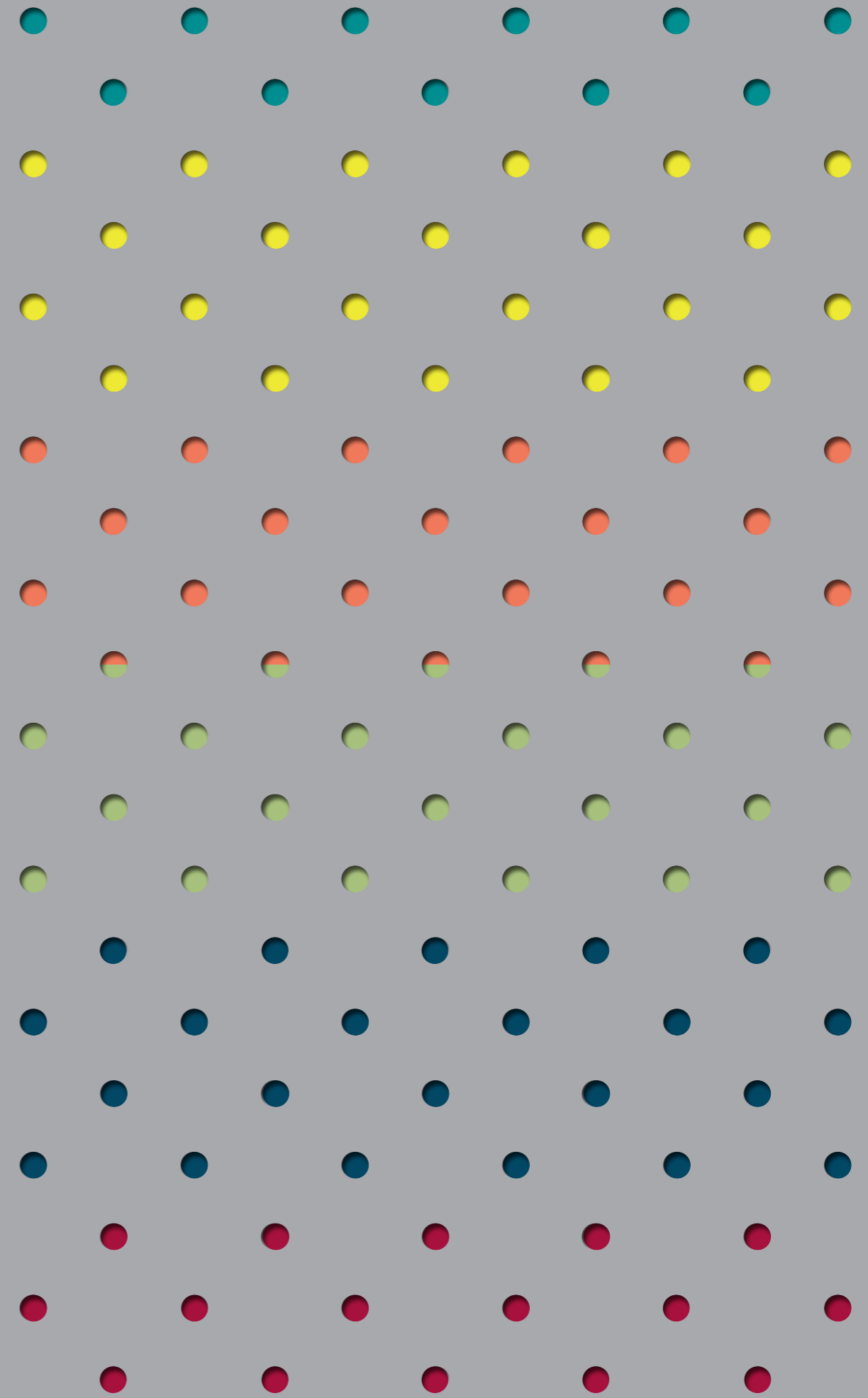
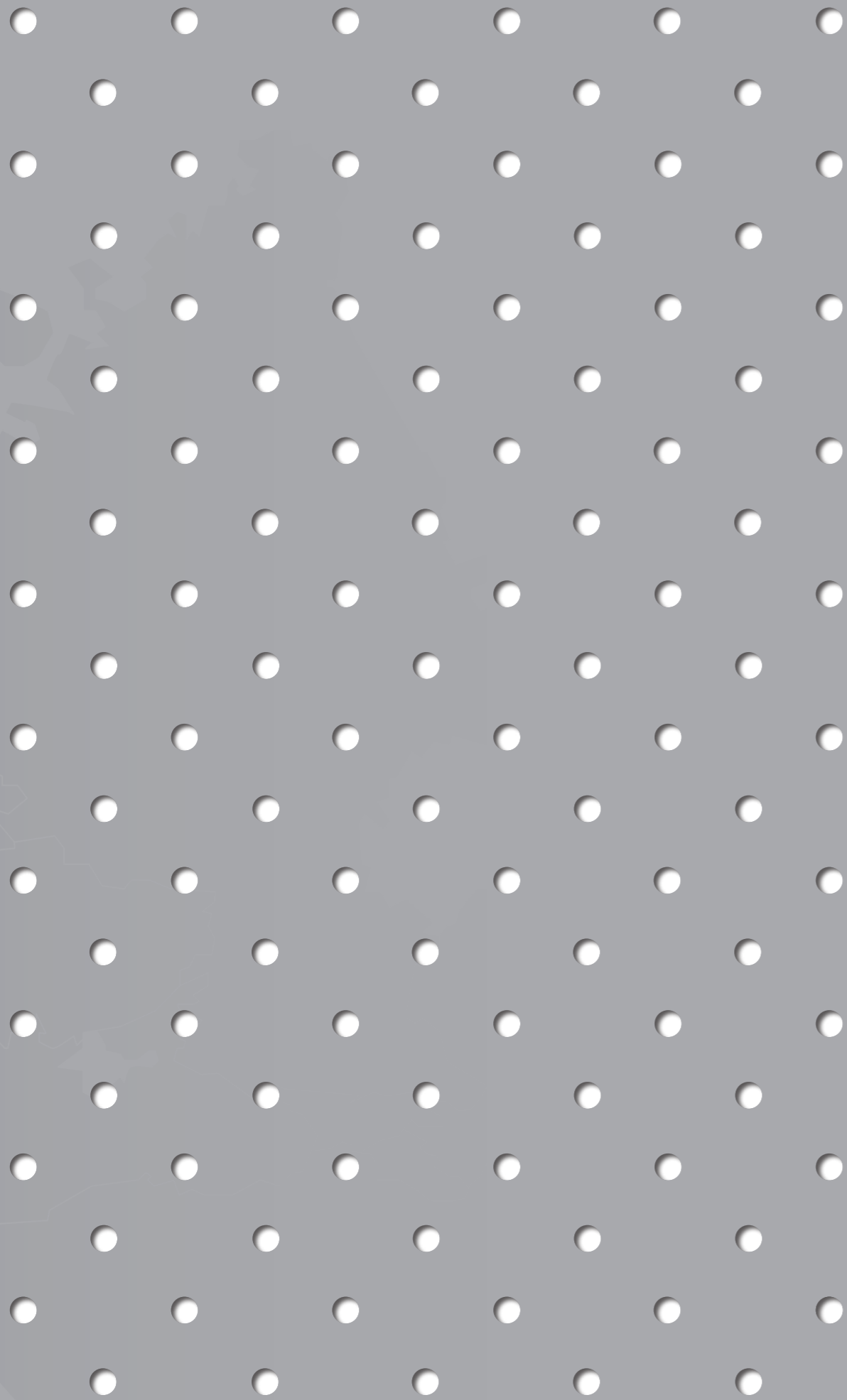
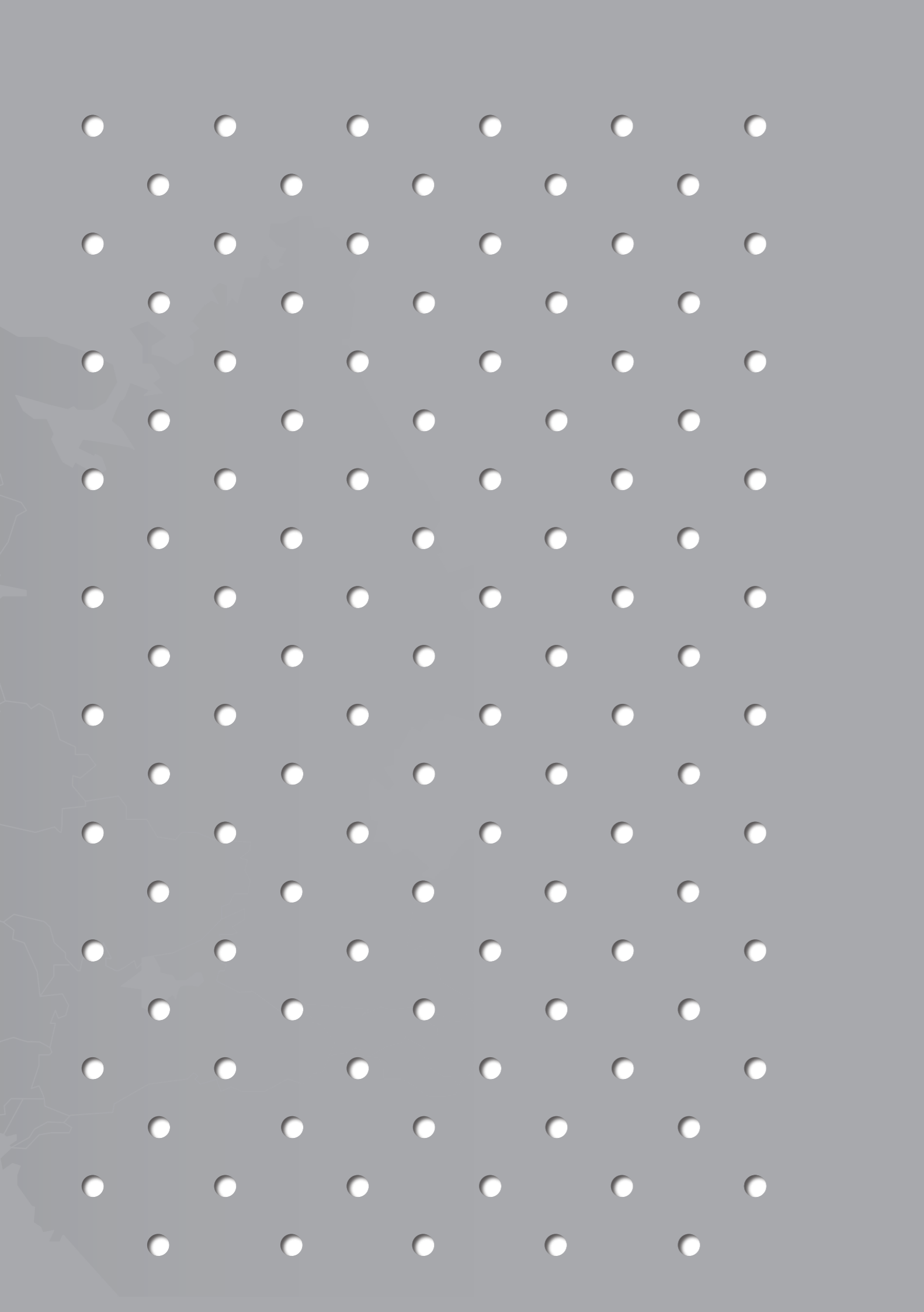


FURAL  
METALIT  
DIPLING

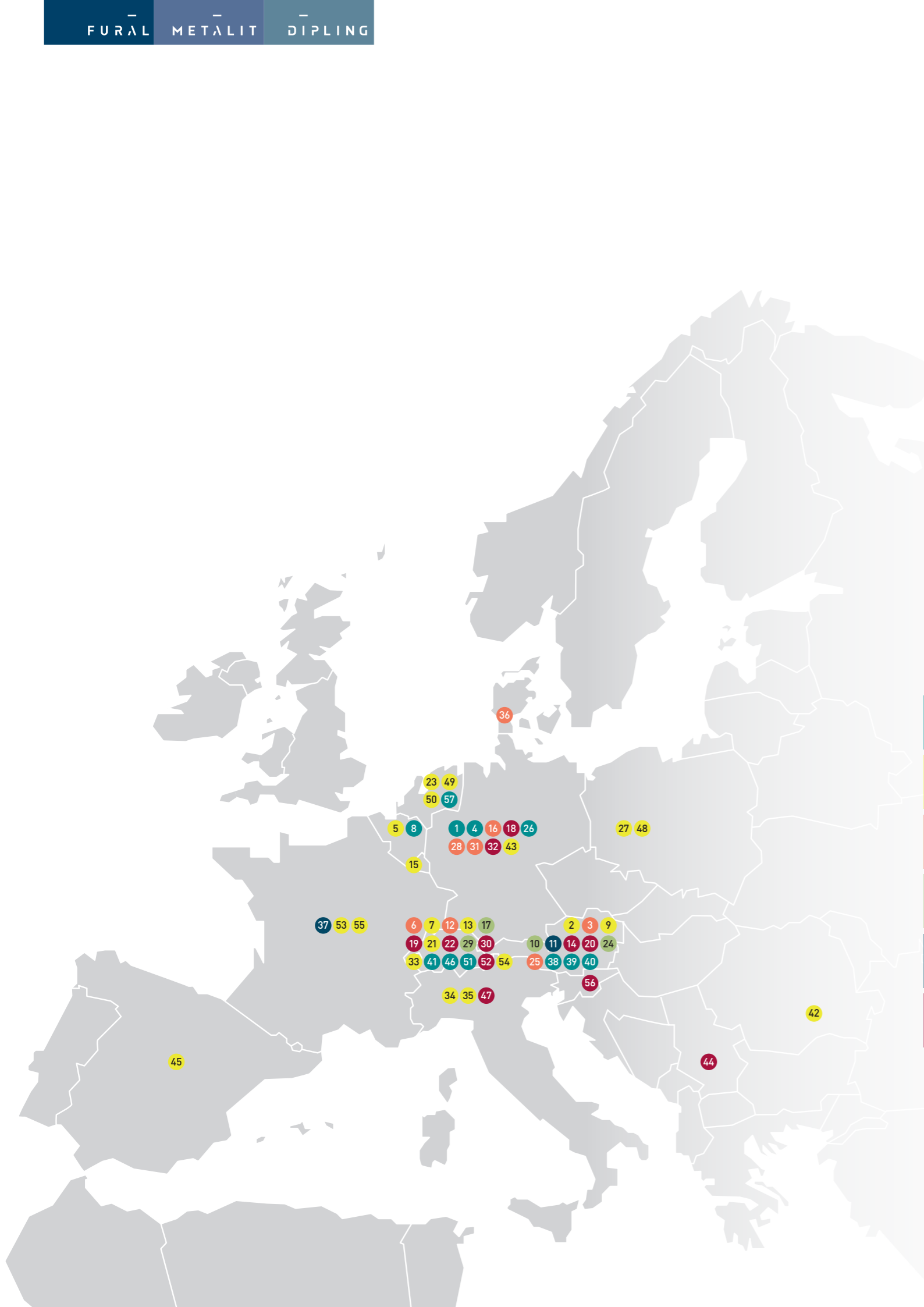




More than 1 million m<sup>2</sup> of metal ceilings from Fural Metalit Dipling were produced at 4 sites in just one year.

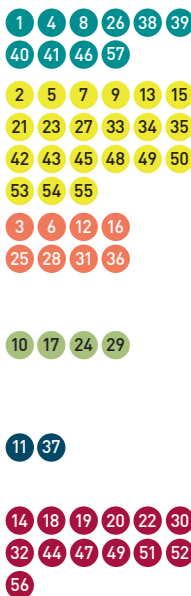
One book – many projects that we present on the following pages to show you how our metal ceilings are being used. To browse, gather information and as a source of inspiration for your future projects!

1,500,000 square metres, 2025  
**1.200.000 square metres, 2021**  
 1,115,384 square metres, 2020  
 1,000,000 square metres, 2019  
 830,000 square metres, 2017  
 435,000 square metres, 2011  
 320,000 square metres, 2007  
 200,000 square metres, 2003



m<sup>2</sup>/running metres per country AT CH DE BE LUX NL PL IT DK FR RO E SVN

	AT	CH	DE	BE	LUX	NL	PL	IT	DK	FR	RO	E	SVN
<b>HEALTH</b>	13,100	12,900	8,100	5,500	-	28,000	-	-	-	-	-	-	-
<b>OFFICE</b>	3,000	262,100	18,000	14,000	44,500	5,500	76,000	65,100	-	21,000	19,000	20,000	-
<b>EDUCATION</b>	3,600	11,500	9,680	-	-	-	-	-	22,100	-	-	-	-
<b>MOBILITY</b>	37,600	54,000	-	-	-	-	-	-	-	-	-	-	-
<b>JUSTICE</b>	3,000	-	-	-	-	-	-	-	-	18,000	-	-	-
<b>PROJECT</b>	2,500	3,400	5,810	-	-	-	-	5,300	-	-	-	-	5,300



AT

- 2**  
Zechner & Zechner ZT GmbH, Vienna  
→ p. 14–17
- 3**  
Markus Perenthaler, Graz  
→ p. 20–25
- 9**  
Dietrich | Untertrifaller Architekten,  
Graz  
→ p. 54–57
- 10**  
Itten Brechbühl AG, Bern  
B & E Baumschlagler Eberle GmbH,  
Switzerland  
→ p. 58–61
- 11**  
YF Architekten, Vienna  
→ p. 64–67
- 20**  
Kulmus Bügelmayer GmbH, Dornbirn  
→ p. 110–111
- 24**  
Vogl-Fernheim ZT GmbH, Innsbruck  
→ p. 126–129
- 25**  
Franz und Sue ZT GmbH, Vienna  
Maurer & Partner ZT GmbH, Vienna  
→ p. 132–135
- 38**  
Urban Zesch Architekten, Vienna  
→ p. 190–193
- 39 40**  
Hinterwirth, Gmunden  
→ p. 194–197  
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- 6**  
ARGE Lussi + Halter Casagrande,  
Lucerne  
→ p. 40–43
- 7**  
axess Architekten AG, Zug  
→ p. 44–47
- 12 29**  
Stücheli Architekten AG, Zurich  
→ p. 70–75  
→ p. 150–153
- 13**  
Itten Brechbühl AG, Bern  
→ p. 76–77  
→ p. 112–115
- 17**  
Rogers Stirk Harbour + Partners,  
London  
→ p. 96–99
- 21**  
PUR.BE Gesamtleistungen AG,  
Liebefeld  
→ p. 112–115
- 22**  
Albi Nussbaumer Architekten ETH  
SIA BSA, Zug  
→ p. 116–119
- 30**  
Monoplan AG, Zurich  
→ p. 154–157
- 33**  
Auf der Mauer Gruppe AG, Zurich  
→ p. 166–169
- 41**  
hemmi fayet architekten, Zurich  
→ p. 202–205

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HDR Germany and  
Matteo Thun & Partners,  
Europe  
→ p. 10–13
- 4**  
Eggert Architekten, Stuttgart  
→ p. 26–29
- 14**  
Marte.Marte Architekten ZT GmbH,  
Feldkirch  
→ p. 80–83
- 16**  
FUN Architekten, Munich  
→ p. 90–93
- 18**  
Cobe, Copenhagen  
→ p. 100–103
- 26**  
a | sh sander.hofrichter architekten  
GmbH, Ludwigshafen/Rhine  
Ernst² Architekten, Stuttgart  
→ p. 136–139
- 28**  
Sturm + Viermetz Architekten,  
Munich  
→ p. 144–147
- 31**  
Ecker Architekten, Buchen  
→ p. 158–161
- 32**  
Office Group GmbH, Munich  
→ p. 162–165

BE

- 5**  
eld, Belgium  
→ p. 34–37
- 8**  
Gortemaker Algra Feenstra,  
Rotterdam  
→ p. 50–53

LUX

- 15**  
ingenhoven architects GmbH,  
Düsseldorf  
→ p. 84–87

NL

- 23**  
Cepezed, Delft  
→ p. 120–123

PL

- 27**  
Skidmore, Owings and Merrill LLD,  
Chicago  
→ p. 140–141

IT

- 34**  
Park Associati, Milan  
→ p. 172–175
- 35**  
Pei Cobb Freed & Partners Architects  
LLP, New York  
→ p. 176–179

DK

- 36**  
C.F. Møller Architects, Denmark  
→ p. 180–185

FR

- 37**  
Renzo Piano Building Workshop, Paris  
→ p. 186–187

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Projects

Petrom City,  
Bucharest

Architects

AJF Architekten,  
Düsseldorf

Country 1000m<sup>2</sup> Function  
RO 19.0

43

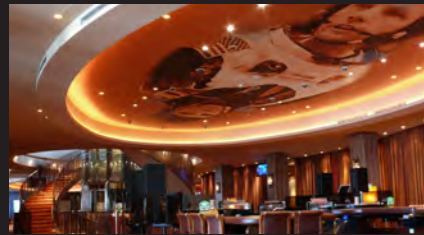


Bügelbauten,  
Berlin

gmp Architekten,  
Berlin

Country 1000m<sup>2</sup> Function  
DE 18.0

44



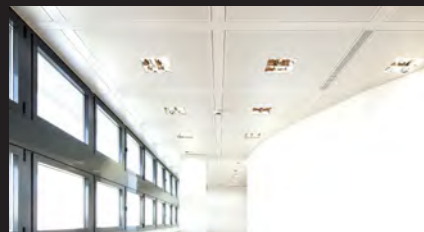
Grand Casino,  
Belgrade

árter,  
Brussels

Country 1000m<sup>2</sup> Function  
SRB •

6 fields à 100 tiles

45

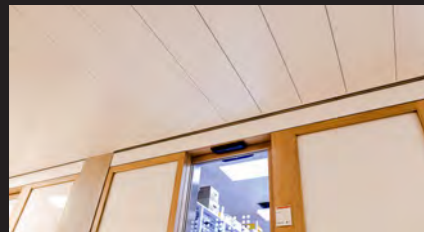


Gerencia Informatica,  
Madrid

López Fando y Asociados,  
Madrid

Country 1000m<sup>2</sup> Function  
E 20.0

46



Cantonal Hospital Graubünden,  
Chur

Stauer & Hasler Architekten AG,  
Frauenfeld

Country 1000m<sup>2</sup> Function  
CH 6.0

47



Casino,  
Campione d'Italia

Mario Botta Architetti,  
Mendrisio

Country 1000m<sup>2</sup> Function  
IT 5.3

48



Projects

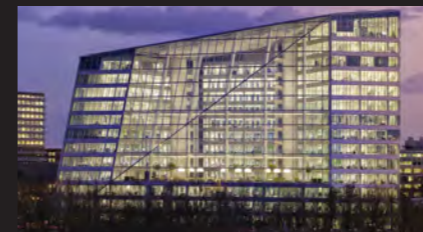
Lipowy Office Park,  
Warsaw

Architects

Emkaa Architekci,  
Warsaw

Country 1000m<sup>2</sup> Function  
PL 36.0

49



The Edge,  
Amsterdam

PLP Architecture,  
London

Country 1000 m<sup>2</sup> Function  
NL 28.0

50

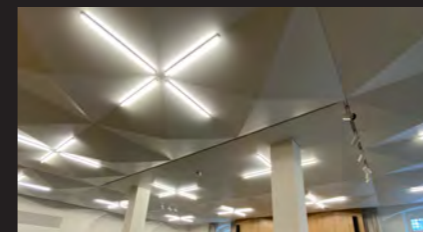


Rabobank Fellenoord,  
Eindhoven

Inbo,  
Amsterdam

Country 1000m<sup>2</sup> Function  
NL 11.0

51



Haus der Kathedrale,  
Dresden

Alexander Poetzsch Architekten,  
Dresden

Country 1000m<sup>2</sup> Function  
DE 0.2

52

Bäderquartier, Baden  
Mario Botta Architetti, Mendrisio

Country 1000m<sup>2</sup> Function  
CH 1.0

53

Urban Garden, Lyon  
Valode & Pistre, Paris

Country 1000m<sup>2</sup> Function  
F 14.0

54

Roche pRED, Basel  
Herzog & de Meuron, Basel

Country 1000m<sup>2</sup> Function  
CH 250

55

l1ve - Grande Armée, Paris  
Baumschlager Eberle Architekten,  
Paris

Country 1000m<sup>2</sup> Function  
F 7.0

56

SISKA, Ljubljana  
ATP architekten ingenieure, ARGE  
AZPML and SHARE Architekten

Country 1000m<sup>2</sup> Function  
SVN 5.3

57

European Medicines Agency,  
Amsterdam  
Fokkema & Partners Architects

Country 1000m<sup>2</sup> Function  
NL 28.0

# WHY METAL CEILINGS?

- The components already have a **finished surface** at the time of delivery.
- Delivery and assembly are **dust-free**.
- Both the ceilings and the substructures stand out due to their **durability**.
- Thanks to their continuous paint surface, metal ceilings are **especially hygienic**.
- The paint surfaces can be **easily cleaned, dry or wet**.
- For school rooms and sports venues, our ceilings can be designed to be **ball-proof**.
- Our metal ceiling systems can be easily **serviced**.
- There is a possibility of **simple dismantling**.
- Our products are winners owing to their **reusability**.
- All our components allow mono-material recycling.
- We have a **large portfolio** of possible perforations.
- The **integration** of technical elements can be done **easily and precisely**.
- Our metal ceiling systems offer **optimal conditions for the combination** with heating and cooling elements.
- We manufacture precise and **aesthetic** products.
- Modular pre-production **allows for short construction time**.

-  Acoustics → p. 48-49
-  Heating and cooling → p. 188-189
-  Fire protection → p. 30-31
-  Hygiene → p. 88-89 and 208-231
-  Design → p. 68-69
-  Sustainability → p. 38-39
-  Parzifal® → p. 108-109
-  Baffle → p. 94-95

Country 1000 m<sup>2</sup> Function

DE

1.8



**Aesthetics**

Hospitals are characterized by efficiency and pragmatism because all processes must run smoothly at all times. The architectural firms HDR Germany and Matteo Thun & Partners succeeded in combining the character of an upscale hotel with the functionality of a hospital for the new construction of Waldkliniken Eisenberg. A bright and warm welcoming atmosphere was created in the interior. Lots of wood and off-white colours in a soft and glare-free lighting harmonise perfectly with one another. Our swing down and slide fire protection ceilings make a perfect contribution to the overall impression.





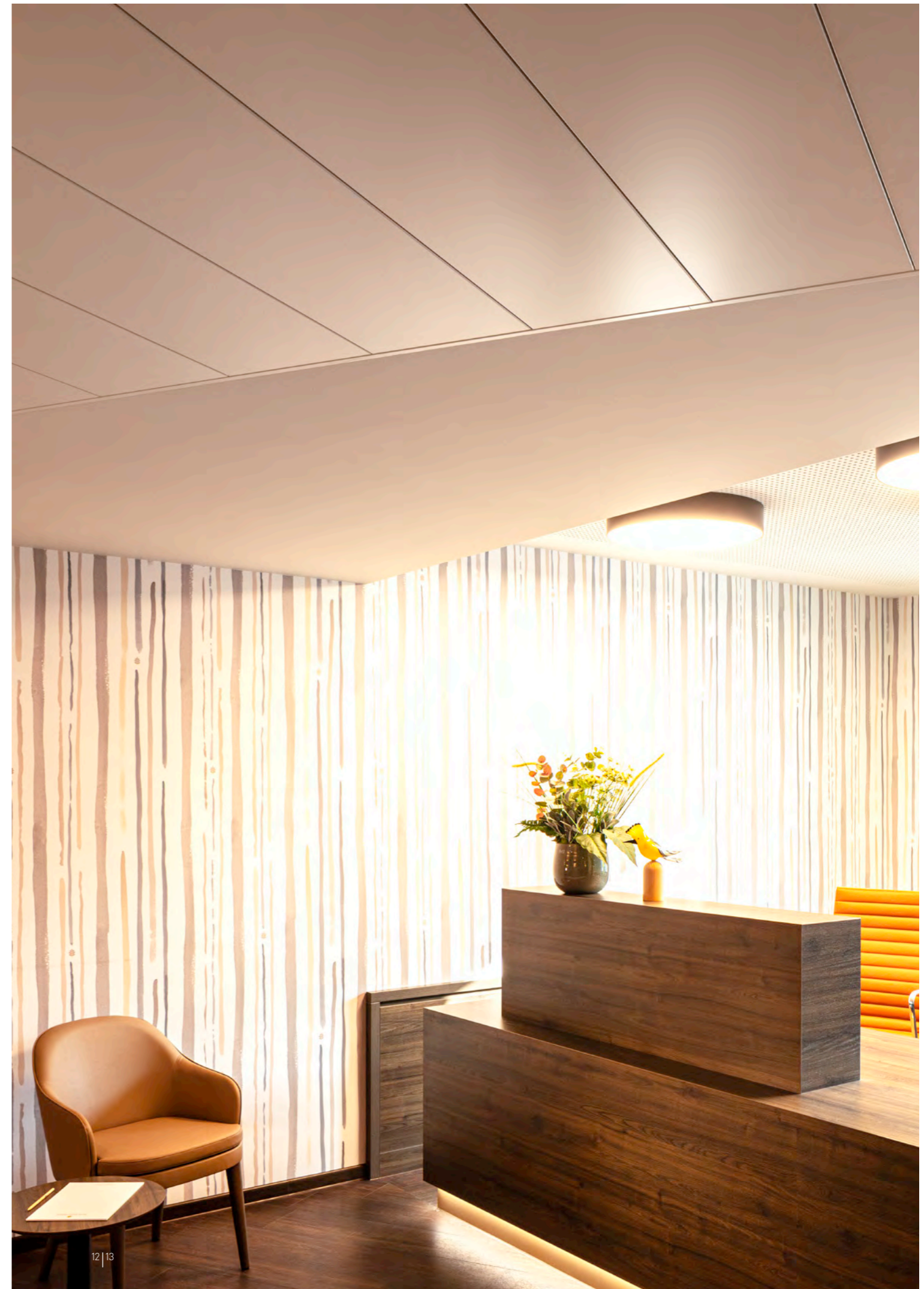
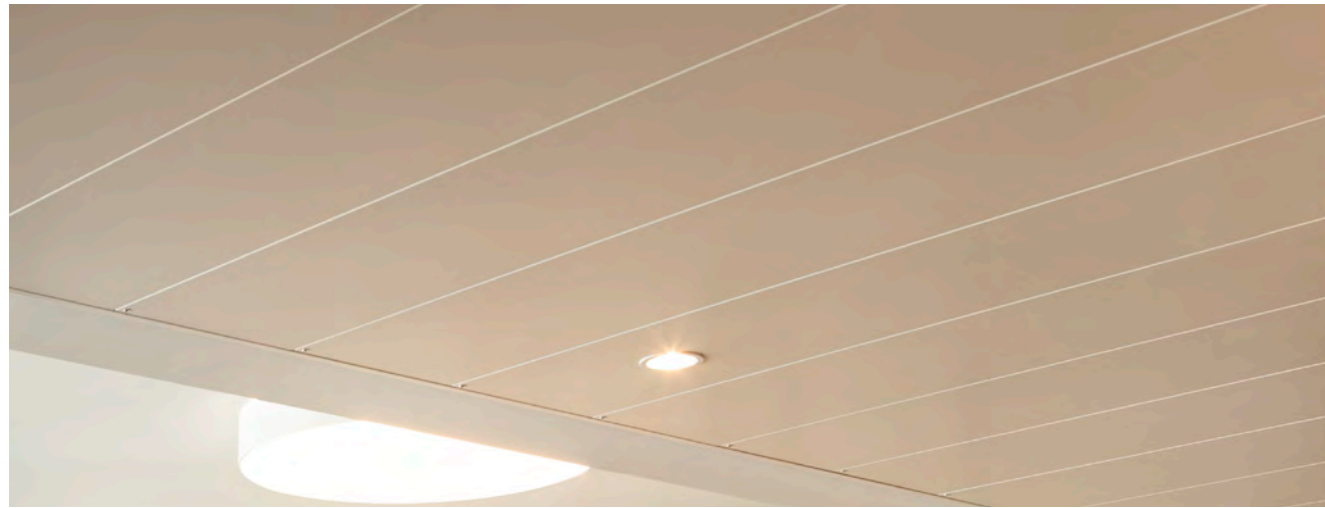
Country 1000 m<sup>2</sup> Function



Product  
Fire protection and hygiene ceiling  
Smooth perforation  
Colour RAL 9010  
Swing-and-slide system F30

Project name  
Waldkliniken  
Eisenberg

Architects  
HDR Germany and  
Matteo Thun & Partners,  
Europe



Country 1000 m<sup>2</sup> Function

AT

1.5



**Stages**

The architecture provides interior and exterior theatre-like stages, where people take the stage and meet. Open spaces, staircases and ramps, bars and restaurants become the podium of lifestyle. The architects of Zechner & Zechner have designed the connecting communal areas of the three high-rise towers of the new "Merkur Campus" in Graz with a varied sequence of spaces and an exciting mix of materials. Our expanded metal tiles painted in rust colour effect make for a lively iridescent and airy-looking ceiling.



OFFICE

Country 1000 m<sup>2</sup> Function



Product

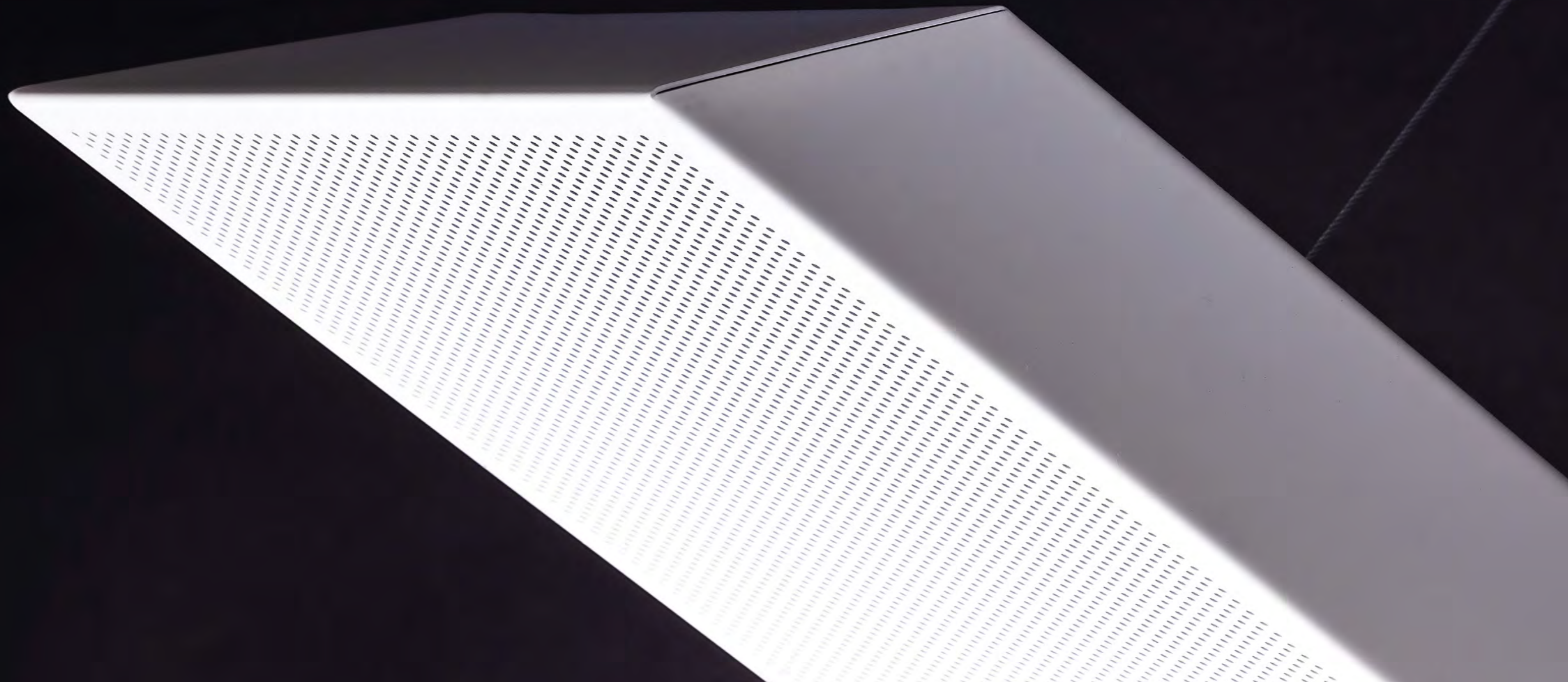
Acoustic and design ceiling  
 Mesh 75 × 31 × 7 × 2 mm  
 Colour Parzifal® RAL 8016  
 Expanded metal H35 hang-in  
 system

Project name

Mercur Campus,  
 Graz

Architects

Zechner & Zechner ZT GmbH,  
 Vienna



Country 1000 m<sup>2</sup> Function

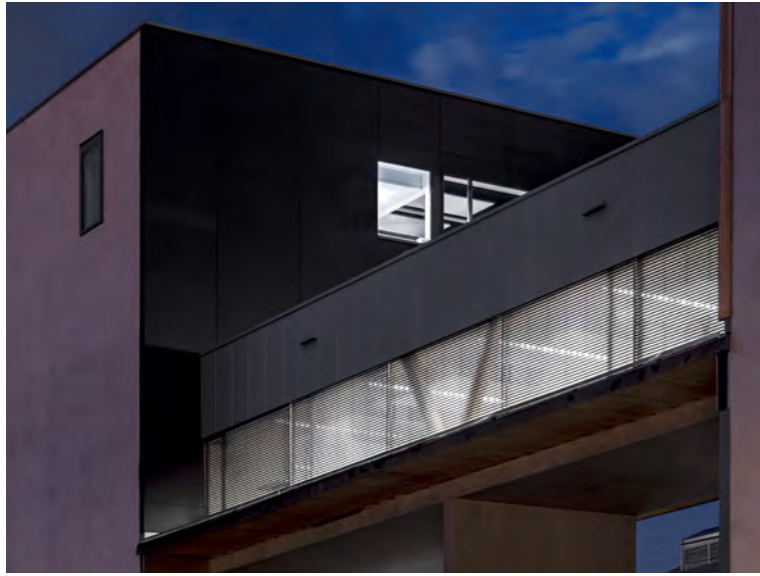
AT

1.3



**Training workshops**

Investing in education is one of the primary tasks of our society to be prepared for the future. A realised dream for all those who will start their training or attend seminars and advance training courses at the training workshops of E-Campus Graz, which was opened in 2019. Our floating ceilings not only offer a contemporary look – the effective optimisation of the acoustics in the rooms also creates an agreeable atmosphere for teaching and learning.



Country 1000 m<sup>2</sup> Function

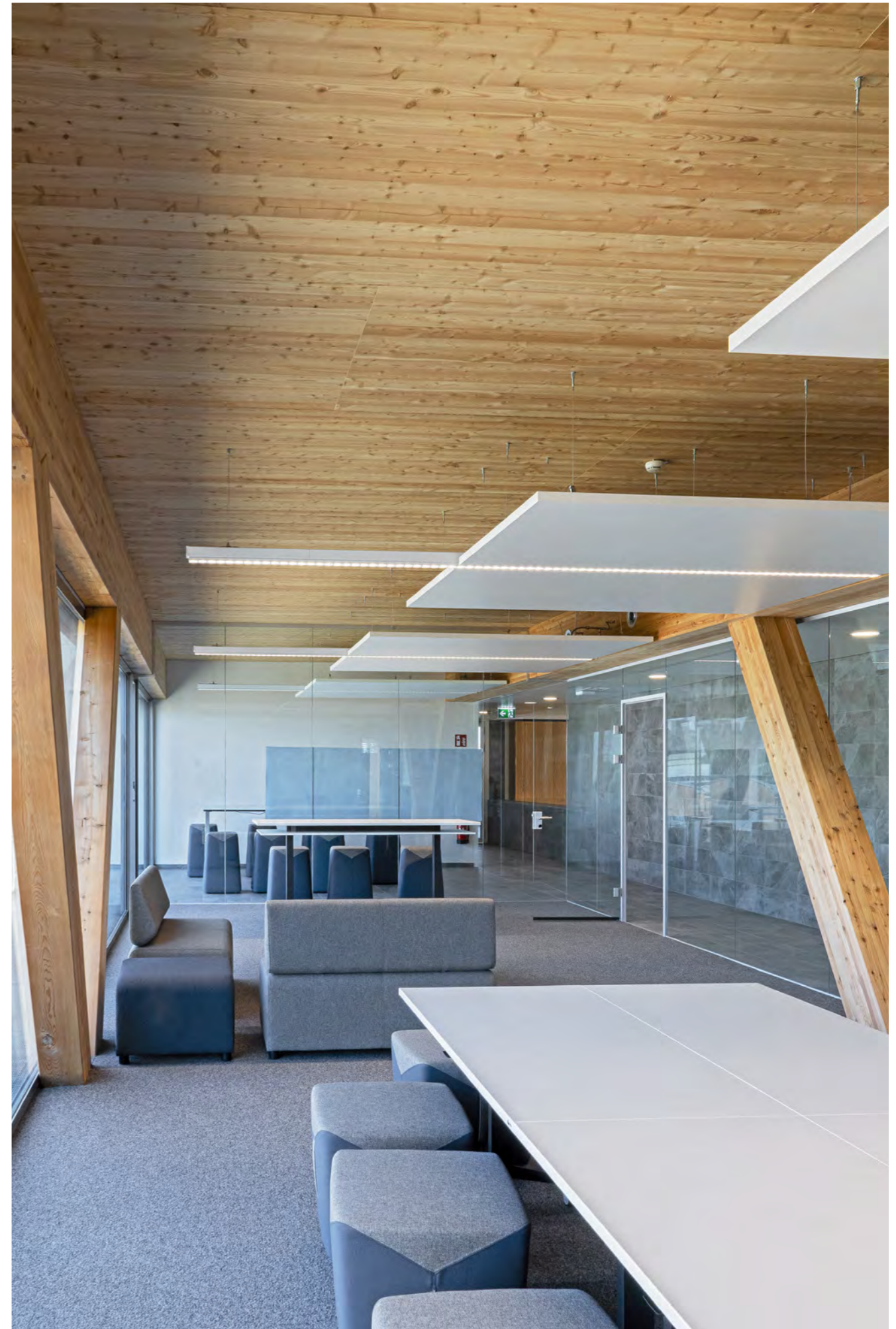


Product  
Acoustic ceiling, cooling floating ceiling  
Perforation Rd 1.5 - 11%  
Colour RAL 9010  
Floating ceiling, Swing

Project name  
E-Campus,  
Graz

Architects  
Markus Pernthaler,  
Graz





EDUCATION

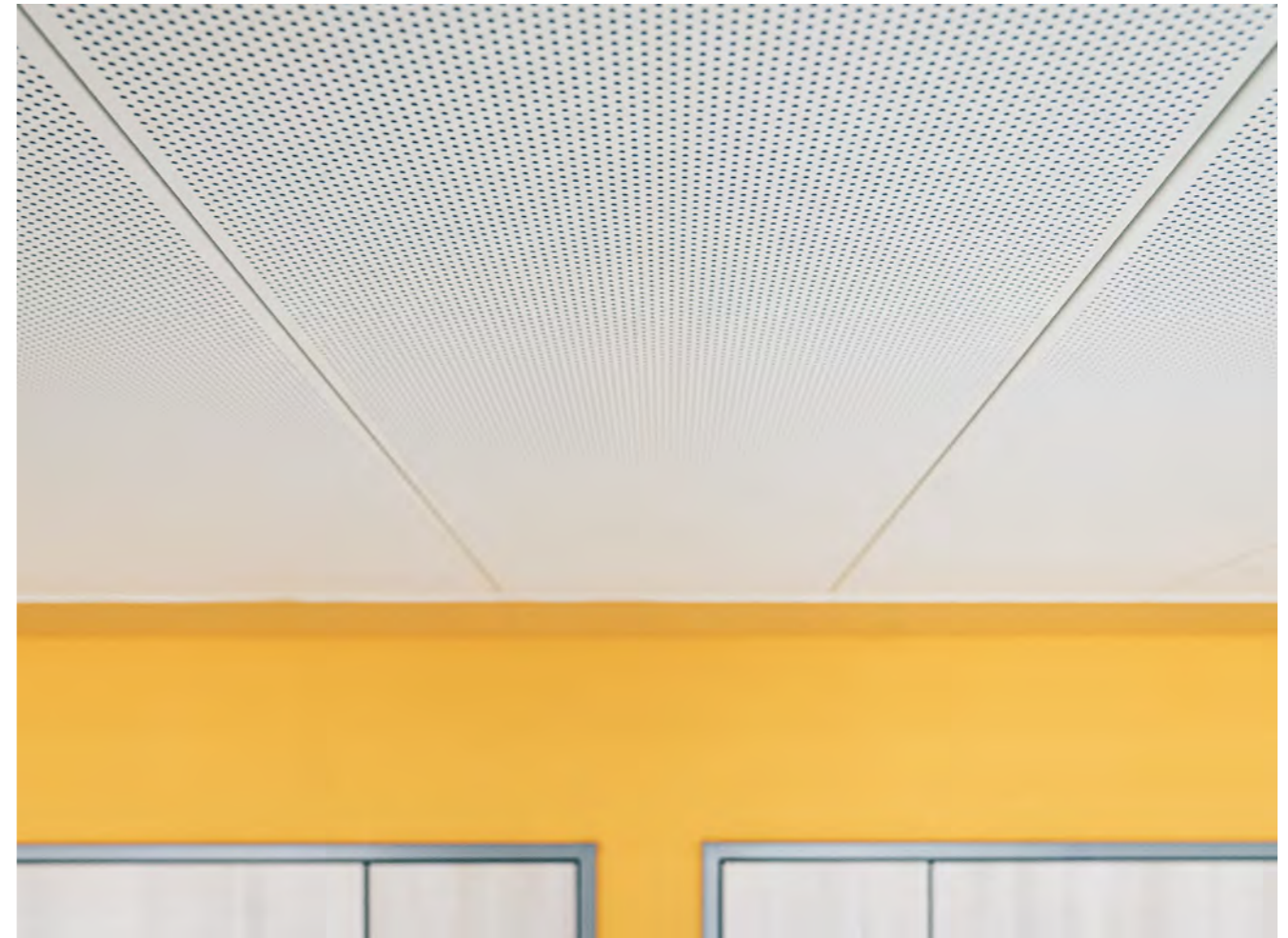
Country 1000m<sup>2</sup> Function

DE 3.0   

**Convenience**

In buildings featuring technology, e.g. hospitals, installations in the ceiling cavity must be conveniently accessible for service and modifications. Partial service openings are not a solution, though. In actual practice, they turn out to be too few in terms of quantity; or they are situated in the wrong place. With our swing-and-slide system, each individual ceiling element can be opened; multiple tiles can be pushed together to form a convenient service opening.





HEALTH



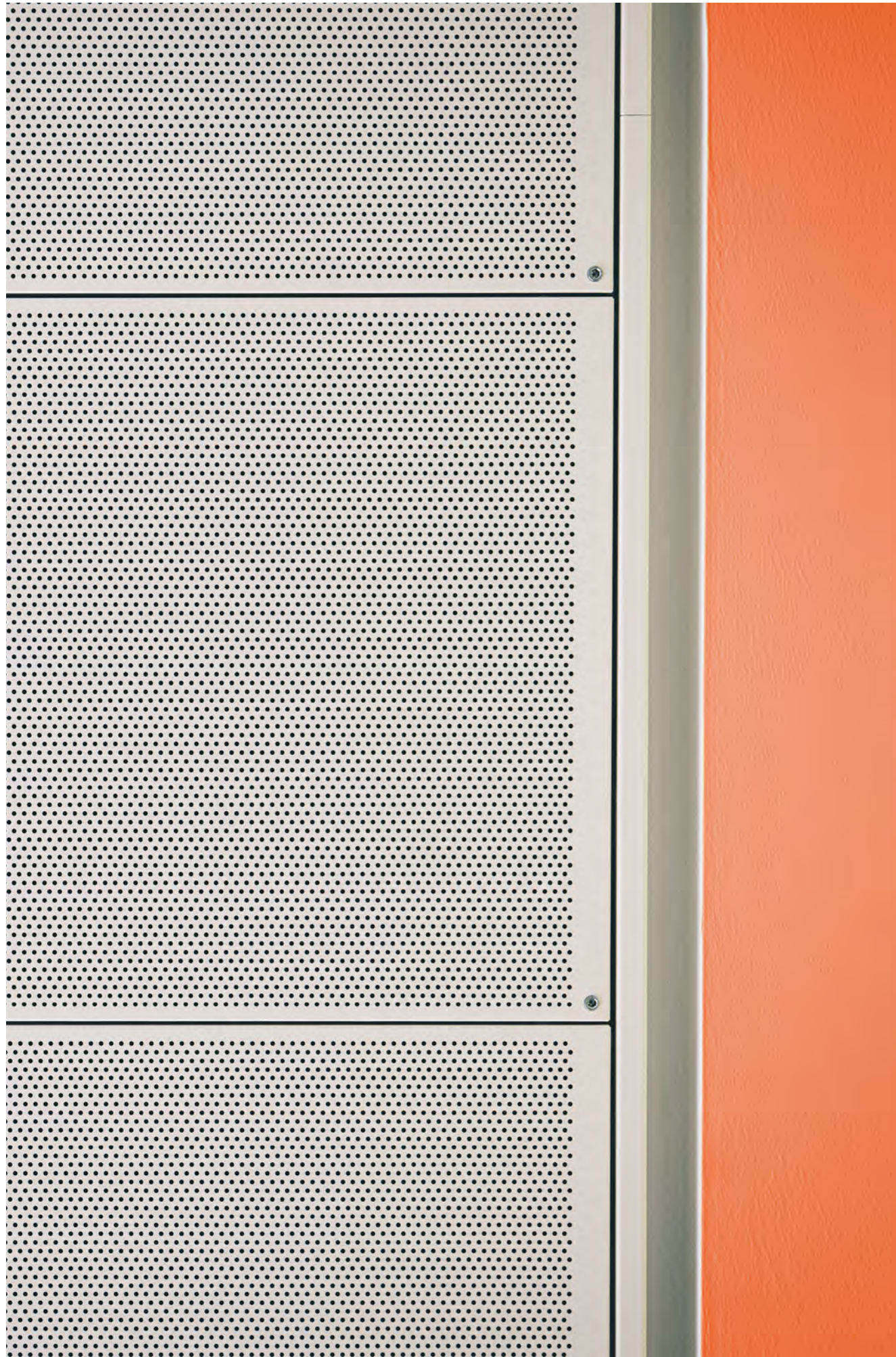
Country 1000 m<sup>2</sup> Function



Product  
Acoustic, fire protection and hygiene ceiling  
Perforation Rv 3.0 - 20%  
Colour RAL 9010, high-gloss  
Swing-and-slide system F30, Swing

Project name  
District Hospital  
Mainkofen

Architects  
Eggert Architekten,  
Stuttgart



District Hospital Mainkofen, Eggert Architekten



## FIRE PROTECTION

### Combining safety and functionality

Fural metal fire protection ceilings combine practicality and safety with today's building requirements and boast of numerous advantages:

In addition to being 100% free of dust, ceilings from Fural Metalit Dipling are easy to clean and fibre-free. The panels do not contain any rock wool; as false ceilings, they guarantee fire protection for up to 90 minutes.

Thanks to the minimum height, light or emergency and warning lights can be easily integrated into the ceiling panels.

In addition to the fire protection function, a cooling system can be integrated as well.

### Fire-resistance rating

With the introduction of the European standard DIN EN 13501-2, the requirements in the area of structural fire protection have changed significantly.

In the event that a fire breaks out in the ceiling cavity, the escape route must be protected for 30, 60 or 90 minutes in accordance with the statutory provisions.

Fural fire protection ceilings have all the requisite certificates and guarantee protection and safety in an emergency.

### Earthquake protection

For earthquake zone Z1 up to building class III and ground class E, Fural has developed a special concept for earthquake-resistant fire protection ceilings.

### Hygiene

In hygiene-sensitive buildings in particular, hospitals for example, cleanliness and sterility take top priority. The fire protection ceilings from Fural offer the necessary conditions for it.

Thanks to their special design, metal ceilings from Fural Metalit Dipling not only prevent the accumulation of dust particles but also ensure easy cleaning of the surfaces. The plaster board of our fire protection tiles behind the ceiling remains completely closed, so dust has no possibility to accumulate. The metal ceiling also enables ideal disinfection.

“Fire Protection Ceiling” Manual in AT/CH/DE according to the corresponding country standard

EI 30 a ↔ b

EI 60 a → b + EI 30 a ← b

EI 90 a → b + EI 30 a ← b

F30 from above and from below

F90 from above and F30 from below

– Intro

– Swinging down system and lay-in system

– Design of the fire protection tiles

– Direct wall connections

– Centre suspensions

– Hall crossings

– Niche connections

– Frieze connections

– Centre friezes

– Installation guide

– User guide

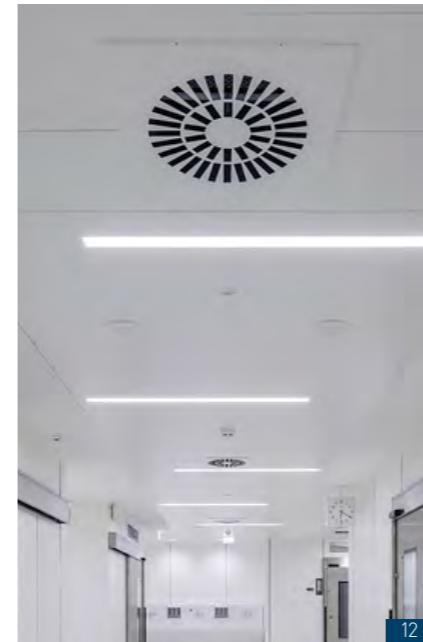
For more information, see our “Fire Protection Ceilings” Manuals, available for Germany, Austria and Switzerland,

as well as on our website at:

[www.fural.com/en/metal\\_ceilings/fire\\_protection/11](http://www.fural.com/en/metal_ceilings/fire_protection/11)

# DETAILED SOLUTIONS FOR HOSPITALS

- 1 100x opening and closing, fold in the plaster, no mineral fibre, light fittings in a tray
- 2 Strip lights
- 3 Strip lights+ pictogram escape route
- 4 System installations, LED panel
- 5 Fire protection and cooling ceiling
- 6 Speaker
- 7 System installations, lighting series 481
- 8 LED lighting, gypsum
- 9 Column in the fire protection ceiling
- 10 KQK light fittings
- 11 Sprinkler and lighting
- 12 System installations lighting series 481, ventilation outlets
- 13 KLK light fittings



Country 1000 m<sup>2</sup> Function

BE

14.0



**Expanse**

The Corda Campus in Hasselt in Belgium is a technology centre offering space for start-ups, networking and innovations. 250 companies with around 5,000 employees are currently residing here. Along with the spectacular exterior, the interior conveys space and wide expanse. Under our cross-strip grid ceiling, big thoughts can be thought here.



OFFICE

Country 1000 m<sup>2</sup> Function



Product  
Acoustic and cooling ceiling  
Perforation Rd 1.5 - 11%  
Colour RAL 9010  
Strip grid with French hook

Project name  
Corda Campus,  
Hasselt

Architects  
ELD,  
Belgium



Metal ceilings are a sustainable product. Metal can be melted down an infinite number of times and recovered in a tried-and-tested recycling process.



## SUSTAINABILITY

### Sustainable building

The topic of sustainability and an awareness of effective use of resources has become a focus in our society more and more over the last few years.

A shift in attitude has evolved that impacts the use of building materials as well. It is essential to counteract the waste of (building) resources and avoid the use of substances that are harmful to health. Because VOCs, mould fungi and carcinogenic substances could have a significant negative impact on our mental and physical health.

For these and many other reasons, it is about time for us to think about the correct use of construction and raw materials in the building sector. The national and international building certification systems have been path-breaking in this context. Both for new buildings and existing buildings, they award certificates for sustainably constructed buildings and honour them.

Quality seals such as LEED, DGNB and BREEAM also facilitate in making the quality of a building visible in terms of its environmental impact. Fural Metalit Dipling fosters and upholds the idea of sustainability and provides products that support building certification.

### Sustainable metal ceilings

The metal ceilings from Fural Metalit Dipling feature sustainability as a concept and offer numerous advantages as well: Steel and aluminium sheets can be easily processed and made to measure at the factory, thus avoiding unnecessary work at the construction site. In addition, metal ceilings allow for repair and servicing without any great effort at all times and can also be used again. Last but not least, the metal ceiling systems are durable and easy to recycle: they protect the environment.

### Metal ceilings for more comfort

Metal ceilings are ideal for cooling and heating rooms. Because the temperature control is based on the radiation principle: Heat or cold radiates directly and gently into the room via the metal ceiling. In addition, cooling ceilings function completely without air circulation and thus create neither dust swirls nor draft.

### Building materials are valuable materials

The materials contained in a metal ceiling are still valuable materials at the end of their product life cycle, since they can be fed back into a closed-loop economy practically without any loss. For painted steel and aluminium sheets, a broad range of collection and recycling processes exist that have long become part of a well-functioning "circular economy". Instead of disposal costs, a yield is generated.

The German Sustainable Building Council (Deutsche Gesellschaft für nachhaltiges Bauen, DGNB) defines the desired "economic quality" of buildings, among other things, through the criteria of "costs across the life cycle" (ECO 1.1) and "flexibility and conversion to new use" (ECO 1.2). The "ecological quality" is based on the criteria of "environmental impact across the life cycle" (ENV 1.1), "risks to the local environment" (ENV 1.2), "responsible resource extraction" (ENV 1.3) and "energy efficiency and climate protection" (ENV 1.8). Fural Metalit Dipling is well positioned in this respect with all its products and systems.



Country 1000 m<sup>2</sup> Function

CH

6.0



**Quiet**

Not only teaching and learning environments need special acoustic solutions but common areas such as galleries and corridors as well. Because they are areas in which children romp and noisily communicate and work off a bit of their natural energy. Architects Lussi + Halter Casagrande integrated the topic of acoustics in the renovation process of the school building. They succeeded in carefully renovating a school building from the 1970s – with Fural metal ceilings as part of the acoustic optimisation.



EDUCATION

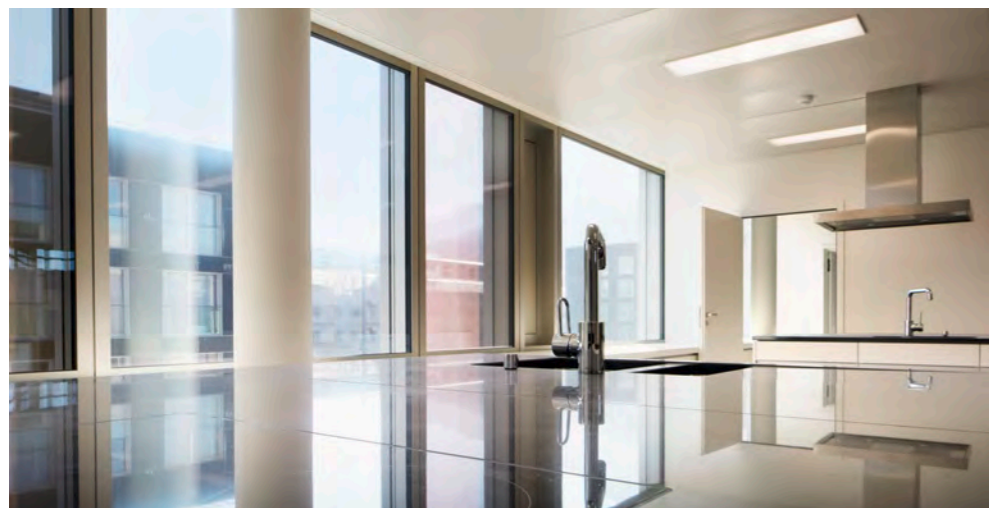
Country 1000 m<sup>2</sup> Function

CH 6.0

Product  
Acoustic and cooling ceiling  
Perforation Rd 1.8 - 21%  
Colour RAL 9010  
Hang-in system HT28 profile

Project name  
High-school building Horw

Architects  
ARGE Lussi + Halter Casagrande,  
Lucerne





Country 1000 m<sup>2</sup> Function

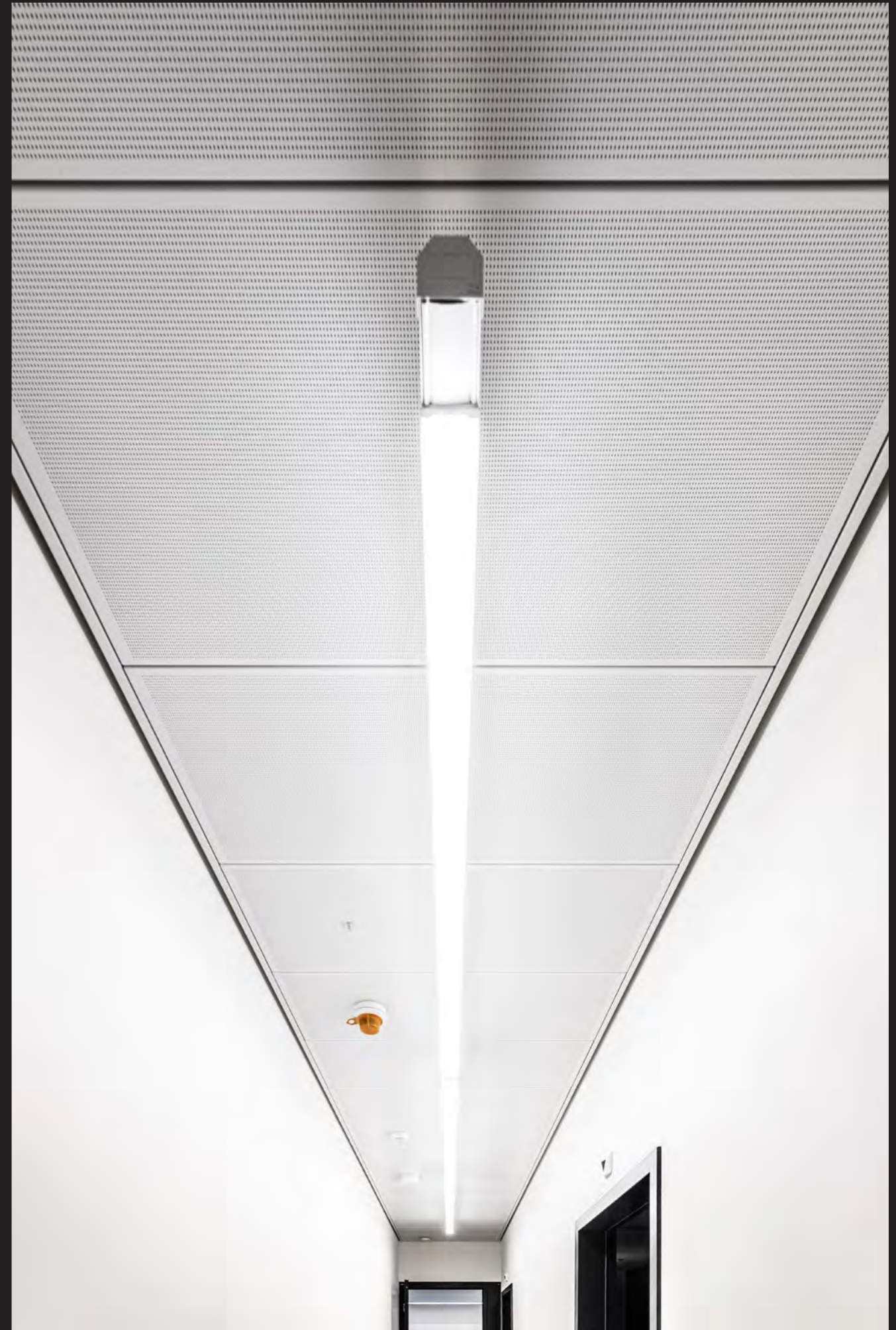
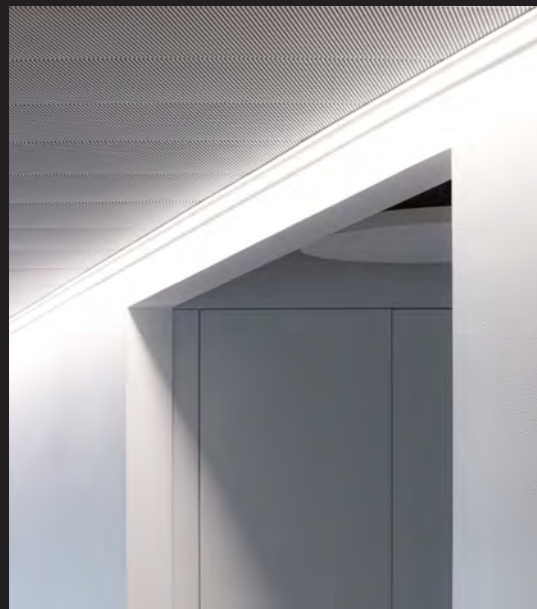
CH

8.1



**Reflections**

In multi-story office buildings, one problem that frequently occurs is that there is a high degree of daylight let in near the façade and areas further back in the room that are too dark. The front needs to be shadowed, and the back needs more artificial light. One problem associated with this is the quality and non-reflection of surfaces. With our Parzifal® surface technology, you get a matt coating that is particularly insensitive to incident diffused light. Especially in the case of room-high window panes, this high-quality surface is quite effective.



OFFICE

Country 1000 m<sup>2</sup> Function



Product

Acoustic, fire protection, design and cooling ceiling  
 Perforation Rd 0.9 - 14% | Rd 1.8 - 21% |  
 Rg 1.5 - 11% | Mesh 16×8×2×1mm  
 Colour RAL 9001 | RAL 9016 | RAL 9005 |  
 NCS 0500-N | RAL 9011  
 Hang-in system HT28 profile, floating ceiling, fire protection ceiling, expanded metal

Project name

Business house Helix,  
 Cham

Architects

axess Architekten AG,  
 Zug





Federal school centre St. Pölten, YF Architekten



## ACOUSTICS

### Acoustics as a key factor

One of the most important senses of mankind is the sense of hearing. Especially in buildings such as schools, office complexes and hospitals, acoustics constitutes a key factor for fostering the ability to work effectively and feel comfortable. Hence acoustic concepts are essential and should already be taken into account in the planning phase of a project.

### Why put in acoustic ceilings made of metal?

Although metal ceilings are hard, they are perfect sound absorbers owing to the materials used and the processing steps employed.

Steel and aluminium sheets of a low material thickness always constitute the starting point. In combination with various perforations, the acoustic fleece and the ceiling cavity above it, the sound absorption values obtained are excellent.

### All-in

Our systems combine excellent acoustic properties and an outstanding appearance with functionality and longevity, which ensures holistic well-being through and through.

Acoustic ceilings can be equipped with additional functions such as heating, cooling, ventilating or the matching lighting.

In addition, it is possible to adapt and expand the product properties. Solutions can be conceived, for instance, that include fire protection and aspects of hygiene.

### Diversity

All Fural metal ceiling systems can be deployed as acoustic ceilings. A wide range of perforations in combination with an acoustic fleece or linings made of rock wool, rock wool welded into PE foil, foam, sheep or polyester wool offer perfect acoustics for your project.

### “Certified Acoustics” Manual

Page	
4–12	Intro
14–42	Acoustic metal ceilings
	– Metal ceilings best practice
	– Impact of the linings
	– Impact of the linings thickness
	– Impact of the acoustic fleece
	– Impact of heavy linings
48–50	Acoustics with expanded metal ceilings
54–58	Acoustics with cooling and heating ceilings
62–68	Acoustics with floating ceilings
72–76	Acoustic walls and L absorbers
78–82	Longitudinal soundproofing
84–92	Overview, perforations tested
94	Overview, perforations not tested

For more information, please refer to our “Certified Acoustics” Manual and our website at:

[www.fural.com/en/metal\\_ceilings/acoustics/10](http://www.fural.com/en/metal_ceilings/acoustics/10)

Country 1000 m<sup>2</sup> Function

BE

5.5

?

**Integration**

Metal ceiling systems are ideal for the precise integration of technical installations such as lighting, ventilation, sprinkler outlets, escape route signs and cameras. The quick and easy serviceability of our ceiling systems also ensures easy access to those installations at all times.

Country 1000 m<sup>2</sup> Function



Product

Acoustic ceiling  
Perforation Rd 1.8 - 21%  
Colour RAL 9010  
Hang-in system Z profile

Project name

Hospital Maas,  
Kempen

Architects

Gortemaker Algra Feenstra,  
Rotterdam



Country 1000 m<sup>2</sup> Function

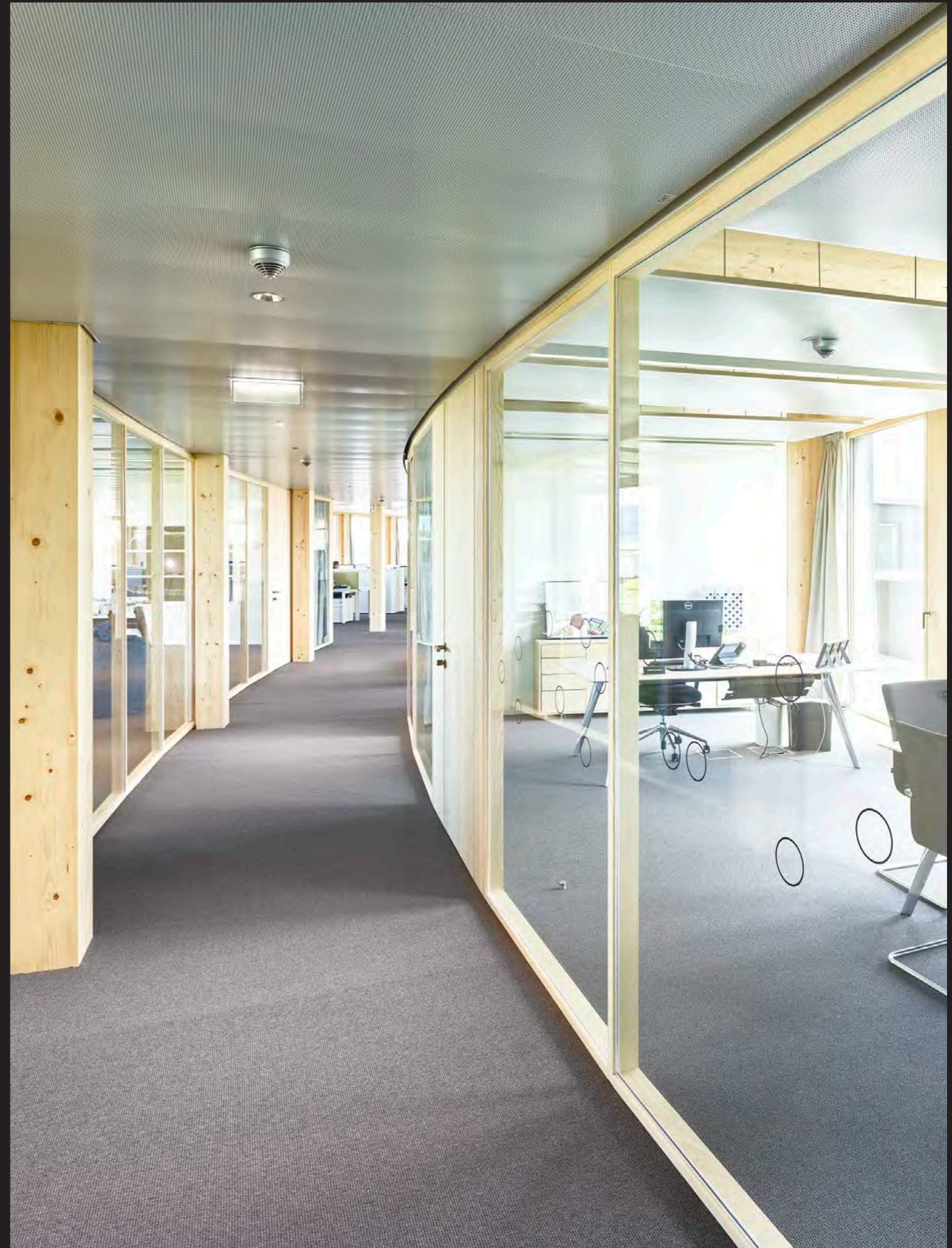
AT

1.5



Cycle

You might think metal ceiling systems are confined to orthogonal floor and ceiling plans. Fural Metalit Dipling proves the opposite and searches for an optimal solution for your project together with you. We will be glad to study your planning thoroughly and develop a custom-tailored design even for the most eccentric idea.



OFFICE

Country 1000 m<sup>2</sup> Function



Product

Acoustic and cooling ceiling  
 Perforation Rg 3.0 - 20%  
 Colour RAL 9006  
 Floating ceiling, hang-in system  
 Z profile

Project name

Legero United Campus,  
 Feldkirchen bei Graz

Architects

Dietrich | Untertrifaller Architekten,  
 Graz

Country 1000 m<sup>2</sup> Function

AT

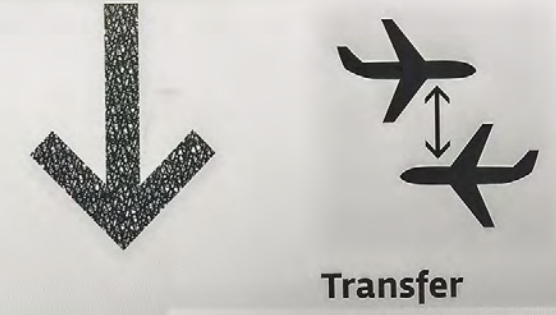
36.0



**The world is on the move**

In recent decades, the focus of mobility has shifted: Individual transport is increasingly being replaced by public transport. Mobility infrastructure was created on a large scale, and existing systems were expanded – be it in the field of air, rail and ship traffic or road transport.

However, the focus of all discussions on mobility is always on the comfort of passengers. In the “Sky-Link” of Vienna Airport, 40,000 metal tiles from our factory help to leave the noise of travelling behind so you can enjoy your stay at the airport.



Transfer

MOBILITY





Country 1000 m<sup>2</sup> Function



Product

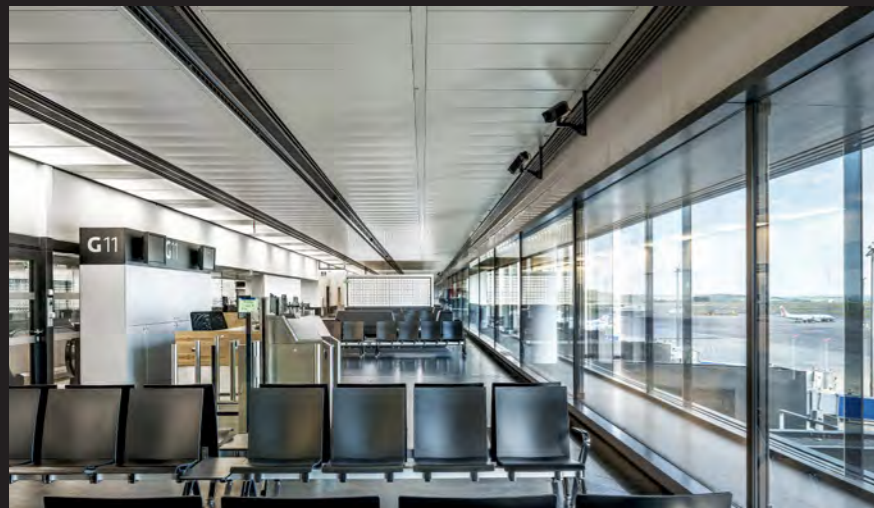
Acoustic ceiling  
Perforation Rg 0.7 - 4%  
Colour RAL 9010  
Strip grid system

Project name

Check-in 3,  
Vienna International Airport

Architects

Itten Brechbühl AG,  
Bern  
B & E Baumschlager Eberle GmbH,  
Switzerland





Country 1000 m<sup>2</sup> Function

AT

3.0

?

**A new kind of justice building**

Just as new forms of the penal system need to be developed on the basis of new insights, the form of prisons also needs to change. Prisons consist not only of cell blocks but also include court and administrative areas, athletic areas and workshops, libraries, hospital wards and visiting areas. Everybody in these building complexes – inmates and employees – needs a functioning and liveable environment.



Country 1000 m<sup>2</sup> Function

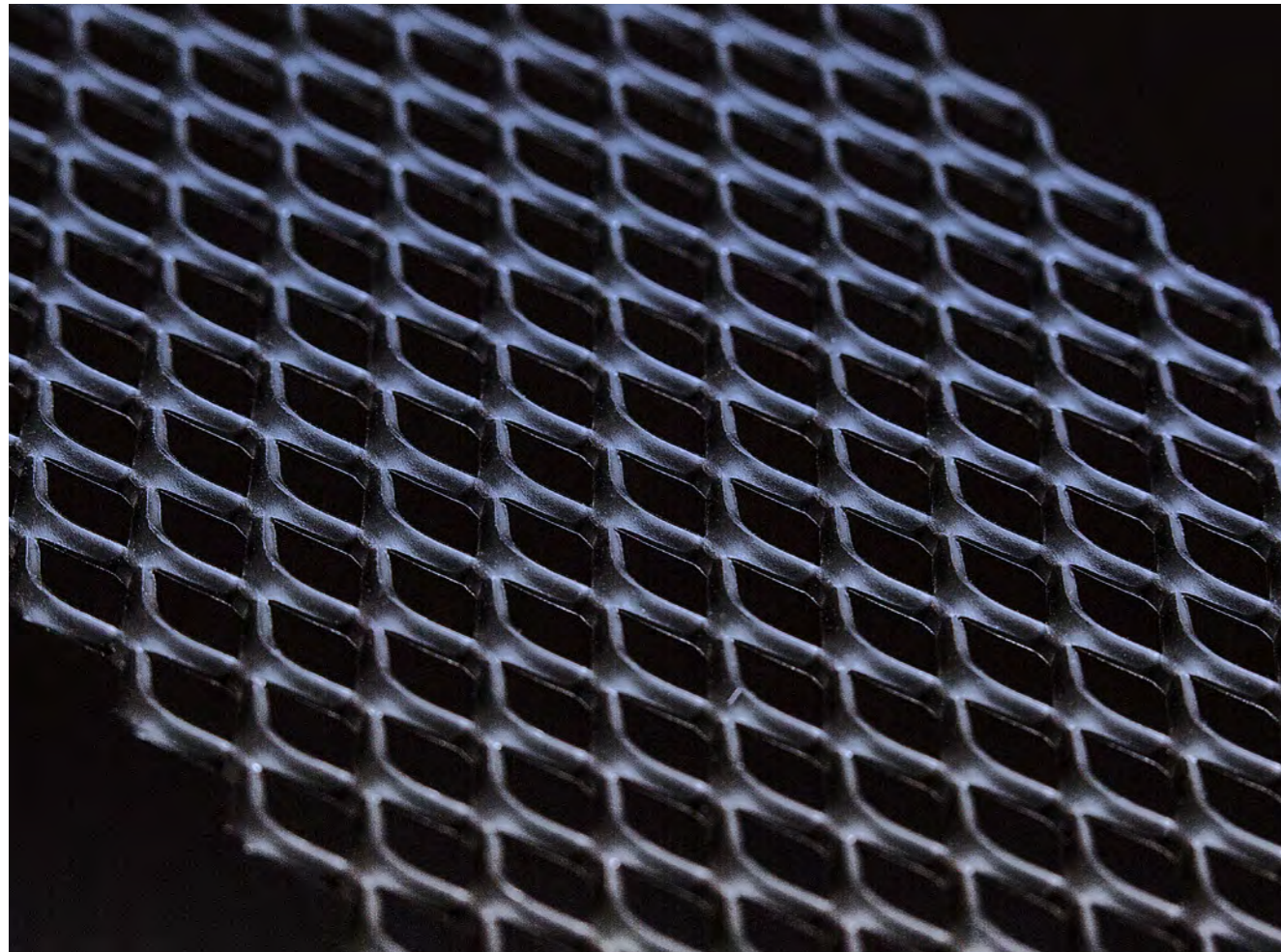
AT 3.0 ↻

Product  
Acoustic ceiling  
Perforation Rd 1.8 - 21%, Rd 4.0 - 33%  
Colour RAL 9016, NCS S1000-N  
Clip-in system, support system

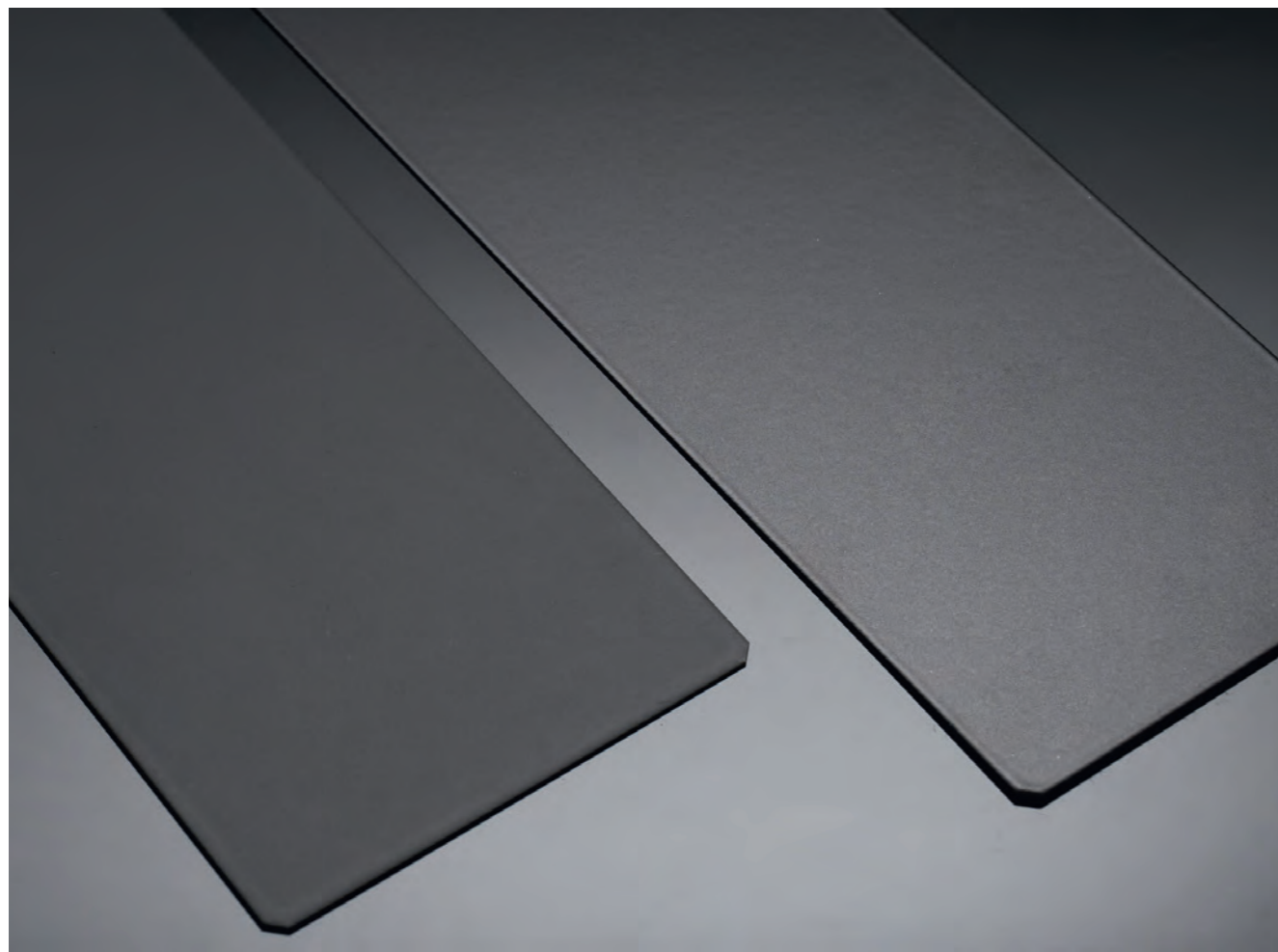
Project name  
Justice Centre  
Eisenstadt

Architects  
YF Architekten,  
Vienna





Expanded metal with high-matt, black Parzifal® wet paint finish



Comparison of high-matt, black Parzifal® wet paint finish with black high-gloss powder coating

*The perfect look  
The eye adjudges the quality of a building.  
For the viewer, the high quality of a ceiling  
only becomes recognisable by a perfect  
and flawless surface. Brilliant colours,  
surface finishes and expanded metal  
ceilings ensure a perfect view when  
looking up.*



## DESIGN

### Elegant surfaces even with sidelight – thanks to Parzifal®

The look of a room is considerably enhanced with matt-coated tiles. The coating based on a hydro stove enamel process diffuses the incoming light. This Parzifal® effect strongly counteracts any reflections or reflective effects, so the ceiling has a uniform and homogeneous appearance.

Parzifal® surfaces are ideal for use in large rooms as well as with room-high windows with incident sidelight.

For more information on our Parzifal® surface technology, please refer to pages 106–107 in this book.

### High-quality powder coating

Powder coating is a recognised technology for the finish of metal ceilings. All visible components as well as the metal tiles can be finished in our in-house powder coating plant. This guarantees a long-lasting, low-maintenance surface that ensures a perfect look for many years. For particularly high requirements in terms of hygiene, all elements can be equipped with a special, antibacterial powder coating.

### Expanded metal Parzifal® matt

Expanded metal ceilings are characterised by an impressive and unique look. The broad range of different mesh sizes, tile formats, joints and colour possibilities allow for the highlighting of architectural features.

Along with its visual qualities, expanded metal ceilings stand for a high level of functionality:

- Meshes with a large, free cross-section are ideal for ventilation and smoke removal.
- Expanded metal ceilings are perfect as cooling ceilings.
- Expanded metal ceilings improve room acoustics.
- The individual tiles can be opened and closed at any point. No servicing hatches are required.

### Colorprint

By means of a special printing process and with a high-quality finish, photo-realistic pictures, graphics and décors can be reproduced on the metal tiles.

Individual pieces such as logos and photographs as well as large-scale applications in a wood or stone look and creative patterns can be implemented.

Along with the individual look, you get functions and system solutions for ceilings and walls that are tried and tested with “Colorprint”!

**For more information, please refer to our “Expanded Metal Ceilings” Manual and our website at: [www.fural.com/en/surfaces/5](http://www.fural.com/en/surfaces/5)**

Country 1000 m<sup>2</sup> Function

CH

5.5



**Textile appearance**

If metal ceilings or floating ceilings are made with expanded metal, the surfaces take on a soft, almost textile appearance. In this school building in Basel, the architects from Stücheli Architekten obviously had lots of fun exploring the design options of coloured expanded metal. Always included: The excellent acoustic properties of the floating ceiling.

Country 1000m<sup>2</sup> Function



Product

Acoustic and design ceiling

Mesh 20x10x2x1.5 mm

Colour: bold NCS shades

Expanded metal, floating ceiling  
made of expanded metal

Project name

High-school building

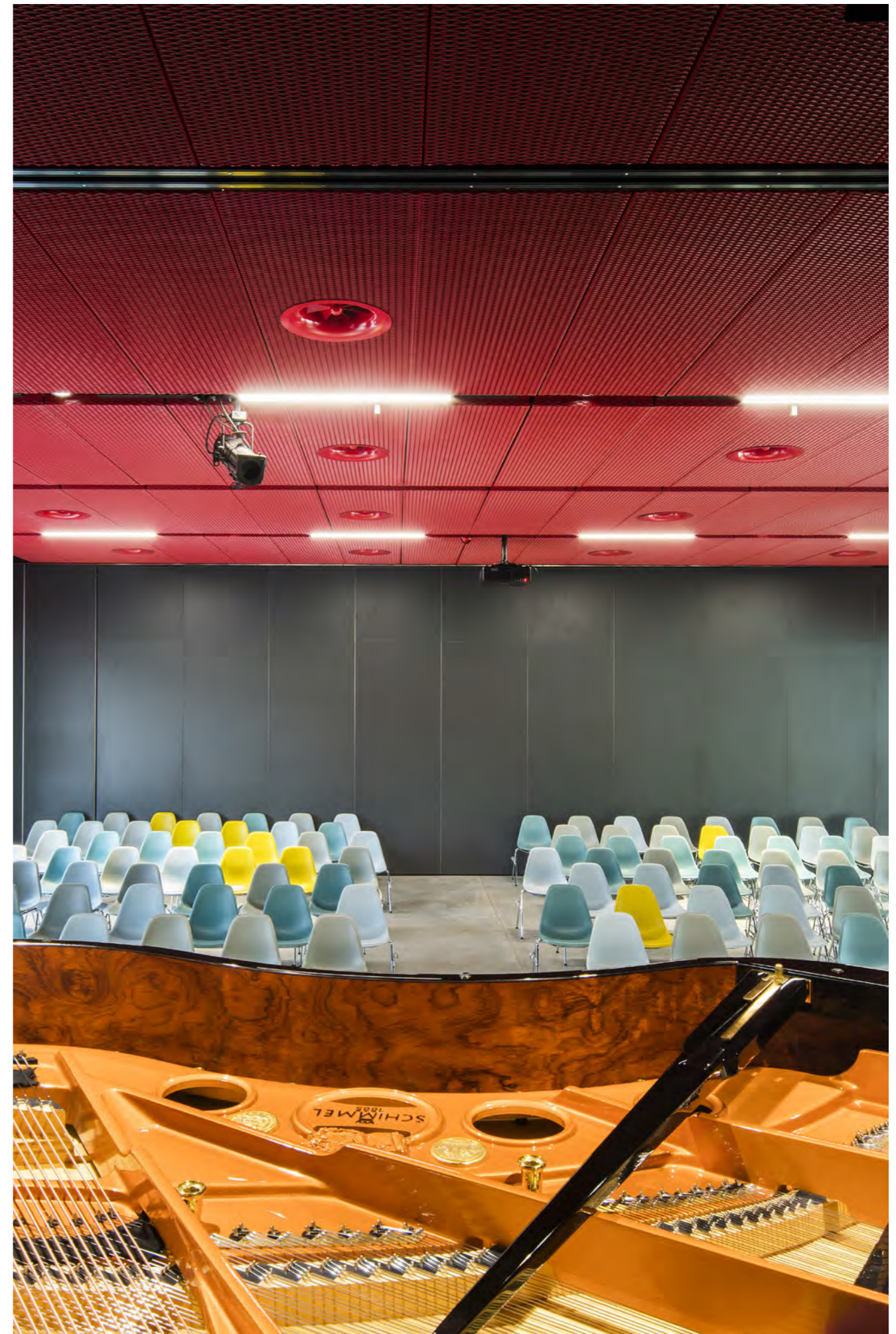
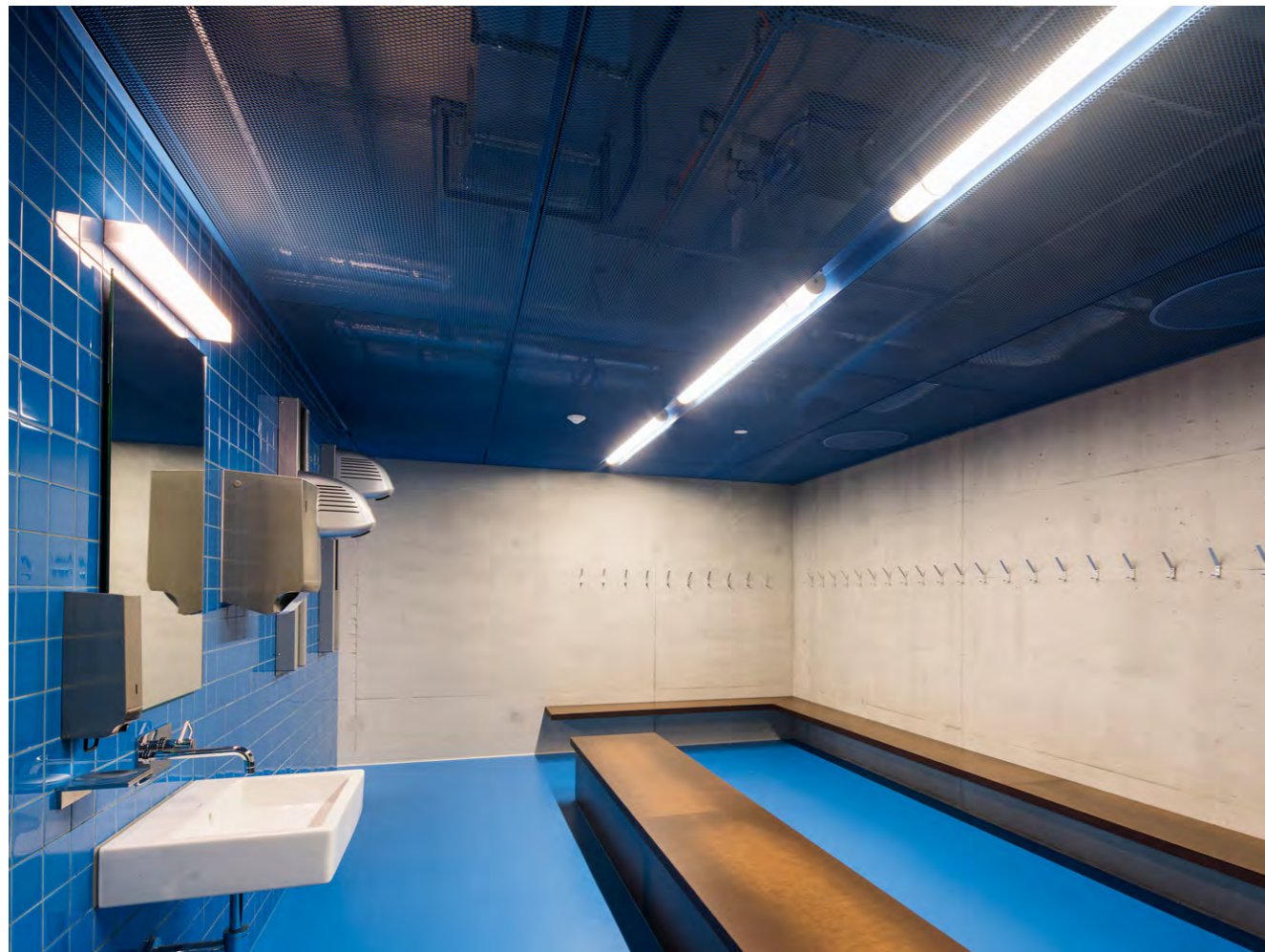
Basel

Architects

Stücheli Architekten AG,  
Zurich



EDUCATION





Country 1000m<sup>2</sup> Function

CH

2.0



OFFICE

Product  
Acoustic, cooling and design ceiling  
Perforation Rd 1.5 - 22% over edge  
Colour: NCS S-2502-Y matt  
Hang-in system Z profile,  
sub-construction for floating ceiling

Project name  
Headquarters Scott Sports,  
Givisiez

Architects  
Itten + Brechbühl AG,  
Bern



Country 1000 m<sup>2</sup> Function

AT

1.7

?

Space age

Architecture is not only about reality, it creates illusory worlds and possible futures as well – especially in the trade fair business. The “red lounge” of the Dornbirn Trade Fair implemented by Marte.Marte Architekten is the entrance to a 34,000 m<sup>2</sup> roofed area, referred to by the operators as “[...] a place of the thousand possibilities [...]”. Stanley Kubrick’s HAL 9000 springs to mind.



Country 1000 m<sup>2</sup> Function



Product

Acoustic ceiling  
Perforation smooth, Rg 0.7 - 4%  
Colour RAL 3002  
Clip-in system

Project name

Trade fair  
Dornbirn

Architects

Marte.Marte Architekten ZT GmbH,  
Feldkirch



PROJECT

Country 1000 m<sup>2</sup> Function

LUX

12.0



**Hide or package?**

You can hide technology behind ceilings and pretend it is not there. Or you can package it so that it displays its potentials proudly. ingenhoven architects clearly prefer the latter. They created two ducts that bundle ventilation, heating, cooling, sprinkler system, electricity and lighting. The spatial design of the common spaces are reminiscent of the interior of a passenger plane.

Country 1000 m<sup>2</sup> Function



Product

Acoustic and cooling ceiling  
Perforation Rd 1.8 - 21%  
Colour RAL 9010  
Floating ceiling

Project name

European Investment Bank,  
Luxembourg

Architects

ingenhoven architects GmbH,  
Düsseldorf



OFFICE



## HYGIENE

### Fural – the hygienic metal ceiling

It is scientifically proven: Fural metal ceilings are an ideal solution in the medical field:

- Dust-free and hygienic
- Optimal cleaning and disinfection
- Agreeable, quiet acoustics
- Easy to install and durable

In terms of hygiene, Fural metal ceilings are the perfect solution for use in hospitals. A recent scientific opinion by the German Advisory Centre for Hygiene (Deutsches Beratungszentrum für Hygiene, BZH) shows that metal ceilings for indoor areas have decisive advantages compared with conventional ceiling elements such as plaster boards: Metal ceilings prevent dust formation, are perfect for cleaning and disinfecting and feature agreeable acoustics to boot. These outstanding properties make Fural metal ceilings suitable for the operation theatre and clean rooms as well.

### The plain facts for metal ceiling in medical establishments – the expert opinion of the Advisory Centre for Hygiene.

Following extensive in-depth analyses, the German Advisory Centre for Hygiene in Freiburg i. Br. has found in its expert opinion that the examined Fural metal ceiling elements meet the highest requirements of hospitals with all key parameters.

Thanks to their high-quality coatings, the clean, smooth surfaces ensure top-notch hygienic efficiency in the area of wiping disinfection – from disinfectants all the way to peroxide compounds with sporicidal effect. By using metal tiles, dust and particles are prevented from drifting downwards. In the area of efficient noise absorption, the metal ceiling elements with integrated acoustic fleece also prove their suitability for the medical field.

### Fural – more than perfect metal ceilings: Your partner for your personal solution.

Fural metal ceilings have been providing valuable services in the medical area for many years now. Numerous hospitals throughout Europe rely on the combination of high-quality appearance and excellent hygienic and acoustic properties. In addition, the metal ceilings guarantee maximum functionality and durability.

Architects and processors appreciate Fural's installation-friendly and sophisticated metal ceiling systems as well as the high level of flexibility and the personal care on the part of Fural for each individual project. Reliably predictable delivery times and modular pre-manufacture allow for short construction times. At Fural, the wishes and requirements of the customers are in the focus of our work. The company develops individual customer solutions instead of pre-fabricated standard systems. Adherence to deadlines and service-oriented project are a matter of course.

With the experience of more than 70 years and a capacity of over 1 million m<sup>2</sup> per year, Fural stands for leading-edge know-how, best product quality in high precision and project reliability.

For more information, please see our "Hygiene" Special, pages 208–231, and our "Hygiene" brochure.

Country 1000 m Function

DE

7.9



EDUCATION

**Dynamics**

According to the 2020 Education Finance Report of the German Ministry of Education and Research, the federal government has spent 10.9 billion euros on education. The German Federal Minister for Education Anja Karliczek says: "The money is well invested because it secures the future of our society. These investments should at least be constant in the next few years."



Country 1000 m Function



Product

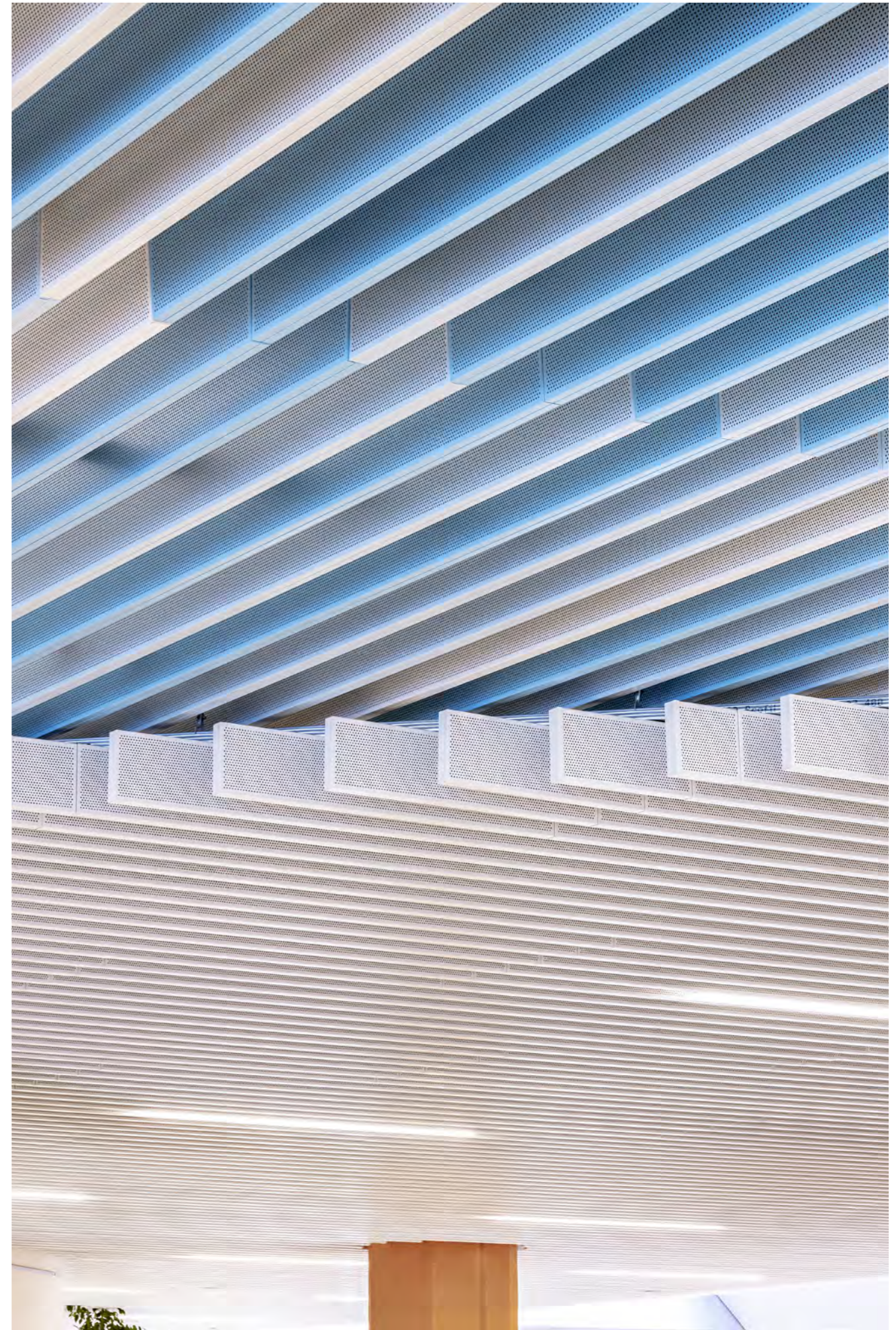
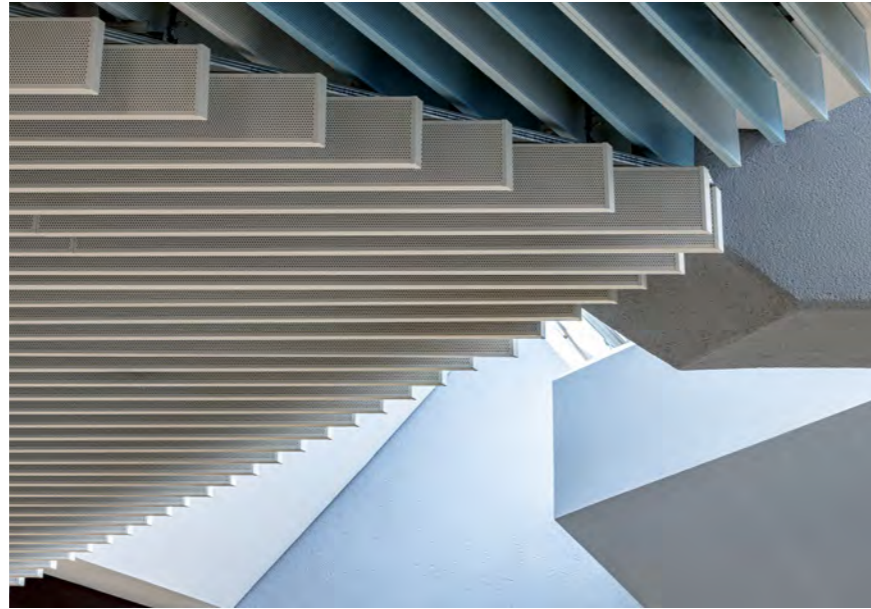
Acoustic and design ceiling  
Perforation Rv 3.0 - 20%  
Colour RAL 9010, NCS S0520-B10G,  
NCS S0540-B10G  
Baffle

Project name

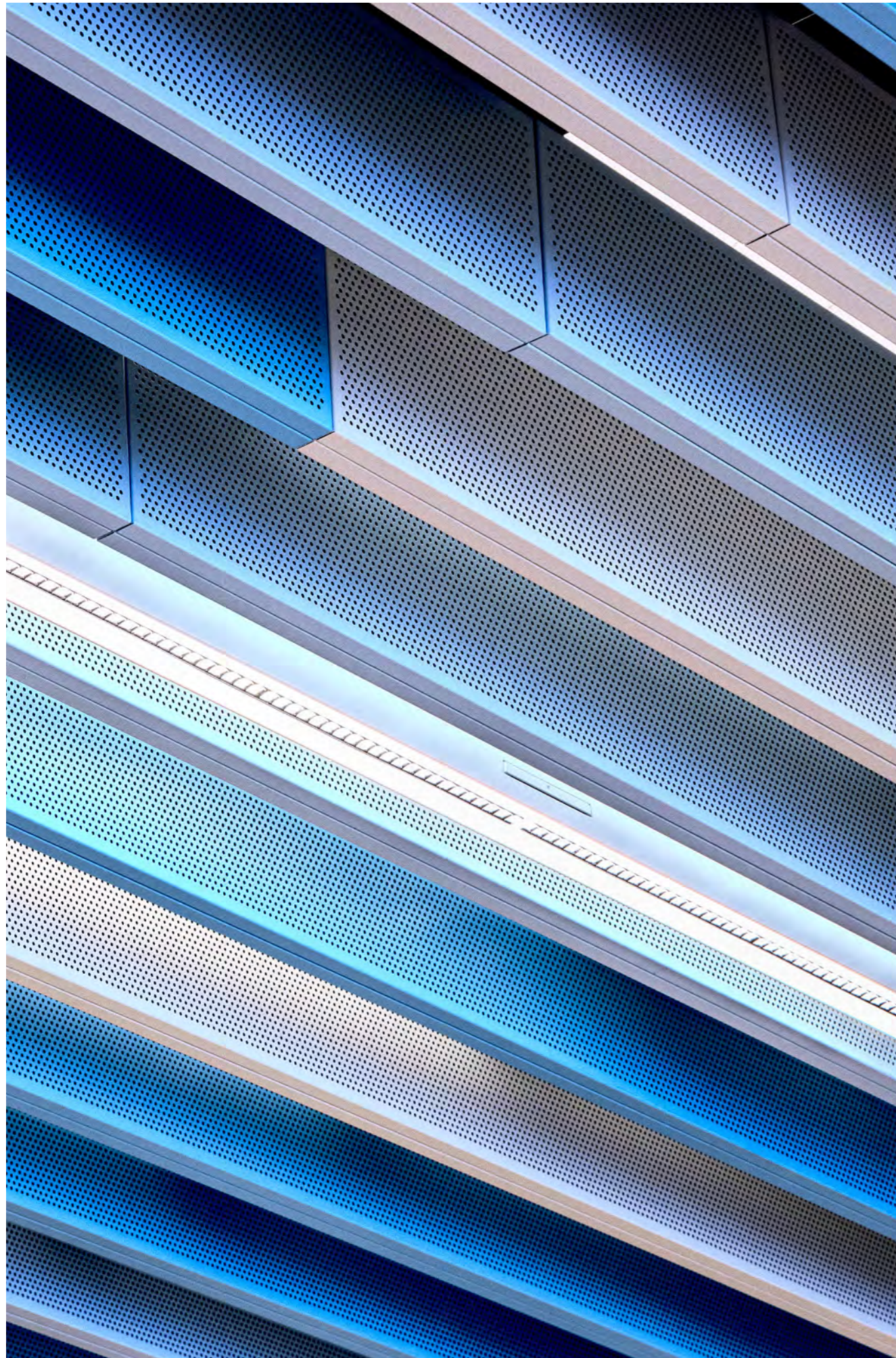
Anton Fingerle Education Centre,  
Munich

Architects

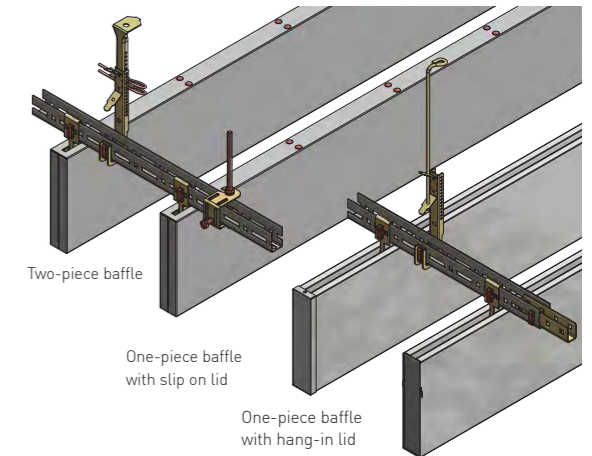
FUN Architekten,  
Munich



EDUCATION



## BAFFLE



### Why use metal baffles?

Metal baffle ceilings are ideal for cooling and heating rooms. Temperature control is largely based on the radiation principle.

The suspended metal baffle ceiling is a perfect conductive medium owing to its good thermal conductivity. The temperature is quickly transferred to or absorbed from the space below; the acoustic properties of the perforated baffle tiles are retained.

Quick and safe servicing of the elements is ensured and constitutes another major plus point that yields considerable advantages both in the construction phase and during operation.

Cooling and heating baffles can be designed with copper/aluminium or plastic systems. Our products and systems are suitable for:

- School and educational buildings
- Hospitals
- Office buildings
- Transport buildings

### Why baffles instead of a closed ceiling?

Baffle ceilings consist of slats hanging vertically from the raw ceiling and are installed at a distance from one another. The gaps created in this way can be used for many practical purposes:

- Baffle ceilings are often used as acoustic ceilings.
- Depending on the height of the baffles and the distance between the baffles, a baffle ceiling can have a significantly higher surface than a smooth ceiling. This means that the acoustic effect is higher.
- Heating and cooling systems can be integrated in the baffle ceilings. The system's efficiency benefits from the larger surface.
- Sprinkler systems do not require special openings into the ceiling. The sprinkler system is installed to the raw ceiling, and the outlets can be placed between the baffles so that they are largely invisible.
- Light fixtures can likewise be installed slightly recessed between the baffles. With flat viewing angles, the baffles ensure additional glare suppression.
- With baffles that are hung into rails and are moveable, the technology in the ceiling cavity can be easily made accessible and serviced.

### Fural baffle ceilings

We are your partner in the field of baffle ceilings for a wide variety of building types and applications.

Our decades of experience in the development and production of metal ceilings have given us the expertise for aesthetically, technically and logistically sophisticated architectural and building projects.

We see ourselves as a quality leader in metal ceilings and help you in successfully realising your projects.

### Baffle brochure

Page
4-8 Intro
10-45 Report
44 Technical aspects 1
48-59 Best practice 1-6
60 Overview, perforations tested
62-69 Other available perforations

For more information, please refer to our "Baffle" brochure and our website at: [www.fural.com/en/systems/baffle/1764](http://www.fural.com/en/systems/baffle/1764)

Country 1000 m Function

CH

52.0



**Three in one fell swoop**

Along with the technical work, architecture has functional and aesthetic aspects. With our baffle ceilings, these three parameters can be combined and unified into a fabulous composition. In addition to the cooling and heating function, our baffle ceilings boast a contemporary look and excellent noise absorption.

Country 1000 m Function



Product  
Acoustic, cooling and design baffles  
Perforation Rd 1.5 - 22%  
Colour of baffles: RAL 5005, 5012, 6018, 1023, 2003, 3001, 4006,  
Colour of aprons: RAL 9005  
Baffle

Project name  
Geneva  
Airport

Architects  
Rogers Stirk Harbour + Partners,  
London



MOBILITY

Country 1000 m Function

DE

5.0



**Beton élégant**

After the "beton brut" of the 1960s and 1970s, contemporary architecture offices take a new stance in terms of the material and create agreeable, human-scale worlds. For example, the Danish architectural firm Cobe for an internationally known sports equipment manufacturer in Central Franconia. An exciting ribbed concrete ceiling with in-between sky-light strips spans the rooms of the "HalfTime" building. In tandem with this, we have integrated our acoustic baffle elements, which also take in the long-span lighting.



Country 1000 m Function



Product

Acoustic and design ceiling  
Perforation Rd 4.0 - 33%,  
Rv 3.0 - 20%, Rg 0.7 - 4%  
Colour bare/galvanised, RAL 7021,  
Parzifal® RAL 9006  
Baffle, clip-on system

Project name

Sports equipment manufacturer  
Herzogenaurach

Architects

Cobe,  
Copenhagen



Country 1000 m Function

CH

0.5



**Light qualities**

Hardly any kind of ceiling allows for combining artificial light and daylight as vividly as with a baffle ceiling. Daylight can be guided into the room via the skylights and be reflected into the space via the sheet metal surfaces. The light fixtures between the baffles add the desired touch of artificial light during the day.

Country 1000 m Function



Product

Acoustic and design ceiling

Perforation Rd 1.5 - 22%

Colour: NCS S 2005-Y20R matt

Baffle

Project name

UBS restaurant,  
Zurich







*Parzifal was...  
...one of the most eminent knights at the court of King Arthur. He is seen as a hero, not only owing to his unusual career but primarily on account of his lengthy, obstacle-laden quest for the Holy Grail. The legend of the Quest for the Holy Grail has been passed down in many regions of the world. The hero Parzifal gains the Holy Grail and redeems the Holy Grail community.*



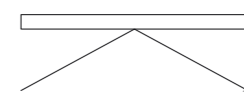
## PARZIFAL®

### Parzifal® – the result of a long quest

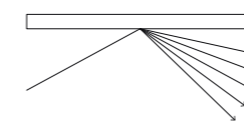
The quest for a naturally matt surface without sidelight effects for metal ceilings has previously not amounted to an auspicious one for many architects and planners. Now the search has come to an end: Fural Metalit Dipling designed a naturally matt surface with an elegant look that is not affected by changing lighting conditions, thus being the sole metal ceiling manufacturer to offer a coating of hydro stove enamel in addition to the classic powder coating.

Although the path to the goal was a long one – it was worth it! Because realising a matt surface coating for metal ceilings with the powder procedure is technically complex and does not look very natural.

With the new surface with hydro stove enamel finish, the light is not directly reflected but is diffusely refracted. The wide light scattering lends an elegant, harmonic and homogeneous appearance, especially in the case of large ceilings.



Light reflection on standard surfaces



Parzifal® effect: diffuse light refraction without reflection

### Quality at the highest level

At the same time, the Parzifal® metal ceilings offer the high quality that Fural as one of the market leaders promises: Excellent fire behaviour (A1 classified, non-combustible according to EN 13501-1), optimal acoustics and a high level of hygiene, and it is very easy to maintain and clean. What's more, the coated tiles meet the limit values for the emission of volatile organic substances (VOCs) according to the AgBB (Committee for Health Evaluation of Building Products) evaluation scheme and are free of production dust and hazardous fibres.

### Matt or textured

Architects and builder-owners are faced with a true agony of choice because Parzifal® is now available in two versions. Both have degrees of glossiness below 10 according to Gardner.

The "matt" variant is available in the special shade of "light white" and in numerous RAL colours. The smooth surface coating reveals the natural character of the basic material and is quite easy to clean.

The "texture" variant is visually impressive with a unique, finely textured surface and can be currently designed in the shade of "white natural matt". No matter how your decision turns out, the room design is supplemented as you like.

**For more information, please go to our website at: [www.fural.com/en/surfaces/5](http://www.fural.com/en/surfaces/5)**

Country 1000 m Function

AT

0.8



Product  
Design ceiling  
Smooth perforation  
Colour RAL 4201  
Baffle

Project name  
Interspar,  
Bregenz

Architects  
Kulmus Bügelmayr GmbH,  
Dornbirn

Country 1000 m<sup>2</sup> Function

CH

1.6

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!±

**Cool**

Colour psychology plays a major role in interior design. It is a well-known fact that certain shades have a calming effect, for instance, and slow down the pulse, foster concentration and strengthen the sense of responsibility. In the renovated "PostFinance" in Bern, a light azure blue supports the cooling function integrated in our floating ceiling.

Country 1000 m<sup>2</sup> Function



Product

Acoustic and cooling floating ceiling

Perforation Rd 1.5 - 11%

Colour RAL 9016

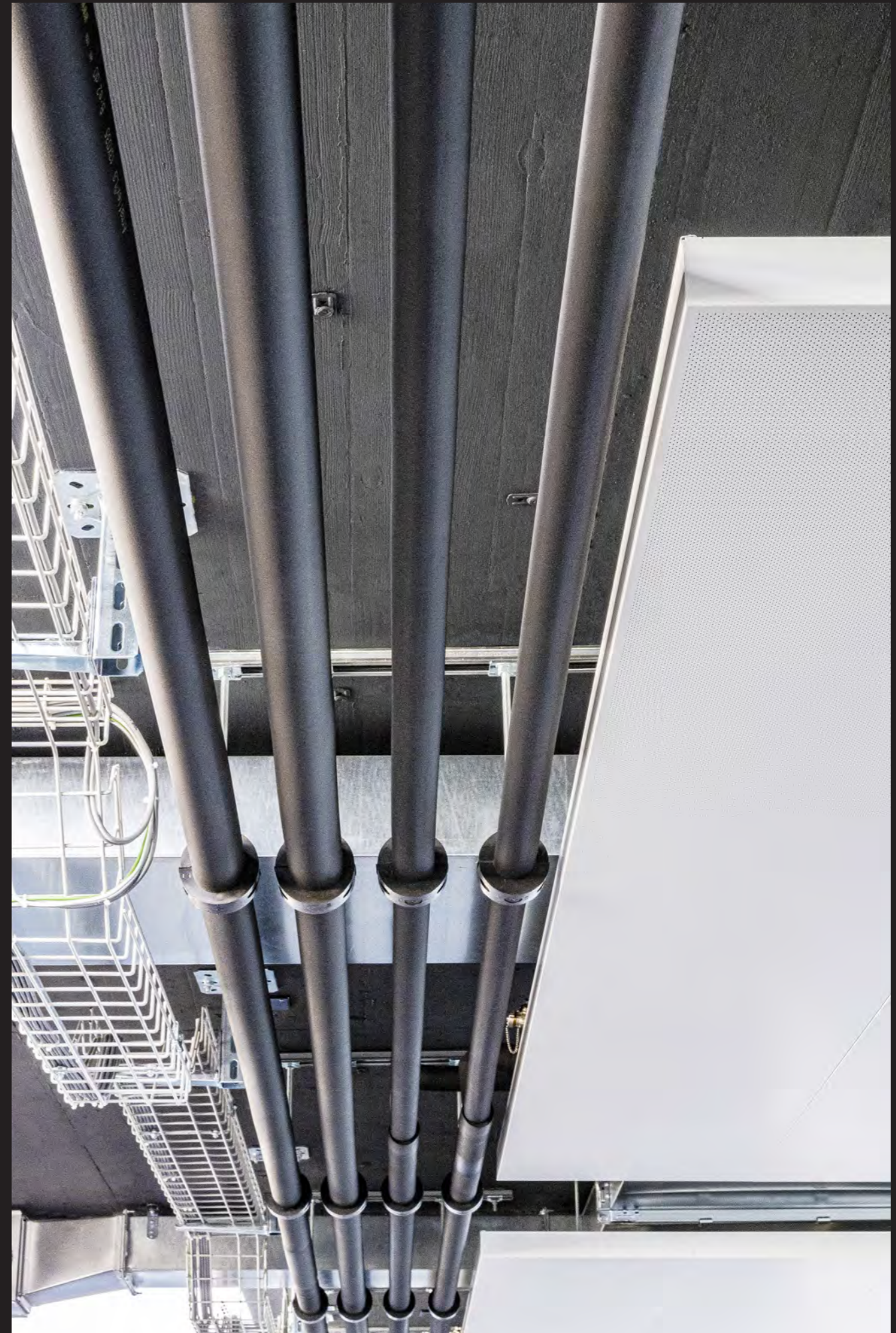
Floating ceiling

Project name

PostFinance,  
Bern

Architects

PUR.BE Gesamtleistungen AG,  
Liebfeld



Country 1000m<sup>2</sup> Function

CH

1.6



Play

According to the philosopher Johan Huizinga (1872–1945), “[...] play is a voluntary action or activity that is carried out within defined limits of time and space according to voluntarily accepted but absolutely binding rules [...]”. Of course, architecture can also be playful – like here in the ceiling plan.

Country 1000 m<sup>2</sup> Function



Product

Acoustic, fire protection and design ceiling  
 Perforation Rv 25 - 46.3%, smooth,  
 Rg 4.0 - 48%, mesh 16x8x2x1mm  
 Colour RAL 9016 matt, RAL 9010,  
 RAL 7022, RAL 9016 matt  
 Floating ceiling, Swing-and-slide system EI 60  
 Clip-in system, hang-in system

Project name

Shopping Centre Herti,  
 Offices in the Herti Centre  
 Zug

Architects

Albi Nussbaumer Architekten ETH SIA BSA,  
 Zug



Country 1000 m<sup>2</sup> Function

NL

5.5

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**Democracy**

The assembly, the plenary assembly, is one of the most important bodies in parliamentary democracies. This is where votes are taken and important issues are debated. Our metal ceilings play a great dual role here: for one, they ensure good intelligibility, so speeches can be heard and understood everywhere in the room; secondly, they allow for the right temperature and thus ensure for cool heads of the representatives.



OFFICE



Country 1000 m<sup>2</sup> Function



Product  
Acoustic and cooling ceiling  
Perforation Rg 2.5 - 16%  
Colour RAL 9016  
Strip grid system, hang-in system

Project name  
Gemeentehuis  
Westland

Architects  
Cepezed,  
Delft





Country 1000 m<sup>2</sup> Function

AT 1.6  

**Cableway in the mountains**

For more than 30 years, the Rhaeto-Romanic mountain village Serfaus has had its own cableway. The village itself is traffic-calmed, has thereby preserved its uniquely idyllic character and is also considered to be a top skiing destination in Europe. The village cableway, at an altitude of about 1420 m above sea level, is hence the highest suspended railway line in the world. The four stations were overhauled according to plans of architect Hanno Vogl-Fernheim and were converted with expanded metal ceilings from our company.



Country 1000m<sup>2</sup> Function



Product

Acoustic and design ceiling  
 Mesh 35 × 16.7 × 2 × 1.5 mm  
 Colour TPR chrome  
 Hang-in system,  
 DZ expanded metal

Project name

Village cableways  
 Serfaus

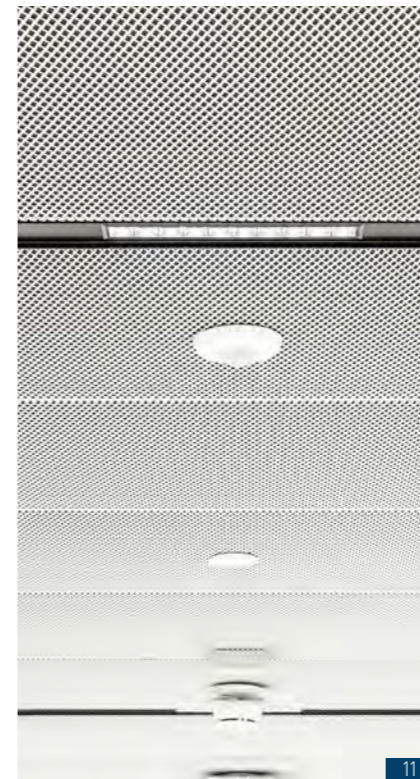
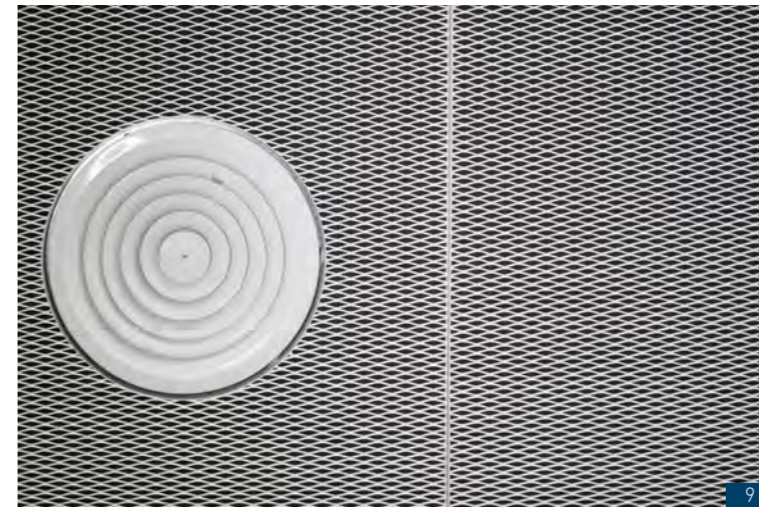
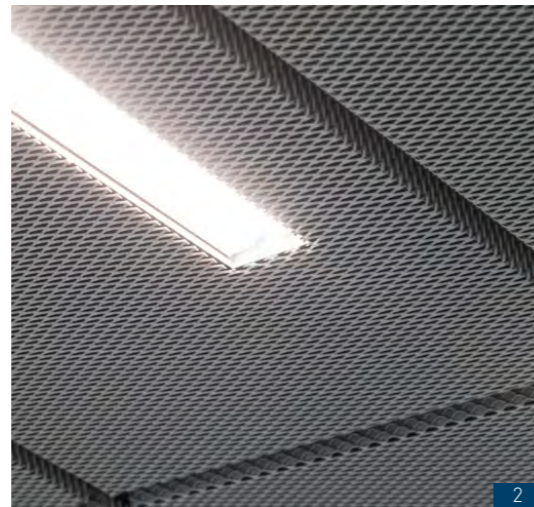
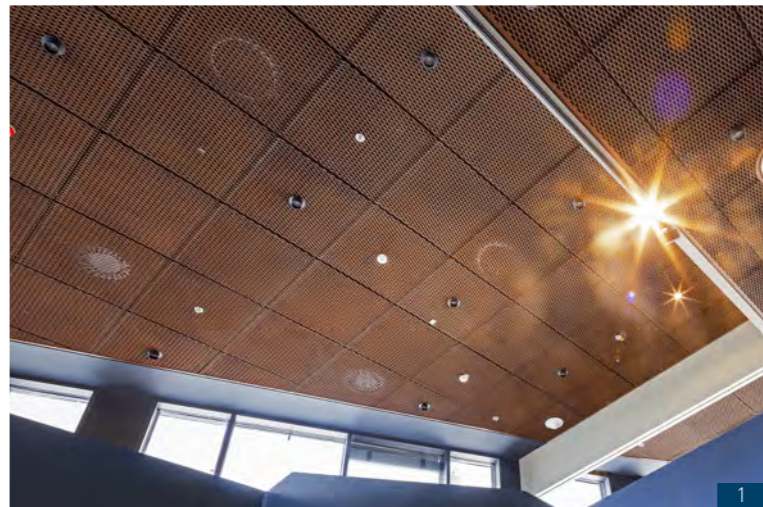
Architects

Vogl-Fernheim ZT-GmbH,  
 Innsbruck

# DETAILED SOLUTION WITH EXPANDED METAL

Our expanded metal ceilings make possible a huge variety of solutions – from different mesh sizes, tile formats and joint designs to creative colour schemes and numerous detailed solutions.

- 1 Sprinkler system, spot lights, fire detectors
- 2 Light fitting
- 3 Column; spots behind the expanded metal ceiling
- 4 Strip lights
- 5 Expanded metal apron
- 6 Lighting between tiles
- 7 Round light fittings
- 8 Suspended lights
- 9 Air swirl outlets
- 10 Printed expanded metal ceiling
- 11 Lights
- 12 Air swirl outlets, lights



Country 1000 m<sup>2</sup> Function

AT

2.3

耳

眼

**Uniformity**

Always doing something to the same measure creates uniformity and repeatability. During the process, it lends certainty and composure; aesthetically, it provides calmness. Being able to repeat something constantly is far from boring. It is an art in which the rule stands above the individual.

Country 1000 m<sup>2</sup> Function



Product

Acoustic and design ceiling

Mesh 22×12×2.0×1.5 mm

Colour RAL 9003

Hang-in system, DZ expanded metal

Project name




IST Austria,  
Klosterneuburg

Architects

Franz und Sue ZT GmbH +  
Maurer & Partner ZT GmbH,  
Vienna



Country 1000 m<sup>2</sup> Function

DE 3.3   

**Structure**

In a large building complex, in a hospital for instance, structure and order are the end-all and be-all. This is why we at Fural focus on it as well – beginning with the planning all the way to implementation, we work with structure and order at the highest levels.



Country 1000 m<sup>2</sup> Function



Product

Acoustic, fire protection and hygiene ceiling

Perforation Rg 2.5 - 16%

Colour RAL 9010

Swing-and-slide system F30, F90, SWING F0

Project name

SKL Clinical Centre, Lüneburg

Architects

a | sh sander, hofrichter architekten GmbH, Ludwigshafen/Rhine Ernst Architekten, Stuttgart



HEALTH





Country 1000 m<sup>2</sup> Function

PL

40.0



Product  
Acoustic ceiling  
Perforation Rv 1.6 - 20%  
Colour RAL 9006, 9007, 9010  
Clip-in system, lay-in system

Project name  
Rondo 1-B,  
Warsaw

Architects  
Skidmore, Owings & Merrill,  
Chicago





Middle school, Munich Moosach, Sturm+Viermetz Architekten

Acoustic walls from Fural not only control room acoustics, they also optimise the design of the entire room.

Thanks to their specific structure, the wall elements function as a broadband absorber and are thus perfect for regulating reverberation time and speech intelligibility.

**Field of application**

The wall cladding is suitable for the targeted and/or subsequent optimisation of room acoustics.

Applications are manifold: Schools, lecture halls or offices as well as public buildings and industrial plants can be upgraded with this system.

In combination with the "Colorprint" surface system, architects and planners have a wide range of application possibilities at their disposal. Whether as a stylistic element or full-surface wall cladding: Acoustic walls create a high-quality sense of space.

**Acoustic walls as a clip-in system**

Acoustic walls with a clip-in system are ideal for full-surface wall claddings and perfect for maximising the noise absorption surface. They can be implemented with a standard clip-in sub-structure, which makes them quite easy to install.

**Acoustic walls as a hang-in system**

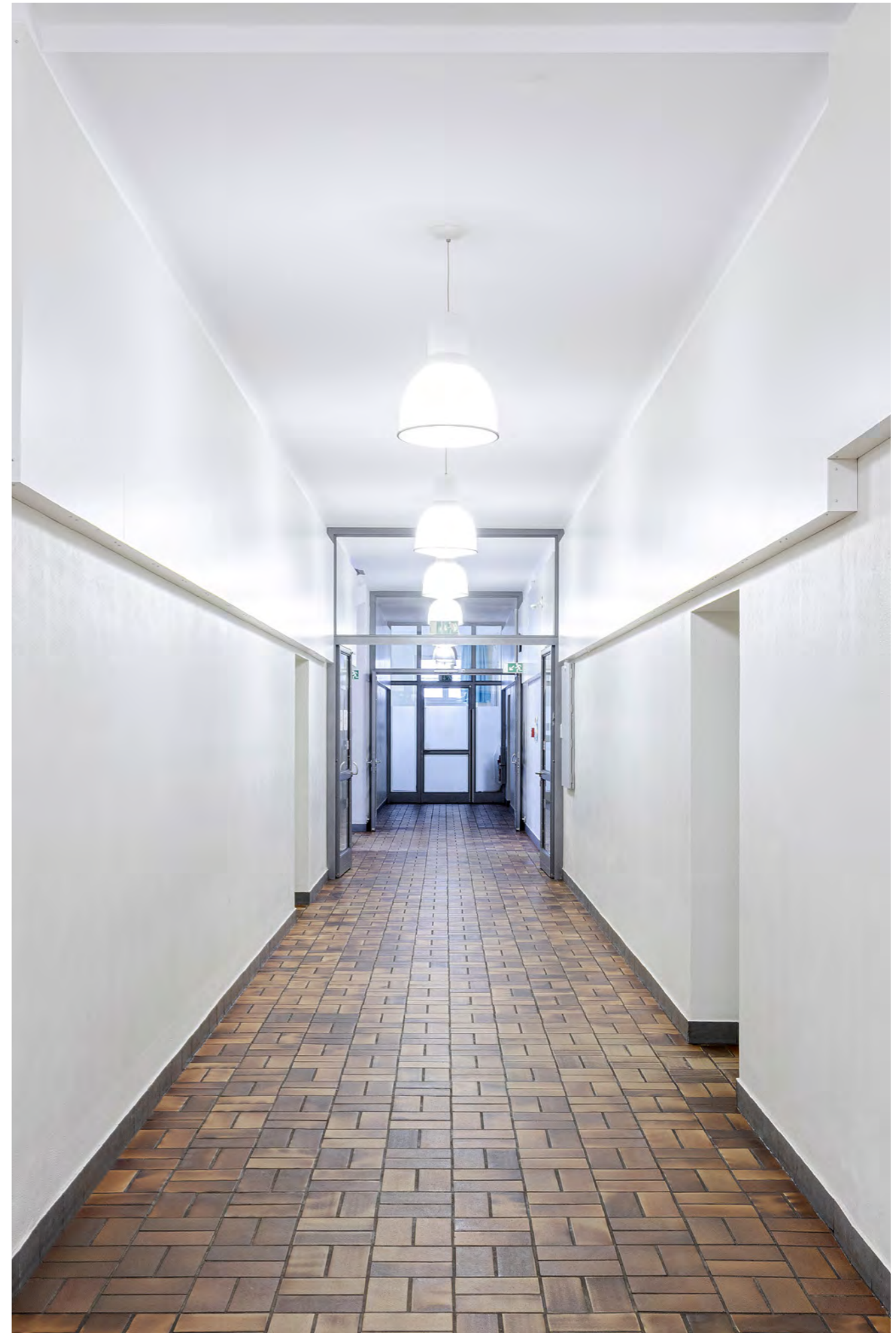
Wall claddings with a simple hang-in system are the ideal solution for targeted acoustic improvements. With partially inserted long-span tiles, subsequent measures can be taken. The system is ideal for quick and clean installation.

**L absorber – room border between wall and ceiling**

The L absorber also promises top-notch acoustics. The L-shaped absorber element consists of metal elements that are arranged perpendicular to one another in the room border between wall and ceiling.



**ACOUSTIC WALLS**



Middle school, Munich Moosach, Sturm+Viermetz Architekten

Country 1000 m<sup>2</sup> Function



**Life exists in movement**

Aristotle recognised this and underscored the importance of constant movement and improvement. Our ceilings are also continuously optimised and can be used in many ways: whether in gyms, in offices or hospitals. Fural Metalit Dipling is and will remain in movement with its metal ceilings!

Country 1000 m<sup>2</sup> Function



Product

Acoustic and design floating ceiling  
Perforation Rv 0.7 - 4%  
Colour RAL 9010  
Floating ceiling, Acoustic walls

Project name

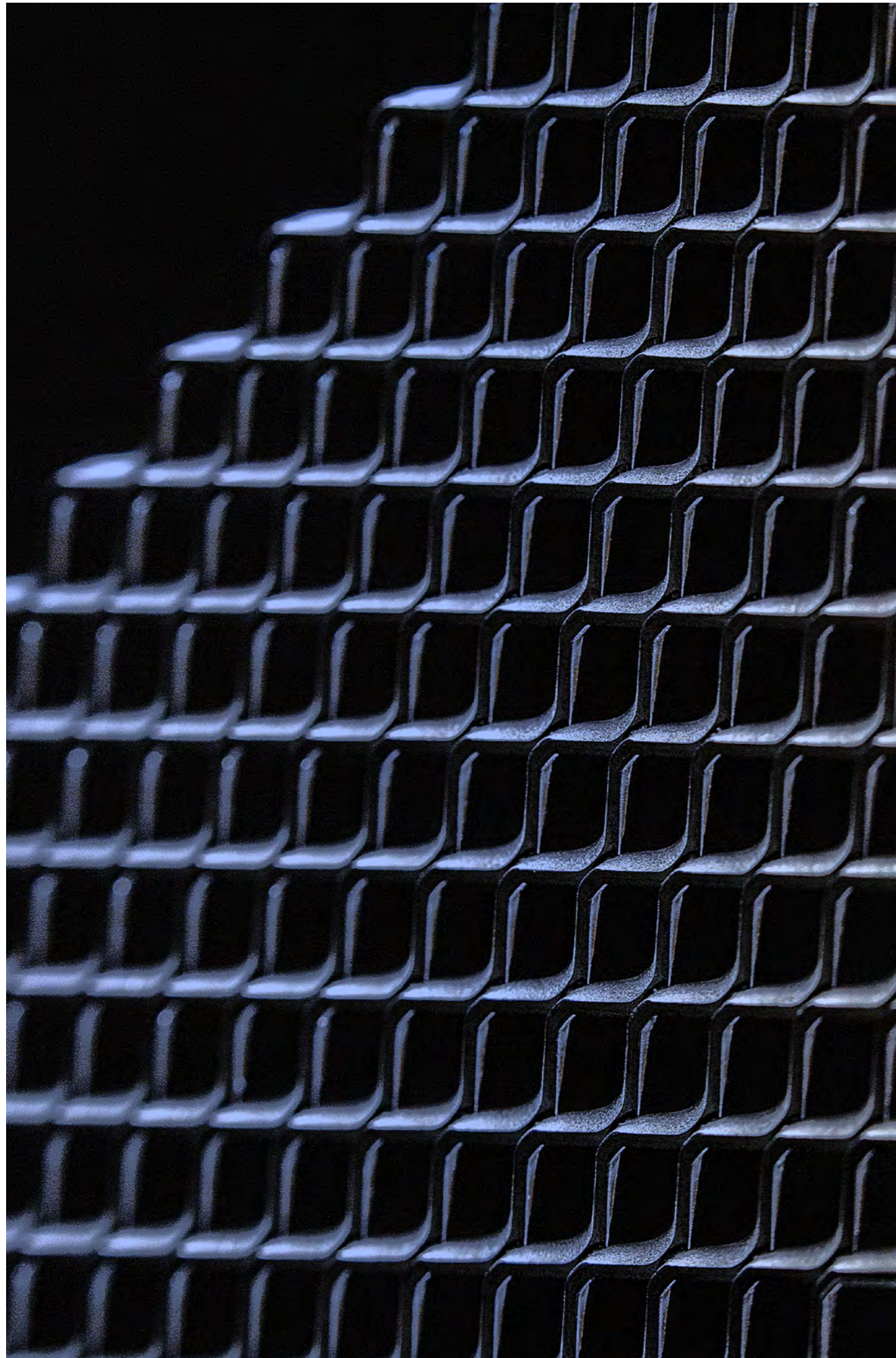
Middle school, Munich  
Moosach

Architects

Sturm+Viermetz Architekten,  
Munich



EDUCATION



## EXPANDED METAL

### "Expanded Metal Ceilings" brochure

Page

4-7 Intro

10-11 Mesh types

12-13 Tiles and joints

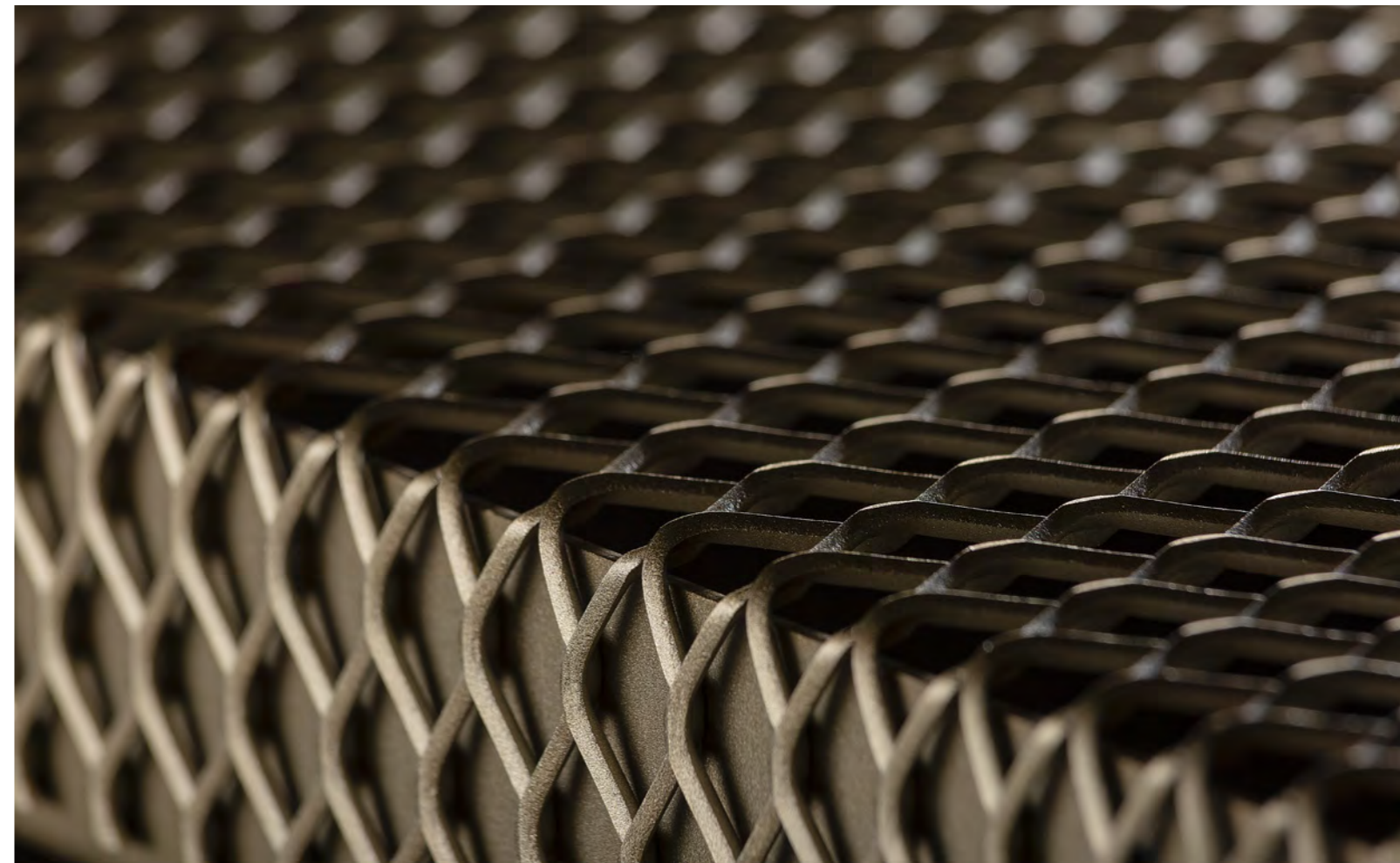
14-15 Systems

16-17 Wall connections

18-19 Built-in parts

22-23 Surfaces

For more information, please refer to the "Expanded Metal Ceilings" brochure and our website at: [www.fural.com/en/systems/expanded\\_metal/1324](http://www.fural.com/en/systems/expanded_metal/1324)



Country 1000 m<sup>2</sup> Function

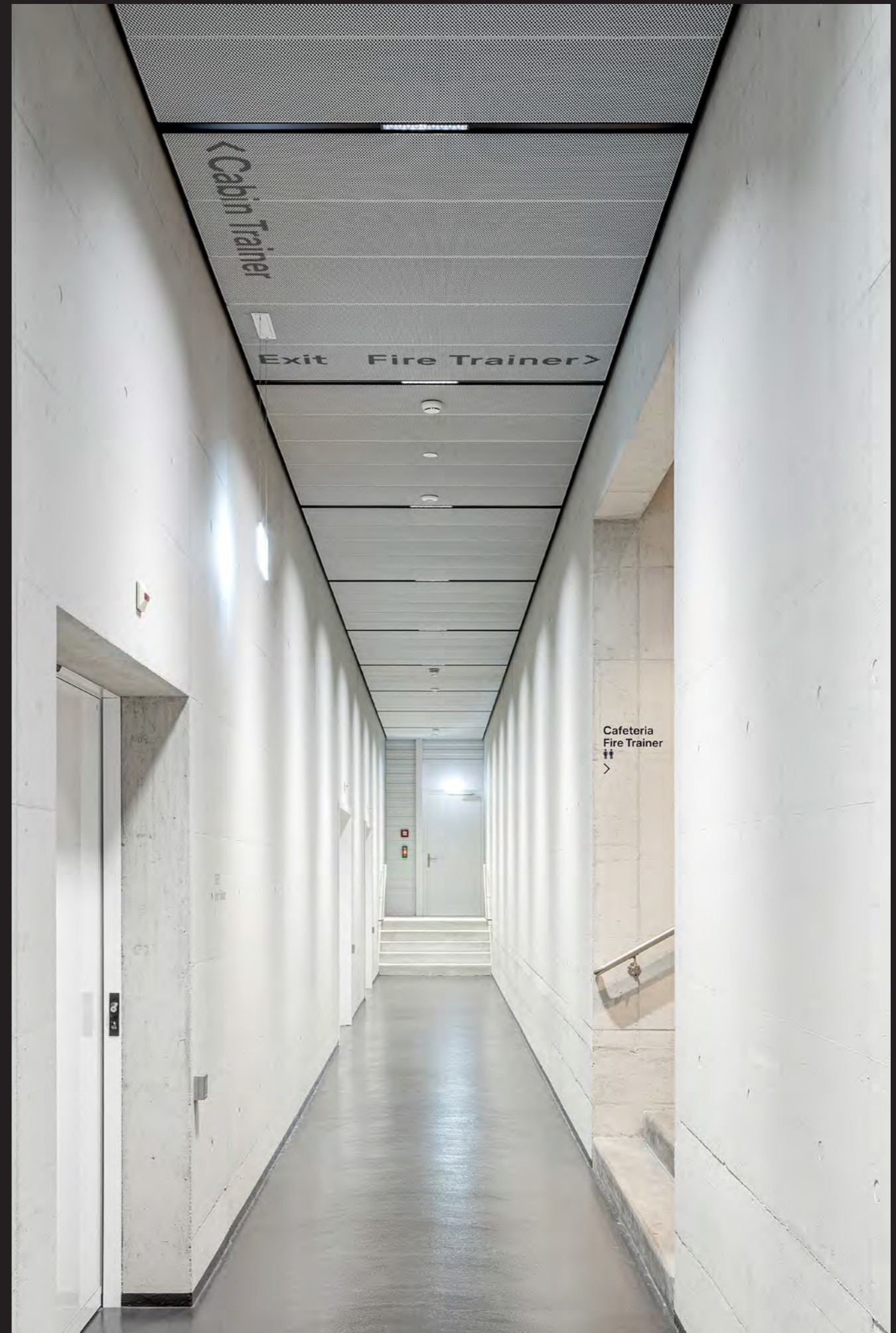
CH

2.0

?

**Winged**

Flying means movement in the medium of air. So it is fitting that our expanded metal ceilings also consist of air for the most part! The diamond-shaped openings help to absorb sound. Large parts of the control and orientation system of the building were also implemented in the air. The printing on our expanded metal tiles makes them highly visible information media. Everybody feels high up in the air with this accurately and highly aesthetically implemented interior design.



Country 1000m<sup>2</sup> Function



Product  
Acoustic ceiling  
Mesh 20x10x2x1.5 mm  
Colour RAL 9016, matt  
Expanded metal

Project name  
Lufthansa Aviation Training,  
Zurich

Architects  
Stücheli Architekten AG,  
Zurich

Country 1000 m Function

CH

0.3

?

!

Stylish

You might think metal ceilings make for a purely technical look – but that does not take a great deal into view. Our products and systems are definitely proving their value in top-notch interior design as well, in this hotel in Zurich, for instance. In its successfully eclectic style, this baffle ceiling is a calm and restrained team-mate. And in calmness, there is strength: The metal ceiling optimises the cooling and acoustics of the room. Wonderful how the rooms that are over 100 years old now shine in new splendour!



Country 1000 m Function



Product

Acoustic and cooling ceiling  
Perforation Rd 1.5 - 22% with border  
Colour RAL 8022  
Baffle

Project name

Hotel Ameron Zurich  
Bellerive au Lac

Architects

Monoplan AG,  
Zurich



PROJECT

Country 1000 m<sup>2</sup> Function

DE

0.08



**Artwork**

Our metal ceilings and walls can be printed in colour with the use of the Colorprint procedure. There are virtually no limits to the imagination. Materials such as stone or wood can be simulated in the surface; likewise, logos and lettering can be applied. Complex, large-format artwork can also be implemented. In the entrance hall of the Eckenberg High School, yellow on grey motifs are a delight to the eyes of both students and teachers. The effect of the soft-contrast implementation is reminiscent of high-quality tapestry.

Country 1000 m<sup>2</sup> Function



Product

Acoustic and design ceiling  
 Perforation Rg 0.7 - 4%  
 Colour RAL 9006, RAL 9016  
 Colorprint, RAL 5015  
 Lay-in system, Swing, KQK door,  
 KQK

Project name

Eckenberg High School,  
 Adelsheim


Architects

Ecker Architekten,  
 Buchen



EDUCATION

Country 1000 m<sup>2</sup> Function

DE 0.6 

**Hexagonal**

Elisenhof in Munich was built according to plans by the Munich architect Herbert Kochta in 1984. The upper floors house doctor's offices, law firms and other offices. Shops and restaurants are located on the upper floor down to the basement. Direct access to Munich's main train station, a spacious underground car park and not least the central location are aspects that make Elisenhof a top address in Munich. Since 2020, 4,500 diamond-shaped ceiling elements in a hexagonal grid form have provided a memorable eye-catcher.

Country 1000 m<sup>2</sup> Function



Product

Design ceiling

Smooth perforation

Colour Parzifal® light white

KGL tile, diamond

Hang-in system

Project name

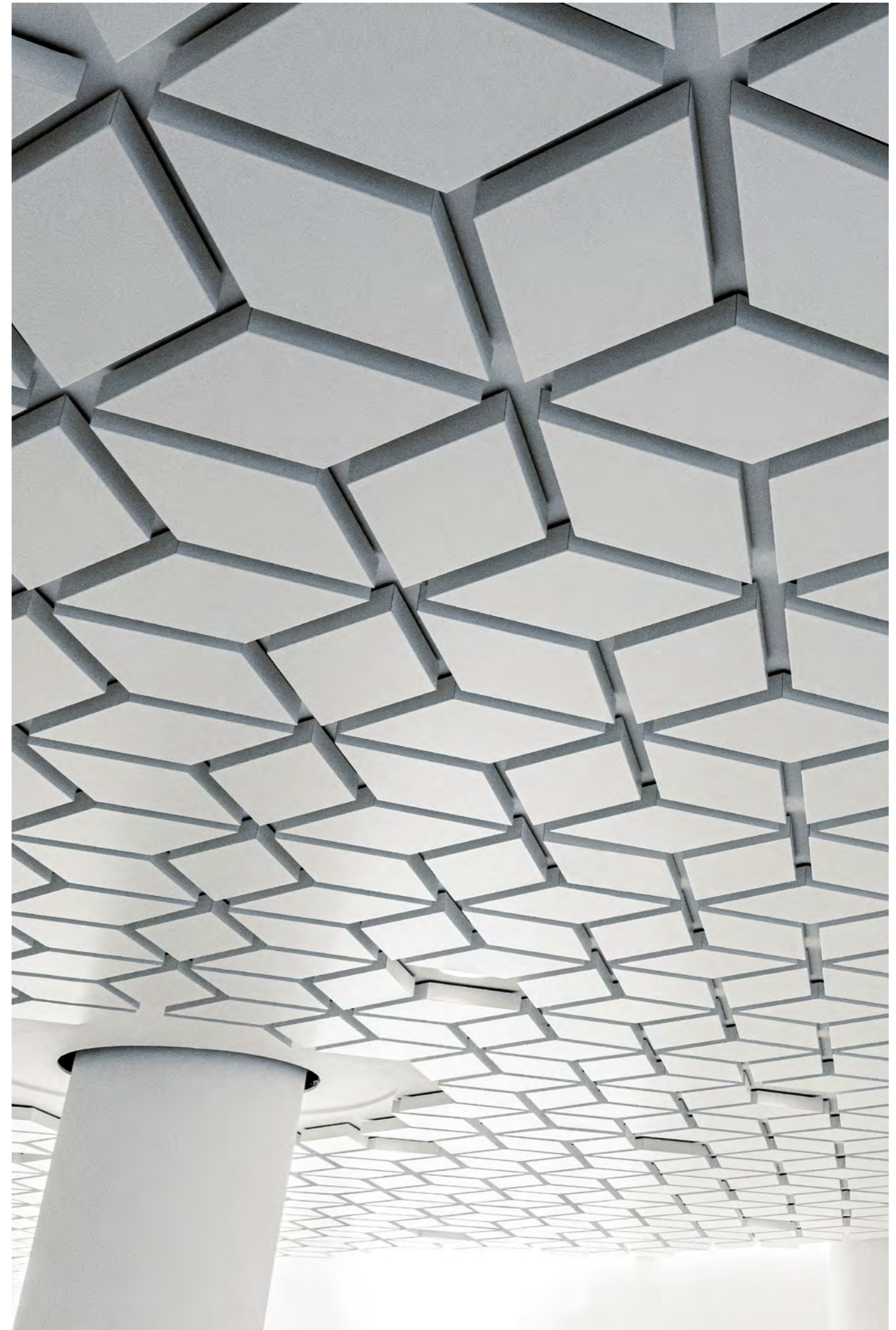
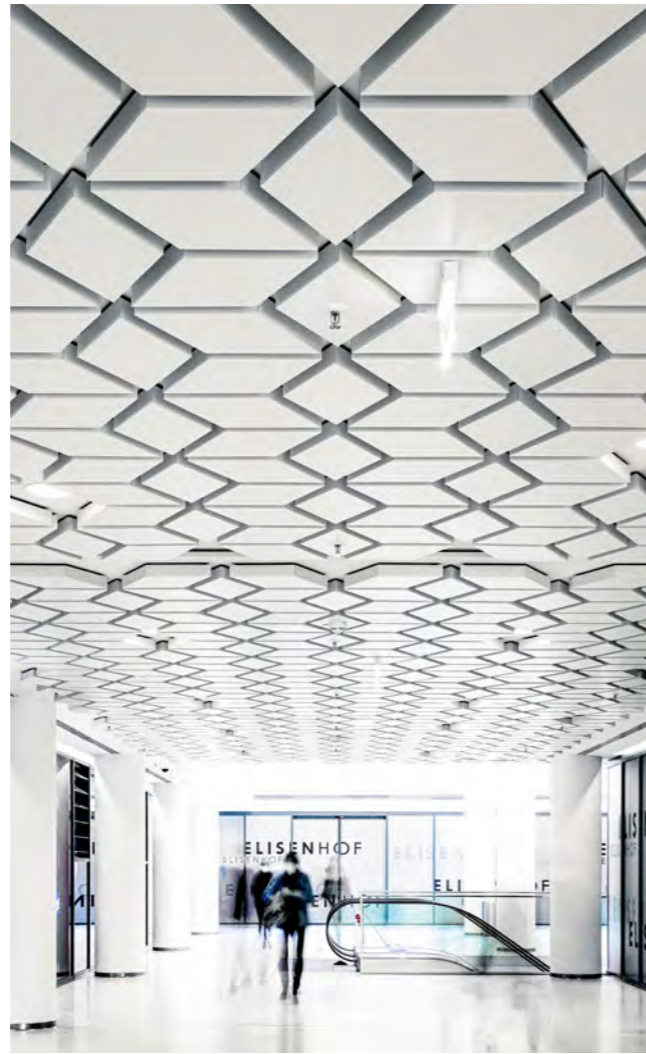
Elisenhof,

Munich

Architects

Office Group GmbH,

Munich



Country 1000 m<sup>2</sup> Function

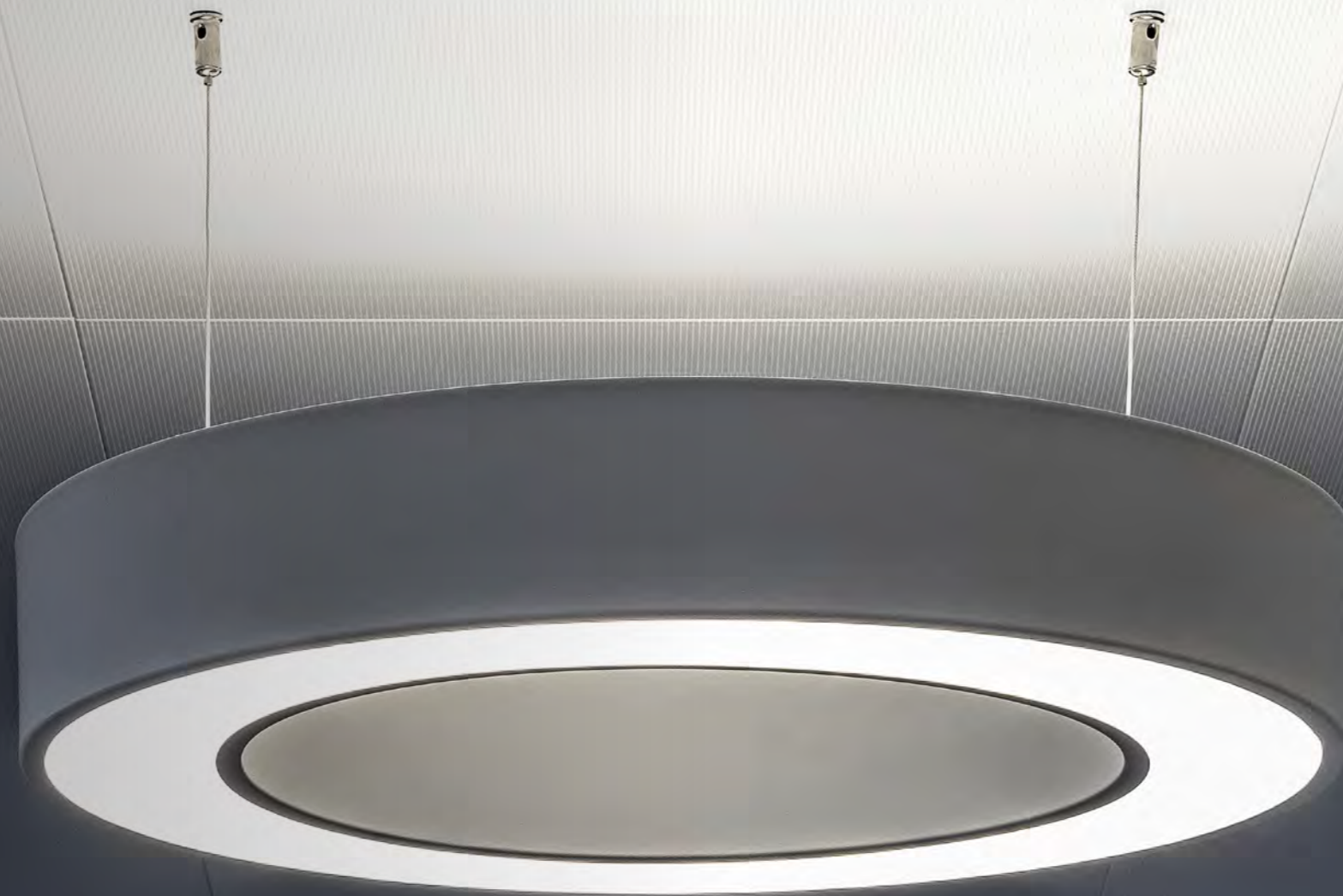
CH

0.4

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**Indirect**

Like landing spaceships, the lights are suspended below the metal ceiling tiles, projecting indirect light on surfaces powder-coated in matt white. It is exciting how different reflections blend into a new form. On the top, the reflection of the ring is visible, while broad and diffuse reflections are shown in the lower area. With the uniformity of the reflections and the lessening of brightness, the precision of our products and their installation becomes apparent.



Country 1000 m<sup>2</sup> Function



Product

Acoustic ceiling  
Perforation Rg 0.9 - 7%  
Colour RAL 9016, matt  
Hang-in system HT28 profile,  
Multi-part floating ceiling

Project name

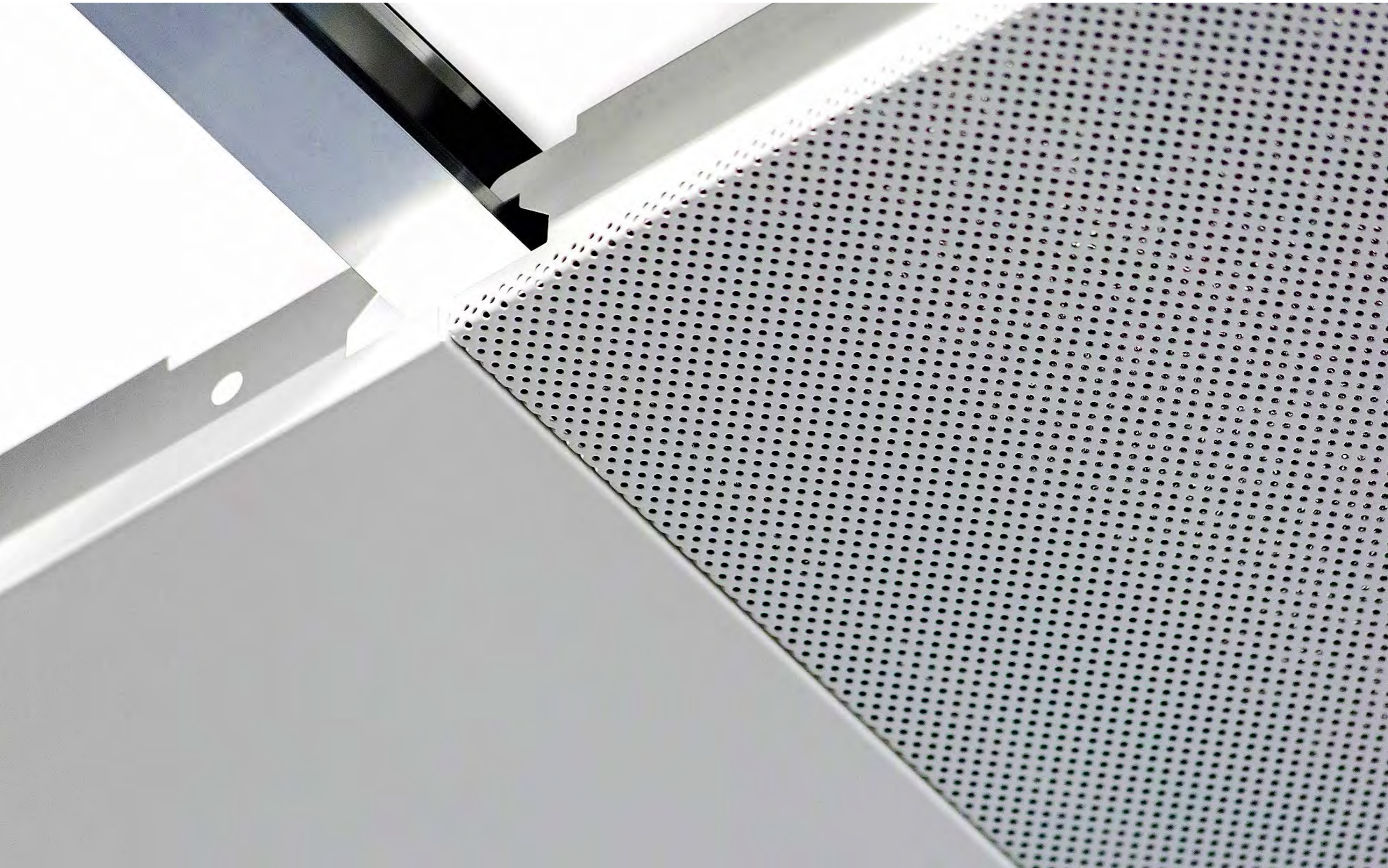
ADM Trusted Advisors,  
Zurich

Architects

Auf der Mauer Gruppe AG,  
Zurich



OFFICE





Country 1000 m<sup>2</sup> Function

IT

5.1

3

**Aperitivo**

Of course, you think of the colour when you hear the name of this liquor. Fantastic that it was possible to carry a surface design forward that epitomises a real zest for life during the renovation of the famous "Palazzo Campari" in Milan – a work by Ermenegildo and Eugenio Soncini from the 1960s. Today, the Morgan Stanley bank resides in the building.

Country 1000 m<sup>2</sup> Function



Product  
Acoustic ceiling  
Perforation Rv 1.6 - 20%  
Colour RAL 9010  
Strip grid

Project name  
La Serenissima  
(Morgan Stanley office),  
Milan

Architects  
Park Associati,  
Milan



OFFICE



Country 1000 m<sup>2</sup> Function

IT

60.0

?

OFFICE

**Crystalline**

In 1955, the New York-based architecture firm Pei Cobb Freed & Partners was founded with the participation of the architect I. M. Pei, who was awarded the Pritzker Prize in 1983. In many of his works, the student of Walter Gropius used glass and steel designs that have a crystalline effect or large triangulations, be it the pyramid in front of the Louvre in Paris or the Bank of China in Hong Kong. We are proud to have the honour of supplying 60,000 m<sup>2</sup> in metal ceilings for this project in Milan, which were especially adapted to the elliptical floor plans of the building.



Country 1000 m<sup>2</sup> Function



Product

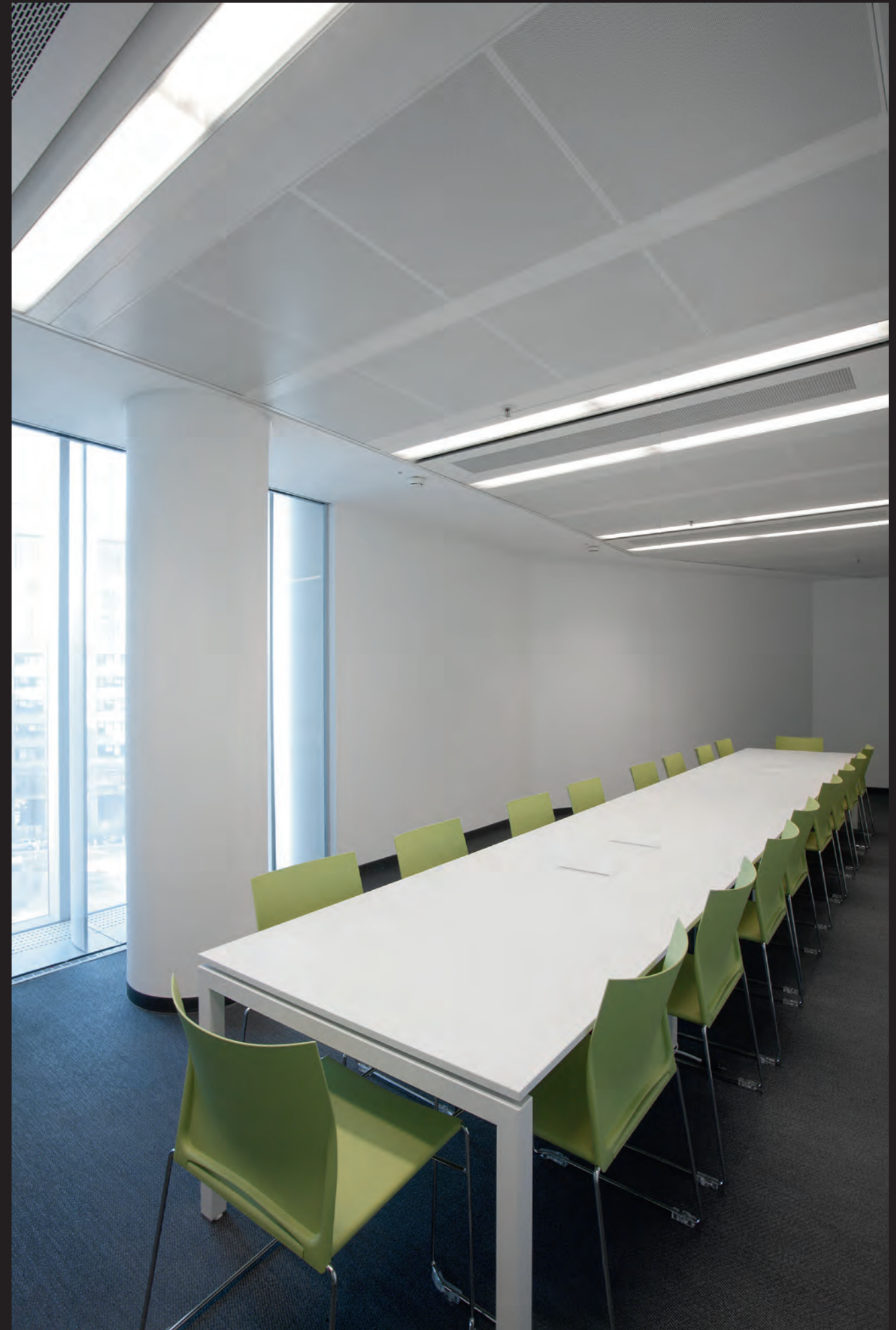
Acoustic ceiling  
Colour RAL 9010  
Strip grid

Project name

Palazzo Regione Lombardia,  
Milan

Architects

Pei Cobb Freed & Partners,  
New York



OFFICE

Country 1000 m<sup>2</sup> Function

DK

22.1



Free flow

An ideal learning flow can now be achieved in the generously sized and bright rooms of the Copenhagen International School. Our ceiling systems offer ideal conditions for it: In addition to an improvement in acoustics and the cooling of the rooms without drafts, our ceilings look great, which also helps to foster a favourable teaching and learning climate.



EDUCATION

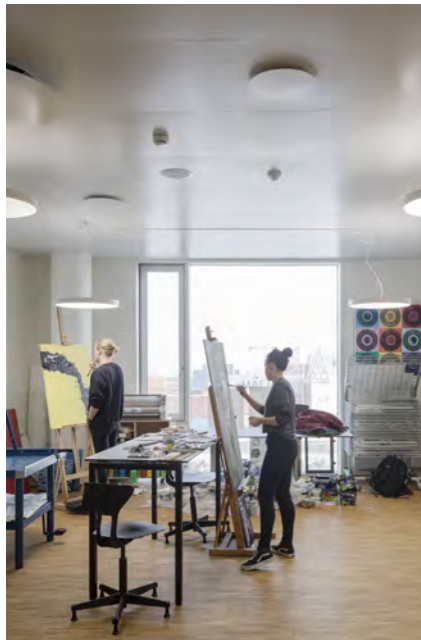
Country 1000 m<sup>2</sup> Function



Product  
 Acoustic, cooling and design ceiling  
 Perforation Rg 2.5 - 16%,  
 Rg 14.0 - 23%  
 Colour RAL 9016, RAL 9017  
 Clip-in system

Project name  
 CIS,  
 Copenhagen

Architects  
 C.F. Møller Architects,  
 Copenhagen



EDUCATION

Country 1000 m<sup>2</sup> Function

FR

18.0



Product  
Acoustic and cooling ceiling  
Perforation Rg 1.5 - 22%  
Colour RAL 9016  
Floating ceiling

Project name  
Palais de Justice,  
Paris

Architects  
Renzo Piano Building Workshop,  
Paris





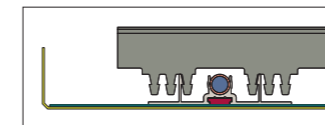
# HEATING AND COOLING



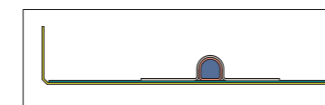
### Climate elements

In Austria, the following climate elements are manufactured by long-term and well-experienced partner companies and integrated into our products.

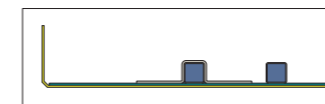
- Copper/aluminium systems with magnetic fixation



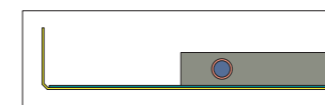
- Copper/aluminium systems with adhesive fixation



- Plastic/aluminium systems with magnetic fixation



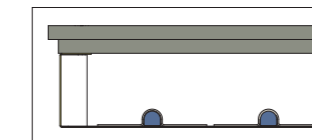
- Copper/graphite systems with adhesive fixation



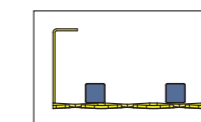
For more information please refer to our website at:  
[www.fural.com/en/metal\\_ceilings/cooling\\_and\\_heating/12](http://www.fural.com/en/metal_ceilings/cooling_and_heating/12)

### Fire protection ceiling and cooling

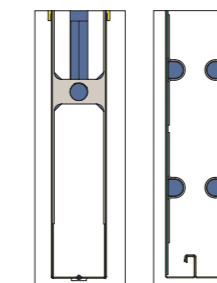
\*Cooling ceiling systems in the case of fire protection ceilings always require an expert opinion.



### Expanded metal ceiling and cooling

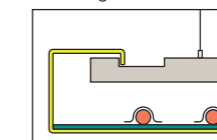


### Baffle ceiling and cooling

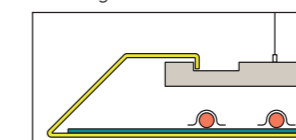


### Floating ceiling and cooling

90° angle



45° angle



(60° angle also available)

### We are a cool company!

Above all, it's the metal ceilings we produce that are cool. Because they make it possible to heat and cool rooms in a very simple way. Climate functions can be added and integrated into our metal ceilings according to the modular principle and be combined with other ceiling variants, e.g. acoustic ceilings.

### Why use metal for a cooling ceiling?

Metal is ideally suited as a conductive medium for heat and cold. Optimal temperature control is achieved on the basis of the radiation principle. Since our cooling ceilings work completely without air circulation, dust swirling is prevented and draft is avoided. During the pollen season, it is particularly important to ensure an agreeable cooling of the room – without being exposed to pollen. This is particularly relevant to school buildings, since more and more children suffer from allergies due to pollen in the air.

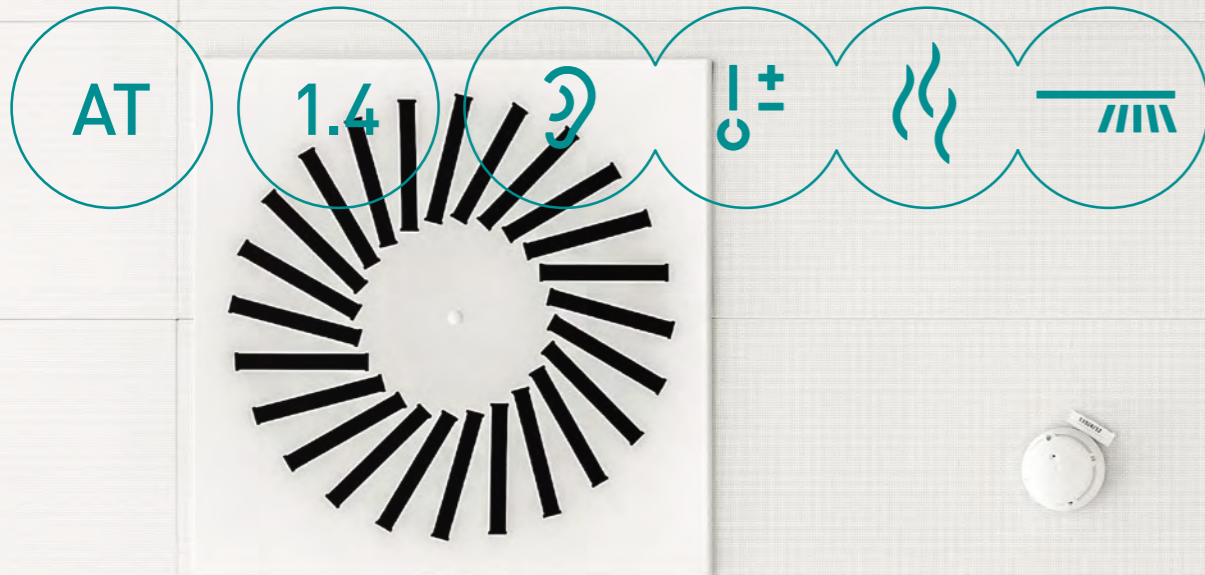
Cooling and heating ceilings with copper/aluminium or plastic systems can be implemented in various designs. Sustainability is also taken into account: Energy is saved, and costs are reduced.

### We test cooling ceilings

The efficiency of our cooling ceilings and walls is no accident. We test your individual projects in our own test laboratory and guarantee custom-tailored solutions for your projects in topmost quality.

Copper/aluminium register with magnetic fixing for heating and cooling, Zent-Frenger + Fural

Country 1000 m<sup>2</sup> Function



**Hygiene meets acoustics**

A hospital is a place for fostering health and recovery, therefore the noise factor plays a vital role alongside hygiene. With its metal ceilings, Fural has a concept that covers both: Metal ceilings without perforation prevent the accumulation of dust and are easy to clean and disinfect. Special acoustic ceilings dampen the noise level in frequently hectic operation theatres and patient rooms. The goal is to create a place where patients can recover at optimal conditions and get 100% healthy again.



HEALTH



HEALTH

Country 1000 m<sup>2</sup> Function



Product  
Acoustic, cooling, fire protection  
and hygiene ceiling  
Perforation Rv 0.7 - 4%, smooth  
Colour RAL 9010  
Swing-and-slide system EI 30,  
clip-in system

Project name  
Salzkammergut Hospital  
Vöcklabruck

Architects  
Urban Zesch Architekten,  
Vienna



Country 1000 m<sup>2</sup> Function

AT 5.0

**Patient rooms**

Patients in hospitals spend most of their time in the patient rooms, while the stay in rooms for operations, treatment and therapy is usually quite short. This is why it is important to use Fural Metalit Dipling ceilings in patient rooms for contemporary hospital buildings. Acoustic, thermal, hygienic and aesthetic advantages can also be effectively brought to bear in these rooms.

Country 1000 m<sup>2</sup> Function



Product

Acoustic and hygiene ceiling  
 Perforation Rv 2.5 - 16%, smooth  
 Colour RAL 9010  
 Lay-in system, clip-in system,  
 Swing

Project name

Salzburg State Hospitals  
 University Hospital of PMU

Architects

Hinterwirth,  
 Gmunden



HEALTH



Country 1000 m<sup>2</sup> Function

AT 6.7

**Hospital acoustics**

Operation theatres, intensive care units, anaesthetic recovery rooms, labs and patient rooms today are full of technical devices whose operation can result in disruptive background noise levels. Acoustic optimisation of these rooms can be achieved easier via the ceiling than via the walls, floors or built-in components. Metal ceiling systems from Fural Metalit Dipling are the ideal choice for this.



Country 1000 m<sup>2</sup> Function



Product

Acoustic, fire protection and hygiene ceiling  
Perforation Rv 2.5 - 16%, smooth  
Colour RAL 9010, RAL 7016  
Swing-and-slide system EI 30, clip-in system

Project name

State Hospital Hall,  
Tyrol

Architects

Hinterwirth,  
Gmunden



HEALTH



Country 1000 m<sup>2</sup> Function

CH

6.9



## Wir wissen weiter.

### Knowledge

Quality and effectiveness in hospitals can be constantly optimised through integrative knowledge management. That is our attitude at Fural Metalit Dipling as well and as a result, we improve our processes continuously. As the manufacturer of perfect metal ceilings, we know what to do and are glad to realise your project together with you.



Country 1000 m<sup>2</sup> Function



Product

Acoustic, fire protection and hygiene ceiling  
 Perforation Rg 0.7 - 1%, Rg 0.7 - 4%  
 Colour RAL 9016, NCS S0500-N  
 Clip-in system, Swing-and-slide system EI 30

Project name

USZ, module construction SUED 2, Zurich

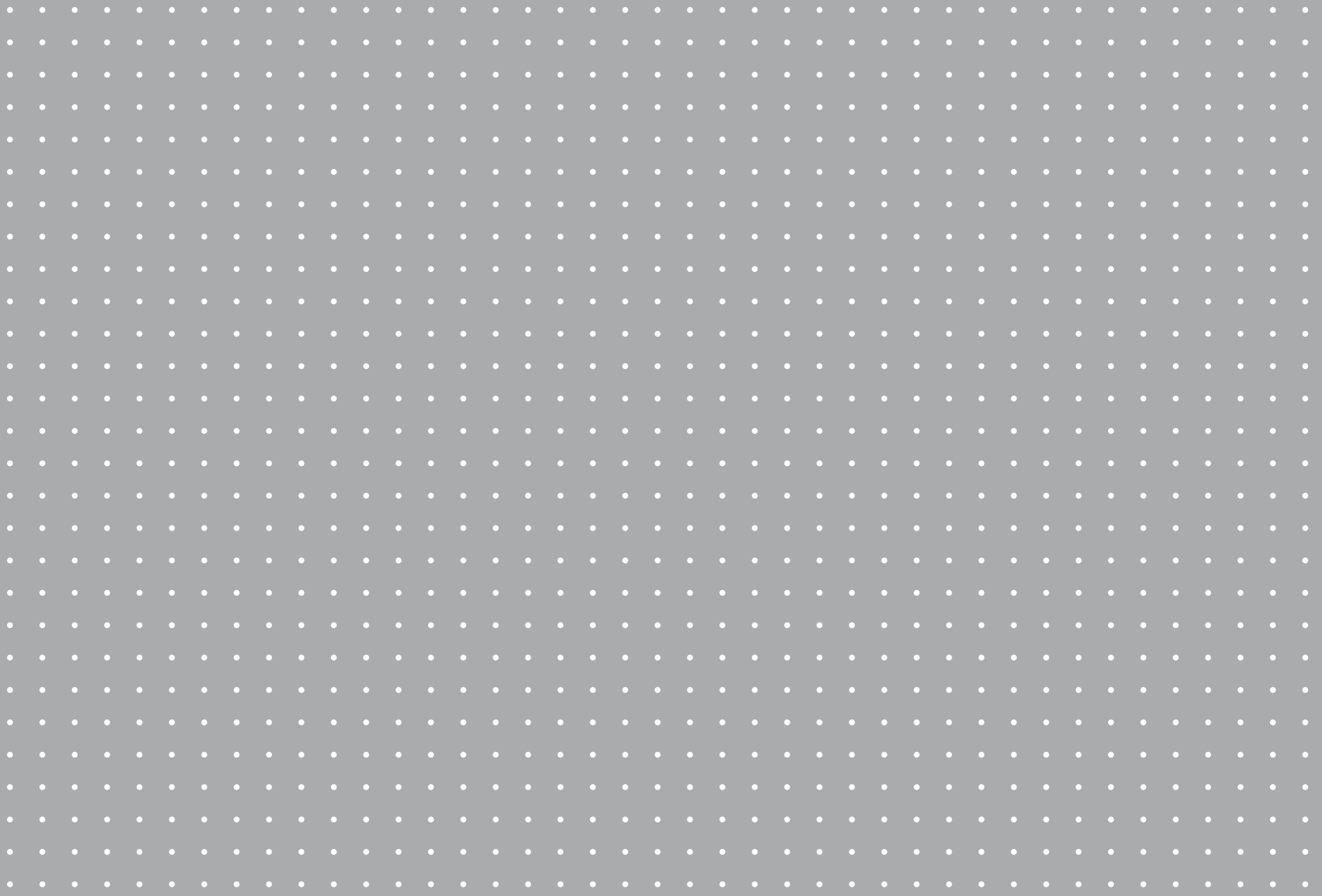
Architects

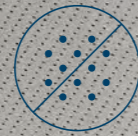
hemmi fayet architekten Zurich



HEALTH

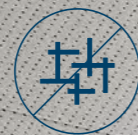






**Dust-free**

Dust is a so-called "dry" carrier of infections, in which viruses and bacteria spread. Dust can also be deposited in mucous membranes and the respiratory tract. This is why it is vital to avoid dust.



**Fibre-free**

Fibres are also "dry" carriers of infection. Since fibres can enter the body through the respiratory tract and skin, it is essential to avoid fibres – and not only those of a risky type.



**Mould-free**

Mould fungi evolve in a humid and warm environment. They secrete substances that can be harmful to humans, either indirectly through the air or by direct contact. Mould must be avoided.



**Disinfection**

In sensitive environments such as hospitals, doctor's offices, schools and public institutions, hazardous environments can be created through use and operation. It must be possible to disinfect surfaces in such buildings.



**No moisture absorption**

Components that can absorb moisture often turn into a breeding ground for microorganisms when heated. Subsequently, the surfaces are hard to disinfect and dry. Metal ceilings by contrast are especially easy to clean and do not absorb moisture.



**Hygienic heating and cooling**

Thanks to the high level of thermal conductivity of metal, our ceilings are excellently suited for heating and cooling. Since our systems work via radiation instead of air transport, they are also especially hygienic.



**Serviceability**

Our ceilings can be quickly and easily opened nearly everywhere. This guarantees easy and thorough servicing not only of the ceiling itself but of the ceiling cavity and the built-in components in it as well.



**Wet cleaning**

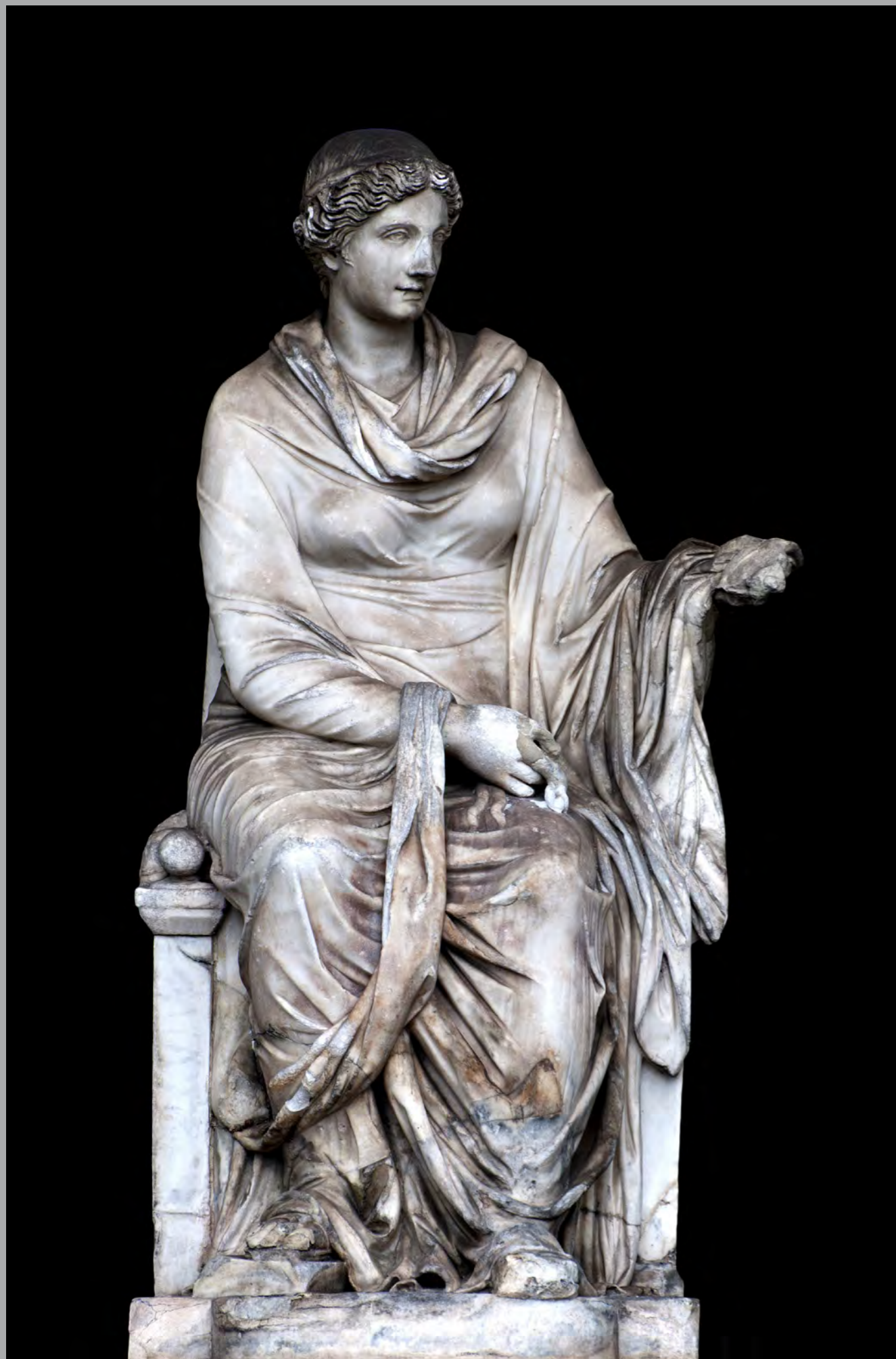
With water as a solvent and surfactants, dirt can be removed far easier than by dry cleaning. Important here is that the surfaces can be rinsed with clean water – metal ceiling systems allow for this, too.



**Interior air quality**

Our metal ceiling systems do not release any relevant quantities of VOCs, even taking into account the paints and adhesives (LCI values, evaluation according to AgBB evaluation scheme). Independent testing institutes have certified this.

**WE ARE HYGIENE**



## HISTORY

### Beginning

Health is a basic human need. Attention to health issues is useful for both self-preservation and the preservation of the species and constitutes an aspect of the effort to improve living.

Even at early stages of development, people were aware that the environment was fraught with risks and that a functioning, healthy society needs certain rules and regulations.

Greek mythology also reflects the importance of health: The goddess Hygieia, for example, was venerated as the daughter – sometimes the wife – of Asclepius, god of the art of healing. Her sister Panacea was considered the goddess of medicine and magic.

### Hygiene and community

Hygiene that only relates to the individual or to specific areas will fail because hygiene is a complex and cross-linked communal task.

The so-called “Neolithic Revolution” that began at the end of the last Ice Age and brought animal husbandry, farming and stockpiling and developed sedentariness led to an exponential population development with very dense and

lasting settlements that still has not come to an end today. In the cities that developed, inhabitants competed for water, food and space and at the same time generated a large amount of waste and faecal matter that the “city” system was no longer able to absorb and process on its own.

### The great epidemics

Up to the end of World War I, the cities of Europe were repeatedly hit at frequent intervals by epidemics: Plague, cholera, typhoid fever, smallpox, flu, malaria, yellow fever and tuberculosis were the order of the day. Many epidemics have been defeated today; the focus now is on HIV, Ebola, SARS and COVID-19.

### Initial hygiene strategies in the 19<sup>th</sup> century

With the onset of the Industrial Revolution in Europe starting in the middle of 18<sup>th</sup> century, urban settlements were once more exposed to a substantially heightened usage pressure. Although the benefits of a continuous sewage system, separated from the drinking water supply, were already known in

ancient times, such systems were implemented very late (Vienna until 1739, Hamburg from 1842, Munich from 1862, London as of 1856, Berlin 1856–1940). Individuals such as the Munich-based Max von Pettenkofer (1818–1901), Clausthal-based Heinrich Hermann Robert Koch (1843–1910) and the Frenchman Louis Pasteur (1822–1895) provided the scientific fundamentals of bacteriology and microbiology. Engineers such as Joseph Bazalgette (1819–1891) and Isambard Kingdom Brunel (1806–1859) in Great Britain, Arnold Zenetti (1824–1891) in Munich, William Lindley (1808–1900) in Hamburg and Marie François Eugène Belgrand (1810–1878) in Paris were responsible for planning and implementing modern-age sewage systems.

### Early 20<sup>th</sup> century

To educate the population, so-called “Hygiene Museums” came into being in many cities (1885 at the Institute of Hygiene of the Charité in Berlin, Dresden in 1912), or exhibitions on the subject were presented.

The aim was to improve the precarious living conditions in many districts, with apartments without running water or clean kitchens and sewage connections.

### Modern hospital construction

In tandem with industrialisation, the meaning of hospitals shifted from hospice to modern healing facilities. It was accompanied by a new dividing up of care duties in the society. Diagnostics and therapy became the focus of attention as well as research and teaching; healthcare became a government task based on statutory health insurance.

### Furniture and building structures made of metal

Early on, hospital and surgery furnishings were made of painted, enamelled or chrome-plated sheet metal because they were more hygienic.

Today, often stainless steel metal sheets are used. In architecture as well, steel sheets have become indispensable for both interior and exterior applications.

# A recommendation of the Advisory Centre for Hygiene: Metal ceilings from Fural Metalit Dipling

## Hygiene – statutory requirements for hospitals

Since for us quality starts at the foundation, Fural banks on precise planning to meet the requirements of a well-thought-out hygiene concept. Statutory requirements that are quite strict and must be complied with constitute the basis for all buildings and conversions. Because according to the law both in Austria and in Germany, it is mandatory to involve hospital hygienists in all hospital construction projects. In some German federal states, separate hygiene reports must be presented before construction begins.

The German Advisory Centre for Hygiene (BZH GmbH) recommends, in particular, the Fural metal fire protection tiles with the swing-and-slide system EI 30 (F30A)/EI 90 (F90AB) and the square tiles or long-span panel clip-on systems as acoustic ceilings with fleece inlay in operation theatres and all other areas of patient care. Directly above the instrument table, an unperforated ceiling surface is preferable because it minimises unnecessary dust deposits.

## Future topic: Hygiene and a germ-free environment

In hygiene-sensitive buildings in particular, hospitals for example, cleanliness and sterility take top priority.

To ensure this, Fural metal ceilings deliver the necessary conditions.

Thanks to their special design, the metal ceilings not only prevent the accumulation of dust particles but also ensure easy cleaning of the surfaces. The plaster board of our fire protection tiles behind the ceiling remains completely closed, so dust has no possibility to accumulate. The metal ceilings also enable ideal disinfection. Additional antibacterial coating is therefore no longer necessary. In general, a wide range of different agents is suitable for disinfection.

Moreover, our special ventilation ceilings with HEPA filters offer ideal conditions for a low level of particle intake and foster perfect air exchange.

## Acoustics and hygiene in patient rooms and operating theatres

Because a hospital is also a place for fostering health and regeneration, the noise factor plays a vital role in addition to hygiene; not least because sometimes it gets a bit hectic and loud in an operating room. Special acoustic ceilings are also needed in rooms where patients are staying. The goal is to create a place where they can get better under optimal conditions and recover completely.

According to the expert opinion of the German Advisory Centre for Hygiene, at the centre of the operating area (operating table, instrument table), a metal ceiling without perforation should be selected to ensure a closed surface. Whereas in the bordering areas, a metal ceiling with perforation can also be used. The acoustic ceilings fundamentally counteract any noise pollution caused by the devices used. This not only achieves better room acoustics but also improves the capacity for concentration of employees.

## The eye decides: What's easier to clean? Metal, plaster or mineral fibre?

As mentioned above, Austrian and German law prescribes that hospital hygienists must always be included when constructing or converting a building. In the German federal states of Berlin, Brandenburg, Hesse and Saarland, hygiene reports must also be presented before construction begins.

For daily cleaning in hospitals, hygiene plans are written that stipulate how often surfaces must be disinfected. Again, the surfaces of our ceilings are perfect for easily wiping away contaminants and for disinfecting.

Coloured disinfectants can also be easily cleaned off metal ceilings. A plaster ceiling, by contrast, would absorb the orange colour.

## Cleaning plans versus antibacterial coating

Frequently touched surfaces such as door handles or railings must be disinfected at regular intervals. Since ceilings are not exposed to daily contact, no special antibacterial coating is necessary. In the event that secretions or excretions get to the ceiling, they can be easily wiped away, and the surfaces can be disinfected again.

In addition, hygiene plans prescribe regular disinfection of all surfaces, including the ceiling.

*"The metal fire protection panels – folding system EI 30 (F30A)/EI 90 (F90AB) and square panels – or long-span panel clamping system can be used in the corridor area of hospitals and other publicly accessible areas after checking the documents. From the point of view of hospital hygiene, the closed ceiling variant should be prioritised, i.e. ceiling elements without fire protection equipment and without perforation. They can therefore be used in all areas of patient care (including operating theatres) in a hospital", is the conclusion of the German Advisory Centre for Hygiene.*



# THE CONCEPT OF HYGIENE

## Comprehensive

While in common parlance, "hygiene" is used as a synonym for purity and cleanliness, the term actually comprises all measures to maintain, strengthen and improve the health and well-being of the individual and the society.

## Avoidance

Hygiene is a general strategy of avoidance, whose principles may also be applied to other areas. Bodily hygiene, sexual hygiene, food hygiene and mental hygiene are terms in use.

## Human-centred building

We want for you to feel well and be comfortable in buildings equipped with our systems and products. Human beings with their wants and needs take centre stage for us.

## Strategy levels

In relation to classical infectious diseases, four strategic areas are distinguished:

- 1 Avoidance of infection reservoirs
- 2 Avoidance of releases from infection reservoirs
- 3 Avoidance of spreading through the air and contact
- 4 Protection of potential entry points to the human body
  - Through the skin (percutaneous)
  - Through the mucous membranes (permucosal)
  - Through the respiratory system (pulmonary)
  - Through the urinary tract (urogenital)
  - Through the genitals (genital)

With our hygienically well-thought-out products, we find ourselves at level 1 and level 2. For one, we do not give infection reservoirs a chance; secondly, our metal ceilings and walls do not emit any critical substances into the environment.

## Technical construction hygiene

This term covers all measures to maintain and foster the health and well-being of people in buildings.

The factors affecting people in relation to buildings are manifold:

- Ambient climate
- Emissions in and into the surroundings
- Contaminated soil
- Radioactivity
- Thermal conditions (heating, cooling, ventilation)
- Electromagnetic conditions (light, radio, electrosmog, electrostatic charges)
- Acoustic conditions (sound, vibrations)
- Chemical conditions



## RISKS AND BENEFITS

### Risk assessment

For us as a manufacturer of metal ceilings and walls, both infection-related aspects and all other factors affecting humans are important with regard to our products and systems.

When assessing a potential risk of infection or contamination, four questions must be asked:

- 1 Which surfaces come in contact with the hands, skin and mucous membranes?  
In the case of ceilings, this can be virtually ruled out for the usual inhabitants, users or visitors. Only acoustic walls in the touching range, e.g. in schools, must be taken in consideration for this group. Otherwise, only the installation and service personnel have contact with the surfaces.
- 2 Is the contact direct or through the air? Metal ceilings and walls do not release substances into the air. So any contact – if at all – is by direct touching.
- 3 Is there any indirect contact, e.g. through dirt, dust or fibres? Metal ceilings and walls can be cleaned and disinfected easily and effectively in case of soiling. Our products release no fibres or dust.
- 4 How large is the dose? Due to the low direct contact, the non-existent release of harmful substances and the good cleanability and serviceability of our products, any possible doses remain in a non-critical range.

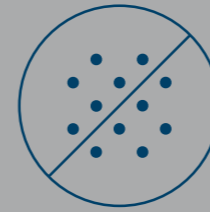
### Critical areas with regard to ceiling systems

- In addition to the visible surface of ceilings, the ceiling cavity in modern architecture must be seen as a critical area. However, unlike other products, our metal ceiling systems facilitate easy cleaning and servicing at any point. This is a significant advantage in long-term operation.
- Heating systems can also be a location for dirt and contamination, especially hot air heating systems. Our heating and cooling systems are based on closed water circuits and the radiation principle, though.
- Ventilation outlets in ceilings are areas that collect dirt easily and may also contaminate the surrounding areas of the ceiling. They must be regularly inspected and professionally cleaned. This applies to systems for controlling the room air, for instance, and adjacent areas according to DIN 6022.
- Around the area of integrated lighting systems, infection reservoirs may form as well, owing to heat and the condensation of moisture. The regular cleaning of light fixtures, mirror louvres, reflectors, glass and housings is therefore important in a consistent hygiene concept. The frameless, flush-mounted system lights from Fural offer clear advantages here.

### Advantages of metal ceilings

This all means that the hygiene risk arising from metal ceilings and walls can be rated as very low. If contaminations occur, they are mostly caused by other components. Owing to their closed and hard surface, metal ceilings are easy to clean and, if required, to disinfect, so contamination can be easily removed. Because metal ceiling systems from Fural Metalit Dipling can be so easily serviced and opened, the inside of the ceiling and the ceiling cavity can be easily integrated in a consistent hygiene concept.





## DUST-FREE

### Formation of dust

The term "dust" refers to very small particles of a size between 0.1 µm and 100 µm. They can have different origins and are dispersed in gases such as the air. The particles are formed:

- Through the erosion of solid materials in physical or hygric processes
- Through manual or mechanical processing of materials
- Through the conversion of gas to particles
- Through biological processes, e.g. the formation of pollen

### House dust

House dust is formed from inorganic and organic substances. Skin scales and hair as well as living and dead house dust mites, their faeces and plant parts are organic. Grit or eroded rock components, e.g. soot, make up the inorganic portion.

### The biogenic effect of dust

Dust can have a harmful effect on health in many different ways. For one, by absorption into the body via the respiratory tract (inhalable or alveolenic dust), resulting in silicosis, lung cancer and cancer of the nasal mucous membranes; secondly, due to toxic components of the dust such as mercury, chromium or lead.

### Dust and microorganisms

Microorganisms (bacteria, fungi, parasites, protozoa and viruses) require nutrients, moisture and a certain amount of heat to survive. The dust that is normally present in buildings provides sufficient nutrients. The moisture from condensation, water ingress and improper cleaning also suffices for them to grow. And the heat prevailing inside does the rest. The majority of all microorganisms are useful or not harmful to humans. But the proliferation of pathogenic microorganisms is critical.

### Total viable count

The total viable count (TVC) is important to determine the degree of contamination of a surface or an object. It describes how many bacteria or fungi are formed on a standardised breeding ground within 48 hours under active breeding.

### Ability to infect surfaces

Virulence – i.e. the ability to infect – of surfaces describes the pathogenicity of surfaces. How do infection reservoirs form on surfaces? The more moisture a building material can absorb, the more nutrients it contains or are accumulated on it and the harder it is to clean and disinfect its surfaces, the greater the potential virulence of such surfaces. Compared with mineral materials, the painted sheet metal we use turn out excellently in this respect.

### Avoiding dust

- 1 The formation of dust must be avoided to the greatest possible extent. Our products give dust no opportunity to adhere to them; they are also installed completely dust-free.
- 2 Our materials do not produce dust when used, e.g. through abrasion or erosion.
- 3 External dust adhering to our painted metal surfaces can be easily caught on the spot by wiping or by vacuuming.

### Occupational health and safety on the construction site

Construction dust, i.e. dust generated or released in the construction process, is a huge problem for people working on the construction site as well as for the environment. Since 2019, the German Technical Rule for Hazardous Substances 504 stipulates that the air at construction sites is not allowed to contain more than a maximum of 1.25 mg/m<sup>3</sup> of so-called E and A dusts. Previously, the limit value was 3.0 mg/m<sup>3</sup>.

### We are dust-free

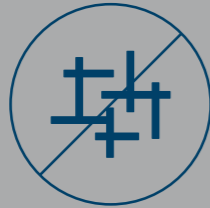
We are delighted that we can contribute to the reduction of dust on building projects with our top-quality product. Later users and residents also benefit from it.

Dust reduction constitutes a vital contribution to technical hygiene in construction.

Nor are any dusts produced by metal ceilings from Fural Metalit Dipling during operation: not when servicing the ceiling cavity nor during cleaning and disinfection nor through erosion.







## FIBRE-FREE

### Fibres

Fibres are elongated units whose length is at least 3 times as large as their diameter.

### Panels made of artificial mineral fibres

Panels made of artificial mineral fibres are frequently used as wall and ceiling panels in interior construction as well as for sound, fire and heat insulation. Until 1997 in Germany, the manufacture of mineral fibre panels containing fibres that are considered carcinogenic was still permitted. As of 2000, manufacturers switched to the use of non-hazardous, bio-soluble fibres.

### Respirability

What can be problematic with respect to fibres is the so-called "respirability". As of a particle size of  $\leq 2.5 \mu\text{m}$ , experts speak of respirability and fine dust. Due to its small size, fine dust can penetrate deep into the respiratory tract and stick there.

### Biosolubility

The longer fibres remain in the human body, the more bioresistant they are and the higher their carcinogenicity index. The less bioresistant they are, i.e. the more biosoluble, the shorter and less critical contact with them is.

### Health problems caused by fibres

In addition to cancer, fibres can cause eye irritation, allergies and itching as well as respiratory tract diseases.

### Mineral fibre panels at Fural

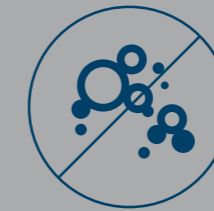
Fural also uses mineral fibre panels in ceiling tiles for further acoustic insulation. However, they are always sealed on all sides with a black light-density polyethylene cover. This solution is dust-free and has a positive effect on the quality of the room air.

It is important to us for our products not to release any fibres into the environment even after long use.

### Goal

The goal is to achieve interior rooms that are completely free of fibres.





## MOULD-FREE

### How does mould develop?

Since mould spores are transmitted via the air, mould can occur everywhere. To avoid mould formation, it is important to prevent the emergence of mould-promoting environments.

### What kind of environment does mould need?

The formation of moulds depends on certain factors: for one, on the nutrients; secondly, on moisture; and thirdly, on heat. The oxygen content and the pH value are likewise important.

Mould in buildings often forms on building materials that are biodegradable. Such substances are contained, for instance, in plaster mortar, water-based paints and sometimes as an additive to concrete. Add moisture – e.g. through the ingress of water or condensation – and you get an ideal growth environment at temperatures common for interior rooms.

### Water-absorbing materials

Materials that are absorbent or can absorb a certain amount of moisture are always more susceptible to mould formation. What's more, mould infestation is not reversible with such materials. The mould spores are stored on them and can be reactivated at any time given the right conditions.

This is why plaster board panels are seen as a potential hazard due to the paper contained in them and their general ability to absorb moisture.

The mould can also settle deeply in parts made of wood and cannot be removed.

Although mould may also form on metal given the right conditions, it cannot penetrate it due to the high density of the material. In the event of an infestation, it is sufficient in most cases that the surface be thoroughly cleaned or the mould simply wiped off.

### Water-proof material

Metal ceilings from Fural Metalit Dipling consist of steel or aluminium sheet metal and have a powder-coated or wet painted surface.

These surfaces are unfavourable to the formation of mould fungi and are therefore optimal for a modern technical building hygiene concept.

### Mould is not trivial

Mould fungi in buildings can cause serious health damage and disease to residents and visitors. Hence its formation and settlement must be avoided at all costs.

### Diseases caused by mould

Mould fungi may cause severe allergies as well as infections. Aspergillosis, for instance, can impact the respiratory system, affecting the lungs and nasal sinuses as well as the skin and ears. In severe cases, the heart and the central nervous system are also affected. Furthermore, mould can cause asthma and bronchitis as well as headaches and migraines.

### Mould prophylaxis

Once buildings are infested with mould fungi, mould cleaning is often only possible to a limited extent and is not particularly sustainable. It is far more successful to use materials that are not susceptible to mould for interior finishing as a preventive measure.



## CLEANING AND CARE

### Information on cleaning and care

Metal ceilings Fural Metalit Dipling are either powder-coated or painted with the Parzifal® hydro-stove enamel finish. Therefore, the smooth surface is especially easy to clean and disinfect.

### Cleaning methods

Depending on the design, the ceiling tiles can be cleaned while installed to the ceiling; or they can be swung down or removed for cleaning.

### Dry cleaning (powder coating)

The powder-coated surfaces can be wiped off with a dry, soft cloth. A vacuum cleaner with a soft brush attachment can also be used.

### Wet cleaning (powder coating)

The powder-coated surfaces can also be cleaned wet, if necessary. Commercially available, non-abrasive cleaning agents (diluted with clean water) should be used. The mixing ratio depends on the degree of soiling of the parts.

If there is heavy, greasy soiling, special cleaning agents (on a self-evaporating basis, e.g. diluted alcohol) can also be used.

### Consulting

In the case of heavy soiling, it is highly recommended to employ the services of a specialist company before starting the work for providing advice and executing the cleaning work.

### Dry cleaning (Parzifal®)

Light soiling can be easily wiped off with a moist microfibre cloth. For more stubborn soiling, we recommend cleaning with water and a mild, commercially-available neutral agent.

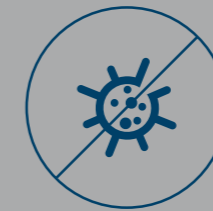
### Wet cleaning (Parzifal®)

Never use abrasive cleaning agents or solvents (nitro-dilution, etc.).

### Rinsing with clean water

For all wet cleaning, it is crucial to rinse the cleaned surfaces with clean water because especially dried surfactant remains are an excellent breeding ground for microorganisms.





## DISINFECTABILITY

### Hygiene and a germ-free environment

In hygiene-sensitive buildings in particular, hospitals for example, cleanliness and sterility take top priority. Metal ceilings from Fural Metalit Dipling offer the necessary conditions for it. They not only prevent the accumulation of dust particles but also ensure easy cleaning of the surfaces. The plaster board behind the metal layer of our fire protection tiles remains completely closed and does not allow dust to accumulate. Our metal ceilings offer optimal disinfectability thanks to their closed and painted surface. Additional antibacterial coating is therefore no longer necessary. A variety of commercially-available products are suitable for the disinfection of our metal ceilings. Furthermore, our special ventilation ceilings with HEPA filters facilitate low particle intake and support optimal air exchange.

### Disinfection

To disinfect metal ceilings from Fural Metalit Dipling, suitable disinfectants (e.g. Sagrotan) can be added to the cleaning water. In this case, though, it should be tested in inconspicuous areas whether the disinfectant additives leads to a change or discolouration of the painted surface.

### Coloured disinfectants

For visual checks whether the cleaning has been executed, coloured cleaning agents or disinfectants are used in hospitals. However, with ceilings made of plaster board or mineral fibres, they cannot be used, since they would leave traces. With metal ceilings from Fural Metalit Dipling, their use is no problem at all.

### Tests

Certain disinfectants were tested in our factory and classified as safe. Please contact us if you have any questions. We would also be delighted to test new agents for you on our surfaces or provide you with samples.



## SERVICEABILITY

### Responsibility of the operator

The operator is responsible for maintaining the function and hygiene of the technical equipment, extensions and installation in a hospital.

This means that the planners of a hospital are not only responsible to the investor regarding the initial costs; they are also responsible to the later operator regarding the service costs.

### Service cycles

In Germany, according to VDI 6022, room air control systems with humidifiers must be checked at least every two years; systems without humidifiers at least every three years. Alongside the conducting of adhesive-film tests to determine the concentration of certain microorganisms and the checking of the filters, this includes an inspection and visual check of the entire facility. How can it be carried out correctly with a closed ceiling with a few service openings?

### Accessibility

Our metal ceilings guarantee absolute accessibility, more than any other ceiling system, to almost every area of the ceiling cavity, thus constituting an important hygiene component.



## INTERIOR AIR QUALITY

### German Sustainable Building Council

The German Sustainable Building Council (Deutsche Gesellschaft für Nachhaltiges Bauen e. V., DGNB) was founded in Stuttgart in 2007. It advocates "...good buildings, liveable quarters, in short: a sustainably built environment." ([www.dgnb.de](http://www.dgnb.de))

Around 1200 member organisations are networked in the DGNB. The association is also Germany's official representative in the "World Green Building Council".

It has developed a remarkable catalogue for the certification of new buildings with the following criteria:

- Ecological quality (ENV)
- Economic quality (ECO)
- Socio-cultural and functional quality (SOC)
- Technical quality (TEC)
- Process quality (PRO)
- Site quality (SITE)

### Socio-cultural and functional quality

Under SOC 1.2, the DGNB defines the criterion of "interior air quality". Since people spend an average of 90% of their lives indoors, the interior room air is critical to health and well-being and thus for hygiene.

### Achieving air quality

In this context, the DGNB calls for

- The use of low-emission products,
- An appropriate air exchange ratio and
- Avoidance of VOCs (volatile organic compounds) that usually escape from paints, varnishes and adhesives via solvent evaporation. This kind of air pollution must not exceed 0.3 mg/m<sup>3</sup>.

### We are tested and certified

Fural Metalit Dipling has had its metal ceiling systems tested and certified according to the AgBB (Committee for Health Evaluation of Building Products) evaluation scheme of the German Federal Environment Agency.

Our systems, including all installations and materials, were tested in a test chamber for 28 days. The result showed that all materials and surfaces used by us (steel and aluminium sheets, powder coatings and Parzifal® wet coatings as well as adhesives) were far below the required limit values. Furthermore, no carcinogenic substances were found.

### Other criteria of the DGNB

Other test criteria are of interest in regard to the understanding that building hygiene includes all measures for maintaining and fostering people's health in and around the building. In the area of "socio-cultural and functional quality", the following points are also rated:

- Thermal comfort (SOC1.2)
- Acoustic comfort (SOC1.3)
- Visual comfort (SOC1.4)

We are delighted to be able to make a contribution here as well with our multifunctional metal ceilings!



## NO MOISTURE ABSORPTION

### Water-proof from the outside

Metal ceilings from Fural Metalit Dipling have a water-proof paint surface. The surface is applied either in a high-quality powder coating procedure or in a special high-matt and low-reflection Parzifal® wet coating.

This allows our metal ceilings to be cleaned wet and disinfected with liquid agents without the cleaning agent or disinfectant penetrating the material.

### Water-proof from the inside

During the operation of building, leaks of water-carrying pipes in the ceiling cavity happen time and again. With ceilings made of plaster board or mineral fibre panels, water retention in the material is almost inevitable.

Since it is also warm in the ceiling cavity, an almost ideal growth environment for microorganisms is created with the use of water-absorbent ceiling materials. Drying out the components entails a huge effort and high expenses and is frequently not possible to a satisfactory degree. Moreover, microorganisms that have once settled on the materials cannot be removed.

With metal ceilings, such water damage in the ceiling is not problematic: Surface drying is easily possible (mechanically or through evaporation), and no moisture penetrates the material. In addition, no white rust is formed on smooth surfaces. We are water-proof.



# OVERVIEW OF PRODUCT DOCUMENTS



[www.fural.com/en/downloads/6](http://www.fural.com/en/downloads/6)

## “Acoustics” Manual

- On 99 pages, the role of acoustics is explained for: Heating and cooling ceilings, floating ceilings, acoustic walls and longitudinal soundproofing
- Everything about the influence factors of: Air cavity, linings, lining thickness, acoustic fleece and heavy linings
- Overview: tested and untested perforations

## Hygiene

- A hygiene concept as the basis for our metal ceilings
- Acoustics and hygiene in patient rooms and operating theatres
- In addition to disinfectability, metal ceilings are dust-free, fibre-free and mould-free

## Baffle

- Technical aspects and benefits
- 6 best-practice examples illustrate the broad range of possibilities
- One-piece or two-piece? – Project pictures from AT, CH and DE demonstrate all the options

## Yearbook

- The highlights of our divisions and departments
- We present: our employees as factors for success of Fural Metalit Dipling
- Pictures speak for themselves: Impressions

## Architecture

- From ideation to information all the way up to our know-how – a selection of international projects
- Best-practice examples of annually >1 million m<sup>2</sup> of delivered ceilings
- Architecture at its best: Metal, expanded metal, baffle ceilings...

## Cooling ceiling, Austria

- Fural as a partner and expert in cooling ceilings on the Austrian market
- Always the right solution; best-practice examples (copper/aluminium, plastic/aluminium, copper/graphite)
- Performance values for the cooling and noise absorption of closed ceilings or floating ceilings

## “Fire Protection Ceilings” Manual, AT or CH or DE

- Swing-and-slide system ceilings according to the relevant country standard
- Detailed solutions for new and existing buildings
- Data sheets, user and installation guidelines for tested systems

## “UP!” magazine, education

- Best-practice school projects in AT, CH, DE, Benelux and Denmark
- Everything for modern school buildings: sustainable and affordable construction
- UP! Where we are is up.

## “Ceilings” Manual/installation

- 126 pages on systems and solutions for various areas of application
- Ideal base for architects and processors
- With required standards for material orders

## “UP!” magazine, health

- Best-practice hospital projects in AT, CH, DE and Benelux
- Our ceilings stand for: Aesthetics, exclusive functions and affordable purchase
- UP! Where we are is up.

# OVERVIEW OF PRODUCT DOCUMENTS



## Expanded metal ceilings

- 28 pages on the perfect mesh types, tiles and joints, systems, wall connections, installations and coating
- Overview of the many possibilities with expanded metal ceilings – for planners and builders
- Best-practice projects with Fural Metalit Dipling ceiling systems

## Data sheets

- Our website at [fural.com/Systeme](http://fural.com/Systeme) showcases the current status of all metal ceiling systems in data sheets
- Precise descriptions, sketches, required standards, joints, wall connections, VOC, installation, care instructions and much more
- We always have the latest version online – that's our pride and joy

## Sample case

- Our sample cases are available upon request
- We present the following systems:  
Strip grid, fire protection, floating ceiling, KLH-HT28 hang-in system, Z hang-in system, window tiles, clip-in system, expanded metal DZ hang-in system and Swing
- The following surfaces are available as sample cases:  
Parzifal®, perforations, wall connections and expanded metal

## Other product documents

- You'll find more product documents at: [fural.com/Downloads](http://fural.com/Downloads) for downloading; or upon request
- FP Secure Gypsum, one LED light – four applications
- Opticlean, metal ceilings with Opticlean – ventilation
- Likeable hospitals – tips and tricks for hospital technicians and planners
- Acoustic walls – all you need to know about acoustic walls – function and technology
- Fire-resistant floating ceiling Belgium – tested according to NBN 713.020
- Colorprint
- Ball-proof ceiling
- Reference book 2012



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