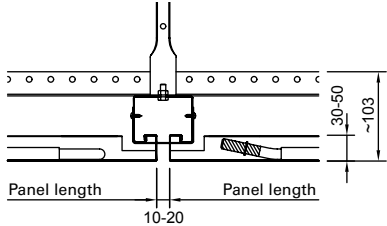

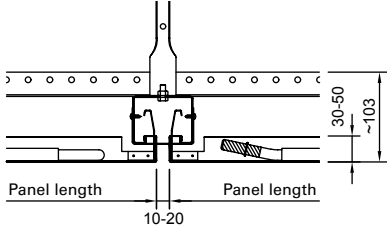







Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® E 213

TECHNICAL DATA

	Ceiling Panel	Installation Detail
Plafotherm® E 213 Type 1 Hook-On length: 250 - 3,000 mm width: 200 - 1,250 mm		
Plafotherm® E 213 Type 3 Hook-On, Swing-Down length: 250 - 3,000 mm width: 200 - 1,250 mm		
 ACOUSTICS ↘ from page 139	Room Acoustics up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to $NRC = 0.80$ in acc. with ISO 354, rated to ASTM C 423	
 FIRE PROTECTION ↘ from page 137	Building Material Class A2 - s2, d0 in acc. with EN 13501-1	
 CLIMATIC REGULATION ↘ from page 118	Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K): 112 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 126 W/m ² in acc. with EN 14037:2003 heat conducting profile perforated with Cu-pipe: nominal cooling capacity (10 K): 102 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 118 W/m ² in acc. with EN 14037:2003 heat conducting profile with V2A-pipe: nominal cooling capacity (10 K): 109 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m ² in acc. with EN 14037:2003 graphite panel with Cu-pipe: nominal cooling capacity (10 K): 120 W/m ² in acc. with EN 14240, nominal heating capacity (15 K): 133 W/m ² in acc. with EN 14037:2003	
 CORROSION PROTECTION ↘ from page 147	exposure class A (interior) in acc. with EN 13964, table 8 and 9	
 SUSTAINABILITY ↘ from page 148	self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804	
 SURFACES ↘ from page 80	Powder Coatings COLOURline, MOODline, ARTline, GRAPHICline Perforations BASICline, REGULARline, SPREADline	
 STATICS ↘ from page 136	Seismic Safety an earthquake-proof construction is possible	

PLAFOTHERM® E 214

HEATED AND CHILLED HOOK-ON CEILING WITH OPEN JOINT

This Hook-On Ceiling with concealed substructure and open joints creates a pleasant and comfortable temperature in your rooms. The open joint between the ceiling panels can also be used for airflow or the independent installation of luminaires or other fixtures. The shape and size of the ceiling panels can individually be designed and operated without tools. On demand, thermally active and passive areas can be combined.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + homogeneous ceiling surface due to concealed substructure
- + individual design thanks to flexible panel shapes and sizes
- + ceiling layout with open joints
- + open joint can be used for airflow
- + independent installation of luminaires and fixtures possible
- + easy maintenance option due to ceiling panels that can be individually operated, swung down and slid without tools

TECHNICAL DATA

Construction

- 1 metal ceiling panel
- 7/8/9 vernier suspension
- 18 self-tapping screw trapezoidal head
- 23 Z-hook-on profile 48
- 24 connector for suspension channel 60 to Z-hook-on profile 48
- 26 suspension channel 60
- 437 heating/cooling coil
- 479 connecting/connection hose
- 505 fit-up aid

Wall Connection Options from page 112

- L-angle
- shadow gap trim
- open wall connection

ADDITIONAL EQUIPMENT page 154

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Ventilation Components

Pleasant supply air distribution possible by ventilation components on the rear side:

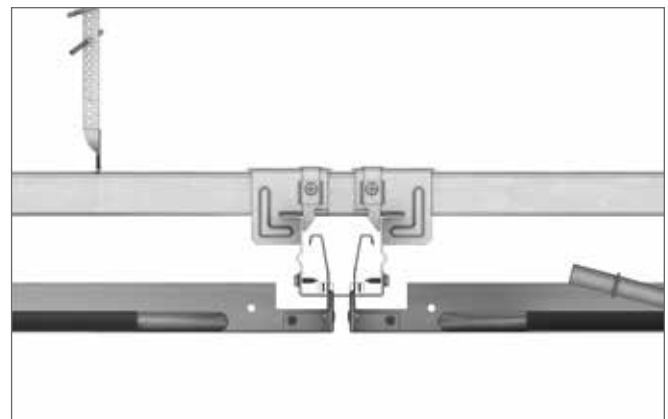
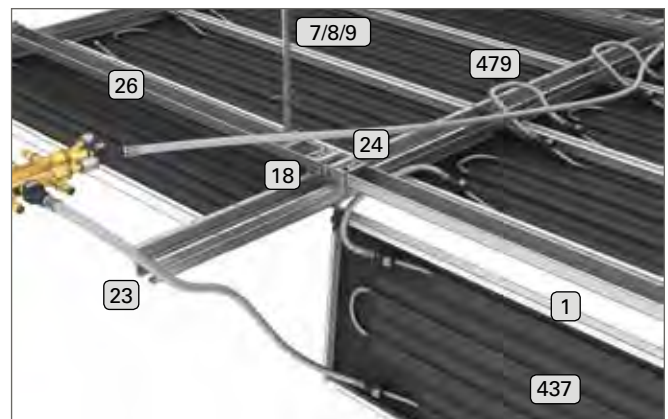
- AirBox S  from page 163
- AirBox E  from page 163
- AirBeam  page 161

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.


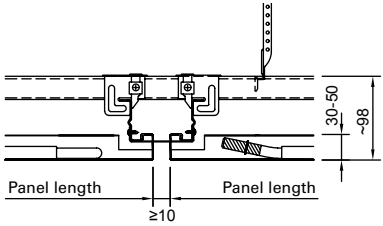

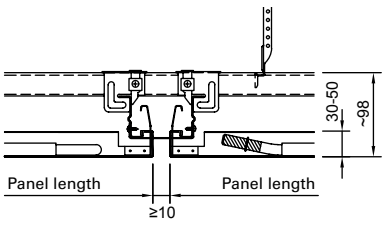






Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® E 214

TECHNICAL DATA

	Ceiling Panel	Installation Detail
<p>Plafotherm® E 214 Type 1 Hook-On length: 250 - 3,000 mm width: 200 - 1,250 mm</p>		
<p>Plafotherm® E 214 Type 3 Hook-On, Swing-Down length: 250 - 3,000 mm width: 200 - 1,250 mm</p>		
<p> ACOUSTICS ↘ from page 139</p>	<p>Room Acoustics up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated to ASTM C 423</p>	
<p> FIRE PROTECTION ↘ from page 137</p>	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>	
<p> CLIMATIC REGULATION ↘ from page 118</p>	<p>Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K): 112 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 126 W/m² in acc. with EN 14037:2003</p> <p>heat conducting profile perforated with Cu-pipe: nominal cooling capacity (10 K): 102 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 118 W/m² in acc. with EN 14037:2003</p> <p>heat conducting profile with V2A-pipe: nominal cooling capacity (10 K): 109 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m² in acc. with EN 14037:2003</p> <p>graphite panel with Cu-pipe: nominal cooling capacity (10 K): 120 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 133 W/m² in acc. with EN 14037:2003</p>	
<p> CORROSION PROTECTION ↘ from page 147</p>	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>	
<p> SUSTAINABILITY ↘ from page 148</p>	<p>self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804</p>	
<p> SURFACES ↘ from page 80</p>	<p>Powder Coatings COLOURline, MOODline, ARTline, GRAPHICline</p> <p>Perforations BASICline, REGULARline, SPREADline</p>	



HEATED AND CHILLED CORRIDOR CEILINGS APPEARANCE COUNTS. FUNCTION TOO.

Create a pleasant climate in your corridors by means of radiant heating and cooling. This can be achieved with Plafotherm® Heated and Chilled Corridor Ceilings that span freely from partition to partition. An adjustable wall connection enables easy compensation of tolerances on the wall. Flexible implementation is possible when combining thermally active and passive areas.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + freely spanned constructions
- + tolerance compensation on the wall is possible due to an adjustable wall connection



Hofstatt - Mitten in München, Munich, Germany
Photo: © Robert Sprang

PLAFOTHERM® E 312

HEATED AND CHILLED CORRIDOR HOOK-ON CEILING

Plafotherm® E 312 comfortably heats and cools your corridors by means of radiation. Thermally active and passive areas can be combined. The freely spanned ceiling panels are hooked onto the concealed construction on both sides. This adjustable wall connection can compensate tolerances on the wall. To facilitate maintenance works in the corridor, each ceiling panel can be operated or swung down and slid without the need for any tools.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + freely spanned construction
- + compensation of tolerances on the wall is possible due to an adjustable wall connection
- + easy maintenance option due to ceiling panels that can be individually operated, swung down and slid without tools

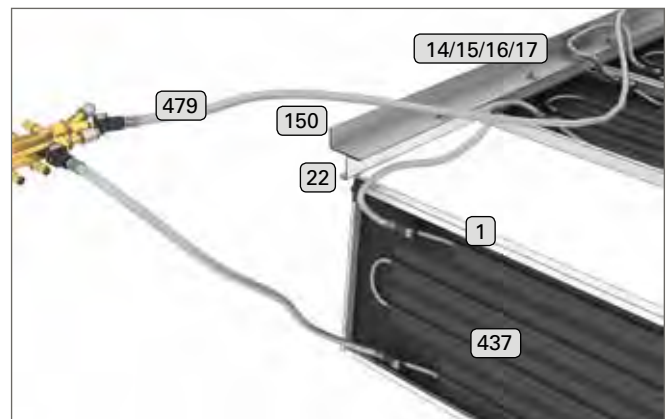
TECHNICAL DATA

Construction

1	metal ceiling panel
14/15/16/17	screw connection
22	Z-hook-on profile 54
150	L-wall profile 43 x 65
437	heating/cooling coil
479	connecting/connection hose
505	fit-up aid

Wall Connection Options from page 112

- L-angle



ADDITIONAL EQUIPMENT page 154

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.


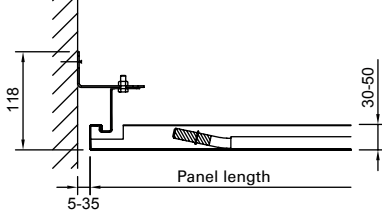

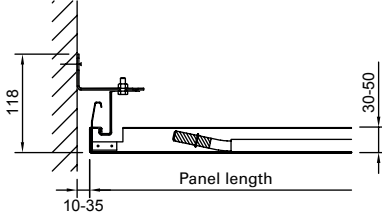






Acoustic Inlays


Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® E 312

TECHNICAL DATA

	Ceiling Panel	Installation Detail
<p>Plafotherm® E 312 Type 1 Hook-On length: 250 - 3,000 mm width: 200 - 1,250 mm</p>		
<p>Plafotherm® E 312 Type 3 Hook-On, Swing-Down length: 250 - 3,000 mm width: 200 - 1,250 mm</p>		
<p> ACOUSTICS ↘ from page 139</p>	<p>Room Acoustics up to $\alpha_w = 0.80$, sound absorption class B in acc. with EN ISO 354, up to NRC = 0.80 in acc. with ISO 354, rated to ASTM C 423</p>	
<p> FIRE PROTECTION ↘ from page 137</p>	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>	
<p> CLIMATIC REGULATION ↘ from page 118</p>	<p>Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K): 112 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 126 W/m² in acc. with EN 14037:2003</p> <p>heat conducting profile perforated with Cu-pipe: nominal cooling capacity (10 K): 102 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 118 W/m² in acc. with EN 14037:2003</p> <p>heat conducting profile with V2A-pipe: nominal cooling capacity (10 K): 109 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 123 W/m² in acc. with EN 14037:2003</p> <p>graphite panel with Cu-pipe: nominal cooling capacity (10 K): 120 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 133 W/m² in acc. with EN 14037:2003</p>	
<p> CORROSION PROTECTION ↘ from page 147</p>	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>	
<p> SUSTAINABILITY ↘ from page 148</p>	<p>self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804</p>	
<p> SURFACES ↘ from page 80</p>	<p>Powder Coatings COLOURline, MOODline, ARTline, GRAPHICline</p> <p>Perforations BASICline, REGULARline, SPREADline</p>	



HEATED AND CHILLED CANOPY CEILINGS BEAUTIFUL SHAPES.

These open ceiling constructions are the ideal solution for high architectural requirements, combined with high heating and cooling capacities as well as excellent sound absorption. The free-floating Canopy Ceilings allow a view of the bare ceiling and offer versatile design and arrangement possibilities. You can combine thermally active and passive areas to suit your specific needs.

- + heating/cooling by means of radiation and convection creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + high heating/cooling capacity and sound absorption due to the open construction
- + design freedom due to individual arrangement of canopies
- + freely floating Canopy Ceilings allow a view of the bare ceiling



Administration Building, Böblingen, Germany

PLAFOTHERM® DS 312

HEATED AND CHILLED CANOPY CEILING WITHOUT FRAME

The frameless Metal Canopy Ceiling can freely be arranged in your rooms, thus offering individual design options. Thanks to the open construction, it can easily be installed and impresses with high heating/cooling capacities and sound absorption. This Canopy Ceiling combines pleasant room climate with impressive acoustics. The ceiling panels can be removed without the need for any tools. With this economic canopy, you can flexibly combine thermally active and passive areas. The exposed concrete between the Canopy Ceilings can be used for installations.

- + heating/cooling by means of radiation and convection creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + high heating/cooling capacity and sound absorption due to the open construction
- + design freedom thanks to an individual arrangement of canopies and an exposed concrete
- + slim, filigree look without circumferential frame
- + easy maintenance option due to ceiling panels that can be individually operated without tools
- + independent installation of luminaires and fixtures possible between Canopy Ceilings
- + quick and easy installation
- + cost-effective Canopy Ceiling as economic solution

TECHNICAL DATA

Construction

- 1 metal ceiling panel
- 7/8/9 vernier suspension
- 18 self-tapping screw trapezoidal head
- 23 Z-hook-on profile 48
- 24 connector for suspension channel 60 to Z-hook-on profile 48
- 26 suspension channel 60
- 437 heating/cooling coil
- 479 connecting/connection hose

ADDITIONAL EQUIPMENT [↘ page 154](#)

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Ventilation Components

Pleasant supply air distribution possible by ventilation components on the rear side:

AirBox S [↘ from page 163](#)

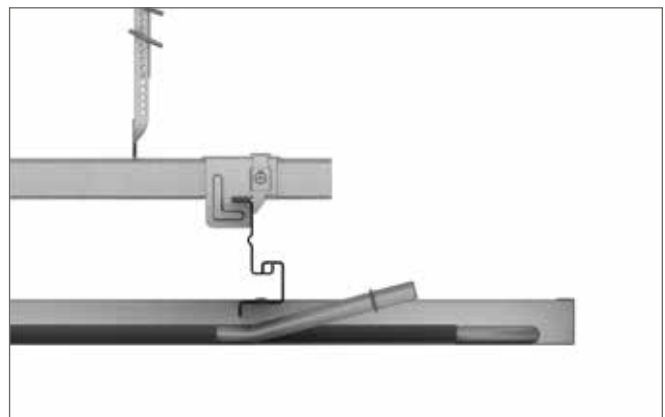
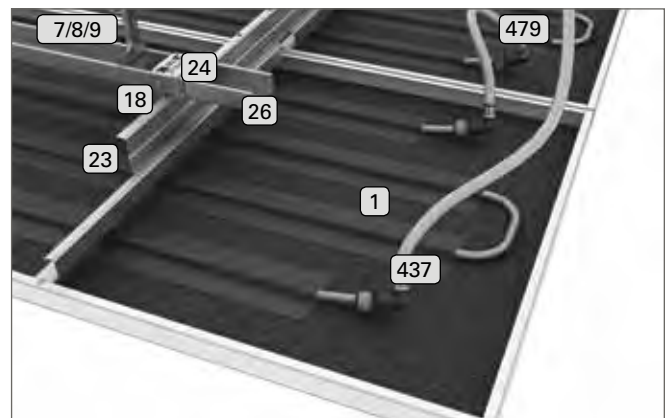
AirBox E [↘ from page 163](#)

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® DS 312

TECHNICAL DATA

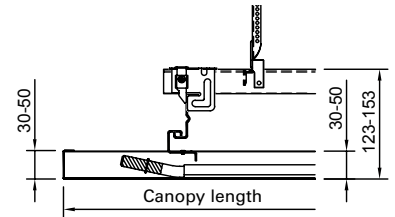
Ceiling Panel

Installation Detail

Plafotherm® DS 312 Type 1

Hook-On

canopy length: depending on requirements
canopy width: 500 - 3,000 mm



 **ACOUSTICS** ↘ from page 139

Room Acoustics

equivalent sound absorption area per canopy in acc. with EN ISO 354

 **FIRE PROTECTION** ↘ from page 137

Building Material Class

A2 - s2, d0 in acc. with EN 13501-1

 **CLIMATIC REGULATION** ↘ from page 118

Heating and Cooling

heat conducting profile with Cu-pipe:

nominal cooling capacity (10 K): 139 W/m² in acc. with EN 14240,

nominal heating capacity (15 K): 167 W/m² in acc. with EN 14037:2003

heat conducting profile with V2A-pipe:

nominal cooling capacity (10 K): 135 W/m² in acc. with EN 14240,

nominal heating capacity (15 K): 163 W/m² in acc. with EN 14037:2003

graphite panel with Cu-pipe:

nominal cooling capacity (10 K): 162 W/m² in acc. with EN 14240,

nominal heating capacity (15 K): 199 W/m² in acc. with EN 14037:2003

 **CORROSION PROTECTION** ↘ from page 147

exposure class A (interior) in acc. with EN 13964, table 8 and 9

 **SUSTAINABILITY** ↘ from page 148

self-declaration in acc. with ISO 14021,

EPD in acc. with ISO 14025 and EN 15804

 **SURFACES** ↘ from page 80

Powder Coatings

COLOURline, MOODline, ARTline, GRAPHICline

Perforations

BASICline, REGULARline, SPREADline

PLAFOTHERM® DS 313

HEATED AND CHILLED CANOPY CEILING WITH FRAME

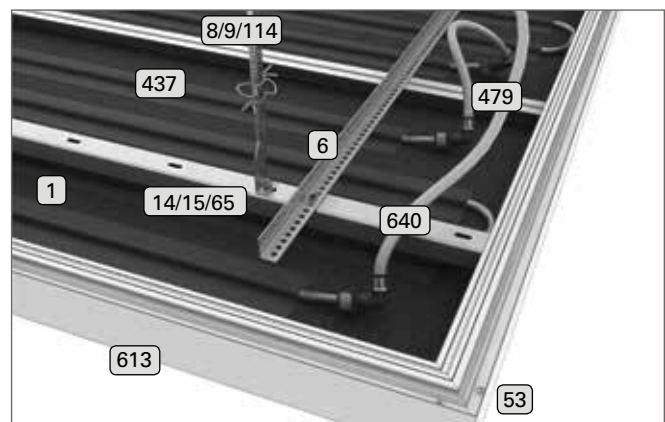
The Canopy Ceiling with circumferential frame offers variable arrangement options. Luminaires or other fixtures can be installed independently between the canopies. A pleasant room climate is created by means of radiation and convection. Moreover, perforated ceiling panels are acoustically effective. The Canopy Ceiling can be installed quickly and easily. Thanks to individually removable ceiling panels, the ceiling void is accessible for maintenance works. A combination of thermally active and passive areas is possible.

- + heating/cooling by means of radiation and convection creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + high heating/cooling capacity and sound absorption due to the open construction
- + design freedom thanks to an individual arrangement of canopies and an exposed concrete
- + circumferential frame as architectural element
- + easy maintenance option due to ceiling panels that can be individually operated
- + independent installation of luminaires and fixtures possible between Canopy Ceilings
- + quick and easy installation

TECHNICAL DATA

Construction

1	metal ceiling panel
6	L-profile 28
8/9/114	vernier suspension
14/15/65	screw connection
53	self-tapping screw raised countersunk head
437	heating/cooling coil
479	connecting/connection hose
613	aluminium frame profile
640	C-profile 50 as cross runner



ADDITIONAL EQUIPMENT [↘ page 154](#)

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Ventilation Components

Pleasant supply air distribution possible by ventilation components on the rear side:

AirBox S [↘ from page 163](#)

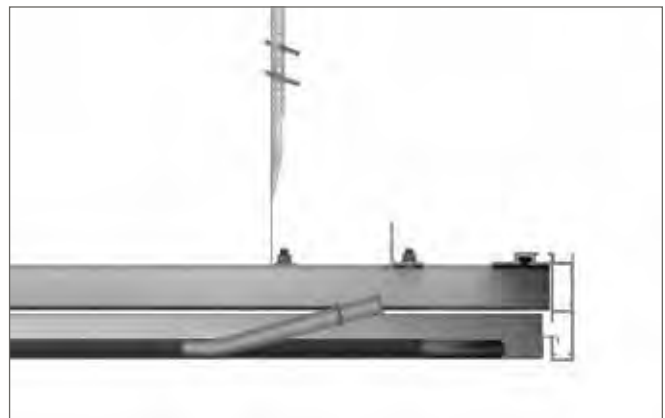
AirBox E [↘ from page 163](#)

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.


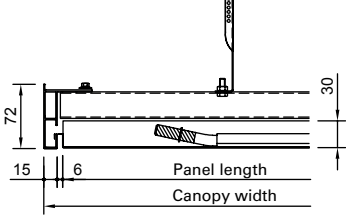

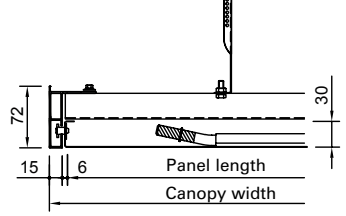
Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® DS 313

TECHNICAL DATA

	Ceiling Panel	Installation Detail
<p>Plafotherm® DS 313 Type 1 Hook-On canopy length: depending on requirements canopy width: 542 - 2,241 mm</p>		
<p>Plafotherm® DS 313 Type 2 Hook-On/Swing-Down canopy length: depending on requirements canopy width: 542 - 2,241 mm</p>		
<p>))) ACOUSTICS ↘ from page 139</p>	<p>Room Acoustics equivalent sound absorption area per canopy in acc. with EN ISO 354</p>	
<p>🔥 FIRE PROTECTION ↘ from page 137</p>	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>	
<p>☀️ CLIMATIC REGULATION ↘ from page 118</p>	<p>Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K): 139 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 167 W/m² in acc. with EN 14037:2003</p> <p>heat conducting profile with V2A-pipe: nominal cooling capacity (10 K): 135 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 163 W/m² in acc. with EN 14037:2003</p> <p>graphite panel with Cu-pipe: nominal cooling capacity (10 K): 162 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 199 W/m² in acc. with EN 14037:2003</p>	
<p>🔧 CORROSION PROTECTION ↘ from page 147</p>	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>	
<p>🌱 SUSTAINABILITY ↘ from page 148</p>	<p>self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804</p>	
<p>📄 SURFACES ↘ from page 80</p>	<p>Powder Coatings COLOURline, ARTline, GRAPHICline</p> <p>Perforations BASICline, REGULARline, SPREADline</p>	

PLAFOTHERM® DS 320

HEATED AND CHILLED CANOPY CEILING IN FILIGREE OPTICS

The Metal Canopy Ceiling in open construction provides for pleasant climate and good acoustics in your rooms. The large-sized ceiling panels can be designed with vertical or angled edge. They can be individually arranged in your rooms. The free space between the canopies offers you the possibility to independently fasten installations. The ceiling panels can be installed quickly. No tools are required to remove the ceiling panels. It is possible to combine thermally active and passive areas of this cost-effective system.

- + heating/cooling by means of radiation and convection creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + high heating/cooling capacity and sound absorption due to the open construction
- + design freedom thanks to an individual arrangement of canopies and an exposed concrete
- + large-sized ceiling panels optionally with 90° or 65° turn-up
- + easy maintenance option due to ceiling panels that can be individually operated without tools
- + independent installation of luminaires and fixtures possible between Canopy Ceilings
- + easy and quick installation
- + cost-effective Canopy Ceiling as economic solution

TECHNICAL DATA

Construction

1	metal ceiling panel
10/15/65	threaded rod suspension
437	heating/cooling coil
479	connecting/connection hose
684	connection clamp
711	hook-on profile 30 x 54 x 30 mm

ADDITIONAL EQUIPMENT [↘ page 154](#)

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Ventilation Components

Pleasant supply air distribution possible by ventilation components on the rear side:

AirBox S [↘ from page 163](#)

AirBox E [↘ from page 163](#)

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.


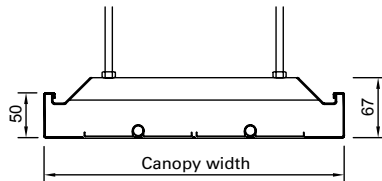

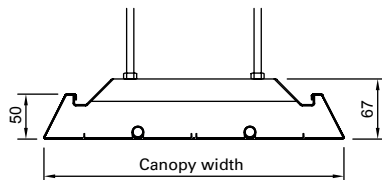

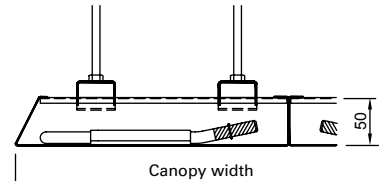

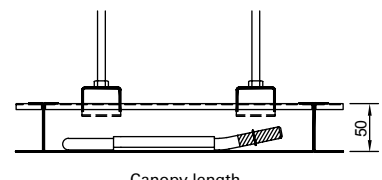







Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® DS 320

TECHNICAL DATA

	Ceiling Panel	Installation Detail
<p>Plafotherm® DS 320 Type 1 90°-turn-up as individual/border or central panel canopy length: depending on requirements canopy width: 200 - 1,250 mm panel length: 500 - 3,000 mm panel width: 200 - 1,250 mm</p>		
<p>Plafotherm® DS 320 Type 2 65°-turn-up as individual panel canopy length: depending on requirements canopy width: 200 - 1,250 mm panel length: 500 - 3,000 mm panel width: 200 - 1,250 mm</p>		
<p>Plafotherm® DS 320 Type 3 65°-turn-up as border panel for extension on short side canopy length: depending on requirements canopy width: 200 - 1,250 mm panel length: 500 - 3,000 mm panel width: 200 - 1,250 mm</p>		
<p>Plafotherm® DS 320 Type 4 65°-turn-up as central panel for extension on short side canopy length: depending on requirements canopy width: 200 - 1,250 mm panel length: 500 - 3,000 mm panel width: 200 - 1,250 mm</p>		
<p> ACOUSTICS ↘ from page 139</p>	<p>Room Acoustics equivalent sound absorption area per canopy in acc. with EN ISO 354</p>	
<p> FIRE PROTECTION ↘ from page 137</p>	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>	
<p> CLIMATIC REGULATION ↘ from page 118</p>	<p>Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K): 139 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 167 W/m² in acc. with EN 14037:2003</p> <p>heat conducting profile with V2A-pipe: nominal cooling capacity (10 K): 135 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 163 W/m² in acc. with EN 14037:2003</p> <p>graphite panel with Cu-pipe: nominal cooling capacity (10 K): 162 W/m² in acc. with EN 14240, nominal heating capacity (15 K): 199 W/m² in acc. with EN 14037:2003</p>	
<p> CORROSION PROTECTION ↘ from page 147</p>	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>	
<p> SUSTAINABILITY ↘ from page 148</p>	<p>self-declaration in acc. with ISO 14021, EPD in acc. with ISO 14025 and EN 15804</p>	
<p> SURFACES ↘ from page 80</p>	<p>Powder Coatings COLOURline, MOODline, ARTline, GRAPHICline</p> <p>Perforations BASICline, REGULARline, SPREADline</p>	
<p> STATICS ↘ from page 136</p>	<p>Seismic Safety an earthquake-proof construction is possible</p>	

PLAFOTHERM® DS Tabs

METAL CANOPY CEILING FOR CONCRETE CORE ACTIVATION

Plafotherm® DS Tabs is a thermo-active Canopy Ceiling that is thermally connected to the activated concrete ceiling. The building mass remains as thermal energy storage and the room is acoustically regulated thanks to the high sound absorption of the canopy. The radiation surface of the concrete core is reflected on the metal ceiling surface. Moreover, this system impresses with reduced energy consumption and low CO₂ emissions. Vertical or angled edges of the canopy as well as an individual arrangement offer free design options in your rooms.

- + acoustically effective solution to improve room acoustics for buildings with concrete core activation
- + building mass remains as thermal energy storage
- + reflection of the radiation surface of the concrete core on the metal ceiling surface
- + design freedom thanks to an individual arrangement of canopies
- + optionally with vertical or angled edge
- + low CO₂ emissions due to reduced energy consumption

TECHNICAL DATA

Construction

- 555 metal canopy ceiling
- 556 contact/compensation strip

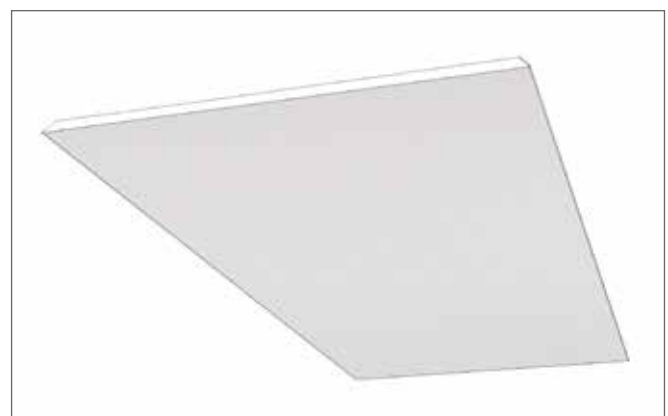
ADDITIONAL EQUIPMENT ↘ page 154



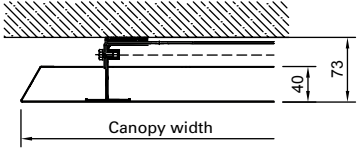






Luminaires

Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® DS Tabs	 TECHNICAL DATA	
	Ceiling Panel	Installation Detail
Plafotherm® DS Tabs canopy length: 700 - 3,000 mm canopy width: 600 - 1,400 mm		
 ACOUSTICS ↘ from page 139	Room Acoustics up to $\alpha_w = 1.00$ (L), sound absorption class A in acc. with EN ISO 354, up to NRC = 1.10 in acc. with ISO 354, rated to ASTM C 423	
 FIRE PROTECTION ↘ from page 137	Building Material Class A2 - s1, d0 in acc. with EN 13501-1	
 CLIMATIC REGULATION ↘ from page 118	Heating and Cooling occupancy 30 % (canopy area to room area) efficiency: 94 - 98 % occupancy 50 % efficiency: 90 - 97 %	
 CORROSION PROTECTION ↘ from page 147	exposure class A (interior) in acc. with EN 13964, table 8 and 9	
 SUSTAINABILITY ↘ from page 148	EPD in acc. with ISO 14025 and EN 15804	
 SURFACES ↘ from page 80	Powder Coatings COLOURline, MOODline, ARTline, GRAPHICline Perforations BASICline, REGULARline, SPREADline	



HEATED AND CHILLED BAFFLE CEILINGS THEIR OPENNESS IS REMARKABLE.

Baffle Ceilings create a pleasant indoor climate thanks to convection and radiation. Very high cooling capacities are possible due to the open construction. Depending on the requirements, thermally active and passive baffles can be combined. The various baffle systems can be arranged and designed flexibly: Variable centre distances and baffle sizes enable flexible design.

- + heating/cooling by means of convection and radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive baffles
- + high cooling capacity due to the open construction
- + freely selectable centre distances and baffle dimensions



Lufthansa First Class Lounge, Munich, Germany

PLAFOTHERM® L 608

HEATED AND CHILLED METAL BAFFLE CEILING, HOOK-ON/SLIDE BAFFLE

This linear Baffle Ceiling is especially suitable for areas with increased maintenance demands. Thanks to movable baffles, you can comfortably reach the ceiling void. The open construction guarantees high cooling capacities and variable design options. Create unique appearances in your well-tempered rooms by means of freely selectable centre distances and baffle sizes. The ceiling void between the baffles can be used for installations. The Metal Baffles can quickly be installed – a combination with passive baffles is also possible.

- + heating/cooling by means of convection and radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive baffles
- + high cooling capacity due to the open construction
- + freely selectable centre distances and baffle dimensions
- + independent installation of luminaires and fixtures possible between baffles
- + visible ceiling void
- + quick and easy installation
- + easy maintenance option due to baffles that can be individually slid without tools

TECHNICAL DATA

Construction

10/15/65	threaded rod suspension
26	suspension channel 60
78	drilling screw hexagon head
124	metal baffle
437	heating/cooling coil
479	connecting/connection hose
746	double hook-on profile 54/608

ADDITIONAL EQUIPMENT [↘ page 154](#)

Hydraulic Components

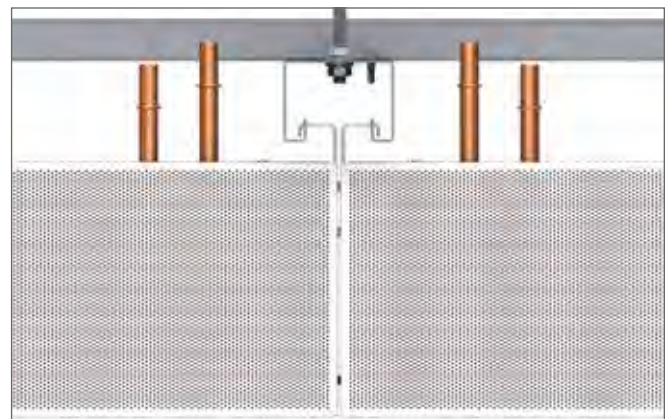
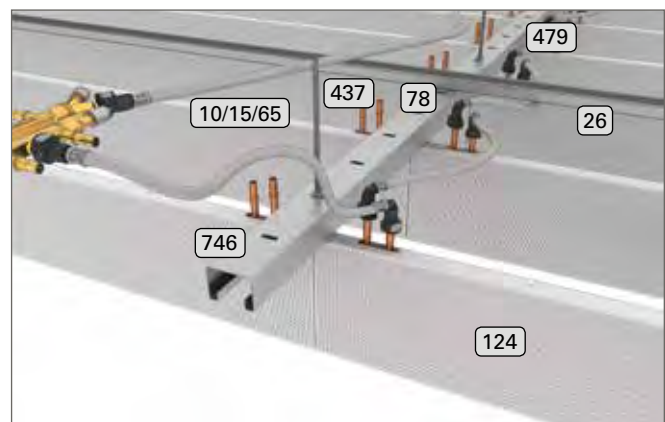
Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.


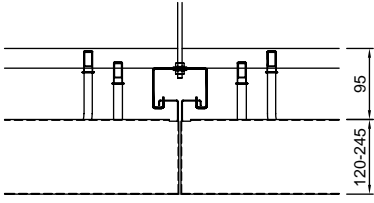

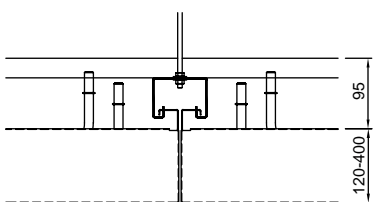





Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



PLAFOTHERM® L 608

TECHNICAL DATA

PLAFOTHERM® L 608	TECHNICAL DATA	
	Baffles	Installation Detail
<p>Plafotherm® L 608 Type 1 One-Piece length: 500 - 3,000 mm width: 45, 50 or 55 mm height: 120 - 245 mm</p>		
<p>Plafotherm® L 608 Type 2 Two-Piece length: 500 - 3,000 mm width: 35 mm height: 120 - 400 mm</p>		
<p> ACOUSTICS ↘ from page 139</p>	<p>Room Acoustics up to $\alpha_w = 0.60$ (MH), sound absorption class C in acc. with EN ISO 354, up to NRC = 0.65 in acc. with ISO 354, rated to ASTM C 423</p>	
<p> FIRE PROTECTION ↘ from page 137</p>	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>	
<p> CLIMATIC REGULATION ↘ from page 118</p>	<p>Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K): 21.1 W/lfm in acc. with EN 14240, nominal heating capacity (15 K): 21.7 W/lfm in acc. with EN 14037:2003</p>	
<p> CORROSION PROTECTION ↘ from page 147</p>	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>	
<p> SURFACES ↘ from page 80</p>	<p>Powder Coatings COLOURline, ARTline</p> <p>Perforations BASICline, REGULARline, SPREADline</p>	



HEATED AND CHILLED EXPANDED METAL CEILINGS

AN IMPRESSIVE LOOK FOR ANY SPACE.

Expanded Metal Ceilings use radiation to heat and cool your rooms comfortably – which allows you to create an ideal indoor climate. Thermally active and passive areas can be combined depending on your needs. Expanded Metal Ceilings are also extremely versatile in regard of their design: The structured expanded metal appearance creates a uniform ceiling surface with meshes in different shapes and sizes.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + uniform ceiling surface due to concealed substructure
- + numerous design possibilities thanks to different mesh types, shapes and sizes



PLAFOTHERM® St 213

HEATED AND CHILLED EXPANDED METAL HOOK-ON CEILING WITH ACCENTUATED JOINTS

For maintenance works in the ceiling void, the Hook-On ceiling panels of this expanded metal ceiling can be removed without the need for any tools. Accentuated joints create a homogeneous ceiling surface. Thanks to integrated heating/cooling technologies, an ideal room climate is achieved – a combination of thermally active and passive areas is possible. A multitude of different meshes offers versatile design options.

- + heating/cooling by means of radiation creates a pleasant room climate
- + flexibility thanks to the combination of thermally active and passive areas
- + homogeneous ceiling surface due to concealed substructure
- + ceiling layout with accentuated joints in both directions possible
- + many design possibilities thanks to different mesh types, shapes and sizes
- + easy maintenance option due to ceiling panels that can be individually operated without tools

⚙️ TECHNICAL DATA

Construction

2	expanded metal ceiling panel
6	L-profile 28
8/9/114	vernier suspension
14/15/65	screw connection
19	drilling screw fillister head
78	drilling screw hexagon head
437	heating/cooling coil
479	connecting/connection hose
534	spacer for double hook-on profile 54
592	double hook-on profile 54

Wall Connection Options [↘ from page 112](#)

- L-angle
- shadow gap trim
- open wall connection

★ ADDITIONAL EQUIPMENT [↘ page 154](#)

Hydraulic Components

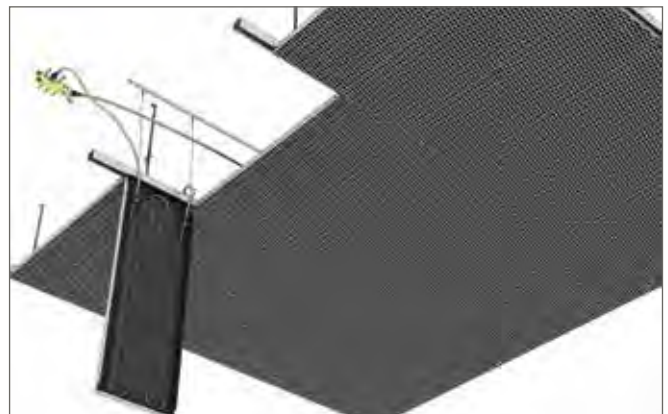
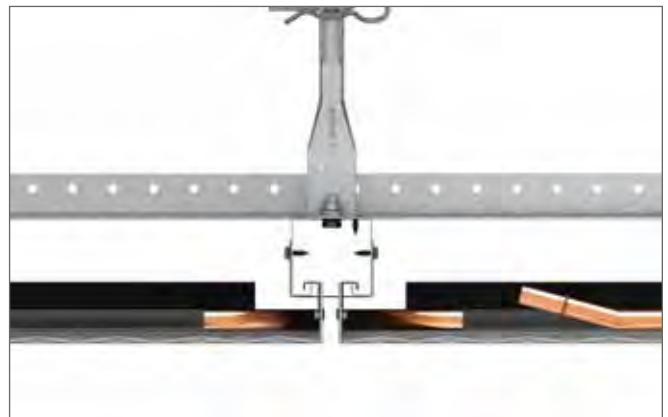
Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



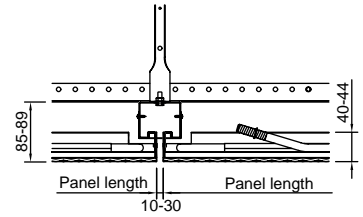
PLAFOTHERM® St 213

TECHNICAL DATA

Ceiling Panel

Installation Detail

Plafotherm® St 213 Type 12
Hook-On, Expanded Metal Placed on Frame
 length: 250 - 2,500 mm
 width: 200 - 625 mm



))) **ACOUSTICS** ↘ from page 139

Room Acoustics

up to $\alpha_w = 0.50$ (L), sound absorption class D in acc. with EN ISO 354,
 up to NRC = 0.65 in acc. with ISO 354, rated to ASTM C 423

🔥 **FIRE PROTECTION** ↘ from page 137

Building Material Class

A2 - s2, d0 in acc. with EN 13501-1

☀️ **CLIMATIC REGULATION** ↘ from page 118

Heating and Cooling

heat conducting profile with Cu-pipe:
 nominal cooling capacity (10 K): 96.6 W/m² in acc. with EN 14240,
 nominal heating capacity (15 K): 122 W/m² in acc. with EN 14037: 2003

🔧 **CORROSION PROTECTION** ↘ from page 147

exposure class A (interior) in acc. with EN 13964, table 8 and 9

📄 **SURFACES** ↘ from page 80

Powder Coatings

COLOURline, MOODline

Expanded metal

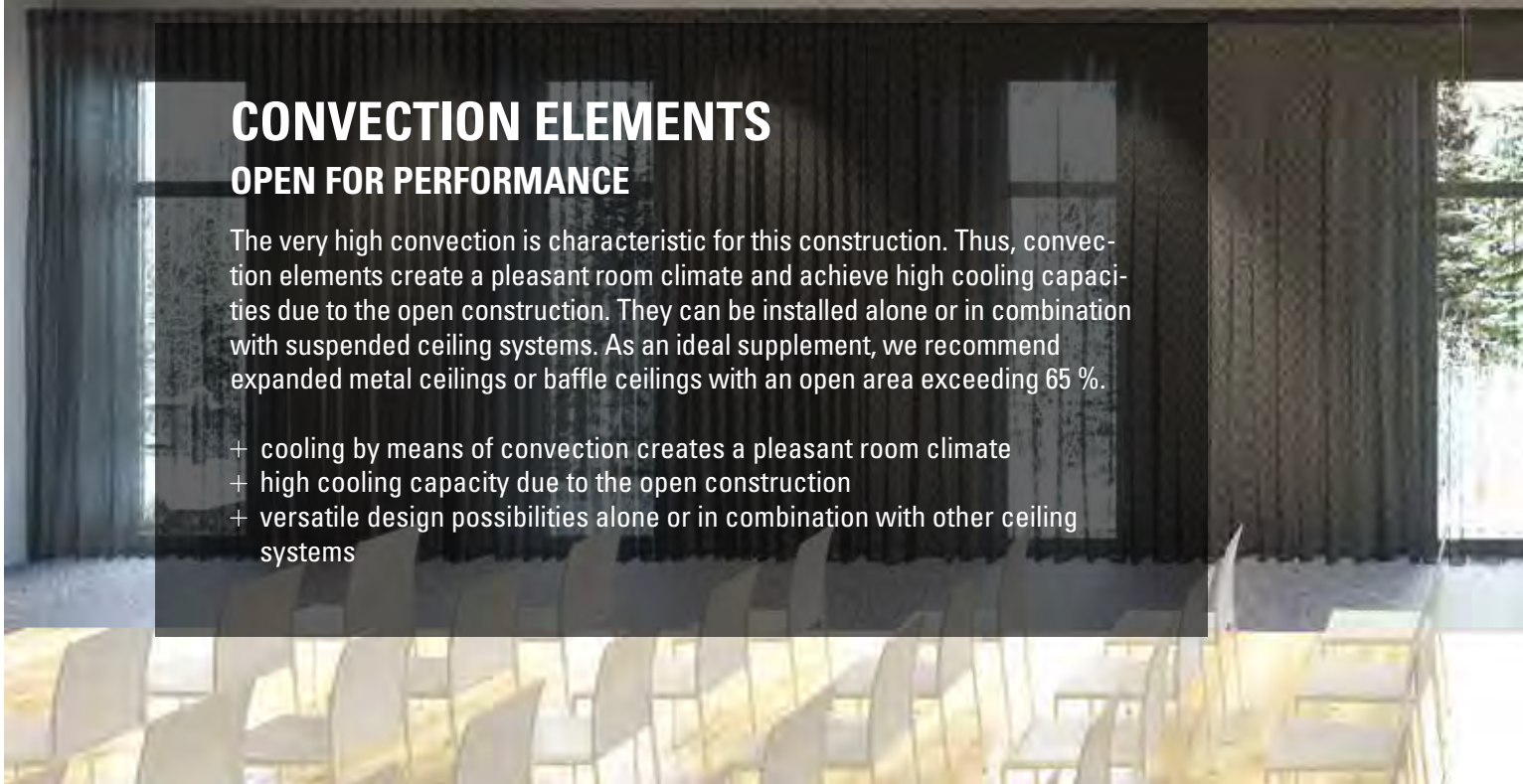
MESHdesign



CONVECTION ELEMENTS OPEN FOR PERFORMANCE

The very high convection is characteristic for this construction. Thus, convection elements create a pleasant room climate and achieve high cooling capacities due to the open construction. They can be installed alone or in combination with suspended ceiling systems. As an ideal supplement, we recommend expanded metal ceilings or baffle ceilings with an open area exceeding 65 %.

- + cooling by means of convection creates a pleasant room climate
- + high cooling capacity due to the open construction
- + versatile design possibilities alone or in combination with other ceiling systems





PLAFOTHERM® KN

CONVECTION ELEMENT

Plafotherm® KN in modular construction achieves high cooling capacities and creates a pleasant room climate by means of convection. With its open construction and extensive combination possibilities, this convection element offers a wide variety of designs: it can be installed alone or in combination with different ceiling systems – for example with suspended expanded metal ceilings or baffle ceilings with an open area exceeding 65 % without capacity losses.

- + cooling by means of convection creates a pleasant room climate
- + high cooling capacity due to the open construction
- + versatile design possibilities alone or in combination with other ceiling systems

⚙️ TECHNICAL DATA

Construction



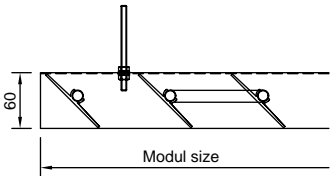



10/15/16 threaded rod suspension
463 Plafotherm® KN module

★ ADDITIONAL EQUIPMENT ↘ page 154

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.



<h1>PLAFOTHERM® KN</h1>	 TECHNICAL DATA	
	Module	Installation Detail
<p>Plafotherm® KN length: 1,000 - 2,500 mm (depending on number of bars) width: 350 - 1,070 mm (depending on number of bars) height: 60 mm number of bars: 4 - 12 bars</p>		
<p> CLIMATIC REGULATION ↘ from page 118</p>	<p>Heating and Cooling heat conducting profile with Cu-pipe: nominal cooling capacity (10 K) exceeding 65 % open area: 149 W/m² in acc. with EN 14240, nominal heating capacity (15 K) exceeding 65 % open area: 142 W/m² in acc. with EN 14037:2003</p>	
<p> CORROSION PROTECTION ↘ from page 147</p>	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>	
<p> SURFACES ↘ from page 80</p>	<p>Powder Coatings COLOURline</p>	



HEATED AND CHILLED PLASTERBOARD CEILINGS FROM ONE SOURCE.

Heated/Chilled Plasterboard Ceilings ensure optimal comfort and a healthy indoor climate provided by radiant heating and cooling. By selecting your choice of plasterboard, you determine the visual effect and thermal conductivity of your plasterboard ceiling. The closed, jointless surface can be designed as a plain or perforated version or with acoustic coating. All individual components of our Plasterboard Ceilings are tested as a complete system.

- + heating/cooling by means of radiation creates a pleasant room climate
- + jointless surfaces can be designed as a plain or perforated version
- + all individual components are tested as a complete system



PLAFOTHERM® GK HEKDA

HEATED AND CHILLED PLASTERBOARD CEILINGS, HEAT CONDUCTING PROFILE AS SECONDARY GRID

This cost-effective system enables jointless surfaces – a multitude of plain or perforated panellings are available. All components of Plafotherm® GK HEKDA are tested as a complete system and provide for best comfort and a pleasant room climate. The profile fuses with the substructure as constructive element and is screwed to the plasterboard panel. This Plasterboard Ceiling can achieve a high occupancy rate of up to 100 %, even in case of rooms with several ceiling fixtures. Height differences and flexible shapes can be realised.

- + heating/cooling by means of radiation creates a pleasant room climate
- + jointless surface can be freely designed in plain or perforated version
- + high occupancy rate of up to 100 % is possible
- + flexible shapes and height differences can easily be realised
- + all single components are tested as a complete system
- + cost-effective heated/chilled ceiling system as economic solution

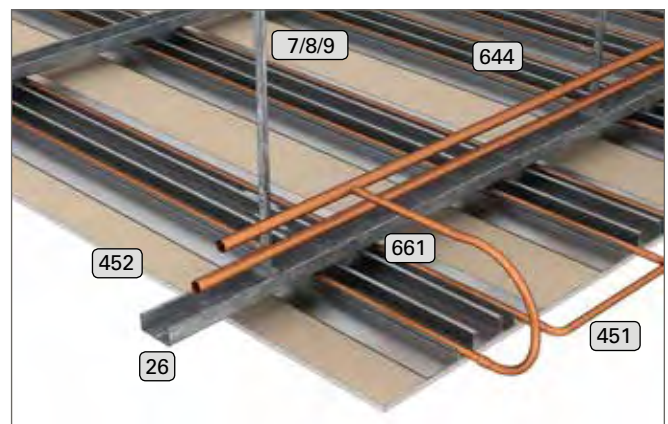
TECHNICAL DATA

Construction

- 7/8/9 vernier suspension
- 26 suspension channel 60
- 451 copper bent pipe
- 452 panelling
- 644 U-coil
- 661 armature angle for Plafotherm® GK HEKDA

Wall Connection Options from page 112

- shadow gap
- open border gap




ADDITIONAL EQUIPMENT page 154

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Ventilation Components

Pleasant supply air distribution possible by ventilation components on the rear side:

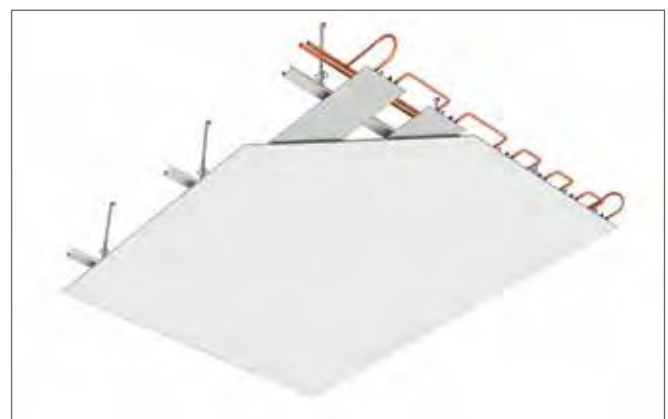
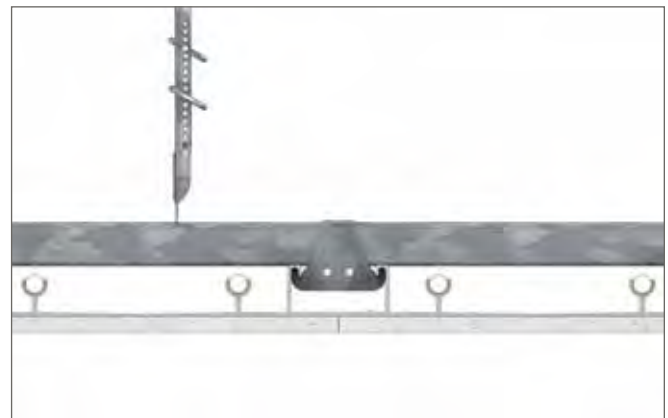
AirBeam  page 161

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



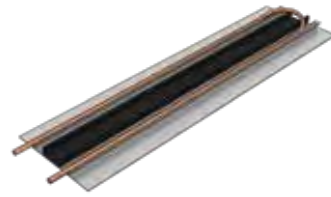
PLAFOTHERM® GK HEKDA

TECHNICAL DATA

View

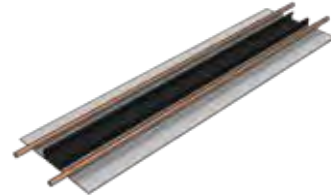
Plafotherm® GK HEKDA U-coil

number of bars: 2 bars
heat conducting profile width: 250 mm
coil length: 500 - 5,000 mm



Plafotherm® GK HEKDA G-coil

number of bars: 2 bars
heat conducting profile width: 250 mm
coil length: 500 - 5,000 mm



Plafotherm® GK HEKDA module 4

number of bars: 4 bars
heat conducting profile width: 250 mm
coil length: 1,000 - 4,000 mm



Plafotherm® GK HEKDA module 6

number of bars: 6 bars
heat conducting profile width: 250 mm
coil length: 1,000 - 3,000 mm



Plafotherm® GK HEKDA module 8

number of bars: 8 bars
heat conducting profile width: 250 mm
coil length: 1,000 - 2,500 mm



))) **ACOUSTICS** ↘ from page 139

Room Acoustics

up to $\alpha_w = 0.45$ (L), sound absorption class D in acc. with EN ISO 354,
up to NRC = 0.50 in acc. with ISO 354, rated to ASTM C 423

🔥 **FIRE PROTECTION** ↘ from page 137

Building Material Class

A2 - s1, d0 in acc. with EN 13501-1

☀️ **CLIMATIC REGULATION** ↘ from page 118

Heating and Cooling

plasterboard panel with graphite content:
nominal cooling capacity (10 K): 95.8 W/m² in acc. with EN 14240,
nominal heating capacity (15 K): 108 W/m² in acc. with EN 14037:2003

plasterboard panel high-compressed:
nominal cooling capacity (10 K): 81.2 W/m² in acc. with EN 14240,
nominal heating capacity (15 K): 99.3 W/m² in acc. with EN 14037:2003

🔧 **CORROSION PROTECTION** ↘ from page 147

exposure class A (interior) in acc. with EN 13964, table 8 and 9

🌱 **SUSTAINABILITY** ↘ from page 148

self-declaration in acc. with ISO 14021

📄 **SURFACES** ↘ from page 80

Plasterboard Surfaces



HEATED AND CHILLED HYBRID CEILINGS MULTIFUNCTIONAL IN ALL AREAS.

Heated/Chilled Hybrid Ceilings are multifunctional elements: they combine various properties like heating, cooling and venting. The right systems for the activation and working of the concrete core are available. Plafotherm® Heated/Chilled Ceilings ensure optimum comfort when combined with hybrid ventilation hoods or heated/chilled beams.

- + multifunctional solutions combining heating, cooling, venting and much more
- + systems for concrete core activation and working are available
- + optimal comfort thanks to the combination with hybrid ventilation hoods or heated/chilled beams



Jupiter Tower, Riga, Latvia
Photo: © www.justdirk.net

PLAFOTHERM® DS TAS

HYBRID HEATED AND CHILLED CANOPY CEILING

This hybrid heated/chilled Canopy Ceiling provides ideal climatic conditions in your rooms by means of radiation and convection. Plafotherm® DS TAS is extremely versatile thanks to the combination of cooling, heating and venting – comfort in acc. with DIN, ISO and SIA standards is ensured at all times. Another advantage: Being an acoustically effective solution, it improves the room acoustics in buildings with subsequent concrete core working. The system is very efficient due to the utilisation of free cooling in night operation and low CO₂ consumption.

- + heating/cooling by means of radiation and convection creates a pleasant room climate
- + acoustically effective solution to improve room acoustics for buildings with subsequent concrete core working
- + comfort tested to DIN, ISO and SIA thanks to the combination of cooling, heating and venting
- + low CO₂ emissions due to reduced energy consumption
- + high level of energy efficiency by using the free cooling in night operation

TECHNICAL DATA

Construction

554 metal canopy ceiling

ADDITIONAL EQUIPMENT [↘ page 154](#)

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Luminaires

Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



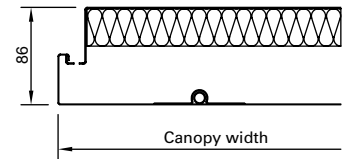
PLAFOTHERM® DS TAS

TECHNICAL DATA

Ceiling Panel



Installation Detail



Plafotherm® DS TAS
 canopy length: 700 - 9,000 mm
 canopy width: 700 - 1,250 mm
 panel length: 700 - 3,000 mm
 panel width: 700 - 1,250 mm

ACOUSTICS ↘ from page 139

Room Acoustics
 equivalent sound absorption area per canopy in acc. with EN ISO 354

FIRE PROTECTION ↘ from page 137

Building Material Class
 A2 - s2, d0 in acc. with EN 13501-1

CLIMATIC REGULATION ↘ from page 118

Heating and Cooling
 total hybrid cooling capacity (8 K): 152 W/m²
 (at 50 % room occupation, supply air volume 7.5 m³/hm² floor area and 18° (supply air temperature))

indirect working of the concrete core: up to 40 W/m²
 (depending on execution, control strategy and building dynamic)

CORROSION PROTECTION ↘ from page 147

exposure class A (interior) in acc. with EN 13964, table 8 and 9

SUSTAINABILITY ↘ from page 148

EPD in acc. with ISO 14025 and EN 15804

SURFACES ↘ from page 80

Powder Coatings
 COLOURline, MOODline, ARTline, GRAPHICline

Perforations
 BASICline, REGULARline, SPREADline

PLAFOTHERM® AirHybrid

HYBRID VENTILATION COMPONENT IN METAL CEILING

Post Cap and Hook-On Ceilings can be combined with ventilation components on the rear side. The ventilation hood is not visible from below – a homogeneous ceiling surface is guaranteed. Best comfort is achieved thanks to an even distribution of supply air – through panel perforations and induction outlets in the ceiling void. The ventilation component can be removed and cleaned in acc. with VDI 6022. Besides supplying fresh air, Plafotherm® AirHybrid can be used for the activation of the concrete core.

- + multifunctional ceiling with guided supply air
- + thermoactive for the activation of the concrete core
- + perfectly matched to Plafotherm® B Heated/Chilled Post Cap Ceilings and Plafotherm® E Heated/Chilled Hook-On Ceilings
- + homogeneous ceiling surface due to concealed hybrid ventilation hood
- + inserts supply air through panel perforation or induction outlets in the ceiling void
- + comfort tested to DIN, ISO and SIA thanks to an even distribution of supply air

TECHNICAL DATA

Construction

heated/chilled ceiling with hybrid ventilation component

ADDITIONAL EQUIPMENT [↘ page 154](#)

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Luminaires


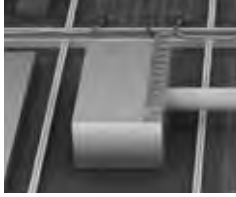
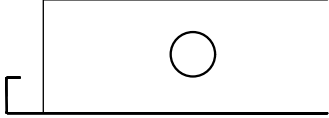




Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



Visualisation © Lindner Group

PLAFOTHERM® AirHybrid	 TECHNICAL DATA	
	Hybrid Ventilation Component	Installation Detail
Plafotherm® AirHybrid length: 1,000 mm width: 375 mm height: 160 mm airside connection piece: 100 mm/2 x 100 mm		
 ACOUSTICS ↘ from page 139	Room Acoustics up to $\alpha_w = 0.65$, sound absorption class C in acc. with EN ISO 354	
 FIRE PROTECTION ↘ from page 137	Building Material Class A2 - s2, d0 in acc. with EN 13501-1	
 CLIMATIC REGULATION ↘ from page 118	Heating and Cooling supply air temperature 16 °C: 6 m³/hm² floor area: waterside nominal cooling capacity (10 K): 134 W/m² following EN 14240, 18 m³/hm² floor area: waterside nominal cooling capacity (10 K): 150 W/m² following EN 14240 supply air temperature 18 °C: 6 m³/hm² floor area: waterside nominal cooling capacity (10 K): 136 W/m² following EN 14240, 18 m³/hm² floor area: waterside nominal cooling capacity (10 K): 153 W/m² following EN 14240 supply air temperature 20 °C: 6 m³/hm² floor area: waterside nominal cooling capacity (10 K): 137 W/m² following EN 14240, waterside nominal heating capacity (15 K): 149 W/m² following EN 14037:2003 18 m³/hm² floor area: waterside nominal cooling capacity (10 K): 159 W/m² following EN 14240, waterside nominal heating capacity (15 K): 161 W/m² following EN 14037:2003	
 CORROSION PROTECTION ↘ from page 147	exposure class A (interior) in acc. with EN 13964, table 8 and 9	

PLAFOTHERM® DS AirHybrid

HYBRID VENTILATION COMPONENT IN CANOPY CEILING

Combined with hybrid ventilation components, Plafotherm® DS Heated/Chilled Canopy Ceilings are multi-functional Canopy Ceilings with guided supply air that can be used for the activation of the concrete core. The ventilation hood is integrated on the rear side of the ceiling panel and is invisible from below. Perforated ceiling panels and induction outlets in the ceiling void evenly distribute tempered fresh air above resp. below the ceiling without generating unpleasant draught. Comfort in acc. with DIN, ISO and SIA as well as a pleasant room climate is guaranteed.

- + multifunctional Canopy Ceiling with guided supply air
- + thermoactive for the activation of the concrete core
- + perfectly matched to Plafotherm® DS Heated/Chilled Canopy Ceilings
- + homogeneous ceiling surface due to concealed hybrid ventilation hood
- + inserts supply air through panel perforation or induction outlets in the ceiling void
- + comfort tested to DIN, ISO and SIA thanks to an even distribution of supply air

TECHNICAL DATA

Construction

heated/chilled ceiling with hybrid ventilation component

ADDITIONAL EQUIPMENT [↘ page 154](#)

Hydraulic Components

Lindner offers a multitude of hydraulic components and accessories for the perfect connection of Plafotherm® Heated and Chilled Ceilings.

Luminaires



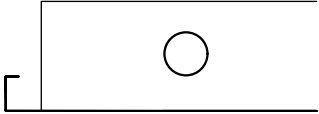




Perfectly integrated Lindner Lighting Solutions are available.

Acoustic Inlays

Equipped with acoustic inlays like mineral wool, this system contributes significantly to sound protection.



Visualisation © Lindner Group

<h1>PLAFOTHERM® DS AirHybrid</h1>	 TECHNICAL DATA	
	Hybrid Ventilation Component	Installation Detail
Plafotherm® DS AirHybrid length: 1,000 mm width: 375 mm height: 160 mm airside connection piece: 100 mm/2 x 100 mm		
 ACOUSTICS ↘ from page 139	Room Acoustics equivalent sound absorption area per canopy in acc. with EN ISO 354	
 FIRE PROTECTION ↘ from page 137	Building Material Class A2 - s2, d0 in acc. with EN 13501-1	
 CLIMATIC REGULATION ↘ from page 118	Heating and Cooling supply air temperature 16 °C: 6 m³/hm² floor area: waterside nominal cooling capacity (10 K): 156 W/m² following EN 14240, 18 m³/hm² floor area: waterside nominal cooling capacity (10 K): 187 W/m² following EN 14240 supply air temperature 20 °C: 6 m³/hm² floor area: waterside nominal cooling capacity (10 K): 160 W/m² following EN 14240, waterside nominal heating capacity (15 K): 160 W/m² following EN 14037:2003 18 m³/hm² floor area: waterside nominal cooling capacity (10 K): 192 W/m² following EN 14240, waterside nominal heating capacity (15 K): 165 W/m² following EN 14037:2003	
 CORROSION PROTECTION ↘ from page 147	exposure class A (interior) in acc. with EN 13964, table 8 and 9	

A modern office interior featuring desks, chairs, and large windows. The ceiling has a perforated acoustic panel design with circular recessed lighting. The office is furnished with desks, chairs, and blue and grey cubicle dividers. Large windows provide a view of the outdoors.

PROJECT-RELATED SOLUTIONS

YOU HAVE THE BUILDING, WE HAVE THE CLIMATE. LINDNER CLIMATE DESIGN.

We are constantly coming up with new, integrated solutions to satisfy your project needs. Our climate design guarantees perfectly matched processes and components. We adapt our innovative technologies and systems to your personal demands. To ensure the ideal room temperature, we test the capacity of different heated and chilled ceilings under laboratory conditions in the in-house testing facility. In a hermetically sealed room, the temperature is measured and checked by external authorities.

- + integrated solutions for individual demands
- + climate design with innovative heating and cooling technologies
- + support from development to installation
- + perfectly matched components and systems
- + test under laboratory conditions in the in-house testing facility



↳ FIFA WORLD FOOTBALL MUSEUM, ZURICH, SWITZERLAND

The former „Haus zur Enge“ at Zurich’s Tessiner Platz has been extensively redeveloped to house the new museum of the FIFA. The museum features a multi-media exhibition that showcases the whole world of football. Finding a highlight with regard to appearance in the exhibition and gastronomic areas is challenging, however, one of the most exciting parts are the 3,700 m² of Custom Metal Hook-On Ceilings by Lindner, featuring aluminium plates that have various surfaces, ranging from powder coated over anodized to mirror polished bronze-golden plates, which have been combined with Convection Cooling Ceilings type Plafotherm® KN. Other Heating and Cooling Ceiling Systems have been partly constructed with rounded metal honeycomb panels or executed as a ten metres long Cooling Canopy Ceiling with acoustic plaster coating, respectively.



FIFA World Football Museum, Zurich, Switzerland
Photo: © FIFA World Football Museum

➤ **FLEET OFFICE II, HAMBURG, GERMANY**

The scope of works included the product areas Heated and Chilled Ceilings, Partition Systems, Lights and Luminaires as well as the management of all fit-out works. Initially, the planning saw circulation air condition systems. However, Lindner convinced with a concept that combined the existing concrete core activation with Heated and Chilled Ceilings of type Plafotherm® DS 320. This approach convinces through several advantages: more cozy temperature control, considerable increase in energy efficiency, improved acoustics through perforations as well as flexibility in case of spatial redevelopments. These alterations are also facilitated by easily movable Glass Partitions by Lindner.



Fleet Office II, Hamburg, Germany

↳ HOCHHAUS ZUR BASTEI, ZÜRICH, SWITZERLAND

The Swiss branch of Lindner SE participated in this project through the supply and installation of various Ceiling Systems. On level 8, Lindner executed Plasterboard Heated and Chilled Ceilings of type Plafotherm® GK HEKDA, as well as Metal Corridor Ceilings. On level 9, an Aluminium Honeycomb Chilled Ceiling of type COMPlacq acoustic was installed. The Ceiling provides very high bending stiffness, even in large formats, while being lightweight and flexible in design. A perforation also brings and optimisation in acoustic performance. The system was essential for the design of the ceiling area, since every ceiling panel is of unique dimensions, showing no regular flow in the overall picture. The visual depth of the ceilings was further increased with Integrated Light Channels.



Hochhaus zur Bastei, Zürich, Switzerland

Photo: © Ortwin Klipp

↳ **ALLIANZ SUISSE, WALLISELLEN, SWITZERLAND**

The new headquarters of Allianz Suisse is situated on Richtiplatz, a former industrial area adjacent to Wallisellen Central Station. They consist of a multi-storey building and low building, which are connected with bridges. This combination forms a versatile working environment for 1,700 employees. Lindner developed and fitted an especially efficient Plafotherm® Heating and Cooling Ceiling System in the course of this project. In addition to its efficiency, the system also contributes to the interior design thanks to a three-dimensional structural surface of the type TOUCHdesign.



Allianz Suisse, Wallisellen, Switzerland

Photo: © Jan Bitter

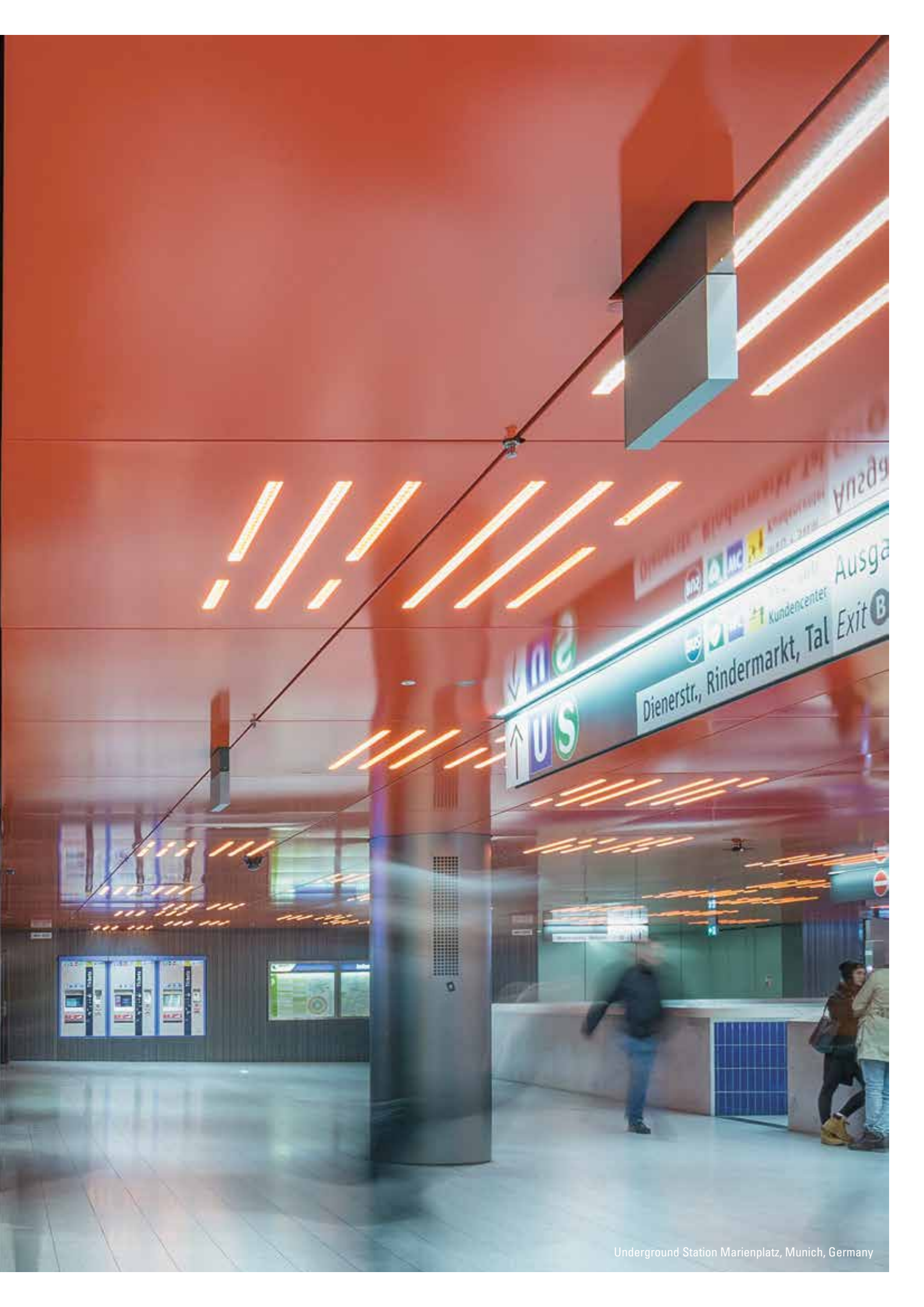


SURFACES

MAXIMUM OPPORTUNITY FOR DESIGN.

Lindner has a wide range of surface designs for different needs – so that your rooms are not only extraordinary but unique. We make an eye-catcher out of every ceiling by means of different colours, decors, images, three-dimensional structures and perforations. Besides various design options, we also offer coatings that improve the room quality.

- + wide range of surface designs to suit different requirements
- + a wide selection of various colours, decors, images, three-dimensional structures and perforations
- + individual design possibilities make an eye-catcher out of every ceiling



Underground Station Marienplatz, Munich, Germany

SURFACES

POWDER COATING from page 83

COLOURline – Powder Coating

MOODline – Powder Coating Deep Matt

ARTline – Decorative Powder Coating

GRAPHICline – Digital Print

PERFORATIONS from page 94

BASICline – Standard Perforations

REGULARline – Further Perforations

SPREADline – Customised Perforations

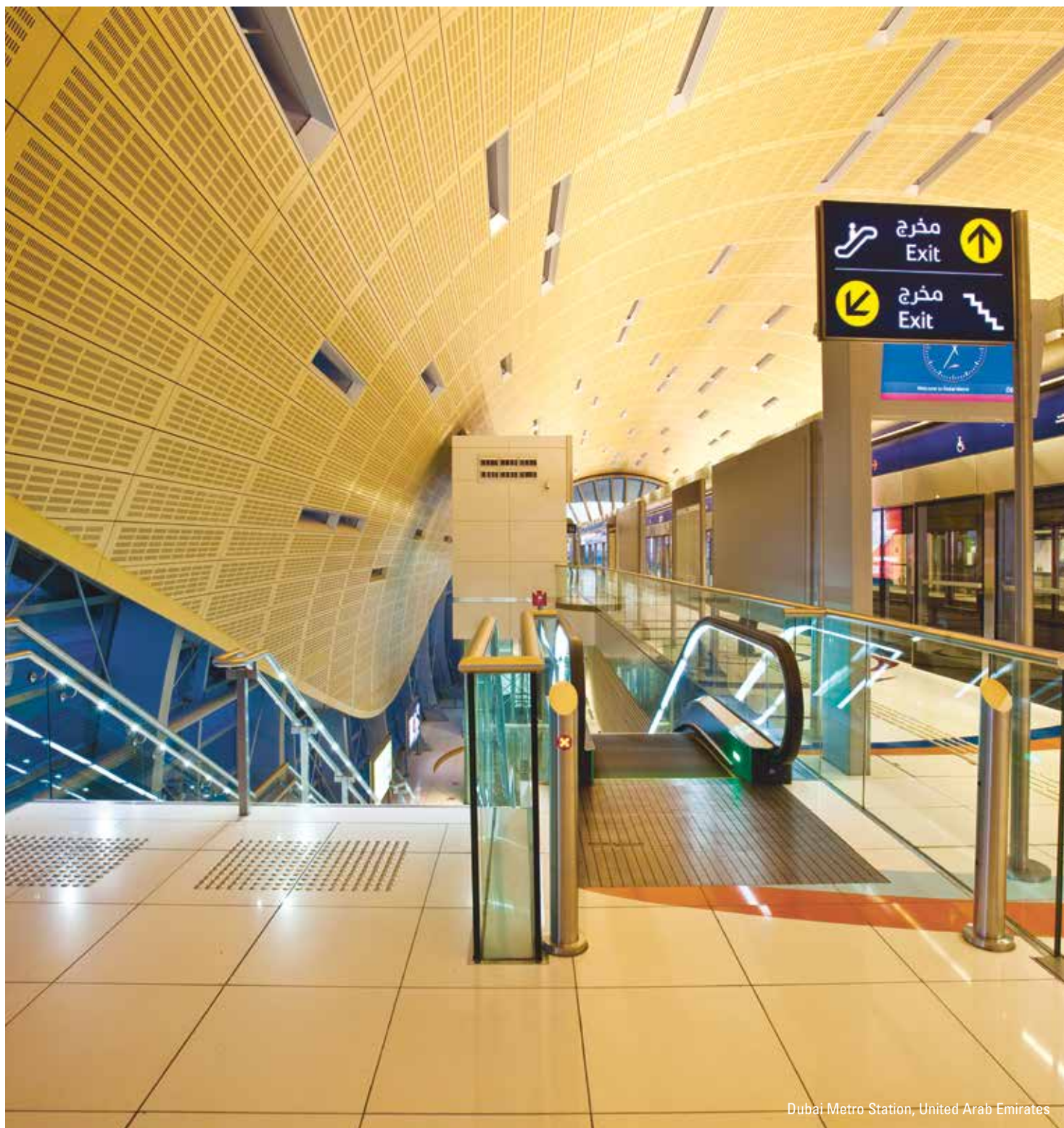
EXPANDED METAL from page 103

MESHdesign – Standard Expanded Metal


DESIGN SURFACES from page 107

TOUCHdesign – 3D Surface

PLASTERBOARD SURFACES from page 109



Dubai Metro Station, United Arab Emirates



POWDER COATING

Metal ceilings can be designed flexibly thanks to versatile powder coating possibilities - the portfolio ranges from powder coatings in acc. with RAL, NCS or DB colour chart to deep matt powder coatings called MOODline. For extraordinary designs, the metal ceiling can also be realised with different decorative surfaces or digital print.







- + flexible design possibilities thanks to versatile powder coatings
- + powder coatings in acc. with RAL, NCS or DB colour chart as well as deep matt powder coatings available
- + decorative surfaces or digital print possible for individual design

COLOURline – POWDER COATING

We create special highlights in your rooms with the environmentally friendly powder coating COLOURline, a solvent-free coating method. Individual colours can be selected from the RAL, NCS and DB colour chart. A wide range of individual and standard colours is available.

- + environmentally friendly coating process free of solvents
- + individual colours can be chosen from the RAL, NCS and DB colour charts
- + powder recycling saves 25 tonnes of powder each year

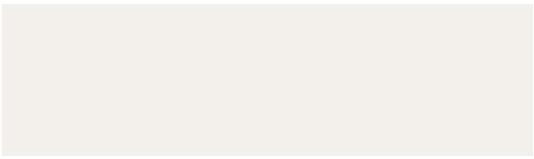
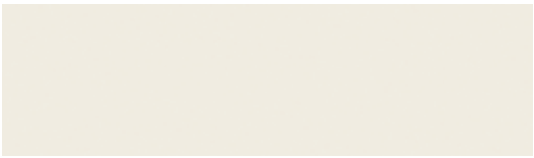

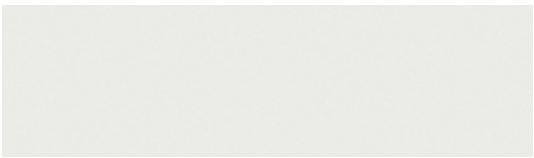


Gloss Level and Reflectance ↘ page 149

 TECHNICAL DATA	<p>Substrate steel</p> <p>Colour Charts RAL NCS DB (Deutsche Bahn) in acc. with Lindner</p> <p>Room Acoustics all perforations possible</p>																		
 ACOUSTICS ↘ from page 139	<p>Room Acoustics equipped with acoustic inlays, perforated surfaces achieve high sound absorption values</p>																		
 FIRE PROTECTION ↘ from page 137	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>																		
 COMBINABLE WITH	<table border="0"> <tr> <td>Plafotherm® B 100 ↘ page 18</td> <td>Plafotherm® E 312 ↘ page 38</td> </tr> <tr> <td>Plafotherm® B 100 SD ↘ page 20</td> <td>Plafotherm® DS 312 ↘ page 42</td> </tr> <tr> <td>Plafotherm® B 110 ↘ page 22</td> <td>Plafotherm® DS 313 ↘ page 44</td> </tr> <tr> <td>Plafotherm® B 147 SD ↘ page 24</td> <td>Plafotherm® DS 320 ↘ page 46</td> </tr> <tr> <td>Plafotherm® E 200 ↘ page 28</td> <td>Plafotherm® DS Tabs ↘ page 48</td> </tr> <tr> <td>Plafotherm® E 210 ↘ page 30</td> <td>Plafotherm® L 608 ↘ page 52</td> </tr> <tr> <td>Plafotherm® E 213 ↘ page 32</td> <td>Plafotherm® St 213 ↘ page 56</td> </tr> <tr> <td>Plafotherm® E 214 ↘ page 34</td> <td>Plafotherm® KN ↘ page 60</td> </tr> <tr> <td></td> <td>Plafotherm® DS TAS ↘ page 68</td> </tr> </table>	Plafotherm® B 100 ↘ page 18	Plafotherm® E 312 ↘ page 38	Plafotherm® B 100 SD ↘ page 20	Plafotherm® DS 312 ↘ page 42	Plafotherm® B 110 ↘ page 22	Plafotherm® DS 313 ↘ page 44	Plafotherm® B 147 SD ↘ page 24	Plafotherm® DS 320 ↘ page 46	Plafotherm® E 200 ↘ page 28	Plafotherm® DS Tabs ↘ page 48	Plafotherm® E 210 ↘ page 30	Plafotherm® L 608 ↘ page 52	Plafotherm® E 213 ↘ page 32	Plafotherm® St 213 ↘ page 56	Plafotherm® E 214 ↘ page 34	Plafotherm® KN ↘ page 60		Plafotherm® DS TAS ↘ page 68
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	Plafotherm® DS TAS ↘ page 68																		
 CORROSION PROTECTION ↘ from page 147	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>																		
 SUSTAINABILITY ↘ from page 148	<p>self-declaration in acc. with ISO 14021 in combination with Plafotherm® heated/chilled ceilings, EPD in acc. with ISO 14025 and EN 15804 in combination with Plafotherm® heated/chilled ceilings</p>																		

STANDARD COLOURS

Notice: colours displayed on the screen or printout are not binding because brightness and contrast may vary. Therefore small colour differences are possible.

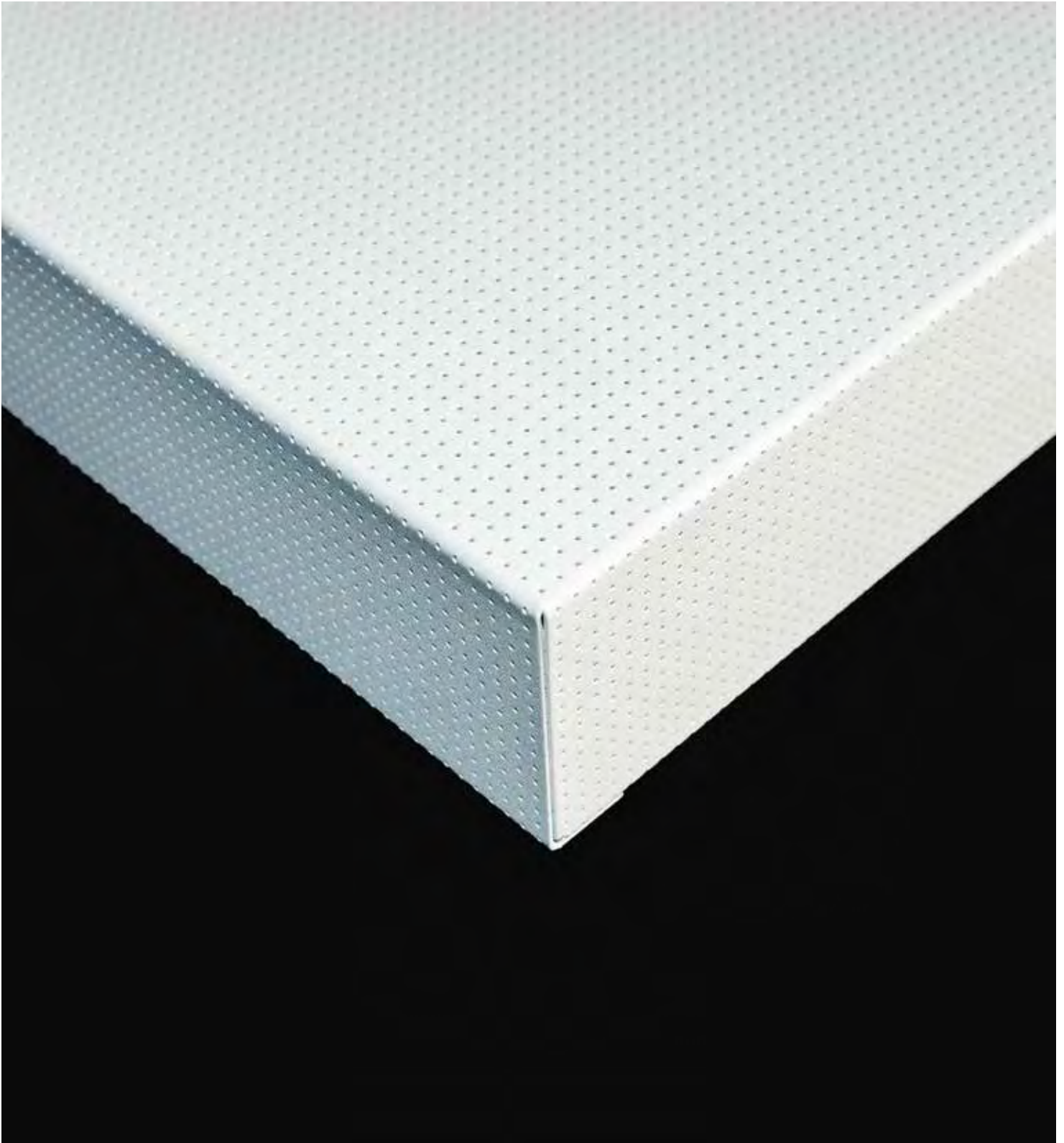
Besides these standard colours, a wide range of individual colours is available.







RAL 9016 colour chart: RAL Classic colour number: 9016 colour name: traffic white gloss level: approx. 18 GU	
RAL 9010 colour chart: RAL Classic colour number: 9010 colour name: pure white gloss level: approx. 18 GU	
RAL 9006 colour chart: RAL Classic colour number: 9006 colour name: white aluminium gloss level: approx. 65 - 70 GU	
RAL 9003 colour chart: RAL Classic colour number: 9003 colour name: signal white gloss level: approx. 20 - 25 GU	
RAL 7035 colour chart: RAL Classic colour number: 7035 colour name: light grey gloss level: approx. 15 - 18 GU	
9006 in acc. with Lindner colour chart: in acc. with Lindner colour number: 9006 gloss level: approx. 57 GU	

MOODline – POWDER COATING DEEP MATT

The deep matt powder coating MOODline creates discreet and elegant surfaces with very low gloss levels. This effect is especially apparent in open rooms with room-high glazing. As the surface is insensitive to streak of light, a homogeneous appearance is achieved. Thus, you create timeless and impressive atmospheres in your rooms.

- + deep matt powder coating with very low gloss level
- + discreet, elegant surface for timeless designs in interior areas
- + homogeneous appearance and insensitive to streak of light
- + especially effective in open rooms with room-high glazing



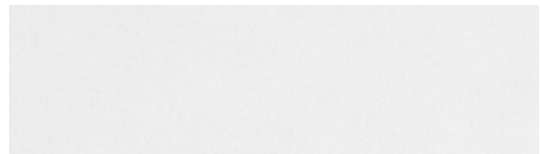
 TECHNICAL DATA	<p>Substrate steel</p> <p>Recommended Perforations all perforations possible, microperforations are recommended to receive a discreet appearance</p>														
 ACOUSTICS ↘ from page 139	<p>Room Acoustics equipped with acoustic inlays, perforated surfaces achieve high sound absorption values</p>														
 FIRE PROTECTION ↘ from page 137	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>														
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 CORROSION PROTECTION ↘ from page 147	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>														
 SUSTAINABILITY ↘ from page 148	<p>self-declaration in acc. with ISO 14021 in combination with Plafotherm® heated/chilled ceilings, EPD in acc. with ISO 14025 and EN 15804 in combination with Plafotherm® heated/chilled ceilings</p>														

STANDARD COLOURS

Notice: colours displayed on the screen or printout are not binding because brightness and contrast may vary. Therefore small colour differences are possible.

Natural white 9016

colour name: natural white 9016
gloss level: < 3 GU
reflectance: approx. 75 %



Lava grey 7016

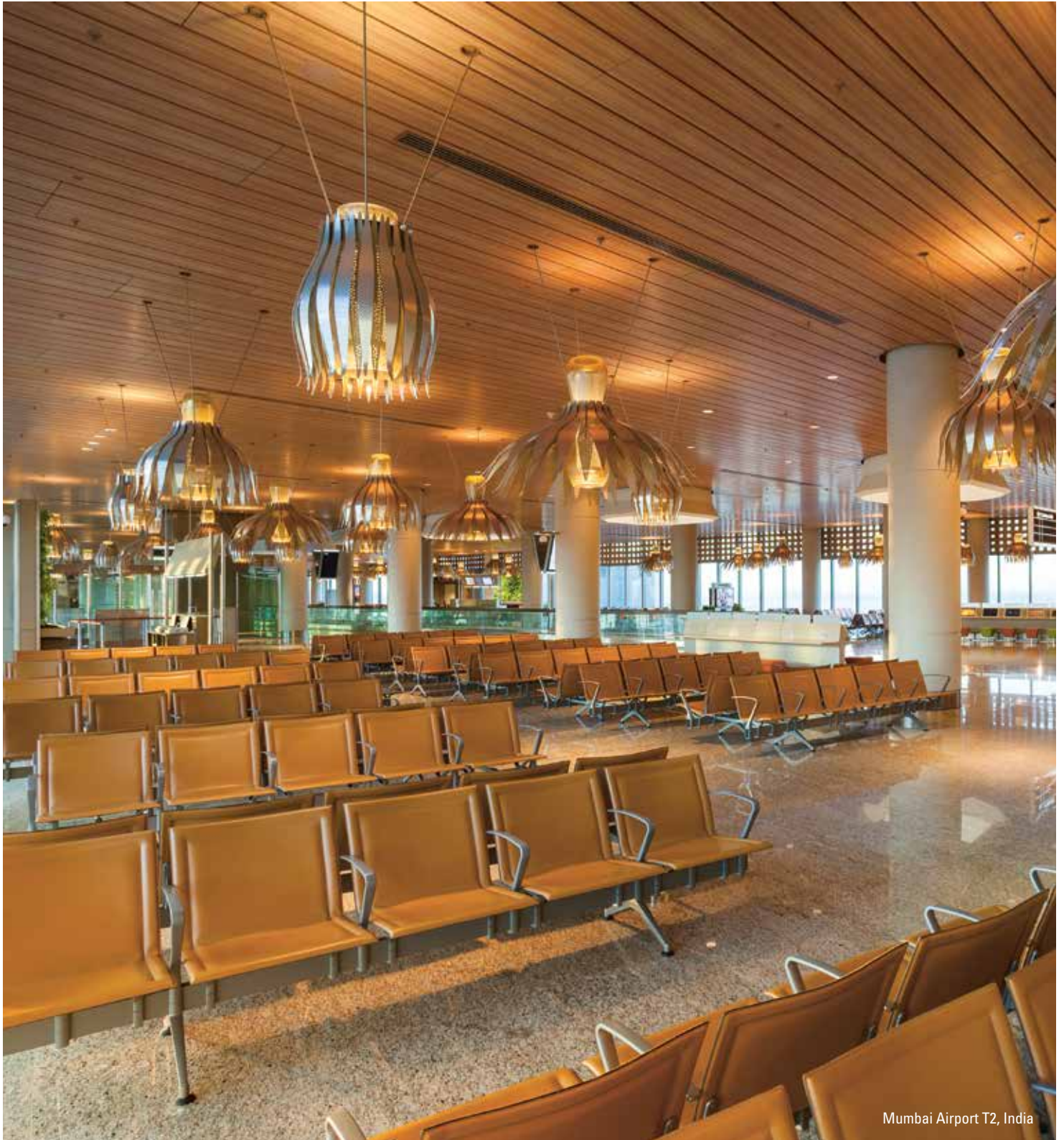
colour name: lava grey 7016
gloss level: < 4 GU
reflectance: approx. 8 %









ARTline – DECORATIVE POWDER COATING

The powder coating ARTline applies different designs on your metal ceiling: we can perfectly imitate different materials such as copper or marble as well as various wood surfaces. Thus, the ceiling has the appearance of a wooden ceiling. Simultaneously, the familiar advantages of metal ceilings can be enjoyed without restrictions. This special powder coating impresses with its resistance against UV radiations, solvents and chemicals of many kinds.

- + decorative powder coating to imitate wood surfaces and materials
- + versatile design possibilities are available
- + resistance against UV radiations, solvents and chemicals of many kinds



Mumbai Airport T2, India

 TECHNICAL DATA	<p>Substrate steel</p> <p>Recommended Perforations all perforations possible, microperforations are recommended to receive a discreet appearance</p>																
 ACOUSTICS ↘ from page 139	<p>Room Acoustics equipped with acoustic inlays, perforated surfaces achieve high sound absorption values</p>																
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EXTRACT FROM POSSIBLE DESIGNS

Notice: colours displayed on the screen or printout are not binding because brightness and contrast may vary. Therefore small colour differences are possible.



Bamboo 1



Black Cherry 1



Beech 1



Yew 1

EXTRACT FROM POSSIBLE DESIGNS

Notice: colours displayed on the screen or printout are not binding because brightness and contrast may vary. Therefore small colour differences are possible.



Oak 1



Oak 8



Oak 9



Oak 12



Oak 13



Ash tree 1



Ash tree 2



Chestnut 1



Teak 1



Walnut 1



Walnut 2



Walnut 8



Jura marble 1



Copper 1



Concrete 1



Galvanising 1







GRAPHICline – DIGITAL PRINT

The print technology GRAPHICline offers complete design freedom thanks to the possibility to apply your desired image on different surface structures and materials by means of a model picture or illustration. All colours and images can be applied colour-fast, gloss-fast and light-fast on panels of any required size due to a photorealistic resolution up to 1,200 dpi! The metal ceiling with print technology is UV resistant due to a special sealed finish.

- + complete freedom of design thanks to the possibility to apply your desired images on ceiling panels
- + model picture is realised colour-fast, gloss-fast and light-fast with a photorealistic resolution up to 1,200 dpi
- + realisation on an unlimited surface possible
- + UV resistance due to a special sealed finish



Bloomberg Center, New York City, USA

 TECHNICAL DATA	<p>Substrate steel</p> <p>Recommended Perforations all perforations possible, microperforations are recommended to receive a discreet appearance</p>														
 ACOUSTICS ↘ from page 139	<p>Room Acoustics equipped with acoustic inlays, perforated surfaces achieve high sound absorption values</p>														
 FIRE PROTECTION ↘ from page 137	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>														
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Volksbank Meinerzhagen, Germany
Photo: © Bank Design



PERFORATIONS

We offer individual design freedom thanks to a wide range of perforations to meet your acoustical and optical demands. We realise perforation patterns in different sizes, arrangements and shapes. Perforated metal ceilings are acoustically effective when combined with sound-absorbing inlays on the rear side.

- + individual design freedom thanks to a wide range of perforations
- + different hole sizes, arrangements and shapes can be realised
- + acoustically effective in combination with sound-absorbing inlays
 - Acoustics, see page 139
- + perforations meet acoustic and visual needs

TYPES OF PERFORATION PATTERNS

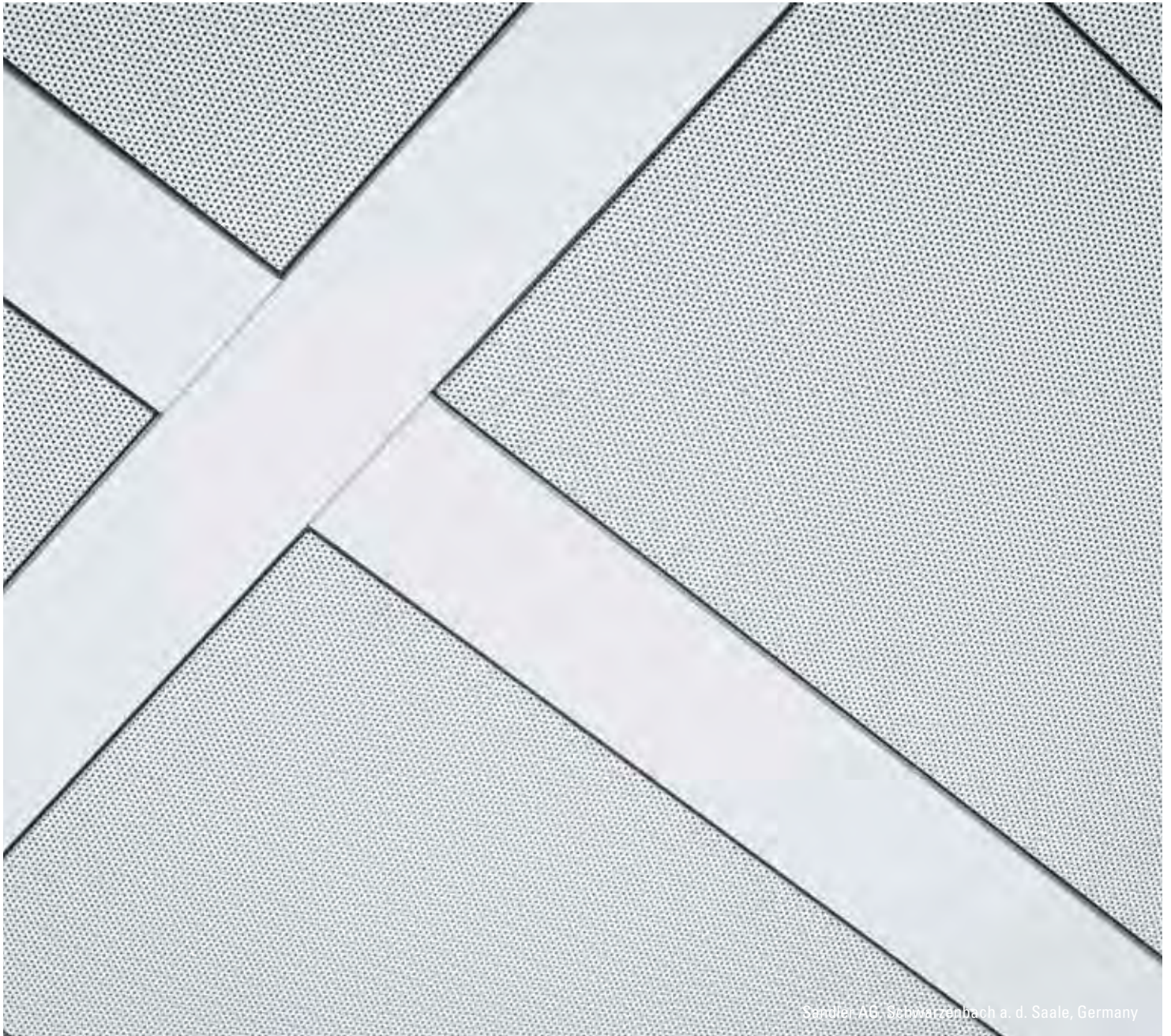
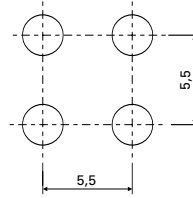
Rg	round holes arranged in straight pitch
Rd	round holes arranged in diagonal pitch (45°)
Rv	round holes arranged in diagonal pitch (60°)
Rs	round holes, special arrangement
Qg	square holes arranged in straight pitch
Qd	square holes arranged in diagonal pitch
Lg	slotted round holes arranged in straight pitch
Lge	slotted square holes arranged in straight pitch

Example:

Rg 2,5-16

↓
↓
↓
open area 16 %
hole Ø 2.5 mm

round holes arranged in straight pitch

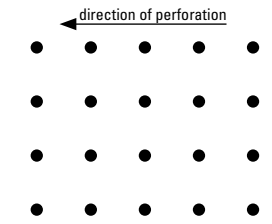
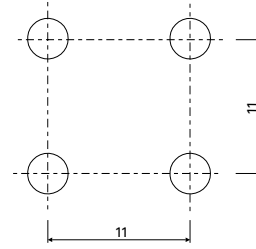


Sandler AG, Schwarzenbach a. d. Saale, Germany

BASICLINE - STANDARD PERFORATIONS

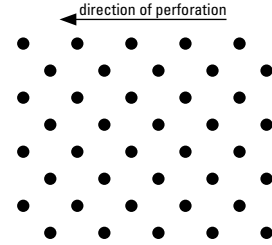
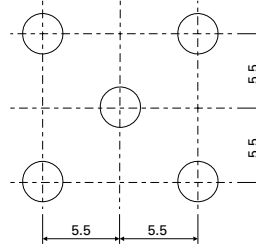
Rg 2,5 - 4

hole: \varnothing 2.5 mm straight pitch
 open area: 4 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,400 mm



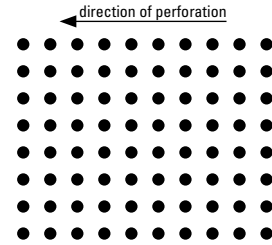
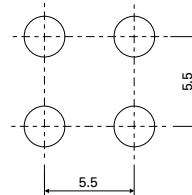
Rd 2,5 - 8

hole: \varnothing 2.5 mm diagonal pitch
 open area: 8 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,400 mm



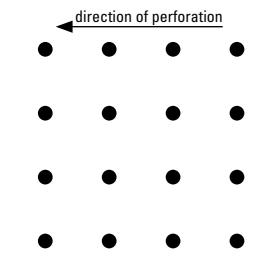
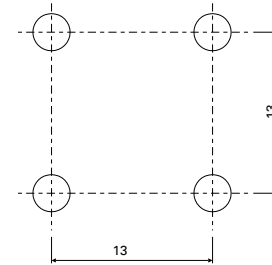
Rg 2,5 - 16

hole: \varnothing 2.5 mm straight pitch
 open area: 16 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,400 mm



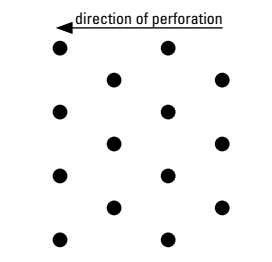
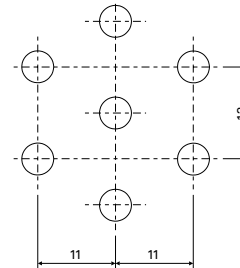
Rg 3,0 - 4

hole: \varnothing 3.0 mm straight pitch
 open area: 4 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,540 mm



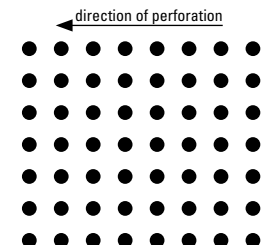
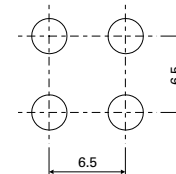
Rv 3,0 - 5

hole: \varnothing 3.0 mm diagonal pitch
 open area: 5 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,500 mm



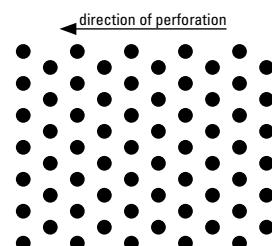
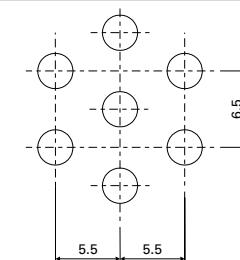
Rg 3,0 - 17

hole: \varnothing 3.0 mm straight pitch
 open area: 17 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,540 mm

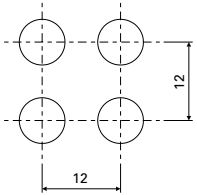
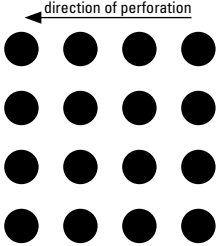
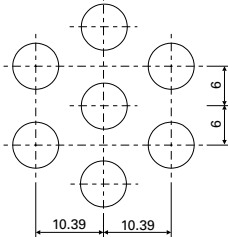
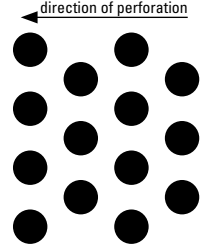
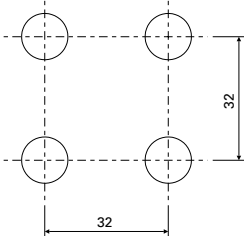
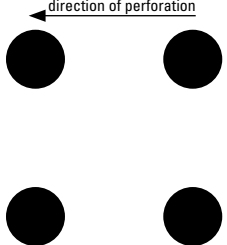
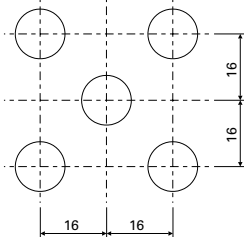
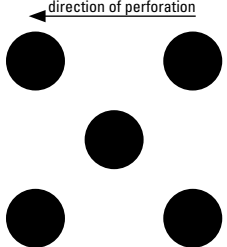


Rv 3,0 - 20

hole: \varnothing 3.0 mm diagonal pitch
 open area: 20 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,500 mm



BASICLINE - STANDARD PERFORATIONS

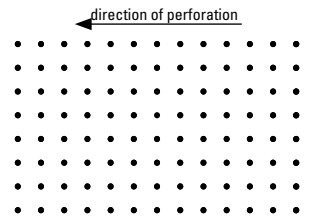
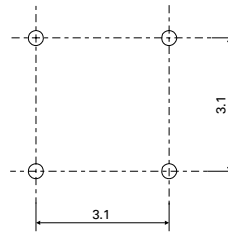
<p>Rg 7,0 - 27 hole: \varnothing 7.0 mm straight pitch open area: 27 % material: steel thickness: 0.7 mm width of perforation: 1,300 mm</p>		
<p>Rv 7,0 - 30 hole: \varnothing 7.0 mm diagonal pitch open area: 30 % material: steel thickness: 0.7 mm width of perforation: 1,300 mm</p>		
<p>Rg 12,0 - 11 hole: \varnothing 12.0 mm straight pitch open area: 11 % material: steel thickness: 0.7 mm width of perforation: 1,290 mm</p>		
<p>Rd 12,0 - 22 hole: \varnothing 12.0 mm diagonal pitch open area: 22 % material: steel thickness: 0.7 mm width of perforation: 1,290 mm</p>		

notice: shown perforations are not to scale. 1:1 illustrations can be found in the digital version by click on the perforation.

REGULARLINE – FURTHER PERFORATIONS

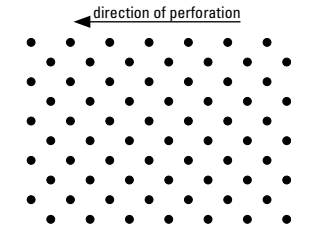
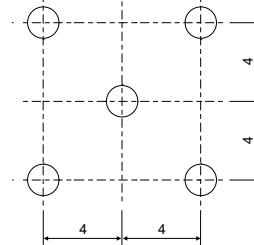
Rg 0,8 - 5

hole: \varnothing 0.8 mm straight pitch
 open area: 5 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,630 mm



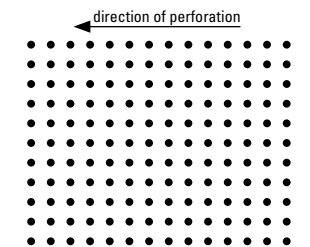
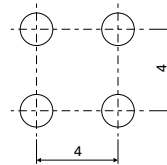
Rd 1,6 - 6

hole: \varnothing 1.6 mm diagonal pitch
 open area: 6 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,630 mm



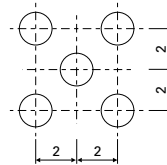
Rg 1,6 - 13

hole: \varnothing 1.6 mm straight pitch
 open area: 13 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,600 mm



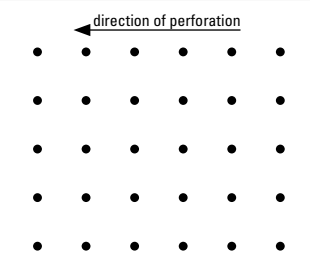
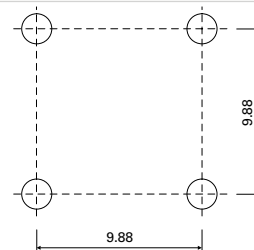
Rd 1,6 - 25

hole: \varnothing 1.6 mm diagonal pitch
 open area: 25 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,600 mm



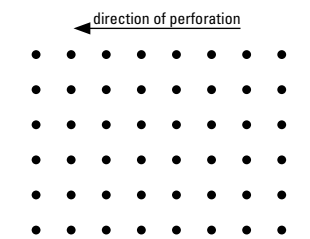
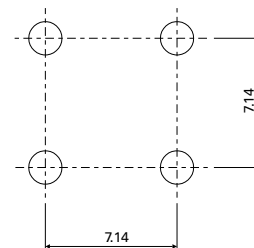
Rg 1,8 - 3

hole: \varnothing 1.8 mm straight pitch
 open area: 3 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,310 mm



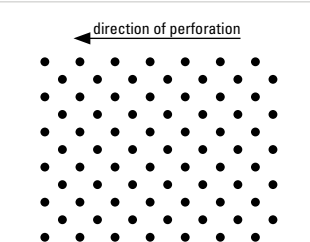
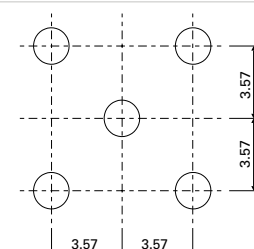
Rg 1,8 - 5

hole: \varnothing 1.8 mm straight pitch
 open area: 5 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,280 mm



Rd 1,8 - 10

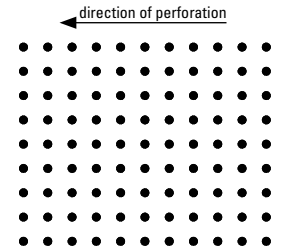
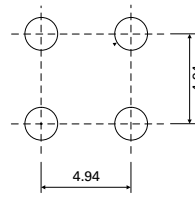
hole: \varnothing 1.8 mm diagonal pitch
 open area: 10 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,280 mm



REGULARLINE – FURTHER PERFORATIONS

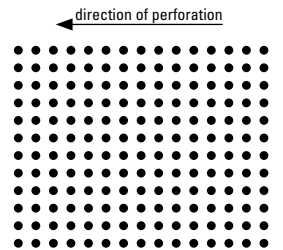
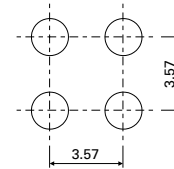
Rg 1,8 - 11

hole: \varnothing 1.8 mm straight pitch
 open area: 11 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,310 mm



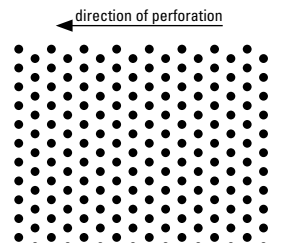
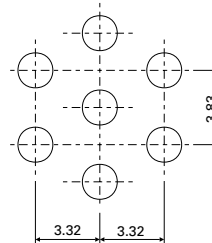
Rg 1,8 - 19

hole: \varnothing 1.8 mm straight pitch
 open area: 19 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,280 mm



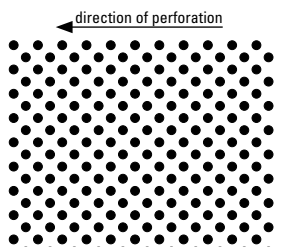
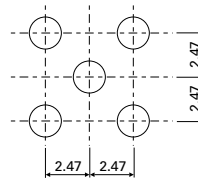
Rv 1,8 - 20

hole: \varnothing 1.8 mm diagonal pitch
 open area: 20 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,550 mm



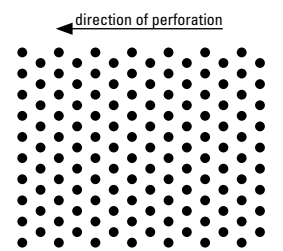
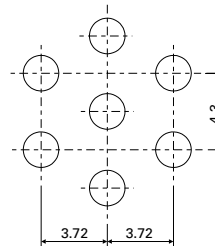
Rd 1,8 - 21

hole: \varnothing 1.8 mm diagonal pitch
 open area: 21 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,310 mm



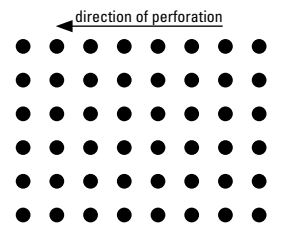
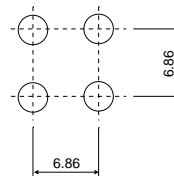
Rv 2,0 - 20

hole: \varnothing 2.0 mm diagonal pitch
 open area: 20 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,250 mm



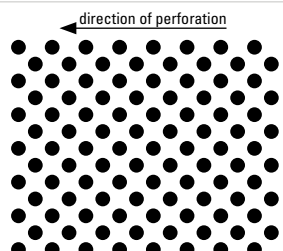
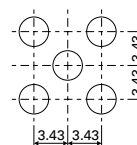
Rg 3,0 - 15

hole: \varnothing 3.0 mm straight pitch
 open area: 15 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,250 mm



Rd 3,0 - 30

hole: \varnothing 3.0 mm diagonal pitch
 open area: 30 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,250 mm

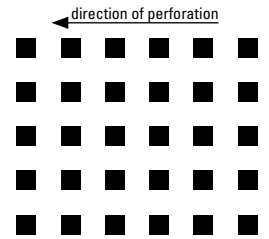
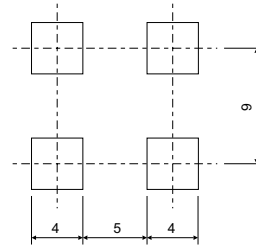


notice: shown perforations are not to scale.
 1:1 illustrations can be found in the digital version by click on the perforation.

REGULARLINE – FURTHER PERFORATIONS

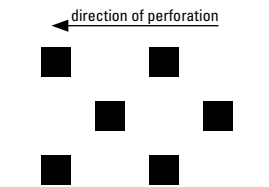
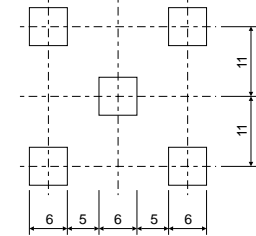
Qg 4,0 - 20

square hole: □ 4.0 mm straight pitch
 open area: 20 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,600 mm



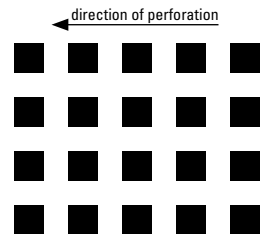
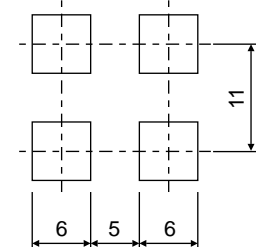
Qd 6,0 - 15

square hole: □ 6.0 mm diagonal pitch
 open area: 15 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,600 mm



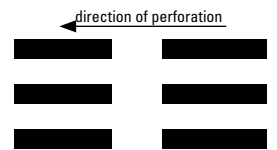
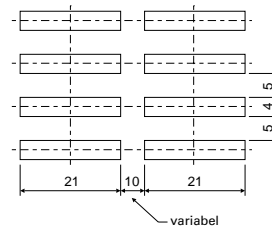
Qg 6,0 - 30

square hole: □ 6.0 mm straight pitch
 open area: 30 %
 material: steel | thickness: 0.7 mm | width of perforation: 1,600 mm



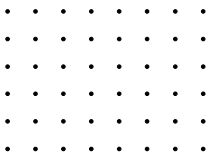
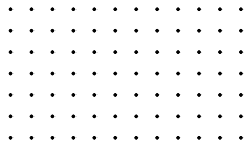
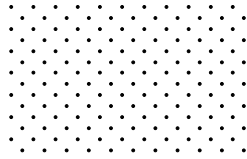
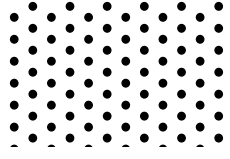
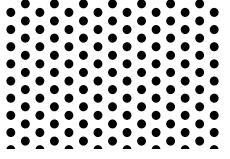
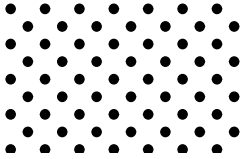
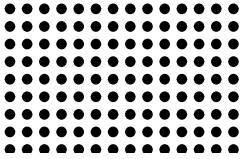
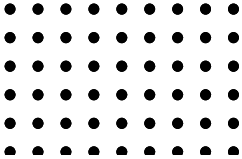
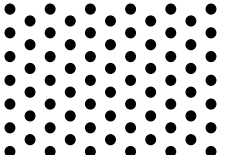
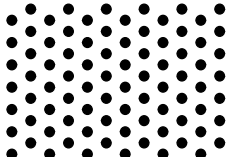
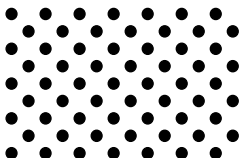
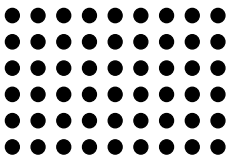
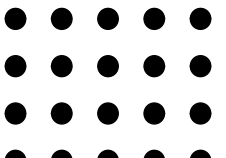
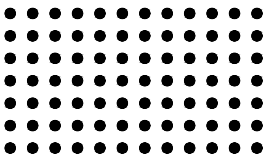
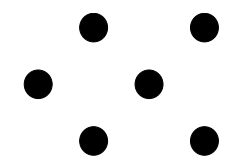
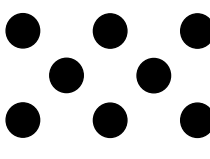
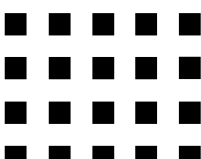
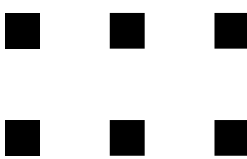

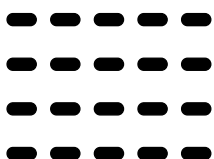
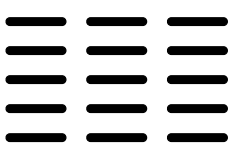

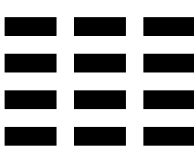
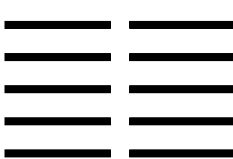
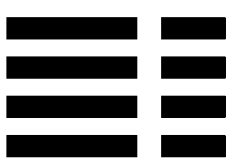
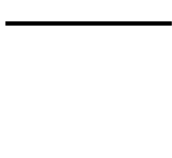
Lge 21 x 4

slotted square hole: 21.0 x 4.0 mm straight pitch
 open area: 30 %
 material: steel | thickness: 0.7 mm | width of perforation: 616 mm



REGULARline – FURTHER PERFORATIONS

In addition to the previously shown perforations, a multitude of further perforations is possible after clarification.

Rg 0.8 - 1 	Rg 0.8 - 2 	Rd 0.8 - 3 	Rv 2.0 - 15 	Rv 2.0 - 25 
Rd 2.4 - 14 	Rg 2.4 - 28 	Rg 2.5 - 12 	Rv 2.5 - 20 	Rv 2.5 - 23 
Rd 2.8 - 20 	Rg 3.5 - 28 	Rg 5.0 - 17 	Rg 6.0 - 15 	Rd 6.4 - 10 
Rd 8.0 - 25 	Qg 5.0 - 25 	Qg 8.0 - 11 	Qg 10.0 - 11 	Lg 7 x 3 
Lg 14 x 2 	Lge 3.2 x 27 	Lge 11.9 x 4.2 	Lge 25.4 x 1.59 	Lge 30 x 5 
Lge 40 x 1 				

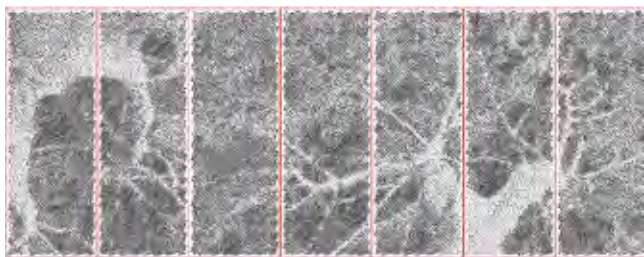
SPREADline – CUSTOMISED PERFORATIONS

SPREADline offers an excellent design freedom due to an individual arrangement of the scattered perforation with different perforation shapes and sizes. The transmission of photos and images as perforation pattern is a striking eye-catcher. The diverse perforations can specifically be used for an effective combination of luminaires and loudspeakers.

- + individual arrangement of the perforation with different perforation shapes
- + transmission of images as perforation pattern possible
- + suitable for an effective combination of luminaires and loudspeakers

EXAMPLES

Diverse motives can be created with perforations – e.g. a tree motive by means of different hole sizes and individual arrangement.



tree motive

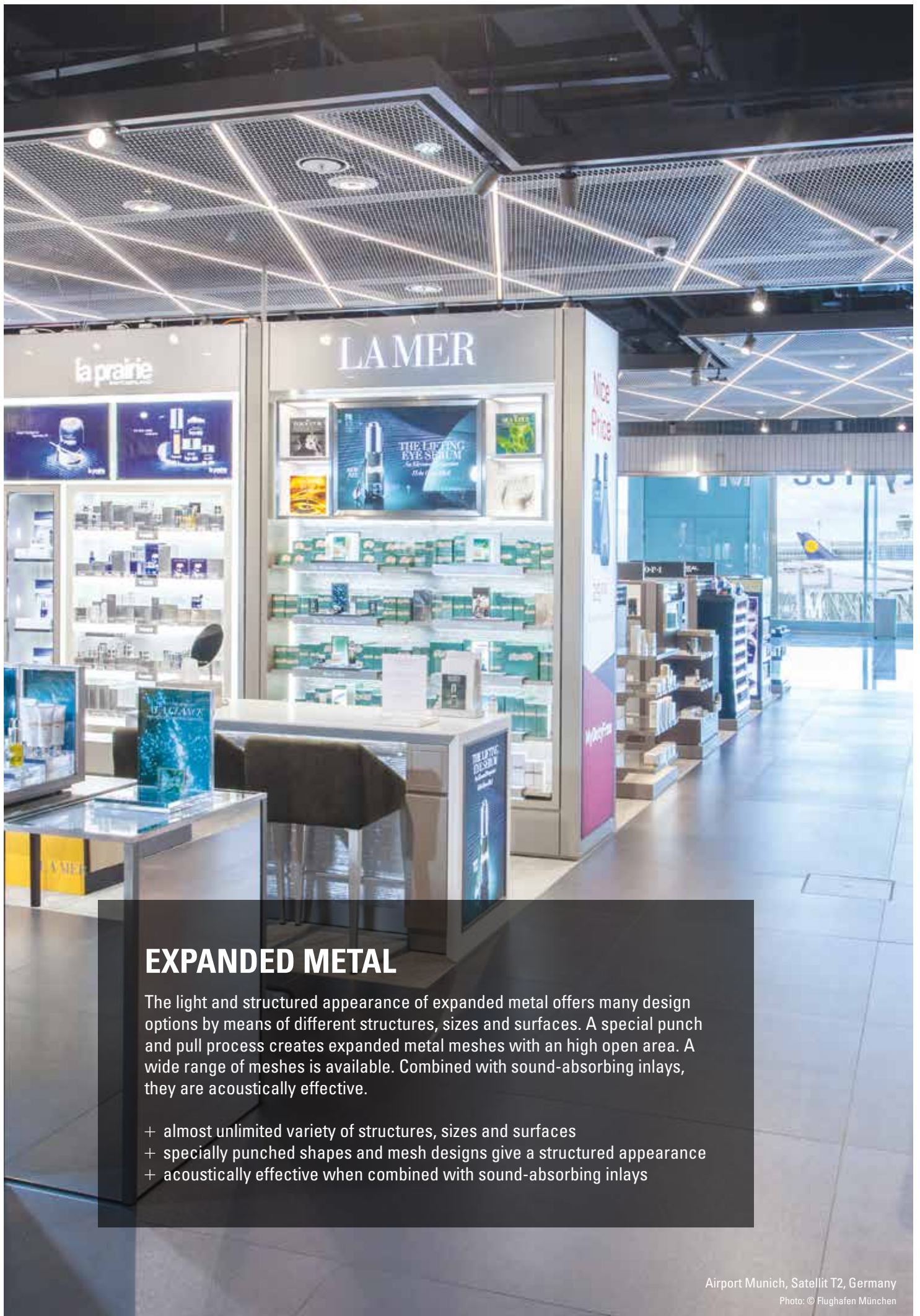


detail



Stockholm Waterfront, Sweden

Photo: © Michael Perlmutter



EXPANDED METAL

The light and structured appearance of expanded metal offers many design options by means of different structures, sizes and surfaces. A special punch and pull process creates expanded metal meshes with an high open area. A wide range of meshes is available. Combined with sound-absorbing inlays, they are acoustically effective.

- + almost unlimited variety of structures, sizes and surfaces
- + specially punched shapes and mesh designs give a structured appearance
- + acoustically effective when combined with sound-absorbing inlays

MESHdesign – STANDARD EXPANDED METAL

Our standard range of expanded metal meshes offers the right solution for your requirements. Different mesh sizes and design possibilities are available – of course, your desired MESHdesign surface can also be adapted in colour.

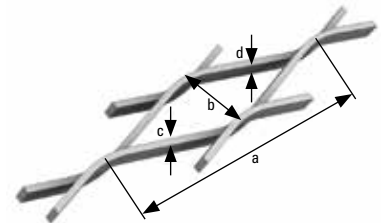
- + wide range of standard expanded metal meshes
- + diverse design possibilities

Material
steel

Coating
COLOURline – Powder Coating ↘ page 84
MOODline – Powder Coating deep matt ↘ page 86

Definition/Dimensions
As a rule, expanded metal is defined using four dimensions.

- Example:
diamond mesh 28 x 10 x 2.5 x 1.5
- a) mesh length: 28 mm
 - b) mesh width: 10 mm
 - c) strand width: 2.5 mm
 - d) strand thickness: 1.5 mm



Depending on the mesh dimension, expanded metal is available up to a width of 1,250 mm. The design and the stability of the ceiling construction are influenced by the shape and size of the mesh, the material and its thickness and also by the ceiling system itself. Thus, we recommend to check the project-specific feasibility and to make a sample of the mesh.

Viewing Direction
Another important aesthetic criterion is the viewing direction. Depending on the angle of vision, the expanded metal appears either more open or more closed.

open

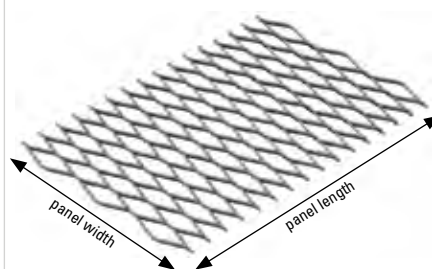


closed

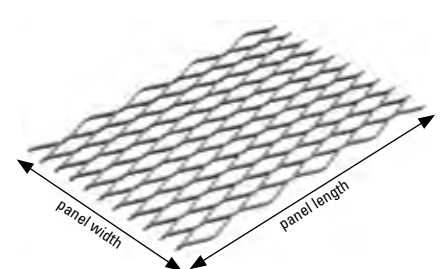


Mesh Arrangement
To maximise the stability and the deflection properties of expanded metal ceiling panels, the mesh arrangement type A should be chosen.

Type A



Type B



TECHNICAL DATA

<p>))) ACOUSTICS ↘ from page 139</p>	<p>Room Acoustics equipped with acoustic inlays, expanded metal ceilings achieve high sound absorption values. In case of expanded metal ceilings with open area exceeding 30 %, the mineral wool inlay is decisive as expanded metal is then absolutely sound-permeable.</p>						
<p>🔥 FIRE PROTECTION ↘ from page 137</p>	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>						
<p>🔧 COMBINABLE WITH</p>	<p>diamond meshes</p>						
	<p>panel type</p>	<p>28 x 10 x 2.5 x 1.5</p>	<p>28 x 12 x 2.5 x 1.5</p>	<p>30 x 12 x 2.5 x 1.5</p>	<p>42 x 16 x 3.0 x 2.0</p>	<p>50 x 25 x 3.0 x 2.0</p>	<p>62 x 23 x 3.0 x 2.5</p>
	<p>Plafotherm® St 213 Type 12</p>	<p>x</p>	<p>x</p>	<p>x</p>	<p>x</p>	<p>x</p>	<p>x</p>
<p>🔩 CORROSION PROTECTION ↘ from page 147</p>	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>						
<p>🌳 SUSTAINABILITY ↘ from page 148</p>	<p>EPD in acc. with ISO 14025 and EN 15804 in combination with Plafotherm® heated/chilled ceilings</p>						

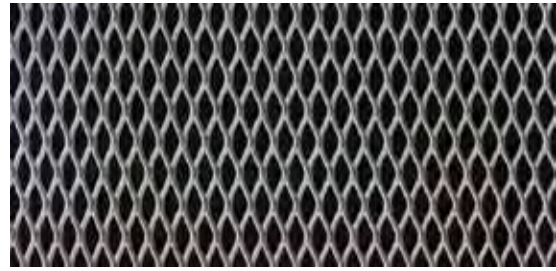


BMW Group Research and Innovation Center, Munich, Germany
Photo © R.B. Esch, Henkel

MESHdesign – STANDARD EXPANDED METAL

Diamond Mesh 28 x 10 x 2.5 x 1.5

open area: 50 %
expanded metal thickness: approx. 5 mm
mesh length: 28 mm
mesh width: 10 mm
strand width: 2.5 mm
strand thickness: 1.5 mm



Diamond Mesh 28 x 12 x 2.5 x 1.5

open area: 58 %
expanded metal thickness: approx. 5 mm
mesh length: 28 mm
mesh width: 12 mm
strand width: 2.5 mm
strand thickness: 1.5 mm



Diamond Mesh 30 x 12 x 2.5 x 1.5

open area: 58 %
expanded metal thickness: approx. 4 mm
mesh length: 30 mm
mesh width: 12 mm
strand width: 2.5 mm
strand thickness: 1.5 mm



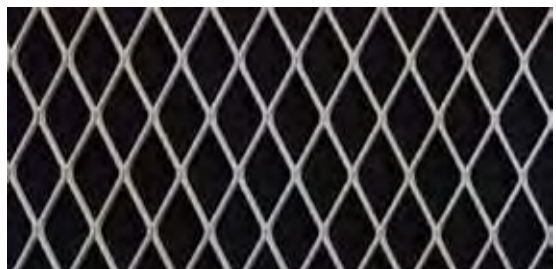
Diamond Mesh 42 x 16 x 3.0 x 2.0

open area: 62 %
expanded metal thickness: approx. 6 mm
mesh length: 42 mm
mesh width: 16 mm
strand width: 3 mm
strand thickness: 2 mm



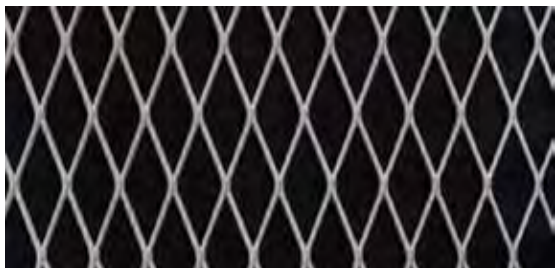
Diamond Mesh 50 x 25 x 3.0 x 2.0

open area: 76 %
expanded metal thickness: approx. 6 mm
mesh length: 50 mm
mesh width: 25 mm
strand width: 3 mm
strand thickness: 2 mm



Diamond Mesh 62 x 23 x 3.0 x 2.5

open area: 73 %
expanded metal thickness: approx. 6 mm
mesh length: 62 mm
mesh width: 23 mm
strand width: 3 mm
strand thickness: 2.5 mm





DESIGN SURFACES






Design Surfaces make every Metal Ceiling into a real highlight. Unique and vivid effects are created by the three-dimensional character. These effects can individually be emphasised by matted or high-gloss areas. Creative solutions are realised thanks to grinded or perforated ceiling surfaces. A combination with light creates special, unique effects.

- + individual design options enable a richly varied design
- + three-dimensional structures create unique and vivid effects
- + creative solutions due to matt and high-gloss areas, perforated and plain areas
- + unique effects in combination with light

TOUCHdesign – 3D-SURFACE

Given the possibility of creating a living three-dimensional structure, TOUCHdesign is an attractive alternative to metal ceilings with plane surfaces. That involves furnishing those ceiling panels with patterns and perforations. Combine vivid design and function with different shapes and sizes regarding embossings and perforations for a ceiling that is second to none.

- + versatile three-dimensional optics
- + different shapes and sizes regarding embossings and perforations available
- + trend-setting combination of design and function

<p> TECHNICAL DATA</p>	<p>Substrate steel, stainless steel</p> <p>Surface COLOURline – Powder Coating ↘ page 84 different surfaces possible depending on the substrate, e.g. grinded, polished, coloured, blasted or anodised</p> <p>Recommended Perforations perforations possible, depending on the substrate and geometry</p>
<p> ACOUSTICS ↘ from page 139</p>	<p>Room Acoustics equipped with acoustic inlays, perforated surfaces achieve high sound absorption values</p>
<p> FIRE PROTECTION ↘ from page 137</p>	<p>Building Material Class A2 - s2, d0 in acc. with EN 13501-1</p>
<p> COMBINABLE WITH</p>	<p>ceiling systems with the 3D surface TOUCHdesign have to be constructed project-related</p>
<p> CORROSION PROTECTION ↘ from page 147</p>	<p>exposure class A (interior) in acc. with EN 13964, table 8 and 9</p>



Allianz Suisse, Wallisellen, Switzerland

Photo: © Jan Bitter

PLASTERBOARD SURFACES

By selecting your choice of plasterboard you determine the visual effect and thermal conductivity of your plasterboard ceiling. The range consists of normal, high-density plasterboard to those containing a percentage of graphite for improved thermal conductivity. Besides plain and perforated plasterboards, perforated plasterboards with acoustic plaster coating are also available.

- + plasterboard panelling determines the visual effect and thermal conductivity
- + normal, high-density and graphite containing plasterboard panels
- + plasterboard panels plain, perforated or perforated with acoustic plaster coating



Samhammer Space Office, Weide i. d. Oberpfalz, Germany



TECHNICAL DATA

WALL CONNECTIONS AND JOINT DESIGN

The visual appearance of a ceiling system can be influenced by wall connections and joint designs. A large selection of different versions is available.

- + wall connections with and without shadow gap
- + curved wall connections for pillar semirings
- + joint design has an influence on visual appearance and acoustic performance
- + different joint distances can be realised



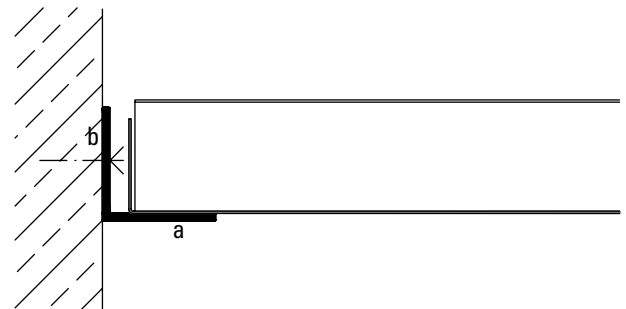
WALL CONNECTIONS

LAY-IN WALL CONNECTIONS

L-Wall Profile



Dimensions (mm)

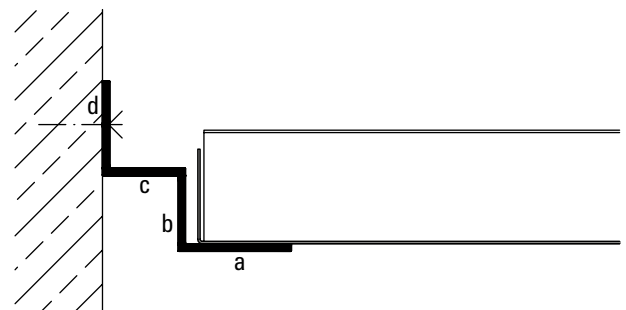


a	b	Material
30	30	aluminium

Shadow Gap Trim



Dimensions (mm)

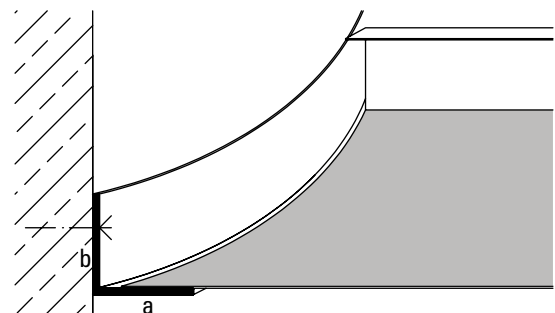


a	b	c	d	Material
30	20	20	25	aluminium

L-Pillar Semiring



Dimensions (mm)

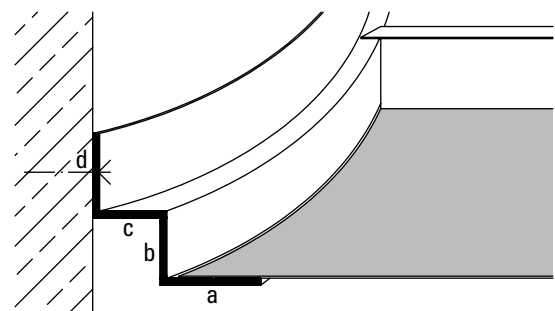


a	b	Diameter	Material
30	30	250 - 1,500	aluminium

Shadow Gap Pillar Semiring



Dimensions (mm)



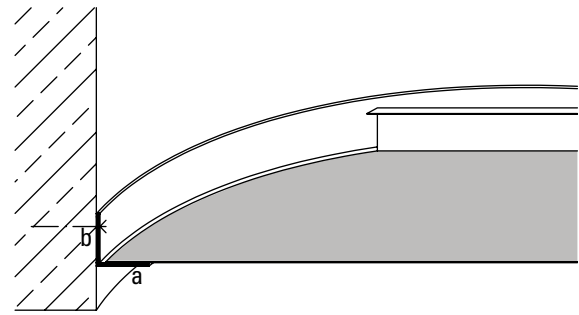
a	b	c	d	Diameter	Material
30	20	20	20	350 - 1,500	aluminium

LAY-IN WALL CONNECTIONS

L-Wall Profile Concave (bent inside)



Dimensions (mm)

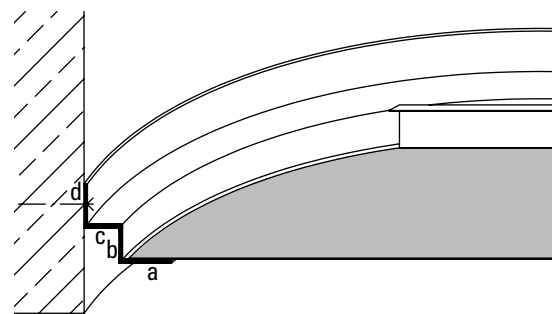


a	b	Radius	Material
30	30	1,000 - 50,000	aluminium

Shadow Gap Trim Concave (bent inside)



Dimensions (mm)

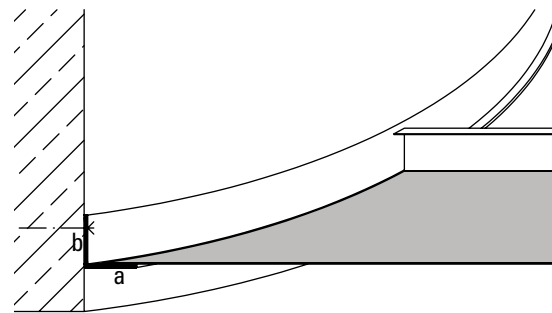


a	b	c	d	Radius	Material
20	20	25	25	1,000 - 50,000	aluminium

L-Wall Profile Convex (bent outside)



Dimensions (mm)

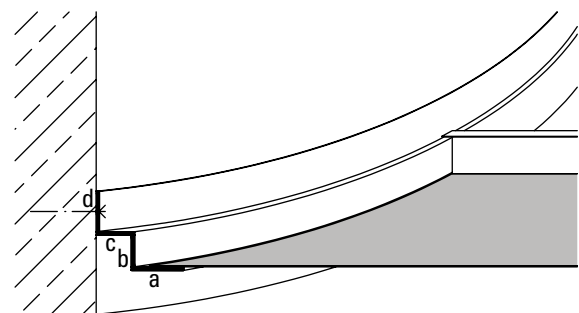


a	b	Radius	Material
30	30	751 - 50,000	aluminium

Shadow Gap Trim Convex (bent outside)



Dimensions (mm)



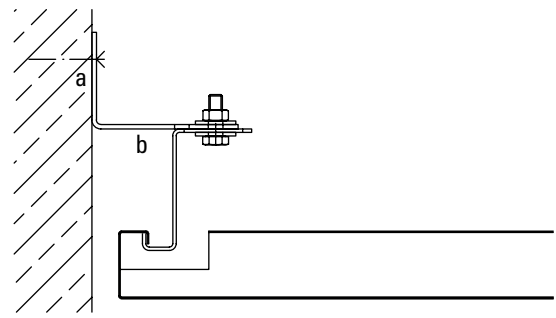
a	b	c	d	Radius	Material
20	20	25	25	1,001 - 50,000	aluminium

HOOK-ON WALL CONNECTIONS

Shadow Gap Joint



Dimensions (mm)

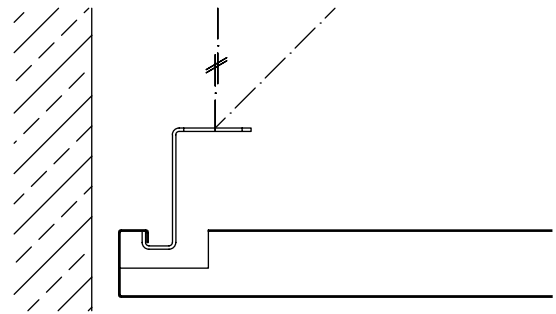


a	b	Material
43	80	steel
43	65	steel

Open Wall Connection

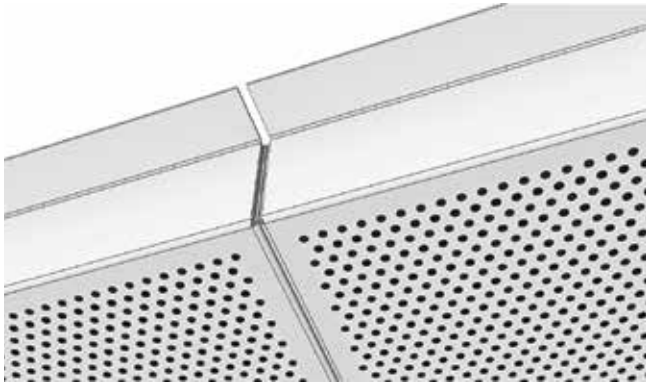


Dimensions (mm)

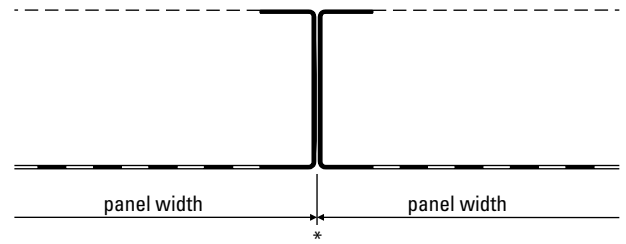


JOINT DESIGN

Panel Abutment without Joint



Dimensions (mm)



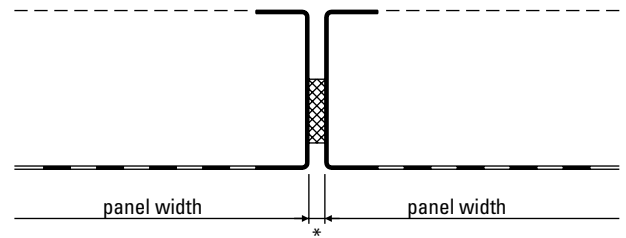
Joint Width*

0

Panel Abutment with Joint and Gasket Strip



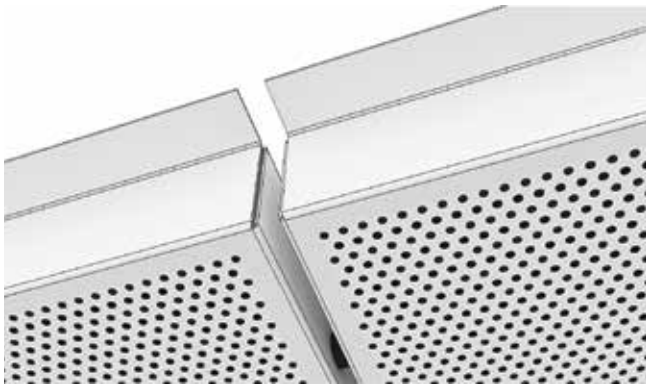
Dimensions (mm)



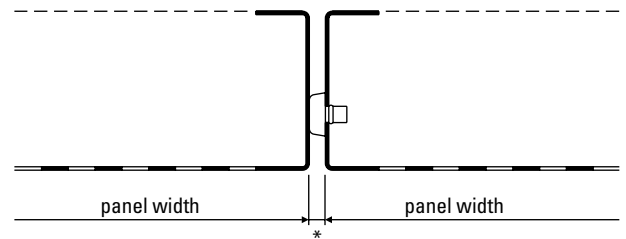
Joint Width*

Joint Width*	Colour
1	black
1	white
3	black
3	white

Panel Abutment with Joint and Spacer



Dimensions (mm)



Joint Width*

Joint Width*	Colour
3	black
3	white
3	transparent
5	black
5	white
5	transparent



EXPERTISE YOUR PRODUCT IN GOOD HANDS.

The demands on your ceiling strongly depend on the application area. We offer reliable solutions and tested heated/chilled ceilings for different product requirements – you will find the perfect solution for your project for:

- + climatic regulation
- + fire protection
- + acoustics
- + sustainability
- + statics
- + corrosion protection



☀️❄️ CLIMATIC REGULATION

HEATING AND COOLING

Whether we feel comfortable in a room depends on many factors. Decisive for a pleasant room climate is the room temperature.

In everyday life, there are several influencing factors that contribute to heat generation and thus favour temperature increases.



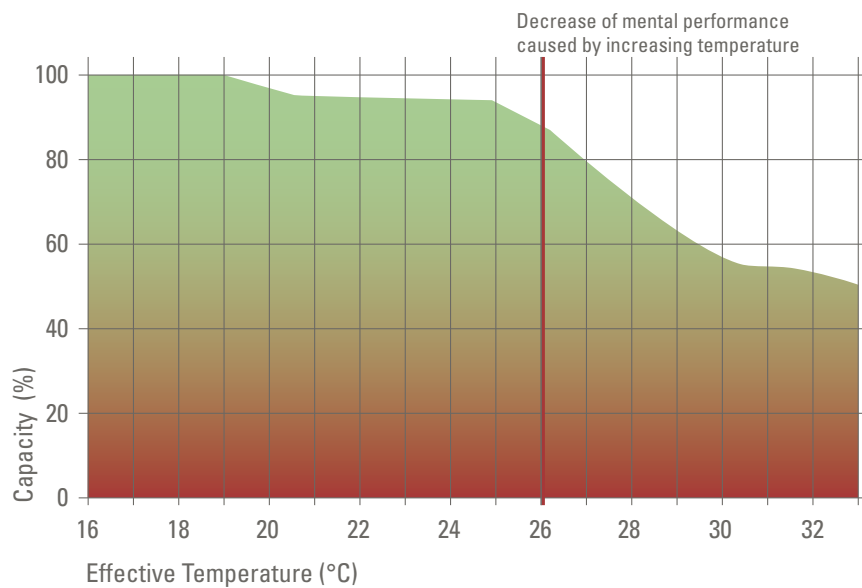
Internal Cooling Loads

- + Q_P people
- + Q_B lighting
- + Q_M equipment

External Cooling Loads

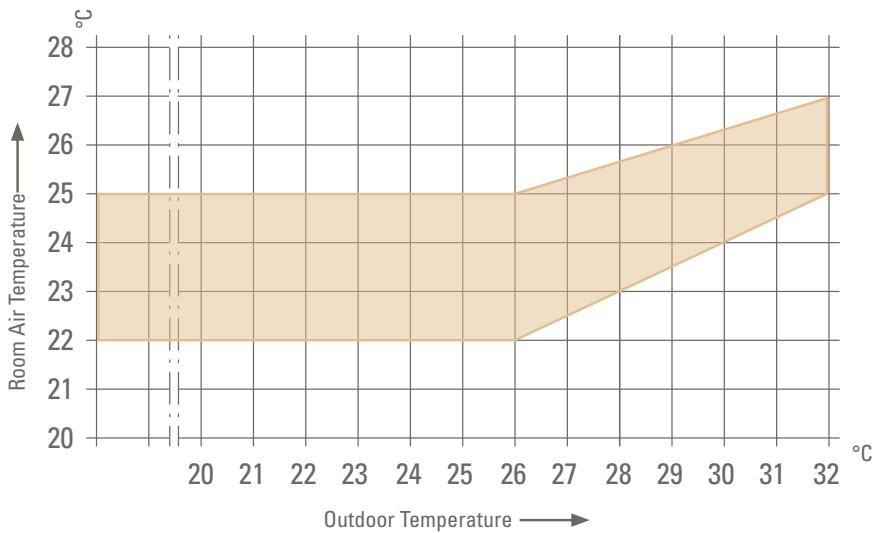
- + Q_S solar radiation
- + Q_R transmission of adjacent rooms
- + Q_W transmission of external surfaces
- + Q_{FL} joint ventilation

Rising room temperatures strongly influence the mental performance of people. Thus, measures are necessary to create a pleasant room climate.



Studies showed that the mental performance is about 95 % at a room temperature of 22 °C and only about 70 % at a room temperature of 28 °C.

To be able to guarantee the personal efficiency and comfort, a room temperature of maximum 26 °C should be pursued in summer months.



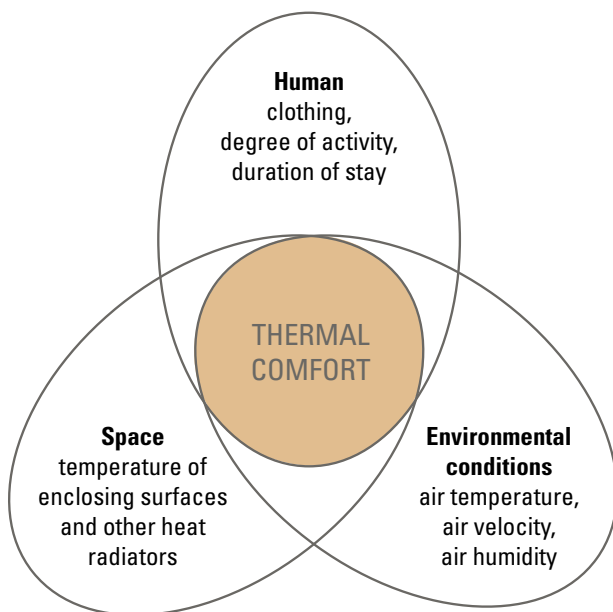
A pleasant room climate basically depends on the correct room temperature.

The coloured zone shows the recommended area in acc. with DIN 1946-2 resp. EN 13779 subject to the outdoor temperature.

COMFORT IN A ROOM

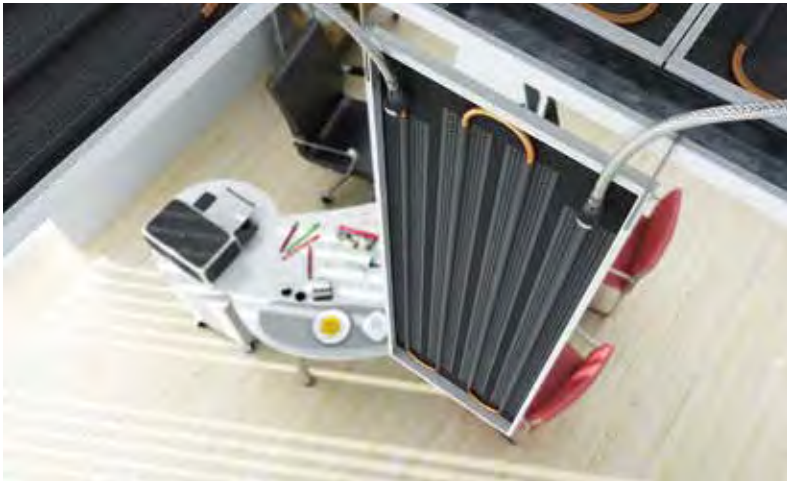
Besides the room acoustics, the light conditions, the indoor air flow and other influencing factors, the thermal comfort plays an important role for the well-being in a room.

Thermal comfort can only be achieved by the interaction of human, space and environmental conditions.



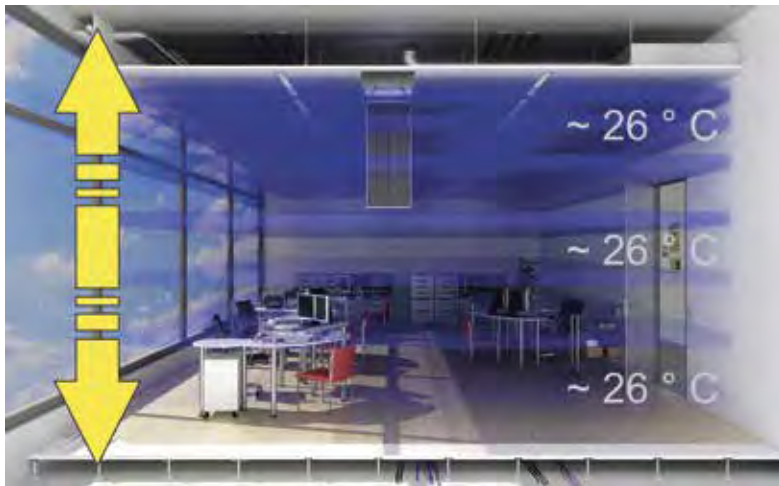
FUNCTIONALITY OF PLAFOTHERM® HEATED AND CHILLED CEILINGS

Plafotherm® heated and chilled ceilings are water-bearing surface tempering systems whose principle is based on thermal radiation and convection. Depending on the ceiling system, the proportion of radiation or convection predominates. Heat in a room can be supplied or dissipated by means of tempered water.



A natural exchange of radiant heat between surfaces and the subjacent room is generated as well as a gentle and completely natural convection.

Thus, heated/chilled ceilings directly temper objects in a room rather than the room air. In this way, a very pleasant atmosphere is created.



Cooling Mode

- heat is transferred about 70 % via radiation and about 30 % via convection in case of closed ceilings
- prerequisite: the temperature of the ceiling is lower than the room temperature
- the coil is streamed by approx. 15 - 17 °C cold water
- the temperature may not be chosen arbitrarily deep due to the risk of condensation



Radiation

All heat sources in a room remove their warmth to the chilled ceiling. The ceiling dissipates the cooling load by means of a cooling technology applied on the reverse side of the ceiling

- not bound to any carrier medium
- takes place at any time between differently tempered surfaces
- the higher the temperature difference, the higher the intensity of radiation exchange
- heat rays can be reflected and/or absorbed on a surface



Convection

Air warms up and rises due to the lower density, cools down on the surface of the chilled ceiling and falls down again.

- bonded to a carrier medium (water/air)
- when air is warmed up by means of a heat source, it rises and transports warmth (free convection)
- chilled ceilings dissipate the warmth by means of the cooling medium, e.g. water
- flow is imposed on the water by means of a pump (forced convection)



Heating Mode

- works almost 100 % by means of radiation
- prerequisite: the temperature of the ceiling is higher than the room temperature
- the coil is streamed by approx. 30 °C warm water



Radiation

All objects and surfaces in a room absorb the warmth of the heated ceiling.

- not bound to any carrier medium
- takes place at any time between differently tempered surfaces
- the higher the temperature difference, the higher the intensity of radiation exchange
- heat rays can be reflected and/or absorbed on a surface

ADVANTAGES OVER CONVENTIONAL CLIMATE CONTROL

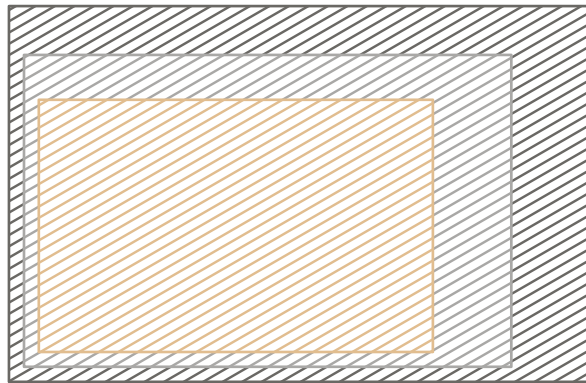
Comfort	<ul style="list-style-type: none"> + pleasant thanks to homogeneous temperature distribution over the whole room + appealing look thanks to concealed heating/cooling technology + no disturbing ambient noises due to silent cooling + allergy friendly and hygienic, as there is no circulation of dust + low air velocities and draught-free occupied zones
Efficiency	<ul style="list-style-type: none"> + energy-saving thanks to low system temperatures + space-saving installation thanks to smaller supply and drain lines + maintenance-free systems + low energy consumption of ventilation due to reduction to the required minimum air change

RELEVANT PARAMETERS

Supply Temperature [°C]	<p>The usual supply temperature in cooling mode is approx. 15 - 17 °C, considering a possible dew point temperature.</p> <p>In heating mode, a supply temperature of max. 38 °C should not be exceeded.</p>												
Return Temperature [°C]	<p>In cooling mode, a temperature spread between supply and return temperature of 2 K to 3 K is recommended.</p> <p>In heating mode, a temperature spread of 3 K to 5 K is ideal.</p>												
Average Water Temperature [°C]	<p>The average water temperature is the average temperature between supply and return temperature.</p> <p>Example:</p> <table style="margin-left: 20px;"> <tr> <td>supply temperature</td> <td>15 °C</td> </tr> <tr> <td>return temperature</td> <td>17 °C</td> </tr> <tr> <td>average water temperature</td> <td>16 °C</td> </tr> </table>	supply temperature	15 °C	return temperature	17 °C	average water temperature	16 °C						
supply temperature	15 °C												
return temperature	17 °C												
average water temperature	16 °C												
Room Temperature [°C]	<p>The room temperature in summer (cooling mode) should be dimensioned at approx. 24 - 26 °C and in winter (heating mode) at approx. 20 - 22 °C.</p>												
Insufficient Temperature [K]	<p>The temperature difference between average system temperature and room temperature in cooling mode is called insufficient temperature – it is defined in Kelvin.</p> <p>Example:</p> <table style="margin-left: 20px;"> <tr> <td>supply temperature</td> <td>15 °C</td> <td rowspan="4" style="vertical-align: middle;"> </td> </tr> <tr> <td>return temperature</td> <td>17 °C</td> </tr> <tr> <td>average water temperature</td> <td>16 °C</td> </tr> <tr> <td>room temperature</td> <td>26 °C</td> </tr> <tr> <td>insufficient temperature</td> <td>10 K</td> <td></td> </tr> </table>	supply temperature	15 °C		return temperature	17 °C	average water temperature	16 °C	room temperature	26 °C	insufficient temperature	10 K	
supply temperature	15 °C												
return temperature	17 °C												
average water temperature	16 °C												
room temperature	26 °C												
insufficient temperature	10 K												
Excess Temperature [K]	<p>The temperature difference between average system temperature and room temperature in heating mode is called excess temperature – it is defined in Kelvin.</p> <p>Example:</p> <table style="margin-left: 20px;"> <tr> <td>supply temperature</td> <td>37 °C</td> <td rowspan="4" style="vertical-align: middle;"> </td> </tr> <tr> <td>return temperature</td> <td>33 °C</td> </tr> <tr> <td>average water temperature</td> <td>35 °C</td> </tr> <tr> <td>room temperature</td> <td>20 °C</td> </tr> <tr> <td>excess temperature</td> <td>15 K</td> <td></td> </tr> </table>	supply temperature	37 °C		return temperature	33 °C	average water temperature	35 °C	room temperature	20 °C	excess temperature	15 K	
supply temperature	37 °C												
return temperature	33 °C												
average water temperature	35 °C												
room temperature	20 °C												
excess temperature	15 K												
Temperature Spread ΔT [K]	<p>The difference between supply and return temperature is called temperature spread.</p> <p>Example:</p> <table style="margin-left: 20px;"> <tr> <td>supply temperature</td> <td>15 °C</td> </tr> <tr> <td>return temperature</td> <td>17 °C</td> </tr> <tr> <td>temperature spread ΔT</td> <td>2 K</td> </tr> </table>	supply temperature	15 °C	return temperature	17 °C	temperature spread ΔT	2 K						
supply temperature	15 °C												
return temperature	17 °C												
temperature spread ΔT	2 K												

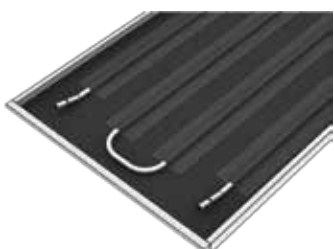

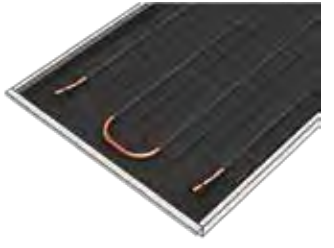
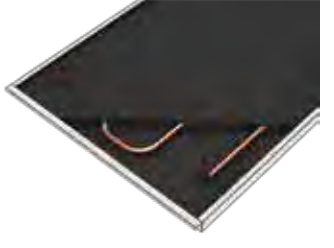
The active area of a chilled ceiling is the area which will be equipped with Plafotherm® Heating/Cooling Technology.

Active Area
(in acc. with DIN EN 14240)



room area
installation area
active area

PLAFOTHERM® HEATING/COOLING TECHNOLOGY

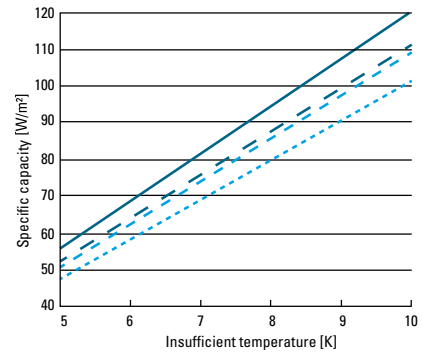
<p>Plafotherm® V2A</p> 	<p>pipe fret: stainless steel pipe 12 mm heat conducting technology: heat conducting profile width of heat conducting profile: 80 or 120 mm execution: plain centre distance: from 90 mm on retaining bulge: with</p>
<p>Plafotherm® Cu</p> 	<p>pipe fret: copper pipe 12 mm heat conducting technology: heat conducting profile width of heat conducting profile: 80 or 120 mm execution: plain centre distance: from 90 mm on support sleeve: with retaining bulge: with or without</p>
<p>Plafotherm® Cu Acoustic</p> 	<p>pipe fret: copper pipe 12 mm heat conducting technology: heat conducting profile width of heat conducting profile: 80 or 120 mm execution: acoustically transparent centre distance: from 90 mm on support sleeve: with retaining bulge: with or without</p>
<p>Plafotherm® Activation Board</p> 	<p>pipe fret: copper pipe 12 mm heat conducting technology: graphite panel execution: plain support sleeve: with retaining bulge: with or without</p>

PROOFS – HEATING AND COOLING

HEATED AND CHILLED POST CAP CEILINGS, HEATED AND CHILLED HOOK-ON CEILINGS

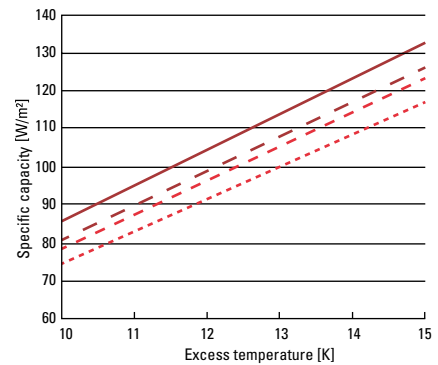
Heating/Cooling Technology Nominal Cooling Capacity in acc. with EN 14240 (10K)

Plafotherm® V2A	109 W/m ²	---
Plafotherm® Cu	112 W/m ²	---
Plafotherm® Cu Acoustic	102 W/m ²	---
Plafotherm® Activation Board	120 W/m ²	---



Heating/Cooling Technology Nominal Heating Capacity in acc. with EN 14037:2003 (15K)

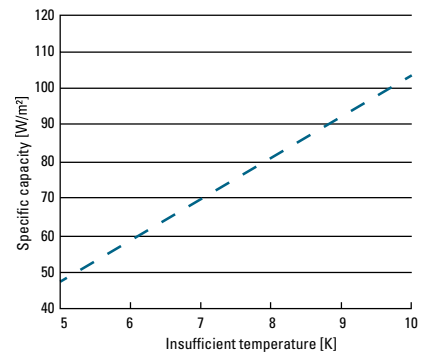
Plafotherm® V2A	123 W/m ²	---
Plafotherm® Cu	126 W/m ²	---
Plafotherm® Cu Acoustic	118 W/m ²	---
Plafotherm® Activation Board	133 W/m ²	---



HEATED AND CHILLED POST CAP CEILINGS, LONGITUDINALLY SOUND-REDUCED

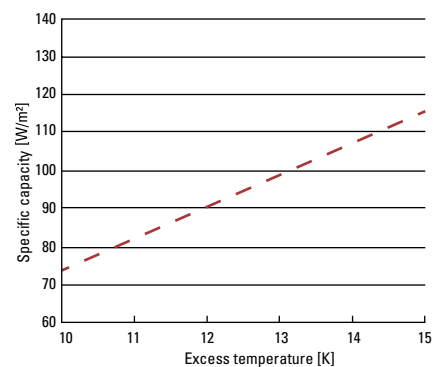
Heating/Cooling Technology Nominal Cooling Capacity in acc. with EN 14240 (10K)

Plafotherm® Cu	104 W/m ²	---
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Heating/Cooling Technology Nominal Heating Capacity in acc. with EN 14037:2003 (15K)

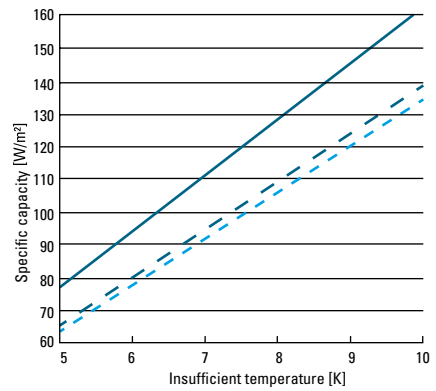
Plafotherm® Cu	116 W/m ²	---
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HEATED AND CHILLED CANOPY CEILINGS

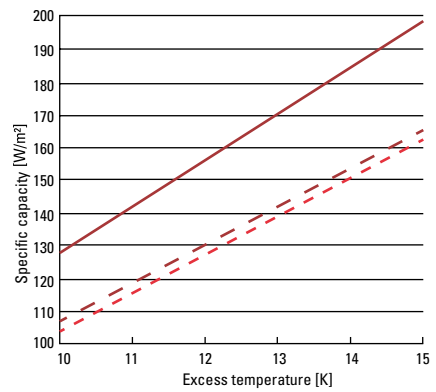
Heating/Cooling Technology Nominal Cooling Capacity in acc. with EN 14240 (10K)

Plafotherm® V2A	135 W/m ²	---
Plafotherm® Cu	139 W/m ²	---
Plafotherm® Activation Board	162 W/m ²	—



Heating/Cooling Technology Nominal Heating Capacity in acc. with EN 14037:2003 (15K)

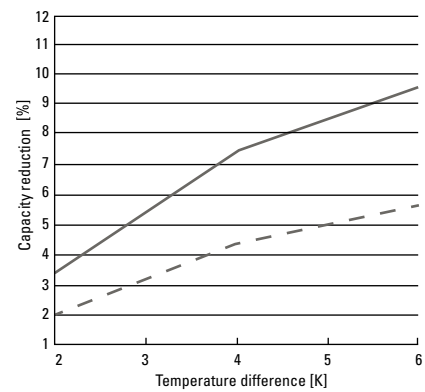
Plafotherm® V2A	163 W/m ²	---
Plafotherm® Cu	167 W/m ²	---
Plafotherm® Activation Board	199 W/m ²	—



HEATED AND CHILLED CANOPY CEILINGS: Plafotherm® DS Tabs (for concrete core activation)

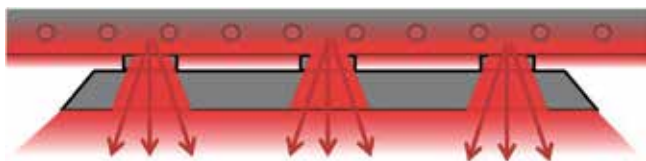
Room Occupancy

capacity reduction at 50 % room occupancy	—
capacity reduction at 30 % room occupancy	---

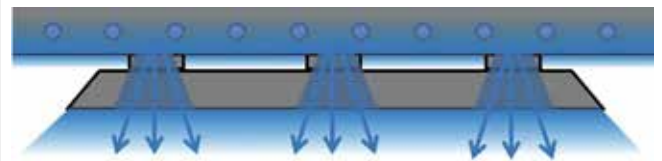


Modes of Operation

heating



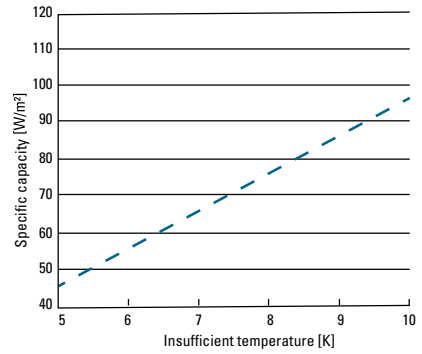
cooling



HEATED AND CHILLED EXPANDED METAL CEILINGS

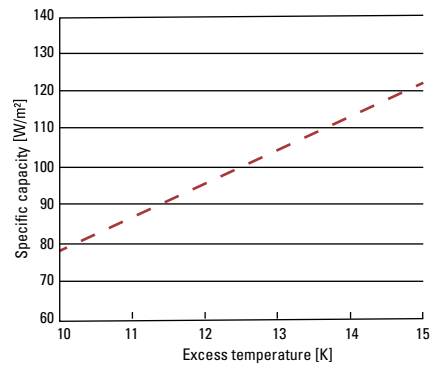
Heating/Cooling Technology **Nominal Cooling Capacity
in acc. with EN 14240 (10K)**

Plafotherm® Cu 96.6 W/m² - - - -



Heating/Cooling Technology **Nominal Heating Capacity
in acc. with EN 14037:2003 (15K)**

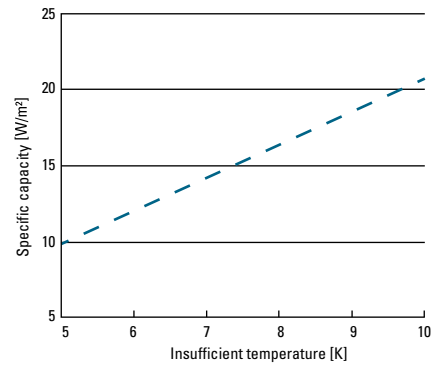
Plafotherm® Cu 122 W/m² - - - -



HEATED AND CHILLED BAFFLE CEILINGS

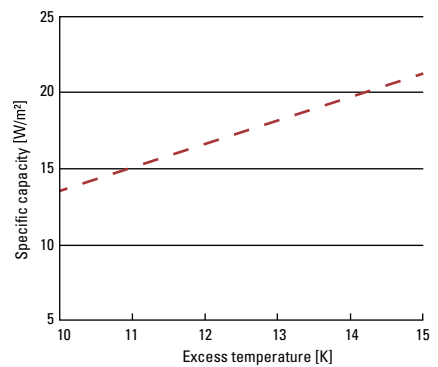
Heating/Cooling Technology **Nominal Cooling Capacity
in acc. with EN 14240 (10K)**

Plafotherm® Cu 21.1 W/lfm - - - -





Heating/Cooling Technology **Nominal Heating Capacity
in acc. with EN 14037:2003 (15K)**

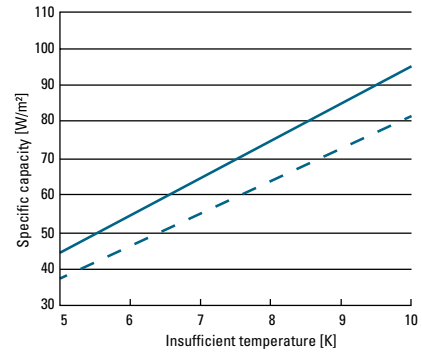
Plafotherm® Cu 21.7 W/lfm - - - -





HEATED AND CHILLED PLASTERBOARD CEILINGS

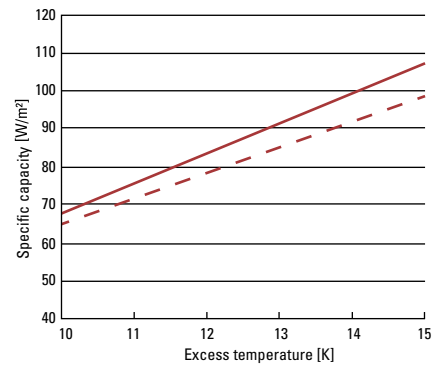
Heating/Cooling Technology Nominal Cooling Capacity in acc. with EN 14240 (10K)

Plafotherm® Cu plasterboard panel with graphite content	95.8 W/m ²	
Plafotherm® Cu plasterboard panel high-compressed	81.2 W/m ²	





Heating/Cooling Technology Nominal Heating Capacity in acc. with EN 14037:2003 (15K)

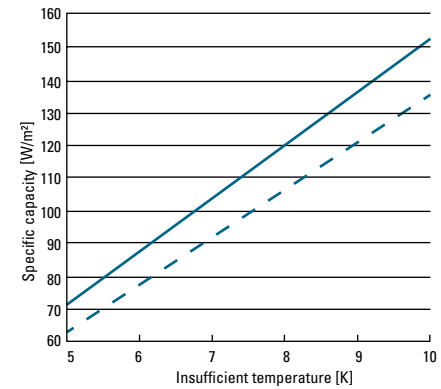
Plafotherm® Cu plasterboard panel with graphite content	108 W/m ²	
Plafotherm® Cu plasterboard panel high-compressed	99.3 W/m ²	



HEATED AND CHILLED HYBRID CEILINGS: Plafotherm® AirHybrid

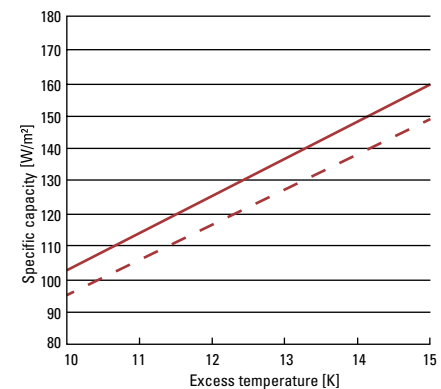
Heating/Cooling Technology Waterside Nominal Cooling Capacity in acc. with DIN EN 14240 (10K)

Plafotherm® Cu 18 m ³ /hm ² floor area	153 W/m ²	
Plafotherm® Cu 6 m ³ /hm ² floor area	136 W/m ²	



Heating/Cooling Technology Waterside Nominal Heating Capacity in acc. with EN 14037:2003 (15K)

Plafotherm® Cu 18 m ³ /hm ² floor area	161 W/m ²	
Plafotherm® Cu 6 m ³ /hm ² floor area	149 W/m ²	



HEATED AND CHILLED HYBRID CEILINGS: Plafotherm® DS AirHybrid

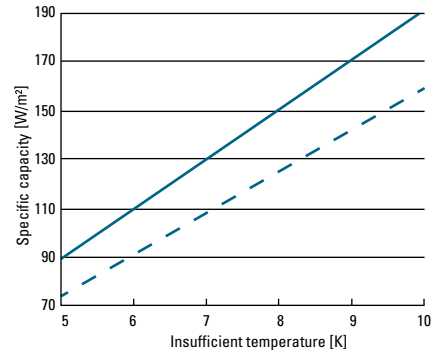
Heating/Cooling Technology Waterside Nominal Cooling Capacity in acc. with DIN EN 14240 (10K)

Plafotherm® Cu 192 W/m² ———

18 m³/hm² floor area

Plafotherm® Cu 160 W/m² - - - -

6 m³/hm² floor area



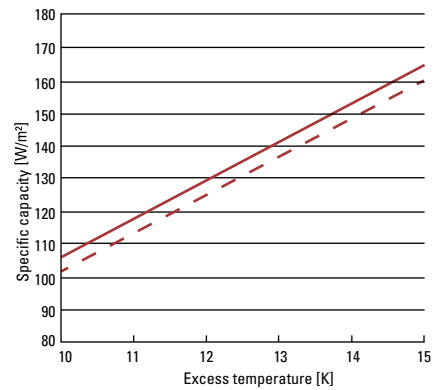
Heating/Cooling Technology Waterside Nominal Heating Capacity in acc. with EN 14037:2003 (15K)

Plafotherm® Cu 165 W/m² ———

18 m³/hm² floor area

Plafotherm® Cu 160 W/m² - - - -

6 m³/hm² floor area

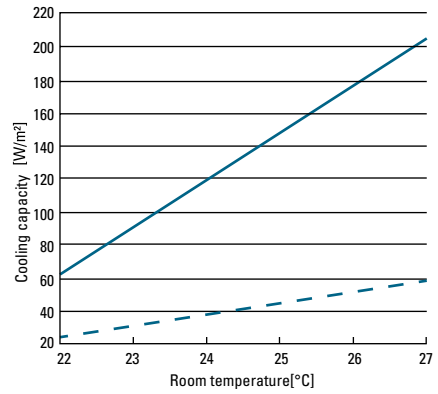


HEATED AND CHILLED HYBRID CEILINGS: Plafotherm® DS TAS (for concrete core working)

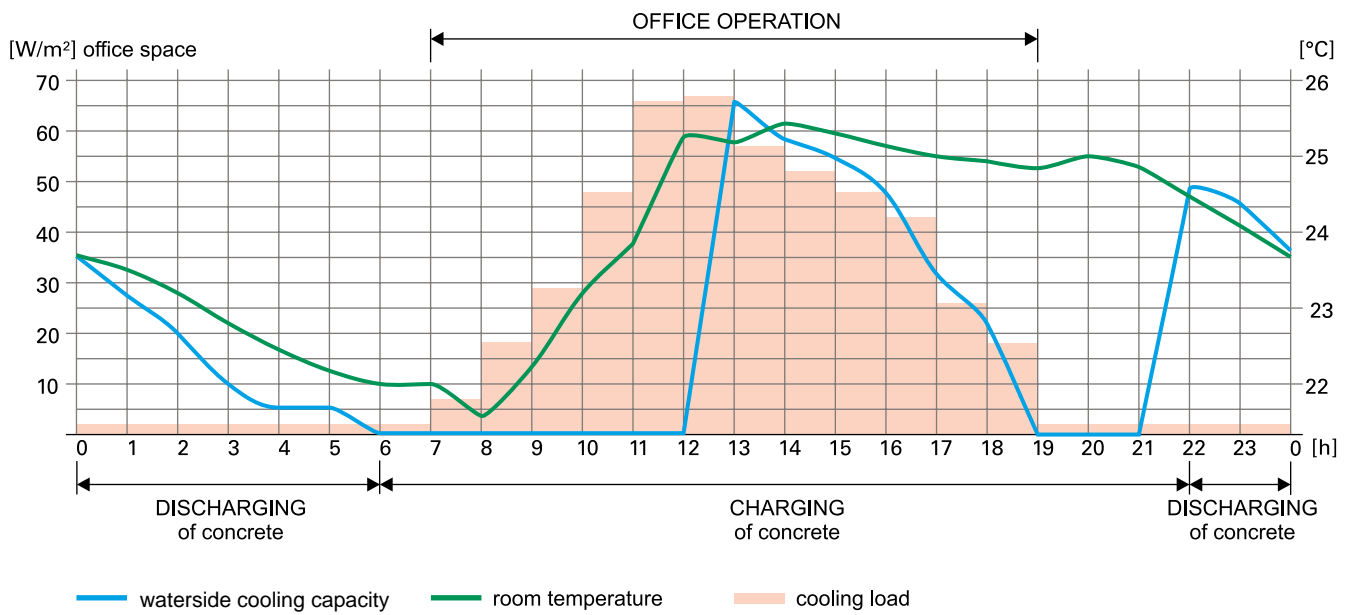
Capacities

dynamic cooling capacity $6 \text{ m}^3/\text{hm}^2$
 ZL $18 \text{ }^\circ\text{C}$, supply of chilled ceiling $16 \text{ }^\circ\text{C}$
 capacity of concrete core working
 at 50 % occupancy

ventilation capacity

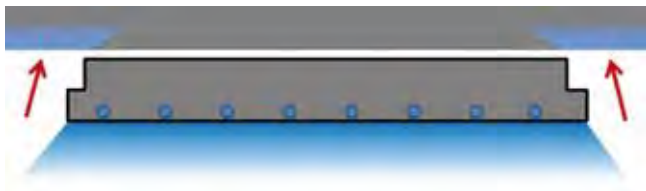


Diurnal Variations in Cooling Mode



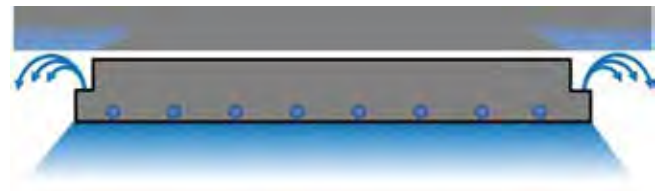
Modes of Operation

night operation
 working of the concrete core



Modes of Operation

peak-load operation
 parallel cooling + supply of fresh air



standard operation
 discharging of the concrete core + supply of fresh air



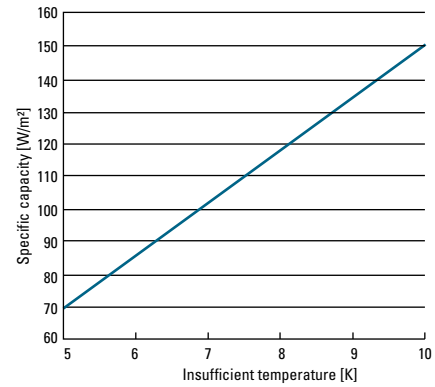
heat load operation
 heating + supply of fresh air



CONVECTION ELEMENTS

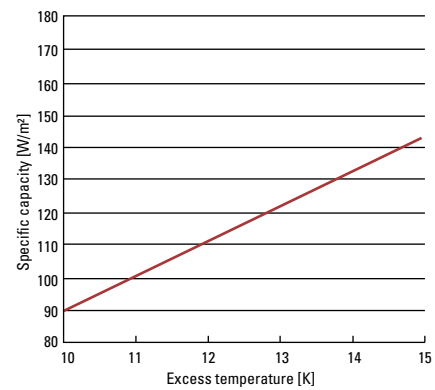
Heating/Cooling Technology **Nominal Cooling Capacity
in acc. with DIN EN 14240 (10K)
exceeding 65 % open area**

Plafotherm® Cu 149 W/m² ———



Heating/Cooling Technology **Nominal Heating Capacity
in acc. with DIN EN 14037:2003 (15K)
exceeding 65 % open area**

Plafotherm® Cu 142 W/m² ———



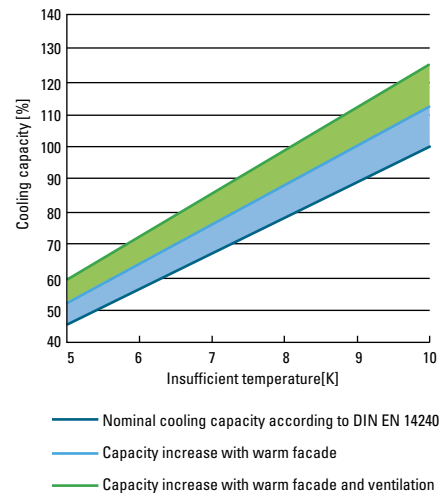
Influencing factors under real installation conditions in cooling mode

Cooling capacities in real operating conditions can be higher than tested under test standard conditions – due to the influence of warm facade and ventilation, for example.

Our experience showed:
increased convection improves the capacity of the chilled ceiling

Measurement in acc. with DIN EN 14240	Capacity Increase
--	-------------------

with warm facade	up to 13 %
with warm facade + ventilation	up to 22 %










The project-specific arrangement and temperature of mechanical ventilation can affect the result.

HYDRAULIC CONNECTION

Especially in modern office buildings, requirements on heating and cooling at the same time in different rooms respectively zones become increasingly necessary. This can be due to a number of reasons: external heat loads are increasing because of large glass facades or different high internal heat loads and people's different feeling of comfort.

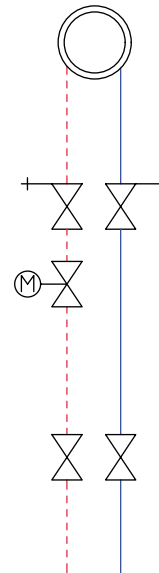
In order to meet the high requirement for simultaneous heating and cooling in different rooms, a 4-pipe-system should be realised. With a 2-pipe-system it is only possible to heat or to cool. The switchover is done centrally. The performance border can be defined project-related.

LEGEND

	supply (VL)
	return (RL)
	shut-off valve
	shut-off valve with drain
	control valve with dynamic volume flow control
	6-way-valve with dynamic volume flow control
	consumer

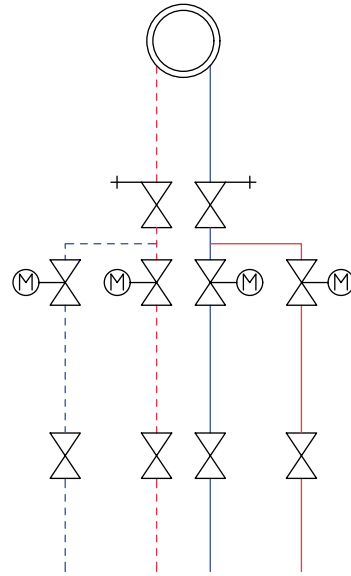
2-PIPE-SYSTEM

- + either cooling or heating mode possible (central switchover)
- + restricted comfort in transition periods (spring/autumn)
- + easy installation
- + favourable regulation technology



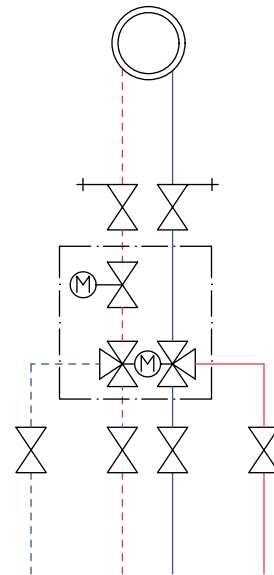
4-PIPE-SYSTEM

- + simultaneous heating and cooling in different zones possible
- + high comfort in transition periods (spring/autumn)
- + increased installation effort
- + versatile regulation technology



4-PIPE-SYSTEM WITH 6-WAY-VALVES

- + simultaneous heating and cooling in different zones possible
- + high comfort in transition periods (spring/autumn)
- + increased installation effort
- + versatile regulation technology
- + compact construction



ACCREDITED TEST LABORATORY IN ACC. WITH ISO/IEC 17025 AS A BRANCH OF HLK STUTT GART

Measurements of heating/cooling capacities in acc. with DIN EN 14240 and following DIN EN 14037 are carried out in the certified test laboratory.

Thanks to an exactly monitored measuring procedure, authentic project-related values are determined.

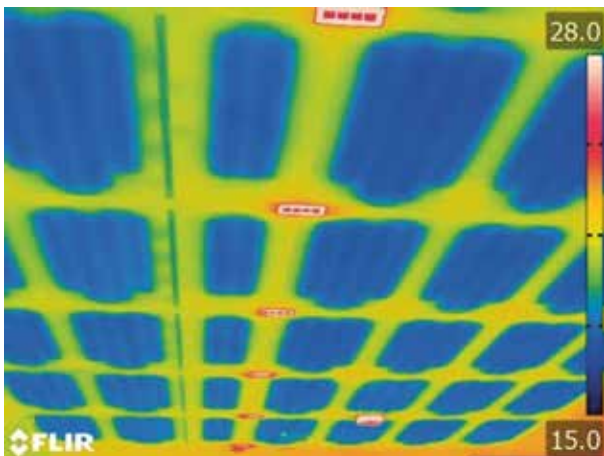
DAP-PL-3139.02

- test chamber for measurement of heating/cooling capacity
- test under laboratory conditions
- observation of measuring procedure
- accredited
- branch of HLK Stuttgart



SERVICE

In addition to our product, we provide relevant services from one source.



Thermography

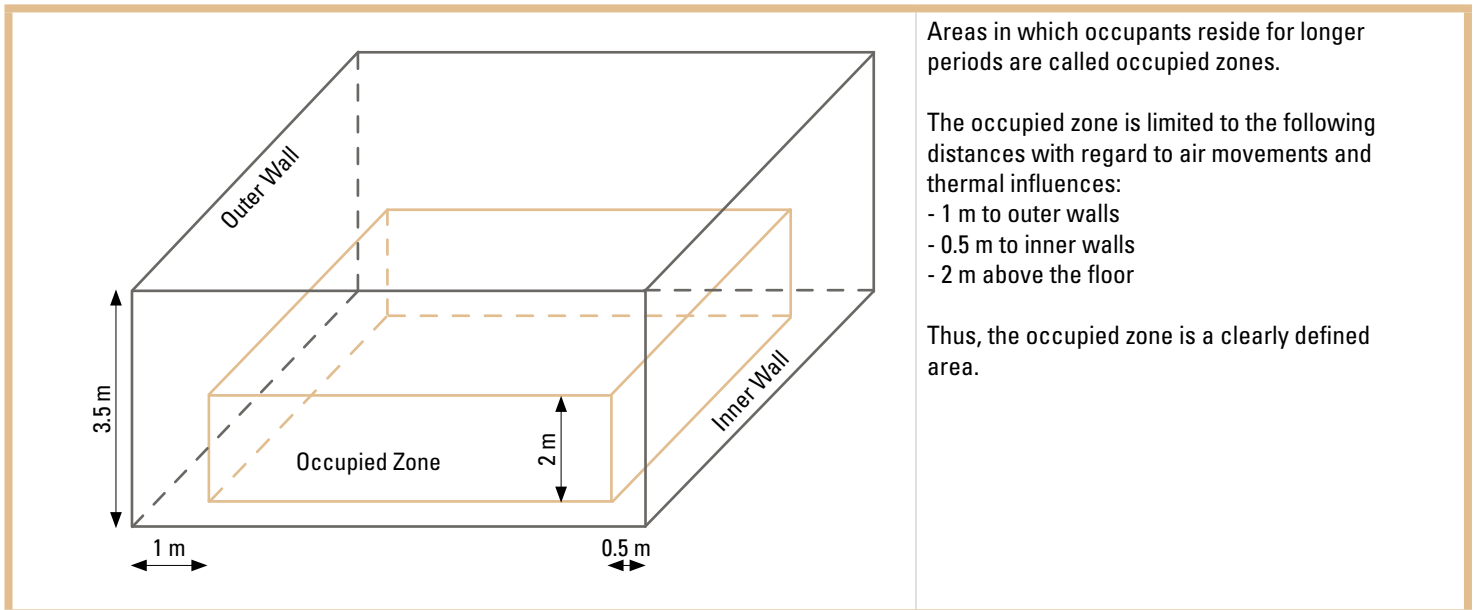
We carry out thermographies to be able to test the performance of heated/chilled ceilings. In this procedure, Lindner visualises amongst others the functionality and piping of existing heating and cooling systems.

- execution by certified employees in acc. with DIN EN ISO 9712
- high-grade measurement equipment
- functional test of heating and cooling systems
- also applicable in development and quality assurance

VENTILATION

Good indoor air quality is essential for our well-being and our health. Besides constructional influences, the indoor air quality is mainly determined by the behaviour of users. The recommended air exchange rates are regulated in standards like DIN 1946-2 resp. EN 13779. The comfort criteria is defined in standards such as EN ISO 7730, depending on the requirement and usage.

How is an occupied zone defined in acc. with EN ISO 7730?



Prerequisites for a good indoor air quality:

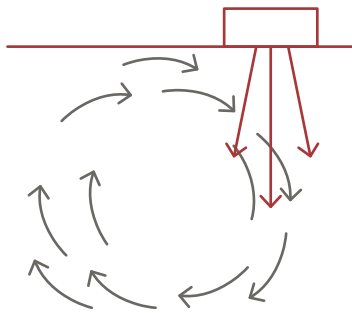
- low CO₂ content in indoor air
- comfort regarding indoor air temperature, relative air humidity, air movement (freedom from draught air, air stratification) and sound level
- usage of low-emission building products and furnishing for the reduction of chemical input
- regular, easy and cost-efficient technical and hygienic maintenance of ventilation and heating systems

The requirements on a ventilation system are decisively influenced by the room size and type of usage. Thus, for example the required fresh air flow rate and the sound level depend on the type of room.

	Outdoor Air Flow		Requirements on Sound Level	
	person m ³ /h	area m ³ /(m ² x h)	increased dB/a	normal dB/a
Individual Office	40	4	35	40
Open-Plan Office	60	6	45	50
Conference Room	40 - 60	18	45	50

RELEVANT PARAMETERS

Cooling Mode	In cooling mode, the supply air is cooler than the room air. Generally, warm outdoor air is cooled and dehumidified. Thus, the room air is changed and dehumidified.
Heating Mode	In heating mode, the supply air is warmer than the room air.
Excess Temperature [K]	<p>The temperature difference between supply and exhaust air is called excess temperature. Normally, the exhaust air temperature can be equated to the room air temperature.</p> <p>An excess temperature exists if the room air temperature is lower than the supply air temperature – this is a heating mode by means of ventilation.</p>
Insufficient Temperature [K]	<p>The temperature difference between supply and exhaust air is called insufficient temperature. Normally, the exhaust air temperature can be equated to the room air temperature.</p> <p>An insufficient temperature exists if the room air temperature is higher than the supply air temperature – this is a cooling mode by means of ventilation.</p>
Air Exchange Rate	The air exchange rate [1/h] defines the multiple of room volume that is supplied per hour [m ³ /h] by means of supply air.
Volume Flow Rate	<p>The volume flow rate defines, how much air is transported through a determined section per unit time.</p> <p>The SI unit of volume flow rate is usually m³/s – in case of ventilation systems, it is specified in m³/h.</p>

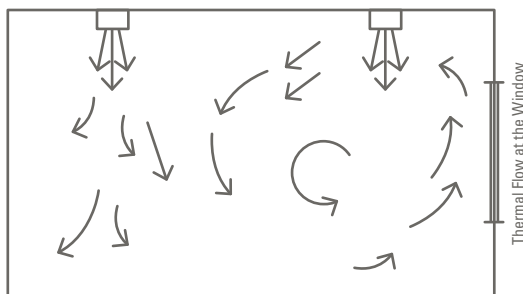


Mixing Ventilation

The position of the exhaust air outlet is not relevant in case of mixing ventilation.

Due to the air induction in a room, a multitude of the primarily supplied volume flow rate is transported. Thus, an exhaust influence is only given in direct proximity of the exhaust air outlet.

In order to prevent a direct suction of fresh air, the exhaust air outlet should be positioned outside the direct flow area of supply air.



Room Air Flow

The flow is usually determined by the thermal.

The warm facade is the driving force and drives the room air flow.

The following ventilation components are available as additional equipment for Plafotherm® Heated/Chilled Ceilings

AirBox S ↘ from page 163

AirBox E ↘ from page 163

AirBeam ↘ from page 161

SEISMIC SAFETY

There are a lot of seismic areas around the world due to high tectonic activity. To be able to reduce damages of an earthquake inside of a building, earthquake-proof ceiling systems have a special construction. Thus, in case of an earthquake, people in a room are not endangered by falling metal ceiling panels.

The requirements of earthquake-proof ceiling systems can vary significantly. This is why the exact planning is always made project-related – you will receive a complete metal ceiling system including substructure that exactly meets your individual requirements.

The following ceiling systems are available in earthquake-proof construction Lindner Seismic:

Plafotherm® E 200 ↘ page 28

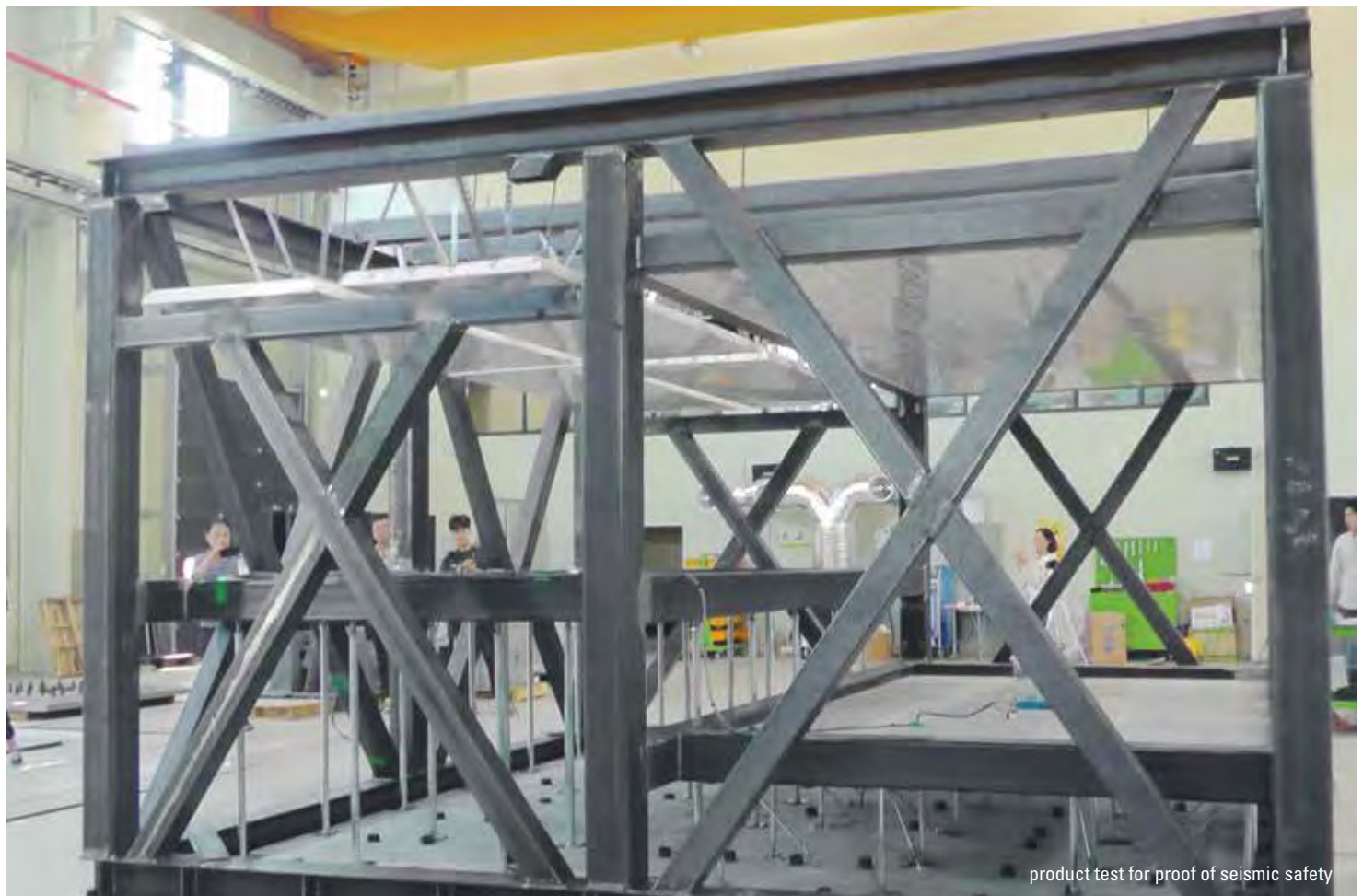
Plafotherm® E 213 ↘ page 32

Plafotherm® DS 320 ↘ page 46

We will be pleased to realise project-related solutions, adapted to the local circumstances.

In the rigorous tests, different earthquake intensities and velocities were imitated in different axes. Lindner Seismic Ceiling Systems passed the requirement “Seismic Safety” in acc. with the following accepted test standards. Thus, they offer highest safety in seismic areas:

American Standard	AC 156 Seismic Certification by Shake-table Testing of Nonstructural Components
Korean Standard	Seismic Test Method for Telecommunication Facilities (National Radio Research Agency notice 2015-14)



FIRE PROTECTION

Buildings are increasing in both size and complexity, and so fire protection is of utmost importance today. Due to the high damage potential of a fire, to life and health as well as to valuable property, taking the right precautions is vital to ensuring our buildings are protected. Preventive fire protection has long been a priority at Lindner, where expert support ensures the best defence for your buildings.

Defects in structural fire protection are not always obvious. It is therefore necessary that a detailed inspection and assessment of the current architecture is initially carried out, in order to plan the work required for the forthcoming project.

BUILDING MATERIAL CLASS

EN 13501-1

Fire classification of construction products and building elements.

The classified properties for fire behaviour of building materials correspond to the following requirements in building inspection conditions for use in accordance with EN 13501-1:


BUILDING AUTHORITY REQUIREMENTS	ADDITIONAL REQUIREMENTS		EUROPEAN CLASS ACC. TO EN 13501-1
	No Smoke	No Flaming Droplets/Particles	Building Products <small>* class achieved by Lindner</small>
Noncombustible	x	x	A1
	x	x	A2 - s1, d0
Difficult to Ignite	x	x	B - s1, d0 C - s1, d0
		x	A2 - s2, d0 * A2 - s3, d0 B - s2, d0 B - s3, d0 C - s2, d0 C - s3, d0
	x		A2 - s1, d1 A2 - s1, d2 B - s1, d1 B - s1, d2 C - s1, d1 C - s1, d2
			A2 - s1, d1 A2 - s1, d2 B - s1, d1 B - s1, d2 C - s1, d1 C - s1, d2
Normal Combustibility		x	D - s1, d0 D - s2, d0 D - s3, d0 E
			D - s1, d1 D - s2, d1 D - s3, d1 D - s1, d2 D - s2, d2 D - s3, d2
			E - d2
Easily Ignited			F

Explanation of additions for the classification of fire behaviour of building materials:

DERIVATION OF ABBREVIATION	CRITERION	APPLICATION AREA		SUBCLASSES
s (Smoke)	smoke development	requirement on smoke development	s1	no smoke development
			s2	limited smoke development
			s3	unlimited smoke development
d (Droplets)	flaming droplets/particles	requirement on flaming droplets/particles	d0	no droplets/particles
			d1	limited droplets/particles
			d2	strong droplets/particles

Proofs – Building Material Class

Lindner Metal Ceiling panels manufactured from galvanised steel sheet, including powder-coated surface, bonded acoustic tissue on the reverse side and heat conducting profile comply with the following building material classes:

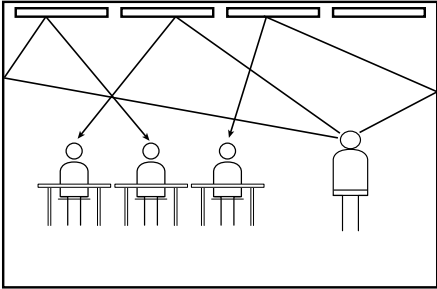
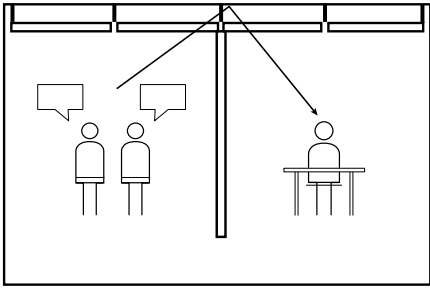
	NORM	CLASSIFICATION
	EN 13501-1	A2 - s2, d0 "difficult to ignite"

))) ACOUSTICS

Lindner has more than 50 years of experience in enhancing acoustics for interior fit-outs. Today, acoustics and sound protection are recognised worldwide as key quality factors for new constructions and building renovations.

Project requirements are evaluated on a case-by-case basis, depending on the purpose of the building, its physical shape, and the type of construction required.

Being equipped with perforations and acoustic inlays, Lindner Ceiling Systems are the perfect solution for acoustic improvement. A multitude of tested acoustic proofs are available – both for room and building acoustics. We also offer project-related solutions, individually adapted to suit your project requirements.

<p>Room Acoustics</p>		<ul style="list-style-type: none"> + speech intelligibility in classrooms, lecture halls and theatres + musical experience in concert halls + reduction of noise level in production facilities and workshops + sound-absorbing behaviour of installed products
<p>Building Acoustics</p>		<ul style="list-style-type: none"> + airborne and structure-borne sound transmission of/through components + restriction of external noises + insulation of technical building equipment + sound insulation properties of separating components + longitudinal sound reduction of flanking components

ROOM ACOUSTICS

The room size, the suitable arrangement of sound-absorbing measures and the future use of the room are important characteristics to fulfil the acoustic requirements of a room. For example in classrooms, a good speech intelligibility is necessary whereas in concert halls, the musical experience is the main focus.

The most important tool in the acoustic design of rooms is the sound absorption. This means the reduction of sound on room boundary surfaces. Different room acoustic parameters play a decisive role:

<p>Sound Absorption Coefficient α</p>	<p>The sound absorption coefficient α indicates the absorbed amount of incident sound: $\alpha = 0$ There is no absorption, the complete incident sound is reflected: $\alpha = 1$ The complete incident sound is absorbed, there is no reflection.</p>																		
<p>Rated Sound Absorption Coefficient α_w</p>	<p>The rated sound absorption coefficient α_w in accordance with EN ISO 11654 is determined for five octaves with medium frequencies from 250 to 4,000 Hz. A reference curve is shifted in steps of 0.05 – the maximum negative sum of deviations must not exceed 0.10. The value at a frequency of 500 Hz is the value of α_w.</p>																		
<p>Practical Sound Absorption Coefficient α_p</p>	<p>The practical sound absorption coefficient α_p is indicated with six values at 125 Hz, 250 Hz, 500 Hz, 1,000 Hz, 2,000 Hz and 4,000 Hz. Each value is determined by three one-third octave values. These are added, averaged and then rounded up or down in steps of 0.05. Example: 200 Hz: 0.65 250 Hz: 0.72 315 Hz: 0.86 The practical sound absorption coefficient α_p at 250 Hz is 0.75.</p>																		
<p>Sound Absorption Classes</p>	<p>In acc. with EN ISO 11654, the rated sound absorption coefficients α_w are divided into different sound absorption classes.</p> <table border="0"> <tr> <td>A</td> <td>≥ 0.9</td> <td>highly absorbent</td> </tr> <tr> <td>B</td> <td>0.8 to 0.85</td> <td>highly absorbent</td> </tr> <tr> <td>C</td> <td>0.6 to 0.75</td> <td>high absorbent</td> </tr> <tr> <td>D</td> <td>0.3 to 0.55</td> <td>absorbent</td> </tr> <tr> <td>E</td> <td>0.15 to 0.25</td> <td>low absorbent</td> </tr> <tr> <td>unclassified</td> <td>≤ 0.1</td> <td>reflective</td> </tr> </table>	A	≥ 0.9	highly absorbent	B	0.8 to 0.85	highly absorbent	C	0.6 to 0.75	high absorbent	D	0.3 to 0.55	absorbent	E	0.15 to 0.25	low absorbent	unclassified	≤ 0.1	reflective
A	≥ 0.9	highly absorbent																	
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E	0.15 to 0.25	low absorbent																	
unclassified	≤ 0.1	reflective																	
<p>Reverberation Time</p>	<p>Reverberation time is the time it takes for a sound pressure to drop by 60 dB in a room. It is specified in seconds. The ideal reverberation time largely depends on the use of a room.</p> <table border="0"> <tr> <td>recording studio</td> <td>< 0.3 s</td> </tr> <tr> <td>classroom</td> <td>0.6 to 0.8 s</td> </tr> <tr> <td>concert hall</td> <td>1.5 to 3 s</td> </tr> </table>	recording studio	< 0.3 s	classroom	0.6 to 0.8 s	concert hall	1.5 to 3 s												
recording studio	< 0.3 s																		
classroom	0.6 to 0.8 s																		
concert hall	1.5 to 3 s																		
<p>Frequency</p>	<p>Frequency is the number of oscillations per second – the unit is Hertz [Hz]. The frequency characterises the tone pitch.</p> <table border="0"> <tr> <td>hearing/music</td> <td>20 to 20,000 Hz</td> </tr> <tr> <td>speech/singing</td> <td>200 to 2,000 Hz</td> </tr> <tr> <td>room acoustics</td> <td>100 to 5,000 Hz</td> </tr> </table>	hearing/music	20 to 20,000 Hz	speech/singing	200 to 2,000 Hz	room acoustics	100 to 5,000 Hz												
hearing/music	20 to 20,000 Hz																		
speech/singing	200 to 2,000 Hz																		
room acoustics	100 to 5,000 Hz																		

PROOFS – SOUND ABSORPTION

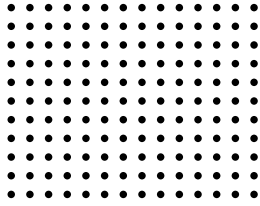
Extract from the standard perforations – further values available on request.

HEATED AND CHILLED POST CAP CEILINGS, HEATED AND CHILLED HOOK-ON CEILINGS

Model	Perforation Pattern	Total Constructional Height	Execution	α_w	NRC	Graph
Rg 0,8 - 5		200 mm 200 mm	acoustic tissue, heat conducting profile acoustic tissue, 20 mm Insula Basic, heat conducting profile	0.50 (L) 0.55 (L)	0.60 0.60	
Rv 1,8 - 20		200 mm 200 mm 200 mm 200 mm	acoustic tissue, heat conducting profile acoustic tissue, heat conducting profile acoustic acoustic tissue, 20 mm Insula Basic, heat conducting profile acoustic tissue, 20 mm Insula Basic, heat conducting profile acoustic	0.45 (L) 0.70 (L) 0.55 (L) 0.80	0.60 0.75 0.60 0.80	
Rv 2,0 - 20		200 mm 200 mm	acoustic tissue, heat conducting profile acoustic tissue, 20 mm Insula Basic, heat conducting profile	0.45 (LM) 0.55 (LM)	0.60 0.70	
Rd 3,0 - 30		200 mm 200 mm	acoustic tissue, heat conducting profile acoustic tissue, 20 mm Insula Basic, heat conducting profile	0.60 (L) 0.70 (L)	 	

HEATED AND CHILLED POST CAP CEILINGS, LONGITUDINALLY SOUND-REDUCED

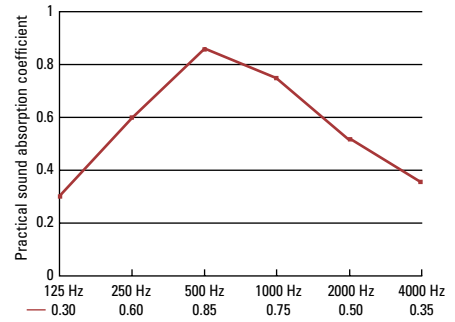
Rg 1,6 - 13



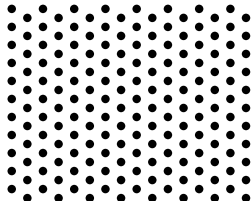
Execution

acoustic tissue, 30 mm Insula Basic,
heat conducting profile, heavy plating

α_w 0.50 (LM) **NRC** 0.70



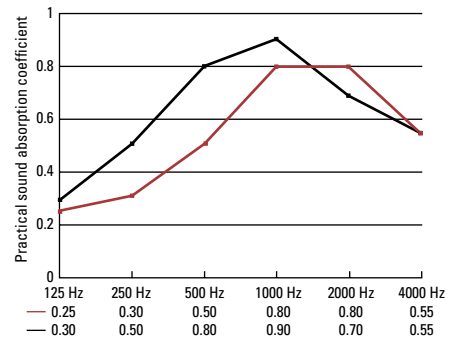
Rv 1,8 - 20



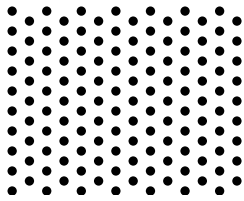
Execution

acoustic tissue, heavy plating,
heat conducting profile
acoustic tissue, 20 mm Insula Basic,
heat conducting profile, heavy plating

α_w 0.55 (MH) **NRC** 0.60
0.70 0.75



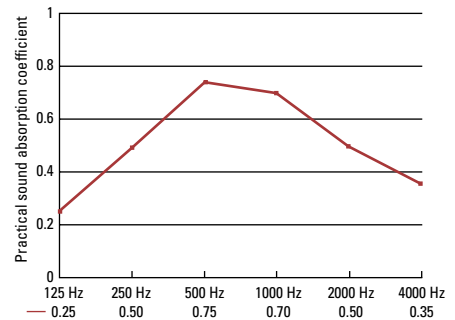
Rv 2,0 - 20



Execution

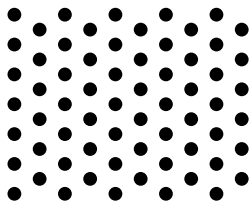
acoustic tissue, 20 mm Insula Basic,
heat conducting profile, heavy plating

α_w 0.50 (M) **NRC** 0.60



HEATED AND CHILLED EXPANDED METAL CEILINGS

Rv 3,0 - 20



Total Constructional Height

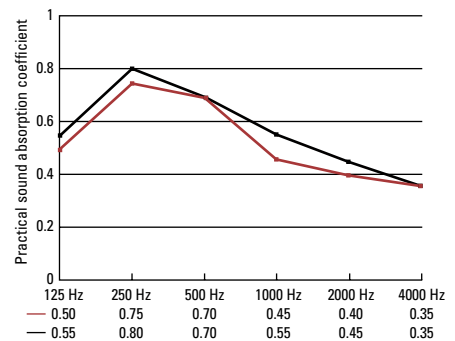
200 mm

200 mm

Execution

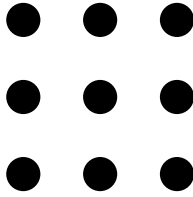
acoustic tissue,
heat conducting profile
acoustic tissue,
20 mm Insula Basic,
heat conducting profile

α_w 0.45 (LM) **NRC** 0.60
0.50 (L) 0.65



HEATED AND CHILLED PLASTERBOARD CEILINGS

8/18 R



Total Constructional Height

200 mm

Centre Distance

260 mm

Execution

acoustic tissue, heat conducting profile

α_w

0.25 (H)

NRC

0.20



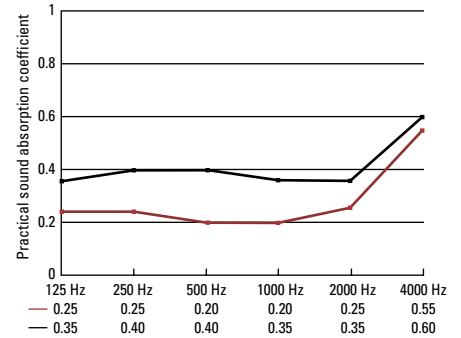
200 mm

333 mm

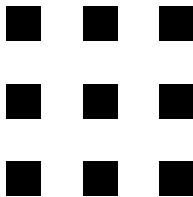
acoustic tissue, heat conducting profile

0.40 (H)

0.35



8/18 Q



Total Constructional Height

200 mm

Centre Distance

260 mm

Execution

acoustic tissue, heat conducting profile

α_w

0.35 (LH)

NRC

0.35



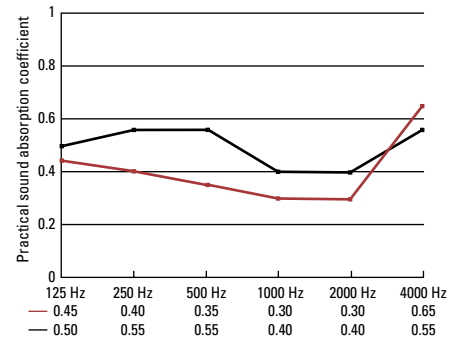
200 mm

333 mm

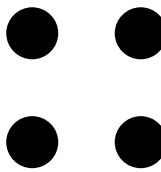
acoustic tissue, heat conducting profile

0.45 (L)

0.45



12/25 R



Total Constructional Height

200 mm

Centre Distance

260 mm

Execution

acoustic tissue, heat conducting profile

α_w

0.30 (LH)

NRC

0.30



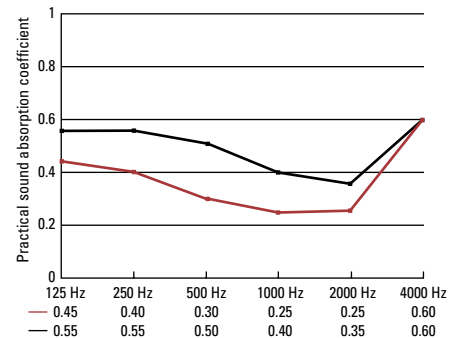
200 mm

333 mm

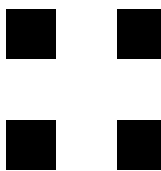
acoustic tissue, heat conducting profile

0.40 (LH)

0.45



12/25 Q



Total Constructional Height

200 mm

Centre Distance

260 mm

Execution

acoustic tissue, heat conducting profile

α_w

0.30 (LH)

NRC

0.30



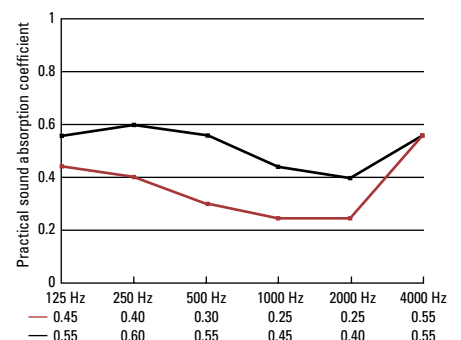
200 mm

333 mm

acoustic tissue, heat conducting profile

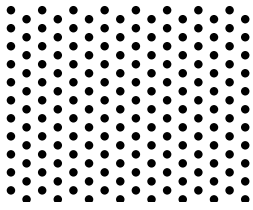
0.45 (L)

0.50



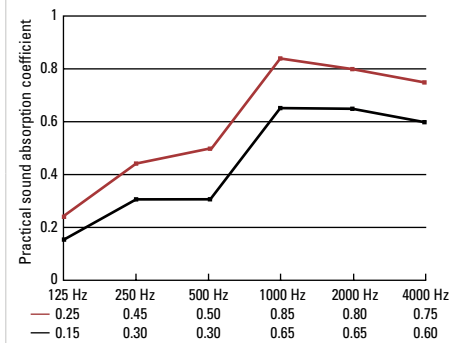
HEATED AND CHILLED BAFFLE CEILINGS

Rv 1,8 - 20



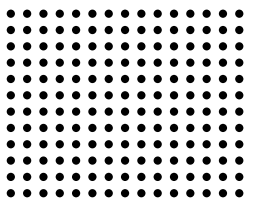
Width	Height	Centre Distance	Execution
35 mm	200 mm	100 mm	acoustic tissue, 20 mm Insula Basic, heat conducting profile
35 mm	200 mm	250 mm	acoustic tissue, 20 mm Insula Basic, heat conducting profile

α_w	NRC
0.60 (MH)	0.65
0.40 (MH)	0.45



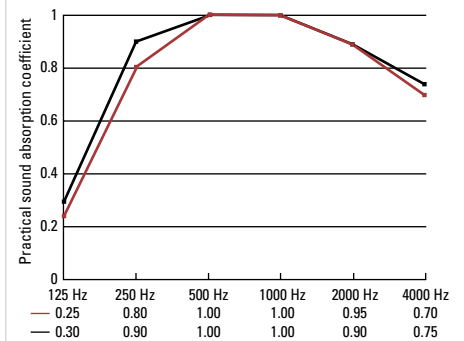
HEATED AND CHILLED CANOPY CEILINGS: Plafotherm® DS Tabs

Rg 1,8 - 19



Total Constructional Height	Execution
73 mm	acoustic tissue, 30 mm Insula Basic, heat conducting profile
73 mm	acoustic tissue, 40 mm Insula Basic, heat conducting profile

α_w	NRC
0.90 (L)	1.05
0.95 (L)	1.05



Equivalent Sound Absorption Area

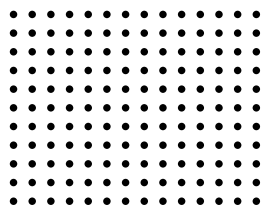
The equivalent sound absorption area is defined as the product of the sound absorption coefficient and the area.

A ceiling area of 10 m² with a sound absorption coefficient of 0.50 has an equivalent sound absorption area of 5 m². Thus, a ceiling area of 20 m² and a sound absorption coefficient of 0.25 have the same effect in a room.

Canopy Ceilings are tested as single elements that are unsystematically positioned in the reverberation room. Thus, the sound incidence on the reverse side is additionally absorbed. The sound absorption capacity of canopy ceilings is defined as equivalent sound absorption area per canopy [m²].

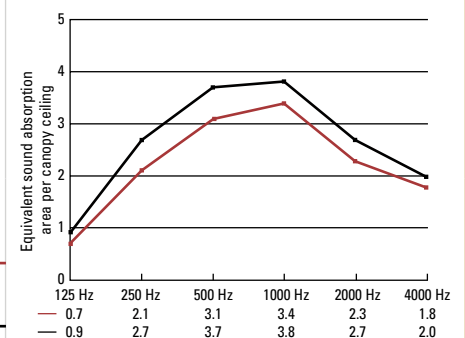
HEATED AND CHILLED HYBRID CEILINGS: Plafotherm® DS TAS

Rg 1,6 - 13



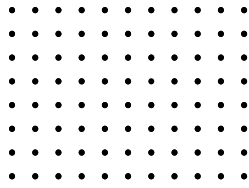
Total Constructional Height	Execution
86 mm	acoustic tissue, heat conducting profile
86 mm	acoustic tissue, 30 mm Insula A2, heat conducting profile

Dimension Canopy Ceiling
4,000 x 900 mm = 3.60 m ²
4,000 x 900 mm = 3.60 m ²



HEATED AND CHILLED CANOPY CEILINGS

Rg 0,8 - 5



Total Constructional Height
200 mm

200 mm

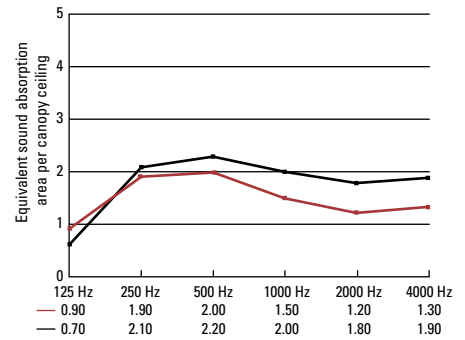
Execution

acoustic tissue,
heat conducting profile
acoustic tissue,
20 mm Insula Basic,
heat conducting profile

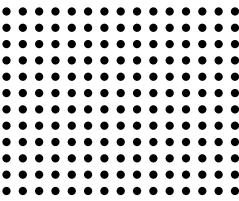
Dimension Canopy Ceiling

1,200 x 2,400 mm = 2.88 m² —

1,200 x 2,400 mm = 2.88 m² —



Rg 1,8 - 19



Total Constructional Height
250 mm

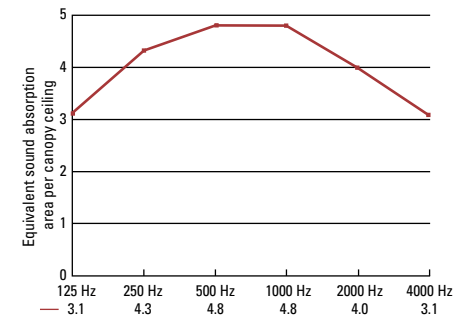
250 mm

Execution

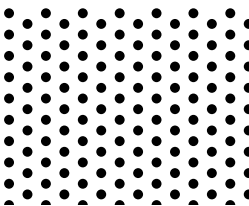
acoustic tissue,
20 mm Insula Basic,
heat conducting profile

Dimension Canopy Ceiling

4,950 x 900 mm = 4.45 m² —



Rv 2,0 - 20



Total Constructional Height
200 mm

200 mm

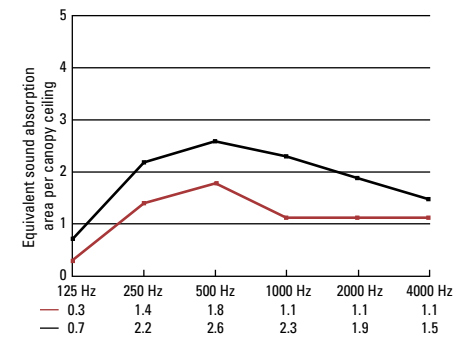
Execution

acoustic tissue,
heat conducting profile
acoustic tissue,
20 mm Insula Basic,
heat conducting profile

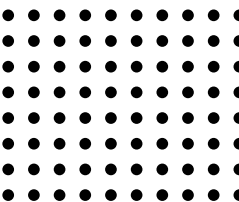
Dimension Canopy Ceiling

1,725 x 1,390 mm = 2.40 m² —

1,725 x 1,390 mm = 2.40 m² —



Rg 2,5 - 16



Total Constructional Height
100 mm

100 mm

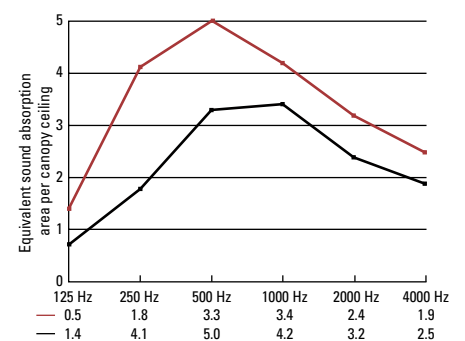
Execution

acoustic tissue,
heat conducting profile
50 % acoustically transparent
acoustic tissue,
30 mm Insula Basic,
heat conducting profile,
50 % acoustically transparent

Dimension Canopy Ceiling

800 x 5,000 mm = 4.00 m² —

800 x 5,000 mm = 4.00 m² —



BUILDING ACOUSTICS

Partitions between two adjacent rooms are often not installed to the raw ceiling in order to stay flexible in the room layout and to be able to easily move partitions. As a consequence, the sound is transferred through the ceiling void which leads to a lack of confidentiality in your rooms.

Thus, it is important to suppress the noise of two adjacent rooms – this capability is called sound insulation.

Being equipped with heavy platings on the reverse side, Plafotherm® Heated/Chilled Ceilings can be executed longitudinally sound-reduced. With longitudinally sound-reduced ceilings, individual room layouts can easily be realised – at the same time, the privacy in your rooms is guaranteed. In our standard range, you can find Post Cap Ceilings with tested longitudinal sound reduction – please contact us if you require project-specific solutions:

Plafotherm® B 100 SD ↘ page 20

Plafotherm® B 147 SD ↘ page 24

PROOFS – LONGITUDINAL SOUND REDUCTION

HEATED AND CHILLED POST CAP CEILINGS, LONGITUDINALLY SOUND-REDUCED		
Execution	Plafotherm® B 100 SD	Plafotherm® B 147 SD
	Rated Normalised Flanking Level Difference $D_{n,f,w}$	
acoustic tissue, heavy plating	43 dB in acc. with ISO 717-1	48 dB in acc. with ISO 717-1
acoustic tissue, 20 mm Insula Basic heavy plating	48 dB in acc. with ISO 717-1	51 dB in acc. with ISO 717-1
acoustic tissue, 30 mm Insula Basic heavy plating bulkhead, panelled with one layer on both sides	60 dB in acc. with ISO 717-1	60 dB in acc. with ISO 717-1

CORROSION PROTECTION

Corrosion protection refers to measures to avoid damages on metallic components caused by corrosion.

CLASSES OF EXPOSURE

Metal ceilings are divided into exposure classes in acc. with EN 13964.

Heated/Chilled ceilings are suitable for interior areas and have the exposure class A.

Class	Conditions
A	building components exposed to varying relative humidity up to 70 % and varying temperature up to 25 °C but without corrosive pollutants.
B	building components exposed to varying relative humidity up to 90 % and varying temperature up to 30 °C but without corrosive pollutants.
C	building components exposed to varying relative humidity up to 95 % and varying temperature up to 30 °C and accompanied by a risk of condensation but without corrosive pollutants.
D	more severe than the above

SUSTAINABILITY

In 2007, Lindner co-founded the German Sustainable Building Council (DGNB) and has become one of the leading specialists for “Green Building”.

For us, implementing projects in a sustainable manner means acting in an environmentally, socially and economically responsible manner. We align our processes with the goal of continuously minimising energy and resource consumption and taking into account the impact that our constructions have on people and nature. When developing our high-quality technical products, we think in closed circuits, ensuring that no unnecessary waste is produced. We support the goals for your building project, help you obtain building certifications, and ensure a healthier environment for building occupants.

HEALTHY LIVING AND WORKING

We develop and produce adaptable and functional high-quality building solutions that support people-friendly architecture. This includes an individual, holistic concept considering the human comfort factors. Always bearing in mind acoustics, fire protection, ergonomics, as well as thermal and visual comfort.

FIT FOR THE FUTURE

“Nothing is as constant as change.” And that’s good. For more than 50 years, Lindner has evolved in an authentic manner and committed itself to compliance within legal frameworks and social contexts. We’ve listened to our customers and turned their visions into reality. Always placing customer needs first. We love the challenges and are always aimed at finding solutions that bring added value for both people and the environment. Drawing on established standards for sustainable construction, we create healthier living and working spaces. Whether long-term investment production or user-oriented models for a healthy working environment – the focus is always on human beings and their needs.

THE BASIS OF YOUR GREEN BUILDING

Selecting the right products for interior fit-out and building envelope has to be technical, functional, and economical. This way, building projects that are committed to sustainability can fulfill the ecological quality and target specifications. As a full-range supplier, we process all components of our building products. We are constantly developing our services and system products such as the Cradle to Cradle Certified™ products: Plafotherm® Heated/Chilled Ceilings. They make a decisive contribution to the success of your building project – in particular when pursuing certification in accordance with LEED, DGNB, BNB and other standard certification systems.

- + resource preservation
- + well-being
- + quality
- + investment protection

 breeam



DGNB

Deutsche Gesellschaft für Nachhaltiges Bauen
German Sustainable Building Council

CRADLE TO CRADLE®

Lindner products have always been developed and produced to be especially durable and resource-efficient. By following the Cradle to Cradle® principle, we are increasingly considering the entire life cycle of products. Our goal is to avoid waste from the very beginning, meaning that products are designed in a way that they can serve as raw materials for the next generation of the same product – a closed technical cycle.

ENVIRONMENTAL PRODUCT DECLARATIONS

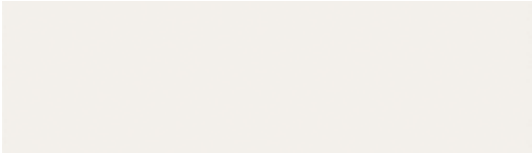

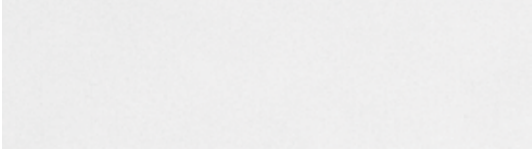

Environmental product declarations answer all your questions about the ecological footprint of our system products, their reusability, recyclability, emissions, material properties, basic and bulk parts. They are a standardised data basis for architects, planners and auditors for use in tenders, life cycle assessments and building certification in acc. with LEED, DGNB, BNB and BREEAM. Environmental product declarations give you comprehensive information about the environmental impact of Lindner Products.

You can obtain in-depth self-declarations in accordance with ISO 14021 as well as EPD verification in accordance with ISO 14025 and EN 15804 for our Plafotherm® Heated/Chilled Ceilings.

REFLECTANCE

The degree of reflection is a very important component of lighting design. It is the percentage of incident luminous flux that is reflected on a surface. Bright surfaces have a high reflectance – dark surfaces have a low reflectance. Furthermore, perforations and inlays on the reverse side have an influence on light reflection. Given the same level of illuminance at work stations (area of usage), the number of luminaires can generally be reduced when using surfaces with high reflectance. Thus, energy can be saved.

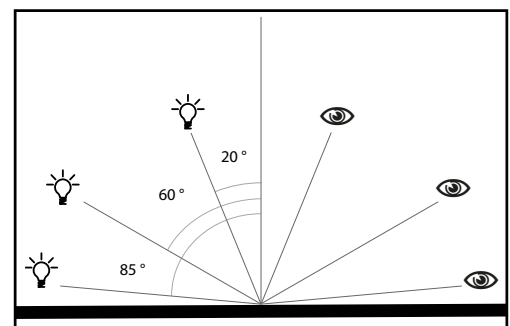
Unperforated, powder-coated Lindner Metal Ceilings have the following degrees of reflection:

SURFACE	COLOUR	REFLECTANCE	
COLOURline	RAL 9016	approx. 82 %	
COLOURline	9006 acc. to Lindner	approx. 47 %	
MOODline	natural white 9016	approx. 75 %	
MOODline	lava grey 7016	approx. 8 %	

GLOSS LEVEL

Besides the colour, the appearance of a metal ceiling is decisively influenced by the gloss level. Gloss is defined as the optical property of a surface to reflect light in a directional way. The gloss level indicates how matt or shiny a surface appears. To guarantee a uniform appearance, it is important that installations such as luminaires or ventilation valves are adapted to the surface of the metal ceiling.

In accordance with ISO 2813, the gloss level is indicated in gloss units (GU) and measured in acc. with pre-defined measurement geometries at an angle of 20 °/60 °/85 °. The gloss level is generally measured at unperforated metal ceiling panels.



Surfaces are divided into the following groups:

GROUP	DESIGNATION	GLOSS LEVEL
G3 MATT	deep matt	1 - 5 GU
	dull matt	6 - 10 GU
G2 MEDIUM GLOSS	silk matt	11 - 30 GU
	silk gloss	31 - 50 GU
G1 GLOSSY	semi-bright	51 - 70 GU
	highly glossy	71 - 90 GU

SURFACE	COLOUR	GLOSS LEVEL	
COLOURline	RAL 9016	approx. 18 GU	
COLOURline	RAL 9010	approx. 18 GU	
COLOURline	RAL 9006	approx. 65 - 70 GU	
COLOURline	RAL 9003	approx. 20 - 25 GU	
COLOURline	RAL 7035	approx. 15 - 18 GU	
COLOURline	9006 acc. to Lindner	approx. 57 GU	
MOODline	natural white 9016	< 3 GU	
MOODline	lava grey 7016	< 4 GU	

CERTIFICATION/REGULATIONS

CE MARKING

The Regulation (EU) No 305/2011 (Construction Products Regulation) and the Regulation 756/2008 lays down harmonised rules for the marketing of construction products within the European Economic Area (EEA).

A declaration of performance has to be created by the manufacturer for all construction products that are covered by a harmonised standard or for construction products for which a European Technical Assessment (ETA) has been issued.

By means of the declaration of performance, the manufacturer is fully reliable for the conformity of the construction product and the declared main characteristics.

The declaration of performance is the basis for CE marking.

Lindner Metal Ceilings are covered by the harmonised standard EN 13964.

Declarations of performance can be downloaded from our homepage www.Lindner-Group.com/en/downloads.

We are entitled to display the CE marking.

Construction products with CE marking may freely be traded across the European Union.



TAIM E.V.



Having emerged from the Technical Association of Industrial Metal Ceilings (TAIM) with its founding in 1988, TAIM e. V. has defined internationally recognised quality standards for metal ceilings which are continuously updated inline with technological developments.

The primary objective of TAIM e.V. is the promotion of quality and the positive aspects of metal ceiling systems above and beyond the minimum requirements of standards. TAIM sets out to achieve this through the supplementary development of technical standards for metal ceiling systems, especially those that are not covered in current standards or are incomplete.

The central quality tool of TAIM is the specially developed TAIM company certification which is the prerequisite for a TAIM e.V. membership. Only certified TAIM members are allowed to carry the TAIM logo. The comprehensive quality criteria of the company certification have to be completed annually by all members. This guarantees that products of all members ensure a consistently high level of quality.

For 30 years we have been member of TAIM e.V.

Comprehensive regulations and data sheets can be found at www.taim.info.

BIM – BUILDING TOGETHER MORE EFFECTIVELY THROUGH DIGITISATION

Building Information Modelling (BIM) is a method of constructing and operating buildings using software tools for improving project effectiveness, quality, transparency and flexibility. A virtual representation of the building is at the heart of this method. Here, all data from the planning and execution phase as well as the facility management are collected. Lindner has a wide range of parametric BIM objects for free download which can be implemented directly into a building model.

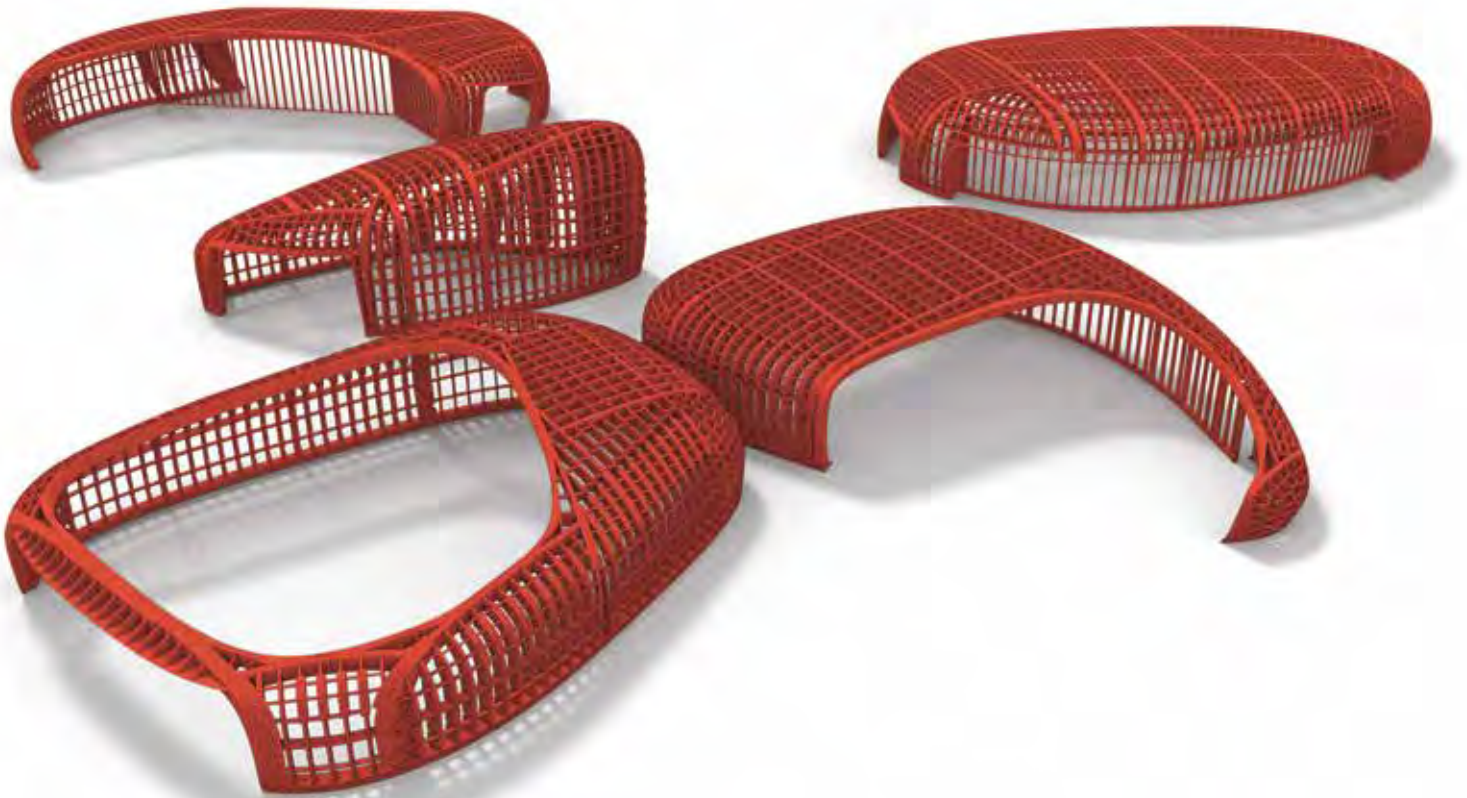
- + integral planning across all disciplines via a growing digital building model
- + BIM objects available for Lindner System Products at www.Lindner-Group.com/BIM
- + 3D visualisation and modelling
- + high degree of transparency through BIM-based working on site and model-based invoicing

OPTIMUM RELIABILITY OF RESULTS THANKS TO BIM

The common database of everyone involved in the project provides a graphical overview of all building trades and the responsibility of the individual services for the whole. Continuous updating of the BIM data allows direct control of quality, costs and deadlines. With the BIM method, the new building is already completely digitalised, enabling all important decisions to be taken during the planning phase and errors to be identified and eliminated at an early stage. The networking of all building data means each planning change can also be digitally simulated in the execution phase, checked for feasibility and re-entered into the construction process.

↳ OSLO AIRPORT, NORWAY

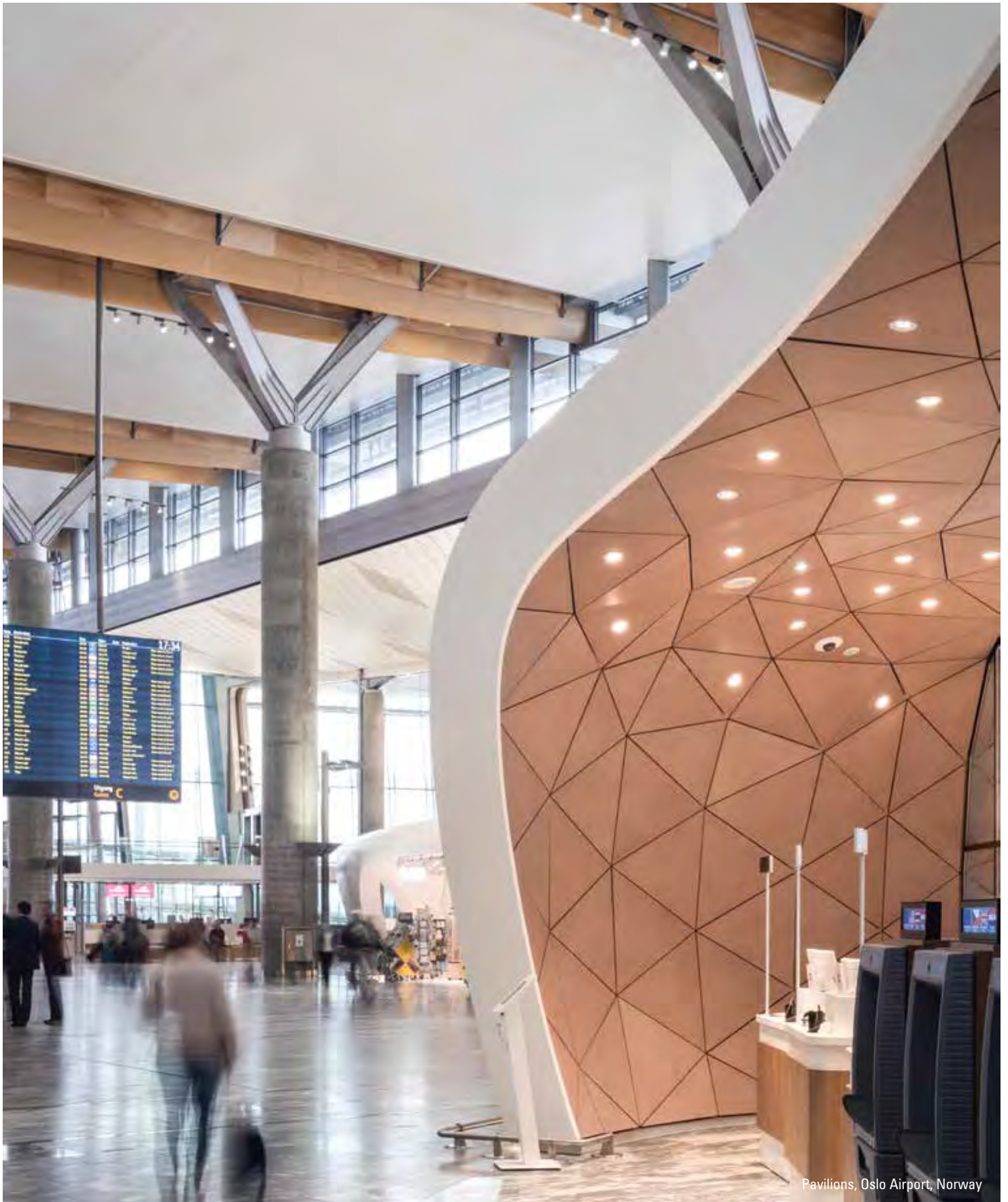
At the extension of the main terminal, Lindner was awarded the contract for the planning of five free-form sales pavilions and for the development of a customised ceiling system for an area of approximately 18,000 m², consisting of about 1,500 different and diamond-shaped panel types. The central area saw the fitting of further 9,000 m² LMD Expanded Metal and LMD Hook-On Ceilings. Besides several ceiling systems, the Hollow Floor System FLOOR and more® power comfort was installed with an integrated heating and cooling system.



Pavilions, Oslo Airport, Norway
Rendering: © Design-to-Production GmbH

↳ PAVILIONS, OSLO AIRPORT, NORWAY

In order to reduce both the weight and the logistics efforts, Lindner recommended the use of wood instead of steel for the sales pavilions. The entire support structure, being designed in detailed 3D planning, was constructed with a framework of laminated timber. The pavilions organic form was created through a multi-layered convex cladding of bendable gypsum fibre boards that also fulfilled the fire protection requirements. The exterior hull was finished with a structured mineral lime plaster. The interior was cladded with 8,000 triangular, acoustically effective metal panels. They and their substructure are also unique.



Pavilions, Oslo Airport, Norway



ADDITIONAL EQUIPMENT

Plafotherm® Heated/Chilled Ceilings can be furnished with different additional equipment. Hydraulic components provide for perfect connections. Being equipped with integrated luminaires and system luminaires, heated/chilled ceilings provide for best illumination in your rooms – to improve the room acoustics, acoustic inlays are available.

- + hydraulic components for perfect connections
- + ventilation components integrated on the rear side for pleasant air distribution
- + integrated luminaires in metal ceilings
- + system luminaires for metal ceilings
- + acoustic inlays to improve the room acoustics



New Construction of Micronova, Business Park Vierkirchen, Germany



HYDRAULIC COMPONENTS




For perfect heating and cooling connections, Lindner provides a great number of hydraulic components and accessory parts. The hoses with stainless steel hose netting are oxygen impermeable in acc. with DIN 4726 and are used as connection hoses. These hoses are perfectly suited to accept a large number of fittings. The quick plug connector MultiQuickConnect does without retaining claws which could unnecessarily damage the pipe frets. Thus, an easy and user-friendly installation and removal is ensured. Visible and tactile green signal discs and a clicking sound prove that the connector is installed correctly and guarantee positive connection and a secure hold. Different combinations of distributors with up to seven connections complete the system.

- + tested system
- + one-stop solutions
- + ideal for Plafotherm® Heated/Chilled Ceilings
- + maintained independently from other building trades

CONNECTING/CONNECTION HOSE

DESIGNATION	TECHNICAL DATA	DETAIL
Connecting/Connection Hose type 2.0	braid: stainless steel (silver) inner tube: plastic corrugated pipe rated width: DN 13 hose length: 0.5 - 10 m operating temperature: 10 °C - 70 °C operating pressure: max. 20 bar oxygen diffusion tight acc. to DIN 4726	
Connecting/Connection Hose type 2.1	braid: polyester (black) inner tube: plastic corrugated pipe rated width: DN 13 hose length: 0.5 - 10 m operating temperature: 10 °C - 70 °C operating pressure: max. 20 bar oxygen diffusion tight acc. to DIN 4726	
Hose Connection MQC type M3G	plug connector: MultiQuickConnect version: straight dimension: 12 mm material: plastic	
Hose Connection MQC type M3W	plug connector: MultiQuickConnect version: 90° angled dimension: 12 mm material: plastic	







MQC – THE SECURE CONNECTION

Audible audible clicking sound guarantees a correct installation	
Visible green visible signal discs provide optical feedback	
Tactile secure installation even in badly visible ceiling voids thanks to tactile signal discs	

FITTINGS

DESIGNATION	 TECHNICAL DATA	DETAIL
System Distributor	dimension: 1/2" external/internal thread x 3 * MQC 12 mm material: brass	
System Distributor with Ball Valve	dimension: 3/4" external/internal thread x 3 * MQC 12 mm material: brass every outlet can be closed separately	
Y-System Distributor	dimension: 1/2" external thread x 2 * MQC 12 mm material: brass	
Y-System Distributor	dimension: 18 mm x 2 * MQC 12 mm material: brass	
Screw-in Pipe End	dimension: 1/2" external thread x 1 * MQC 12 mm material: brass	
Double Nipple	dimension: 2 * MQC 12 mm material: brass (alternative copper or stainless steel)	
Transition Fitting	dimension: 12 mm x 1 * MQC 12 mm material: brass	
Transition Fitting	dimension: 15 mm x 1 * MQC 12 mm material: brass	
Transition Fitting	dimension: 12 mm x 1 * MQC 12 mm material: copper	
Threaded Plug Self-Sealing	dimension: 1/2" external thread material: brass, nickel-plated	
Closing Cap	dimension: 12 mm material: brass, nickel-plated	

APPLICATION OF FITTINGS

DESIGNATION	 TECHNICAL DATA	DETAIL
Alternative 3-times	system distributor + threaded plug	
Alternative 4-times	system distributor + screw-in pipe end	
Alternative 5-times	system distributor + Y-system distributor	
Alternative 6-times	2 x system distributor + threaded plug	
Alternative 7-times	2 x system distributor + screw-in pipe end	



VENTILATION COMPONENTS

Ventilation components are necessary to comply with the recommended air exchange rates in a room and to create a pleasant indoor climate. Different ventilation components are available that can be concealed integrated in the ceiling system. Thus, you achieve thermal comfort – adapted to the architecture of the ceiling system.

- + ventilation components create a pleasant indoor climate and comply with the recommended air exchange rates
- + integrated solutions available, adapted to the architecture of the ceiling system

AirBeam


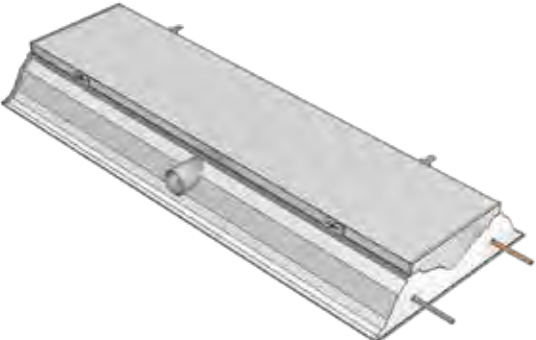
The heated/chilled beam AirBeam is installed on the rear side of Plafotherm® Heated/Chilled Ceilings or Lindner LMD Metal Ceiling Systems and can be realised in different versions: either as visible element with wide slots, as discreet version with adapted perforation and small slots or as invisible construction without slots.

The heated/chilled beam is additionally connected to a central air supply machine. Thanks to the air recirculation by supply air, high cooling capacities can be achieved with this product.

- + AirBeam Basic
- + AirBeam Discreet
- + AirBeam Invisible



Visualisation © Lindner Group

<h2>AirBeam</h2>	 CLIMATIC REGULATION
	<p style="text-align: center;">Heating and Cooling</p> <p>waterside nominal cooling capacity (10 K): 200 - 2,466 W/unit capacity depending on size, temperature and volume flow rate</p>

AirBeam Basic



TECHNICAL DATA

construction: single element with big perforation and wide slots
 perforation: Rd 5.0 - 50
 length: 1,200 - 3,000 mm
 width: 600 - 625 mm
 height: 185 mm

CLIMATIC REGULATION

waterside nominal cooling capacity (10 K):
 400 – 2,466 W/unit

COMBINABLE WITH

Plafotherm® B 100 ↘ page 18
 Plafotherm® B 110 ↘ page 22
 Plafotherm® E 200 ↘ page 28
 Plafotherm® E 213 ↘ page 32
 Plafotherm® E 214 ↘ page 34
 Plafotherm® GK HEKDA ↘ page 64

AirBeam Discreet



TECHNICAL DATA

construction: single element with same perforation as ceiling panel and smaller slots
 perforation: Rv 1.8 - 20, Rd 3.0 - 30
 length: 1,200 - 1,400 mm
 width: 600 - 625 mm
 height: 185 mm

CLIMATIC REGULATION

waterside nominal cooling capacity (10 K):
 200 – 590 W/unit

COMBINABLE WITH

Plafotherm® B 100 ↘ page 18
 Plafotherm® B 110 ↘ page 22
 Plafotherm® E 200 ↘ page 28
 Plafotherm® E 213 ↘ page 32
 Plafotherm® E 214 ↘ page 34
 Plafotherm® GK HEKDA ↘ page 64

AirBeam Invisible



TECHNICAL DATA

construction: element integrated in ceiling panel, not visible
 perforation: Rd 1.6 - 25, Rv 1.8 - 20, Rd 3.0 - 30
 length: 1,200 - 1,400 mm
 width: 800 - 900 mm
 height: 120 - 140 mm

CLIMATIC REGULATION

waterside nominal cooling capacity (10 K):
 200 – 450 W/unit

COMBINABLE WITH

Plafotherm® B 100 ↘ page 18
 Plafotherm® B 110 ↘ page 22
 Plafotherm® E 200 ↘ page 28
 Plafotherm® E 213 ↘ page 32
 Plafotherm® E 214 ↘ page 34
 Plafotherm® GK HEKDA ↘ page 64

AirBox

Being installed on the rear side of metal ceiling panels, the AirBox supply and exhaust air elements are not visible but provide for pleasant fresh air and air distribution in a room. Exhaust air is unobtrusively removed by exhaust air elements.

Different versions are available:

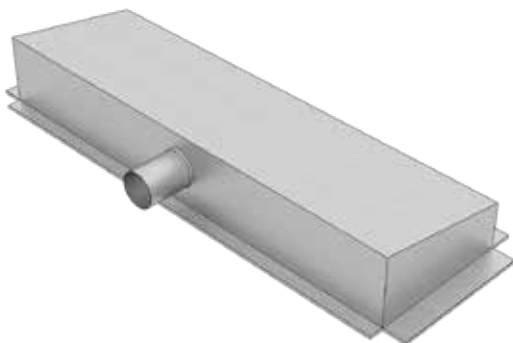
- + AirBox S – supply air elements
- + AirBox E – exhaust air elements



Visualisation © Lindner Group

AirBox

TECHNICAL DATA



For concealed installation on the rear side of metal ceiling panels.

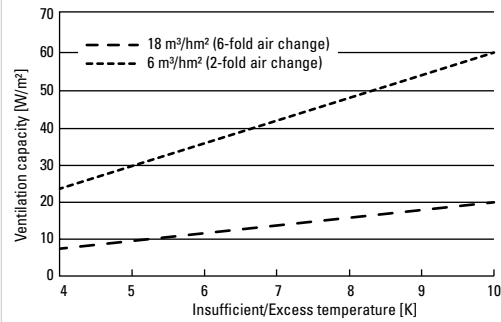
Prerequisites	
panel length:	800 - 1,400 mm
panel width:	450 - 625 mm
perforation:	min. 20 % open area

AirBox S – SUPPLY AIR ELEMENTS

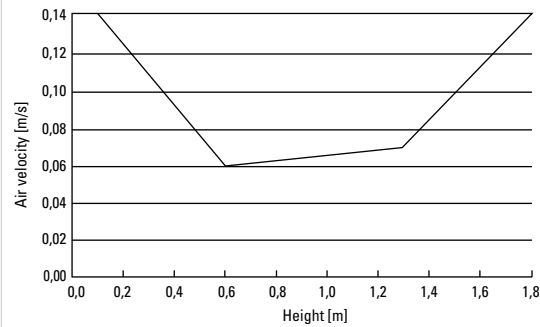
TECHNICAL DATA

	AirBox S80	AirBox S135	AirBox S160
length:	700 mm	700 mm	900 mm
width:	350 mm	350 mm	450 mm
height:	150 mm	175 mm	150 mm
weight:	approx. 4 kg	approx. 4 kg	approx. 7 kg
connection:	DN 100	DN 125	2x DN 100
volume flow rate:	80 m ³ /h	135 m ³ /h	160 m ³ /h
sound pressure level:	22 dBA	22 dBA	22 dBA

Ventilation Heating/Cooling Capacity

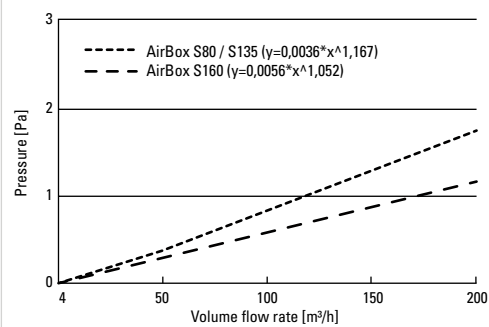


Flow Velocity



The air velocity is measured underneath the AirBox at a ground clearance of 0.10 m, 0.60 m, 1.3 m, 1.8 m and the parameters 8 K insufficient temperature, 90 m³/h and 18 °C supply air.

Pressure



CLIMATIC REGULATION

↳ from page 118

AirBox E – EXHAUST AIR ELEMENTS

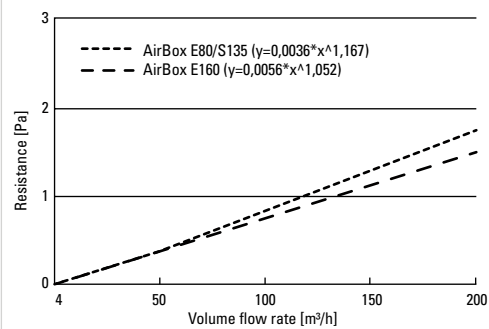
TECHNICAL DATA

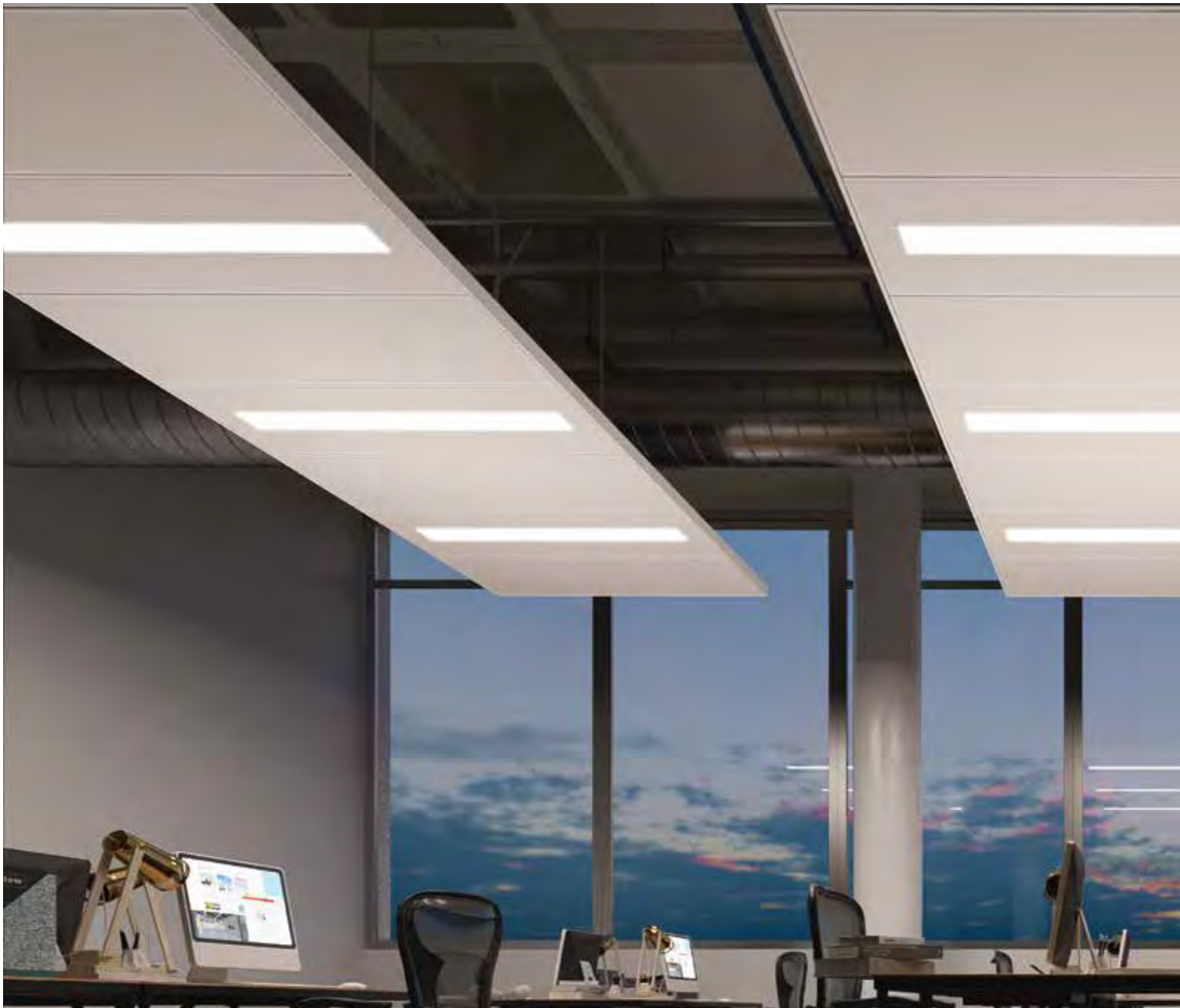
	AirBox E80	AirBox E135	AirBox E160
length:	700 mm	700 mm	900 mm
width:	350 mm	350 mm	450 mm
height:	150 mm	175 mm	150 mm
weight:	approx. 4 kg	approx. 4 kg	approx. 7 kg
connection:	DN 100	DN 125	2x DN 100
volume flow rate:	80 m ³ /h	135 m ³ /h	160 m ³ /h
sound pressure level:	22 dBA	22 dBA	22 dBA

CLIMATIC REGULATION

↘ from page 118

Resistance





INTEGRATED LUMINAIRES IN METAL CEILINGS

Voltage

IS 17

Integrated Luminaire for general areas

The lighting fixture IS 17 is framelessly and flush-mounted integrated into the metal ceiling element. It is delivered as a factory-prepared combined module without colour deviation. Light distribution is made by a satined acrylic PMMA cover. The lighting system is suitable for general areas, such as corridors or entrance areas.



220 - 240 V/
50 - 60 Hz

IS 22

Integrated Luminaire for display work stations

The lighting fixture IS 22 is framelessly and flush-mounted integrated into the metal ceiling element. It is delivered as a factory-prepared combined module without colour deviation. Light distribution is made by a special microprismatic cover for glare-control. The lighting system is suitable for monitor workstations.



220 - 240 V/
50 - 60 Hz

IS 450

Integrated Luminaire for office and general areas

The lighting fixture IS 450 is framelessly and flush-mounted integrated into the metal ceiling element, suitable for asymmetric rail-construction ceiling systems. It is delivered as a factory-prepared combined module without colour deviation. Light distribution is made by a special microprismatic cover for glare-control. The lighting system is suitable for monitor workstations.



220 - 240 V/
50 - 60 Hz

INTEGRATED LUMINAIRES AND SYSTEM LUMINAIRES

PERFECT COORDINATION.

The Lighting and Ceiling Systems are perfectly matched with our Integrated Luminaires in Metal Ceilings and System Luminaires for Metal Ceilings. We can offer lighting solutions that are perfectly adjusted to the room concept, the lighting requirement and the Ceiling System.

- + perfectly synchronised
- + „one-stop supplier“
- + reduced interfaces
- + high technical and visual quality

Visualisation © Lindner Group

TECHNICAL DATA

Class of Protection	Protection Rating	Ballast	Cover	Colour	Light Colour
1	IP20	switchable, optional: DALI dimmable	opal	suitable to ceiling	4,000 K optional: 3,000 K
1	IP20	switchable, optional: DALI dimmable	microprismatic	suitable to ceiling	4,000 K optional: 3,000 K
1	IP20	switchable, optional: DALI dimmable	opal, optional: microprismatic	suitable to ceiling	4,000 K optional: 3,000 K

SYSTEM LUMINAIRES FOR METAL CEILINGS

Voltage

BREL 100

Post Cap Spare Light

Our luminaire type BREL 100 is used instead of a post cap system. As a linear light-strip it is the ideal solution for a perfectly adapted system lighting. There is no colour deviation to the ceiling. It is produced project-related and adjusted to your individual requirements.



220 - 240 V/
50 - 60 Hz

DPL

Integrated Luminaire for Post Cap Ceilings

The system luminaire DPL is suitable for integration into post cap ceilings. It is produced project-related with the according mounting-upstand, adapted to the ceiling system. Light distribution is made by homogeneously illuminated microprismatic cover.



220 - 240 V/
50 - 60 Hz

FR 625

Integrated Luminaire

The system luminaire FR 625 is suitable for wet room areas thanks to its high degree of protection (IP50). It can be used for coffered ceilings with visible t-profiles or concealed clip-in systems. The visible parts are adjusted to the colour of the ceiling system.



230 - 240 V/
50 - 60 Hz

QZI

Integrated Luminaire with Cell Louvres

The system luminaire QZI can be flexibly used for all areas with requirements of glare-control. Light distribution is made by an innovative cell louvre, made of aluminium. This ensures highest glare-control. In acc. with requirements the middle part can be equipped with blind plates, clamping ranges with/without sensors.



220 - 240 V/
50 - 60 Hz

Q 600

Integrated Luminaire

The square luminaire Q 600 is suitable for coffered ceilings with visible t-profiles or concealed clip-in systems. Light distribution is made by a homogeneously illuminated opal acrylic cover or optionally by a microprismatic plate for glare-control.



220 - 240 V/
50 - 60 Hz

RS 03

Integrated Luminaire for Metal Ceilings

Our system luminaire RS 03 for metal ceilings is the ideal solution for modern lighting. It provides a perfect match between functional lens technology and architectural optics. Due to the pre-assembled magnet holder on the ceiling cut-out, the luminaire can be easily inserted.



220 - 240 V/
50 - 60 Hz

LShine

Baffle Luminaire

Our system luminaire type LShine is the ideal lighting solution for Lindner baffle ceiling systems. It is delivered as an integrated entire modul consisting of luminaire and baffle ceiling. Besides the linear version, the luminaire can be produced for curved Lindner baffle ceiling systems.



220 - 240 V/
50 - 60 Hz

LK 73

Light Channel

Our lighting fixture LK 73 can be adjusted to your ceiling solution. The luminaire is produced project-related with hang-in system, for integration between the Lindner metal ceiling. Light is distributed via a an opal acrylic diffuser, optional with a microprismatic cover.



220 - 240 V/
50 - 60 Hz

LK 100

System Luminaire

The system luminaire LK 100 is produced with mounting system and integrated between post cap ceiling systems. Light distribution is made via a microprismatic cover, suitable for office areas.



220 - 240 V/
50 - 60 Hz

 TECHNICAL DATA

Class of Protection	Protection Rating	Ballast	Cover	Colour	Light Colour
1	IP20	switchable, optional: DALI dimmable	microprismatic, optional: opal	suitable to ceiling	4,000 K optional: 3,000 K
1	IP20	switchable, optional: DALI dimmable	microprismatic	RAL 9016	4,000 K optional: 3,000 K
1	room side IP50, optional: IP54	switchable, optional: DALI dimmable	opal, optional: microprismatic	suitable to ceiling	4,000 K optional: 3,000 K
1	IP20	switchable, optional: DALI dimmable	cell louvre	follows RAL colour chart	4,000 K optional: 3,000 K
1	IP40	switchable, optional: DALI dimmable	opal, optional: microprismatic	suitable to ceiling	4,000 K optional: 3,000 K
1	IP20	switchable, optional: DALI dimmable	lens	black	4,000 K optional: 3,000 K
1	IP20	switchable, optional: DALI dimmable	opal	suitable to ceiling	4,000 K optional: 3,000 K
1	IP20	switchable, optional: DALI dimmable	opal, optional: microprismatic	RAL 9016, optional: customer's wish	4,000 K optional: 3,000 K
1	IP20	switchable, optional: DALI dimmable	microprismatic	suitable to ceiling	4,000 K optional: 3,000 K



ACOUSTIC INLAYS

Insula mineral wool inlays are used to improve room acoustics. Depending on the perforation and the acoustic inlay, a sound absorption up to $\alpha_w = 1.00$ can be achieved.

They consist of mineral wool in different thicknesses and gross densities that is shrink-wrapped in acoustic transparent black foil. Thus, fibre fly is reduced and mineral wool inlays are harmless for health.

- + Insula A2
- + Insula I
- + Insula Basic

Visualisation © Lindner Group

ACOUSTIC INLAYS	FIRE PROTECTION
	Building Material Class
Insula A2	A2 - s1, d0 in acc. with EN 13501-1
Insula I	B1 in acc. with DIN 4102-1, class A in acc. with ASTM E 84
Insula Basic	B2 in acc. with DIN 4102-1

Main Picture: New Offices Lindner Arnstorf, Germany

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