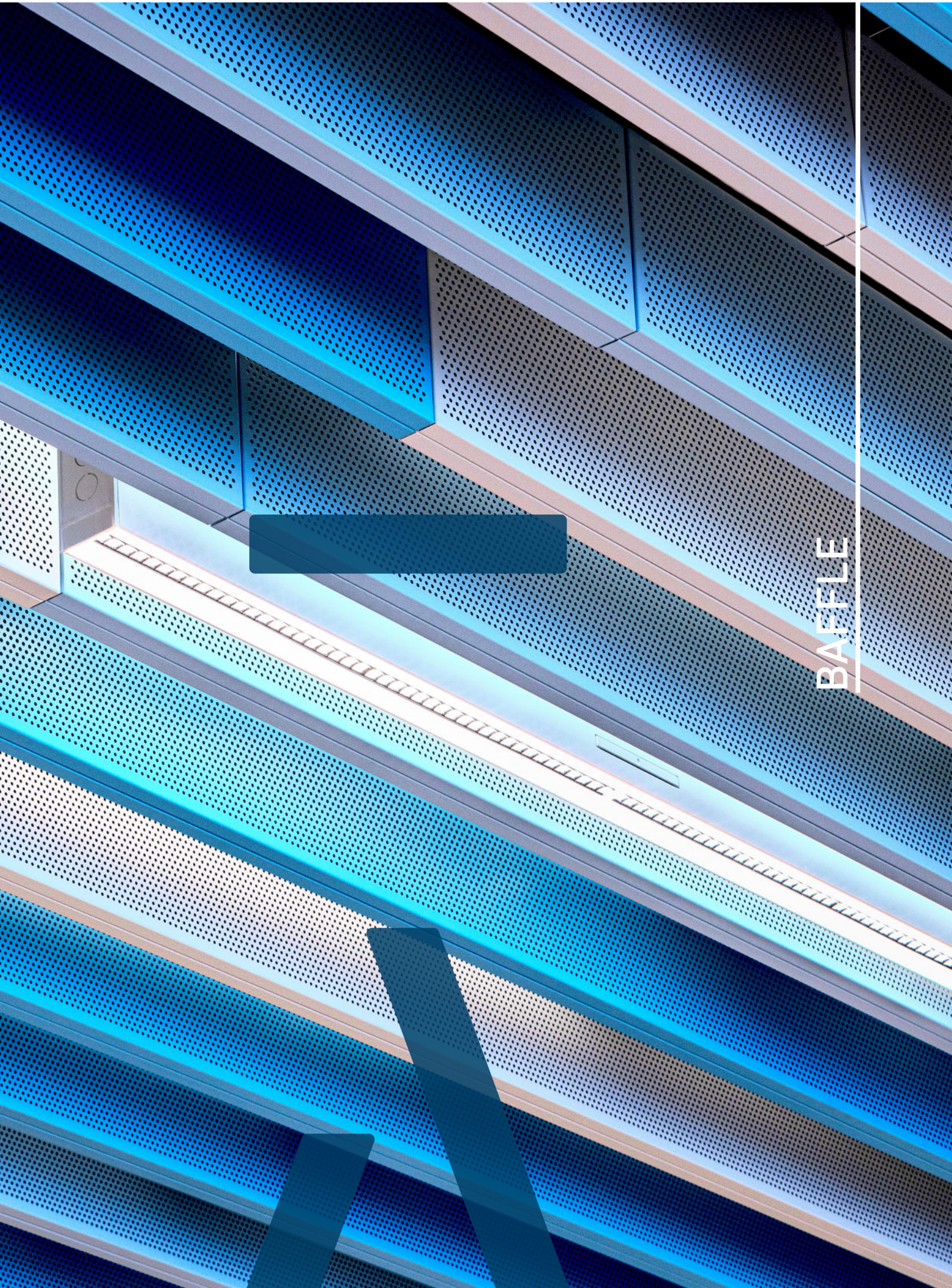

BAFFLE

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WE ARE BAFFLE CEILING

We are family!

Since the first half of 2019, Fural Systeme in Metall GmbH in Gmunden, Austria, Dipling Werk GmbH in Frankfurt/Hungen (Germany) and Metalit AG in Büron (Switzerland) together have been a strong and international group of companies. 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 has given us the expertise for aesthetically, technically and logistically sophisticated architectural and building projects.

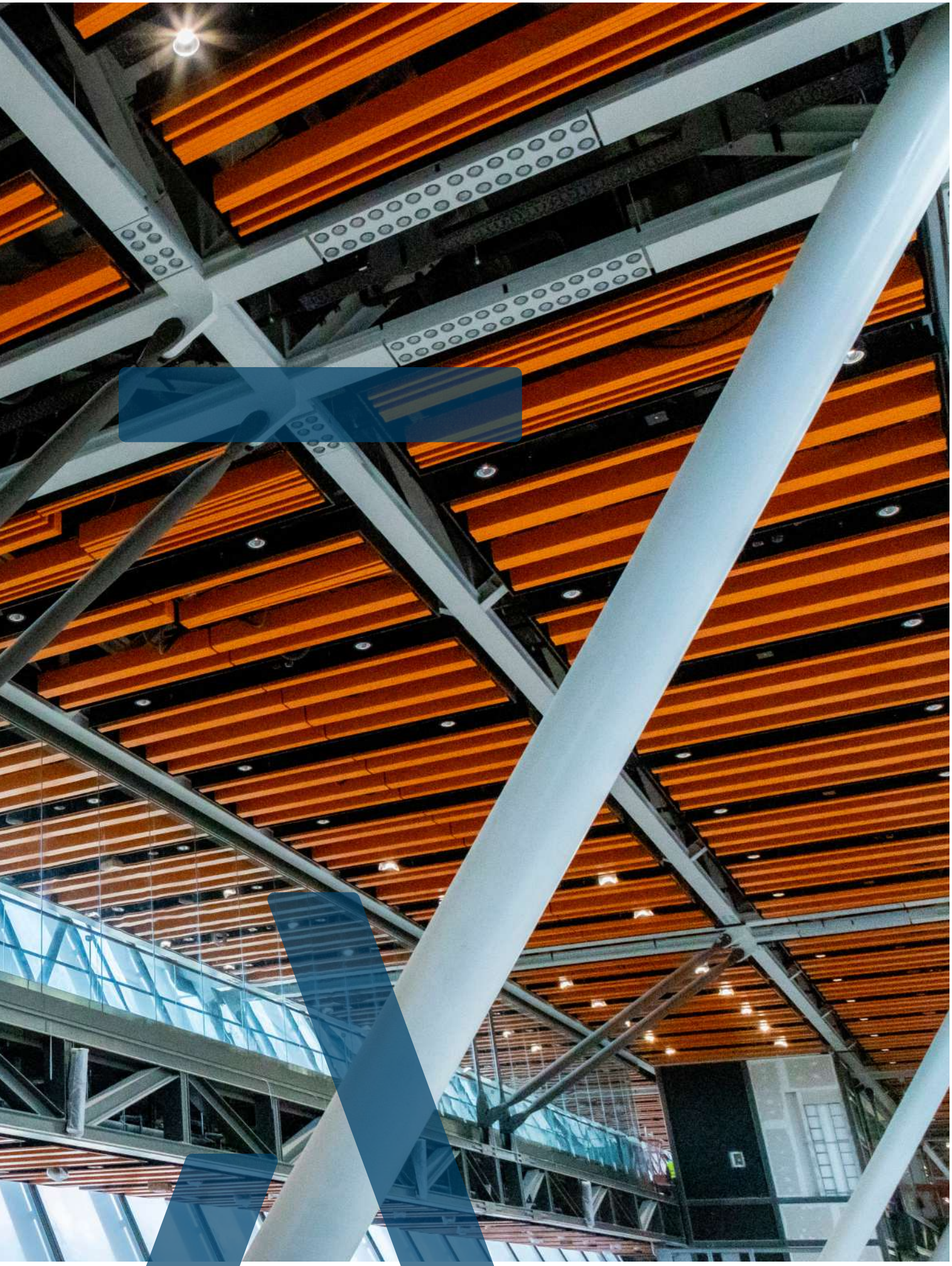
We see ourselves as a quality leader in metal ceilings and help you in successfully realising your projects.

Why baffles instead of a closed ceiling?

Baffle ceilings are made as double-walled slats. The elements are installed with spaces between them. Baffle ceilings can be positively used in many ways:

- 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 larger surface than a closed ceiling. This allows for a boost in the acoustic effect.
- Heating and cooling systems can be integrated in our baffle ceilings.
- Sprinkler systems and other installations (e.g. emergency exit signals, speakers, etc.) do not require extra openings through the ceiling. The installations are fastened to the raw ceiling, and the outlets can be placed, slightly recessed and largely invisible, between the baffles.
- 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.

"Baffles make it possible for us to show the concrete ceiling as it has come out of the building shell – particularly when the baffles are used in regular structures (spaces). Furthermore, we can arrange media and special lighting effects between the baffles and thus structure the entire ceiling."
(Jost Gellinek,
nbp Architekten)



WE THINK IN ARCHITECTURE

We think in the categories of **city, building, space and users** and not in running metres of baffle ceiling. We take you and your projects seriously and look for the best solution together with you, particularly if the project is to be worked out from scratch. We see ourselves as your system partner for **high-quality architecture components** and look forward to working with you!

In the end, all of us are happy about the result we achieved and will enjoy it for many years.

Anton Fingerle Education Centre, Munich
- FUN Architekten
- School hall
- Baffle
- Rv 3.0 - 20%
- RAL 9010, NCS S0520-B10G, NCS S0540-B10G

"Baffles open up a wide range of design possibilities: By varying the height of the baffles or the space above and below the baffle, many different impressions can be produced."
(Hans Niedermaier, FUN Architekten)

WHY USE METAL BAFFLES?

There are many and multifarious reasons to opt for metal baffles. They are regarded as genuine all-rounders that yield numerous advantages:

With their closed and hard surface, metal baffles are free of dust and fibres, do not take in moisture and are easy to clean and disinfect. Outwardly, they makes a fabulous impression with their aesthetically pleasing and premium-quality look.

With a wide range of colour and form variations, there are (nearly) no limits to creative design possibilities.

Another important aspect is sustainability. With a service life of more than 50 years, metal ceilings are very durable; in the end, they can be easily recovered for reuse in long-established recycling processes for steel.

Not only for installation but for servicing and during use as well, they have the advantage of being less easy to damage owing to their hard surface. Moreover, they are harmless with respect to the room air quality – there is no relevant release of VOC from the surface coating, the acoustic fleece and, if used, the glued-in heating and cooling registers.

In addition, unlike other materials, metal baffles do not need to be repainted – thus their acoustic effectiveness remains intact throughout their service life.

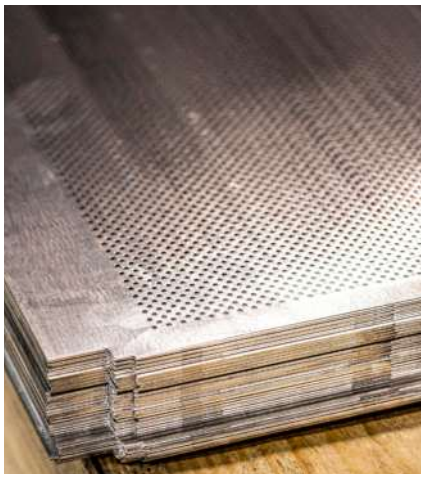
"A lot of technology had to be integrated and 'hidden' (lines, swirl outlets, lighting fixtures, speakers, fire detectors, etc.). The advantage of baffles is that we can integrate everything at a single level in the ceiling and make the space as open as possible."
(Vanessa Thulliez, Monoplan AG)

Restaurant Bellerive au Lac at Hotel Ameron Zurich Bellerive au Lac

- Monoplan Restaurant
- Baffle
- Rd 1.5 - 22%
- NCS S 2005-Y20R matt

SPEED

Pieces of aluminium or sheet metal are perforated and provided with contouring and cut-outs on fast and precise machines from technology leaders such as Trumpf and Salvagnini. The machines and processes are operated by experienced employees.

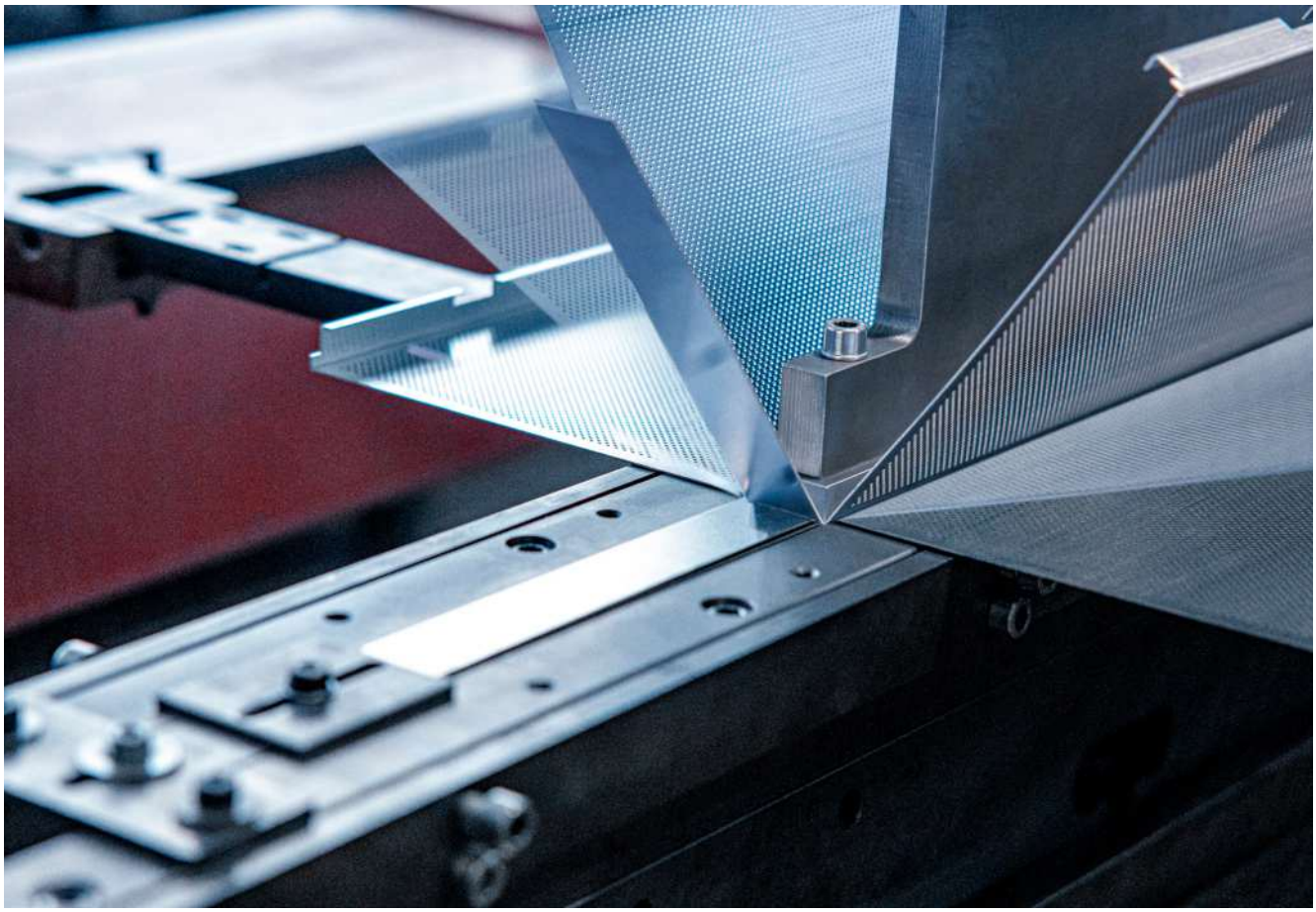


The machining process is so quick that it is hardly perceptible with the naked eye. Nonetheless, positioning, machining, turning and depositing are done with the greatest precision.

PERFORMANCE

In the next work steps, the perforated and contoured boards are given a three-dimensional shape on trimming presses. Operating this machine is also an art that requires not only precision of manual control but the expertise and experience of the employees when setting and maintaining the tools and machines.

POWER



On a powder coating line with suspended transportation of the components through the coating and annealing chamber, the baffles receive their final surface in the desired colour, layer thickness and degree of matt or glossiness.

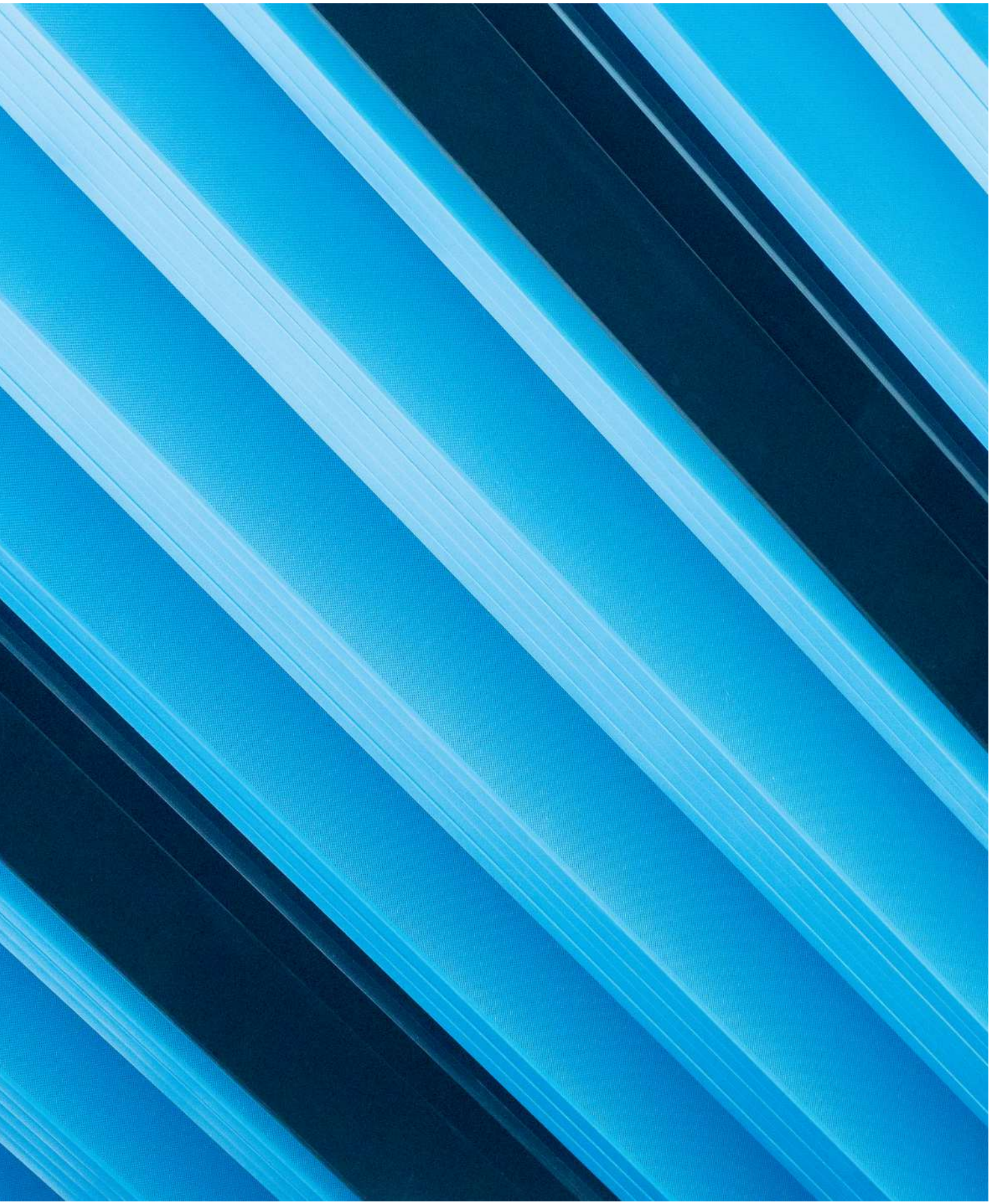
COLOUR

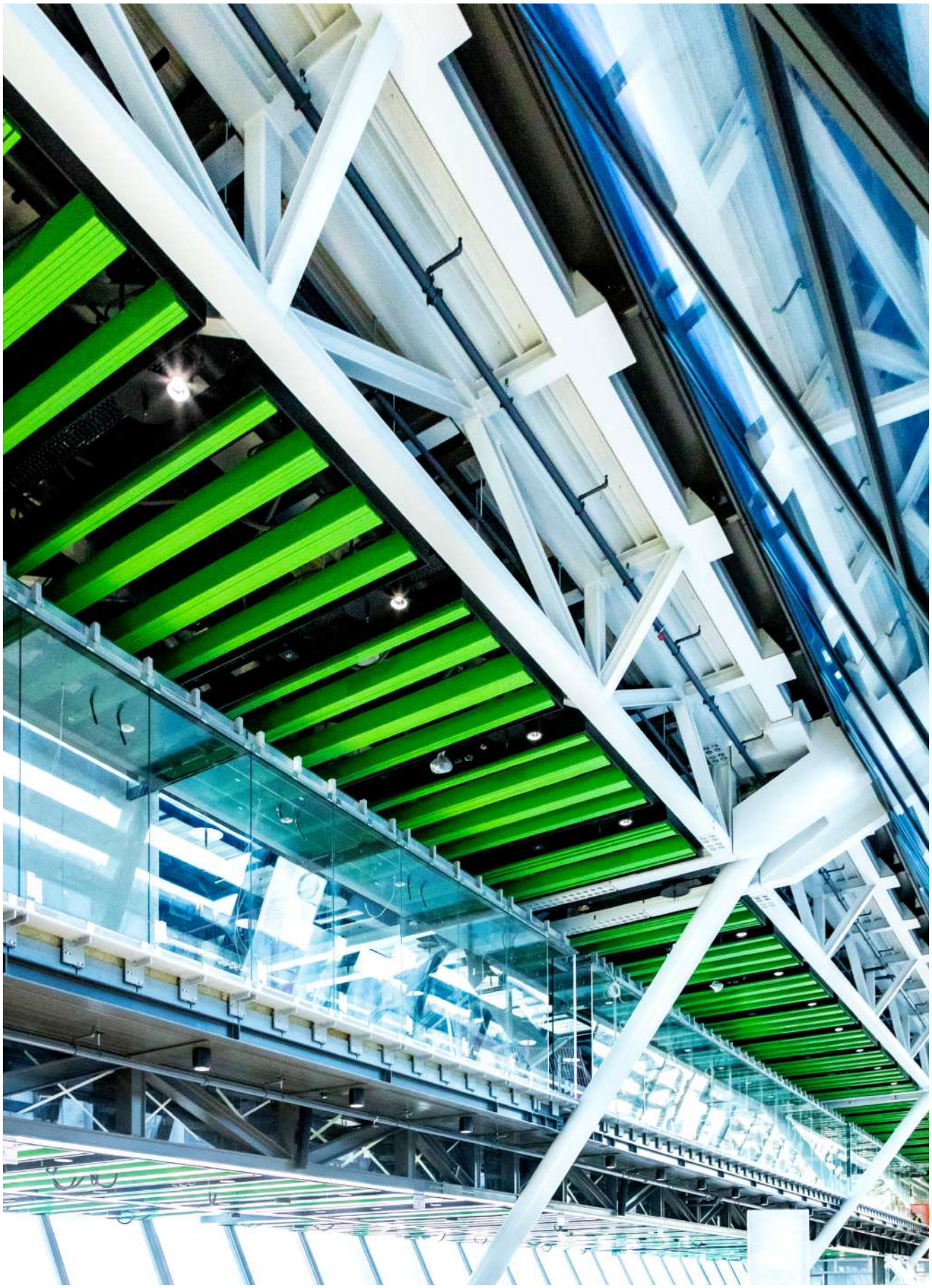
For large-scale projects, tens of thousands of components – some of which are precisely custom-tailored to the construction task – are managed, planned, manufactured, stored, packaged and shipped. Our digitally supported logistics processes are an important building block of our quality and adherence to deadlines, for which we are well-known in the market.

LOGISTICS

ASSEMBLY

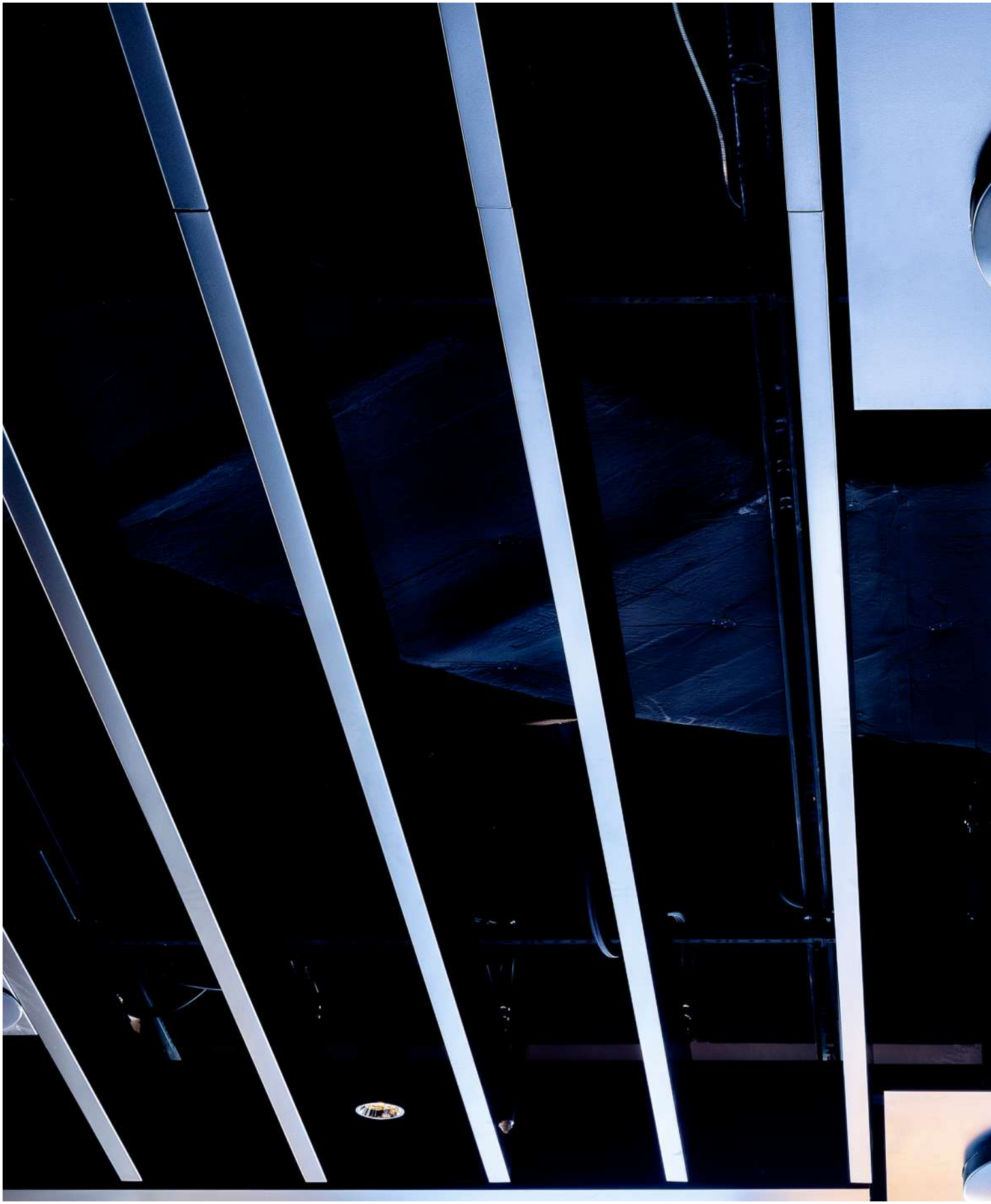
The consistently high quality of our systems and components as well as the sophisticated assembly technique are already evident during assembly. Due to our high level of pre-production, ready-to-install components with finished surfaces come to the construction site and can be quickly and finally installed there.





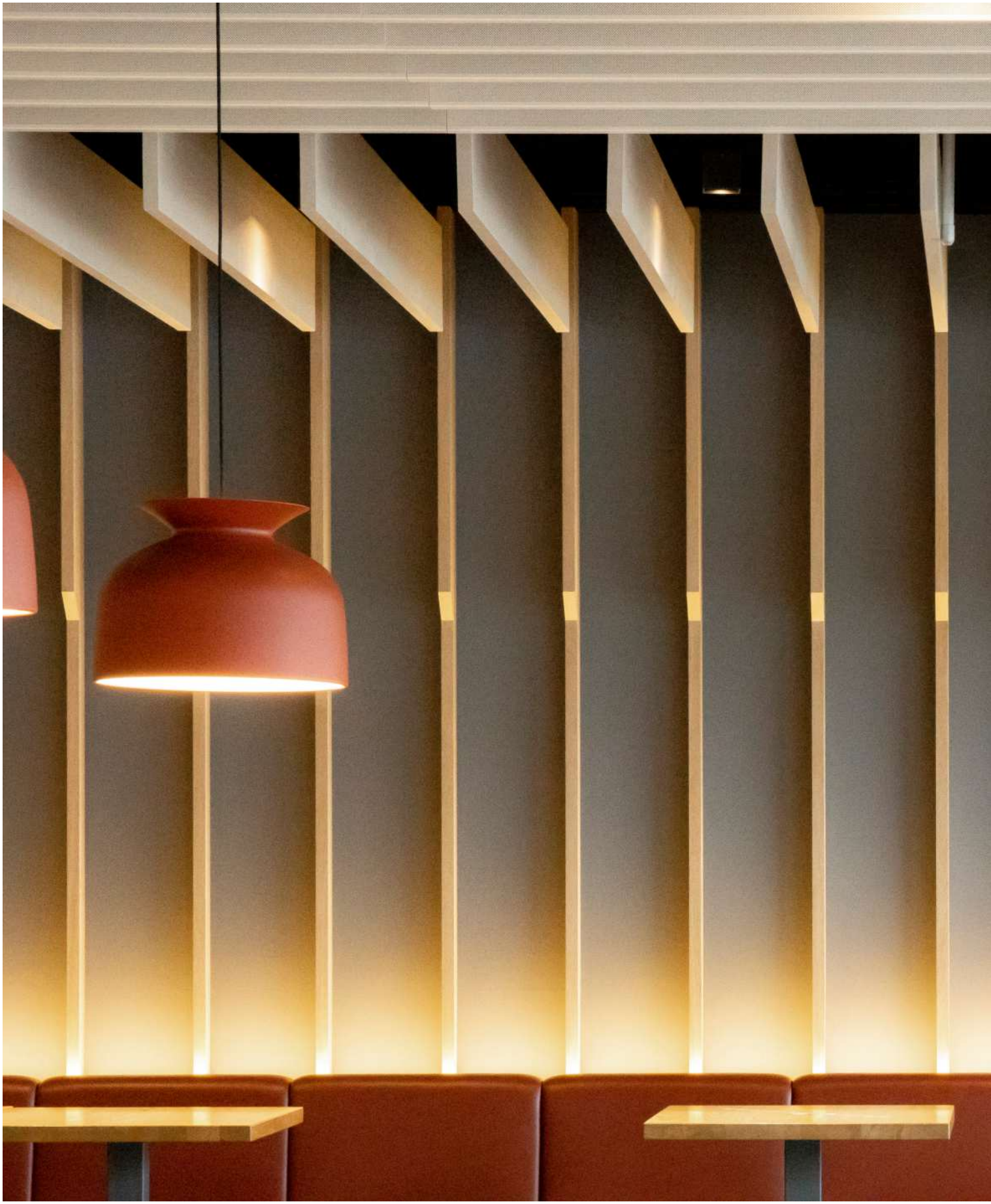
In the open high-tech architecture of the new "Aile Est" terminal at a length of 520 metres, the former long-distance terminal built in 1975, our baffle ceiling is a major player in both technical and aesthetic ways. With a total construction of 480 million euros, the building is a strategic investment Geneva Airport as the client made for the future.

GENEVA AIRPORT



The advantages of baffle ceilings are most evident for ceilings with a high degree of technology integration. Outlets for sprinkler systems as well as lighting and ventilation elements can be positioned between the baffles. In addition, the baffles that are installed in rails can be easily pushed aside to inspect the ceiling cavity.

HIGH TECH



In the catering sector, metal baffle ceilings are proving their worth in the optimisation of the room acoustics and the integration of sprinklers. Different lighting and ventilation systems can also be integrated between the baffles.

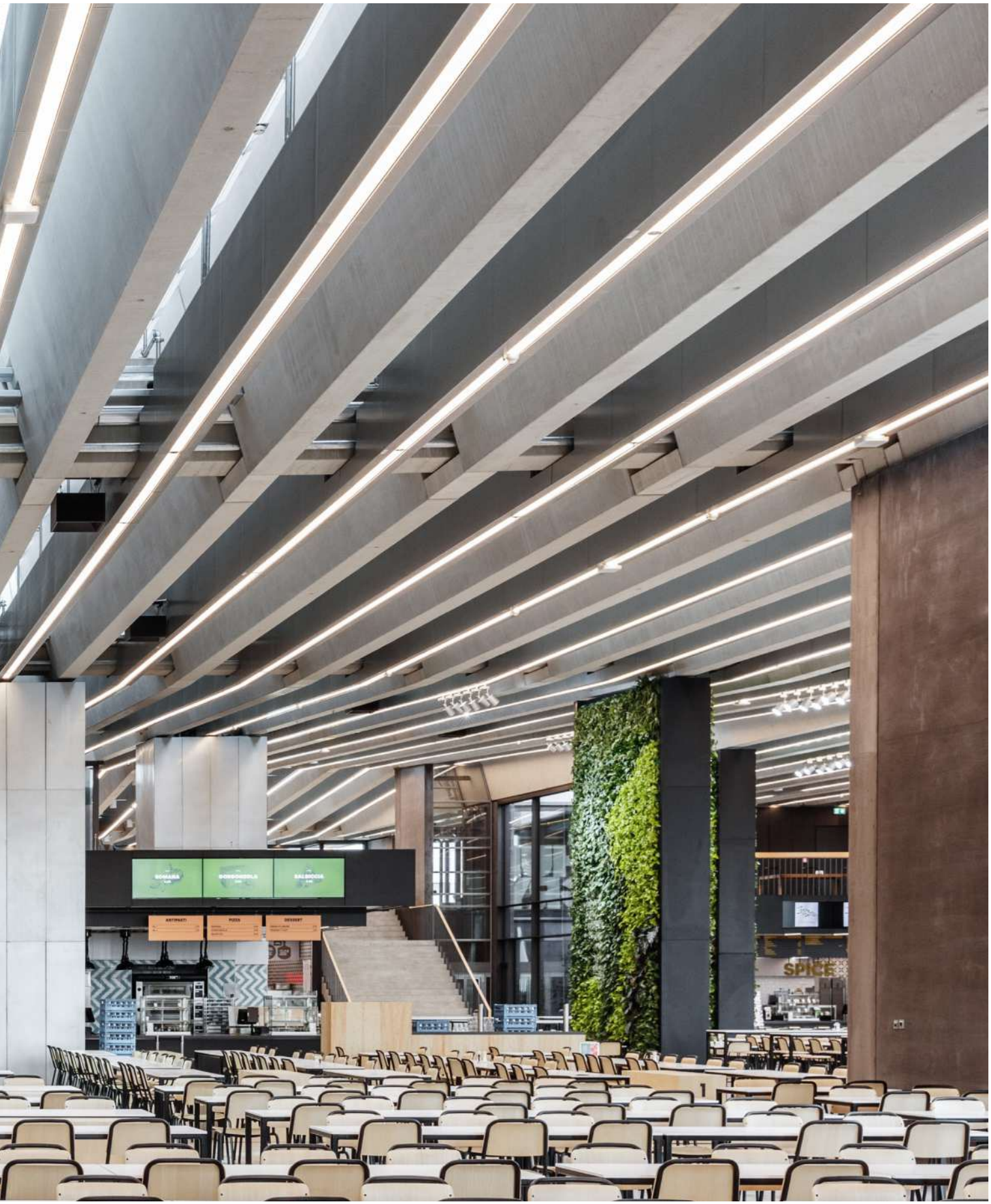
CUSTOMISATION

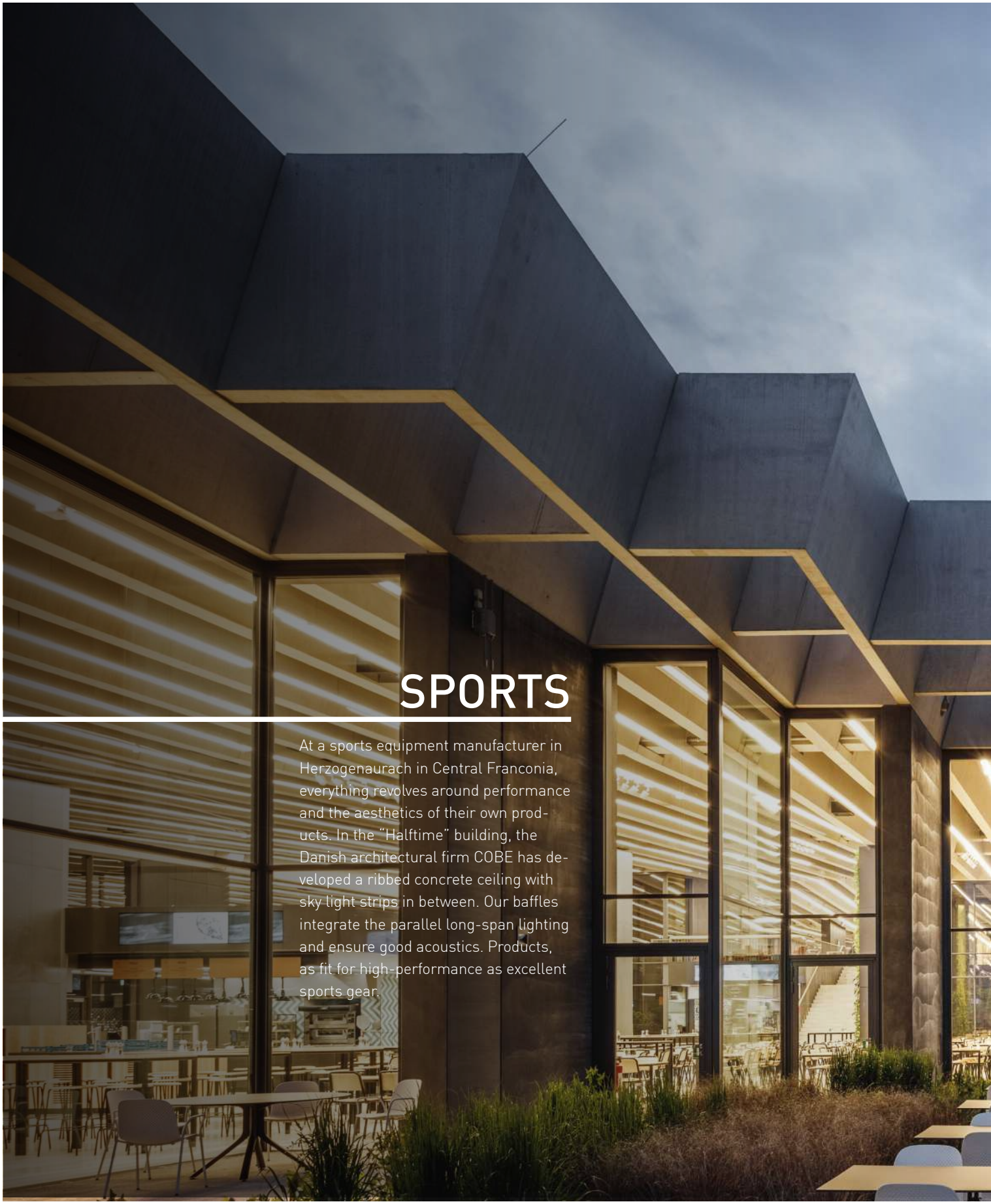
In the cafeteria of UBS Bank in Zurich, the baffle ceiling is an integral part of the interior design. The changing ceiling pattern is rhythmically continued to some extent in the wall design.

UBS RESTAURANT FLUR, ZURICH

MIXED LIGHT

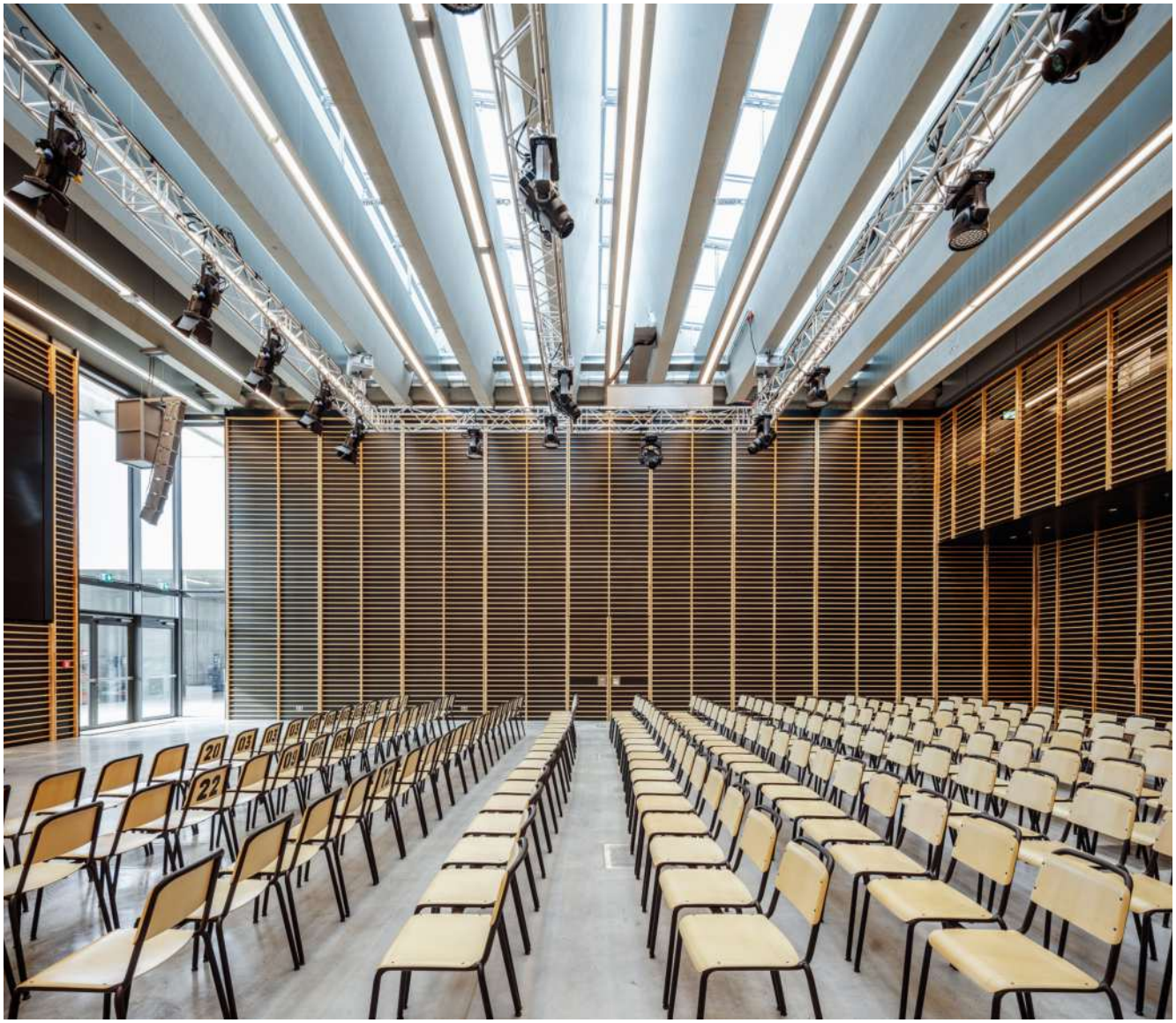
Baffle ceilings offer excellent opportunities for mixing daylight and artificial light. Depending on the reflectance of the surface, the light is softly brought into the room.

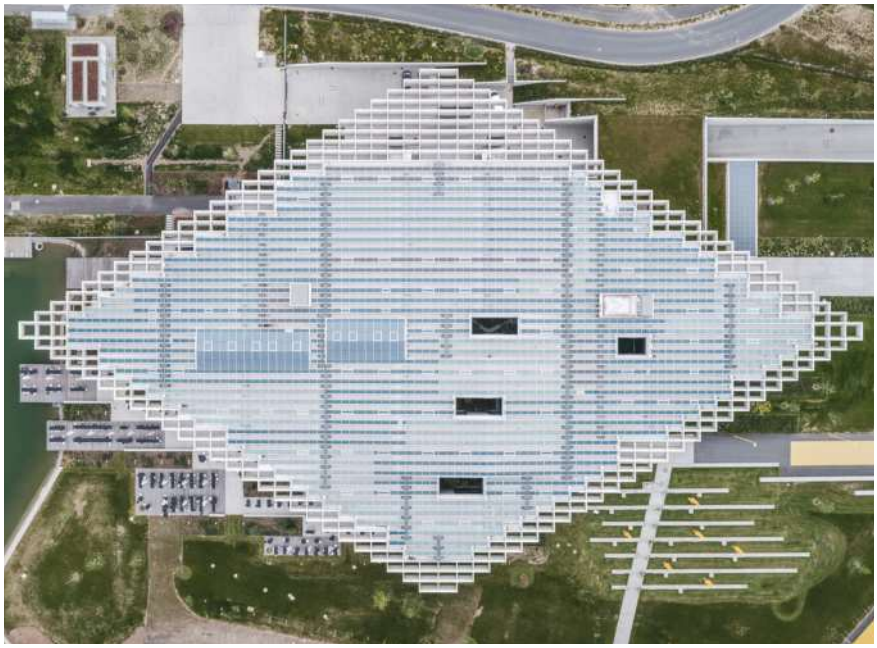

SPICE



SPORTS

At a sports equipment manufacturer in Herzogenaurach in Central Franconia, everything revolves around performance and the aesthetics of their own products. In the "Halftime" building, the Danish architectural firm COBE has developed a ribbed concrete ceiling with sky light strips in between. Our baffles integrate the parallel long-span lighting and ensure good acoustics. Products, as fit for high-performance as excellent sports gear.





CHILLED

Baffle ceilings not only improve the acoustics of a room, they can also be a strong means for heating and cooling the room that can be precisely controlled.

INTEGRATION

Despite its narrow view from below, the baffle ceiling in the "Halftime" building in Herzogenaurach is a perfect example of the integration of technical functions in an assembly. Lighting, sprinkler system and acoustic optimisation are combined in a rectangular geometry. The light contributes to lending the cubic assembly a slim and transparent look.

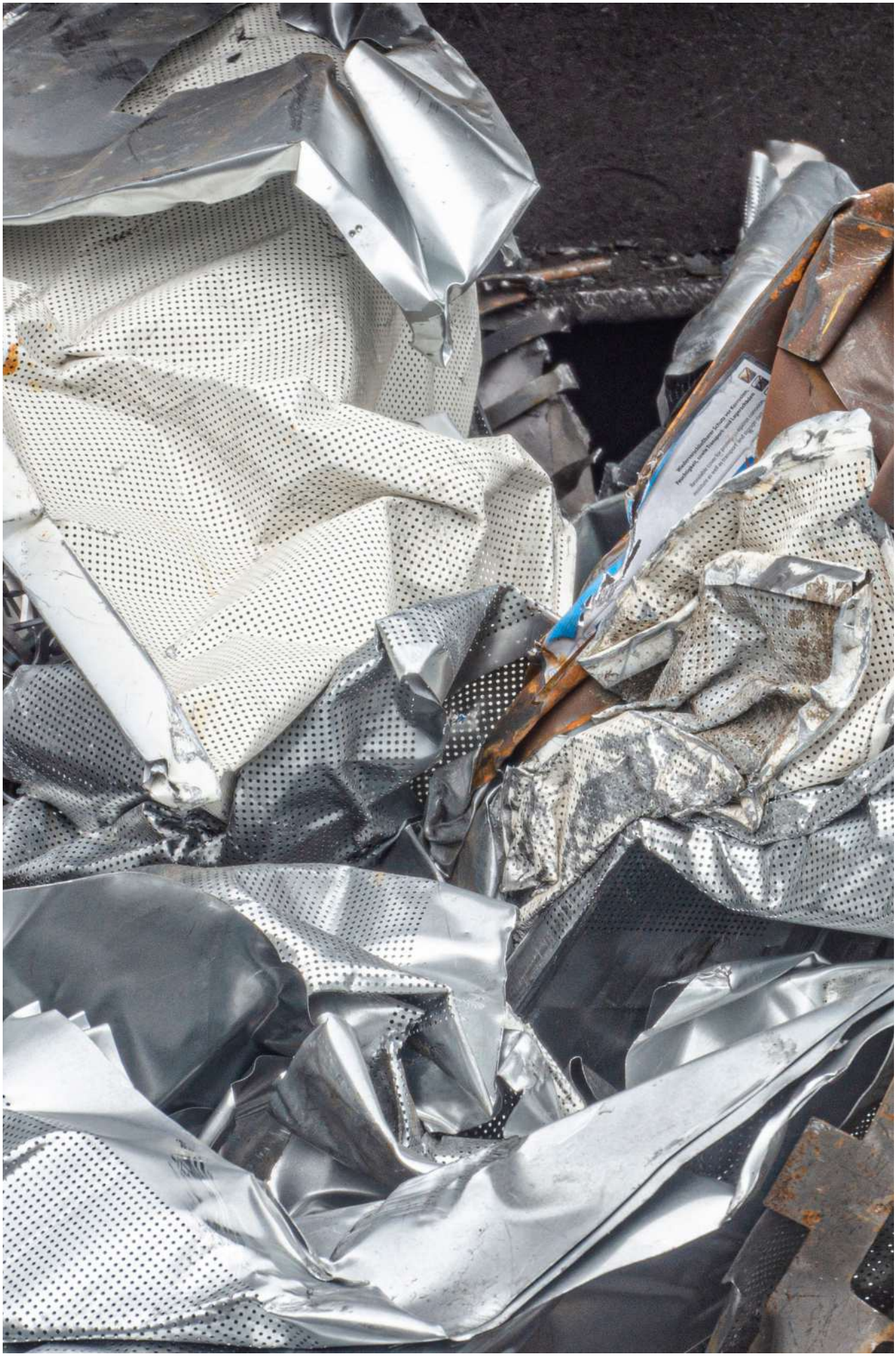
GREEN BUILDING

Our baffle ceilings are made of easy-to-recycle base materials, e.g. painted steel or aluminium sheet metal. Our systems' high level of sustainability also result from the fact that our products can be dismantled and last for the entire service life of a building.

STYLE

Today, contemporary interior designs of hotels take you into a new world ruled by a style mix of retro and modern, East and West, sophisticated and improvised. Guests want to experience to the full a world that is quite different from their everyday lives. Our metal ceiling products allow for creative design options to highlight the desired ideas.

"The ceiling resolves a paradox: It looks quite calm and disappears, although a lot of things are openly visible there.
(Vanessa Thulliez, Monoplan AG)



SUSTAINABILITY

Sustainable building

Sustainability has been a much discussed topic for quite some time now. Naturally, the matter has been an important theme for the construction industry as well: Not only is it rather energy-intensive itself, its planning also has a considerable impact on sustainable living and working. Alongside obvious factors such as insulation and thermal protection, the long-run use of rooms and buildings constitute an integral part of the sustainability idea – after all, every conversion or even demolition has quite a negative environmental record.

Building materials

The use of building materials and structures with materials that entail hazards to health and the environment has been avoided in construction for a quite a while now; at least, it has been greatly reduced.

Moreover, the recyclability of individual components in the event of refurbishment or conversions is always taken into account.
Since around 79% of the mineral waste in Germany comes from the construction sector and a total of around 52.5% of the total volume of waste can be ascribed to the building industry, dismantling or possible conversions are already taken in consideration during the planning phase.

Components and products that can be manufactured with less energy are preferred today – the assessment of energy flows in the production, transport or processing of building materials is done by calculating their primary share in non-renewable energy, their contribution to global warming and to acidification.

Sustainable metal baffles

Metal baffle systems offer several advantages: 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 baffles allow for repairs and servicing at any time without great effort – reusability is also guaranteed. And last but not least, the metal ceiling systems, which last a long time anyway, are easily recyclable.

Steel has been recycled for decades now. The metal ceilings are mechanically pulverised and returned into the recovered materials cycle. Chemical treatment is not necessary. The more often steel is recycled, the smaller its ecological footprint – the perfect material for sustainable building.

Metal baffles for more room comfort

Metal baffles are ideal for cooling and heating rooms, because 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.

Green building – sustainable building

Sustainable building is a key issue in modern construction. Topics such as the conservation of resources, value retention and user comfort are increasingly in the focus in the planning, construction and operation of buildings.

Quality seals such as LEED, DGNB and BREEAM facilitate making the quality of a building visible in terms of its environmental impact. Fural has an open mind when it comes to this future topic, offering products that 100% support building certification.

TECHNICAL ASPECTS

The technical properties of baffle ceilings and their aesthetics largely depend on the following factors:

Hollow body

Our baffle tiles are made of sheet metal and form a hollow body that can be technically used in many ways: e.g. for the integration of heating and cooling elements or lighting fixtures; or for fillings that further improve the acoustics.

Baffle width A

The A dimension describes the width of the visible bottom side of the baffle.

Baffle height B

A higher baffle has a larger surface than a lower one and is thus more efficient in terms of its acoustic effect and any integrated heating and cooling. At the same time, the visual overlap with adjacent baffles is better.

Baffle length C

This dimension describes at which lengths the individual tiles of the baffles can be manufactured.

Baffle space D

The smaller the space D, the more baffles can be deployed effectively. The surface of baffle ceilings clearly exceeds that of smooth ceilings.

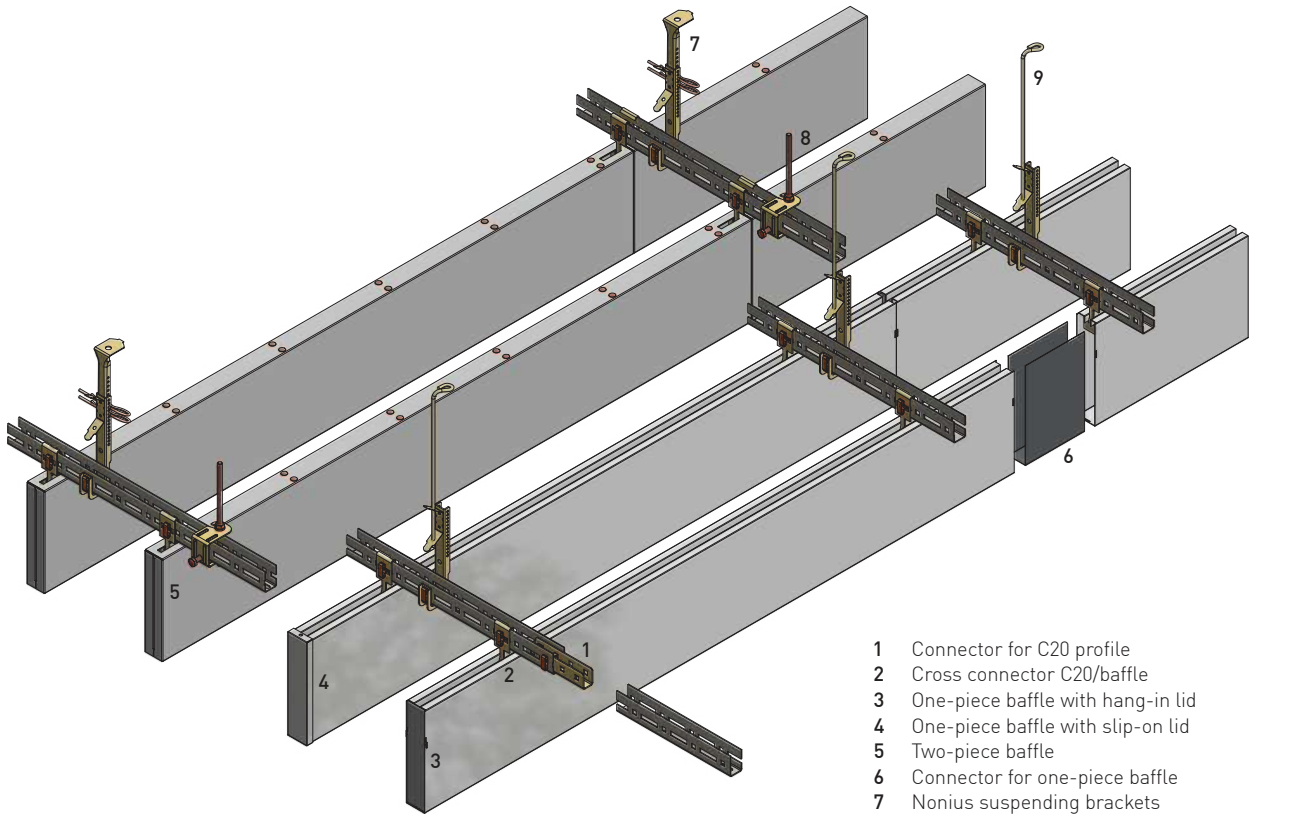
Perforation height E

Not the height of the baffle but the actual height of the perforation is key to the acoustic effect of metal baffle ceilings.

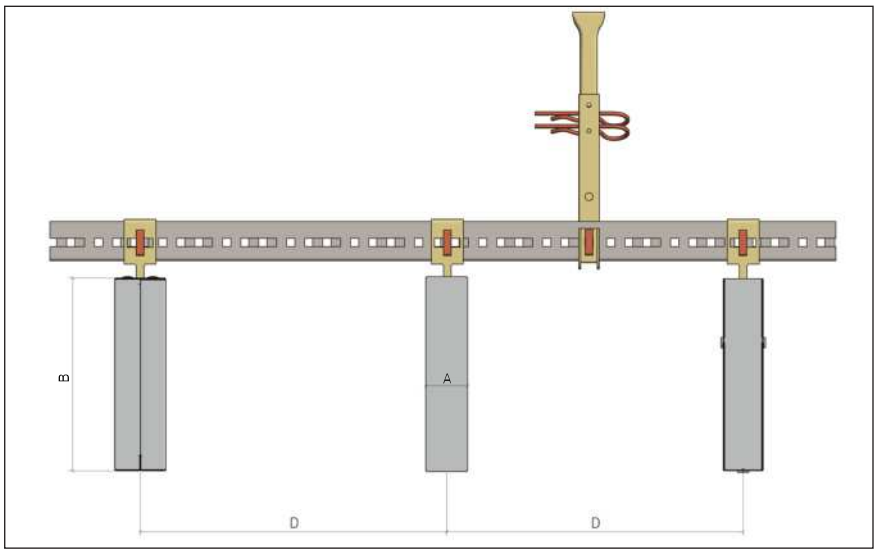
Ceiling cavity/suspension height F

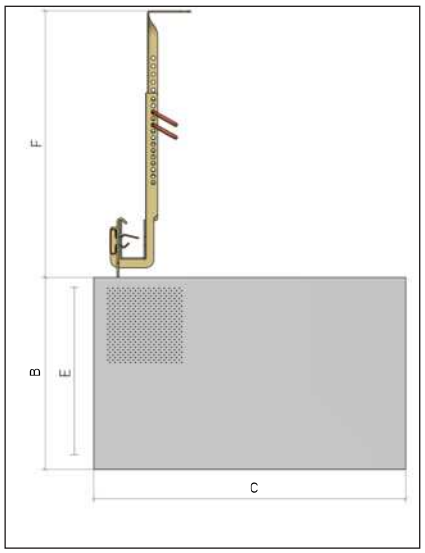
The clearance from the upper border of the baffles to the raw ceiling describes the height of the ceiling cavity. Dynamic fanning allow for creative ceiling plans and responding to special floor plan situations.

	One-piece baffles	Two-piece baffles
A (internal dimensions)	25/30/35/40/50/60 mm	30–50 mm
B (external dimensions)	100–600 mm (with a length of up to 3,500 mm) 100–350 mm (with a length of up to 4,000 mm)	150–600 mm
C (external dimensions)	up to 4,000 mm	up to 3,000 mm
Materials	Sheet metal 0.6 mm (standard) Sheet metal 0.7 mm Aluminium 1.0 mm	Sheet metal 0.6 mm



1 Connector for C20 profile
2 Cross connector C20/baffle
3 One-piece baffle with hang-in lid
4 One-piece baffle with slip-on lid
5 Two-piece baffle
6 Connector for one-piece baffle
7 Nonius suspending brackets
8 Threaded rod with clamping lever
9 Nonius suspending bracket with eyelet wire





A Baffle width
B Baffle height
C Baffle length
D Centre to centre distance/module
E Perforation height
F Suspension height

THERMALLY ACTIVATED BAFFLES

Beyond the acoustic aspect, baffles are excellent for cooling or heating rooms. Temperature control is based on the radiation principle:
Heat radiation is a form of heat transfer in which the heat is transmitted by electromagnetic waves (infrared radiation and infrared light). The thermal energy always moves in the direction of the lower temperature, so no thermal energy is lost – according to the second main principle of thermodynamics and the law of conservation of energy.

The properties of heat radiation for the thermal activation of the baffles are generally of great import. Because when heat radiation hits a body, some of it is reflected, some of it is absorbed by the body. The rougher the surface and the darker a body, the more heat radiation is absorbed and the less is reflected by the body.

The radiation power of a black body with its surface and absolute temperature is specified here by the Stefan Boltzmann Law that describes an ideal black body depending on its temperature and its radiated thermal power.

$$P=\sigma \cdot A \cdot T^4$$

The radiation power of a black body is therefore proportional to the fourth power of its absolute temperature: Doubling the temperature causes the radiated power to increase by a factor of 16.
A black body completely absorbs all radiation that hits it (absorption = 1). According to Kirchhoff's Radiation Law, its emission level ε therefore also reaches the value of 1, which results in the fact that, given the relevant temperature, the black body radiates the maximum possible thermal power.

The value of the Stefan Boltzmann constants amounts to

$$\sigma=\frac{2\pi^5 k_B^4}{15h^3c^2}=5.670374419\ldots \cdot 10^{-8}\,\frac{W}{m^2K^4}$$

If the body is not black, the weighted average emission degree across all wavelengths and the weighting function of black body energy distribution are taken into account. Depending on the material and coating, ε(T) scatters between 0.01 and 0.98.

$$P=\varepsilon(T) \cdot \sigma \cdot A \cdot T^4$$

Due to these physical principles, it is possible to optimise the power of a cooling system through the cooling assignment and the colour.

	ε(T) at T=300K(≅26.85 °C)
RAL 9010 matt	0.93 ± 0.02
RAL 9016 matt	0.93 ± 0.02

In the cooling mode, the cold water flow absorbs the thermal radiation from people and objects in the room and dissipates it. An immediately noticeable cooling effect occurs. In the heating mode, the heat radiates softly via the baffles directly into the room.

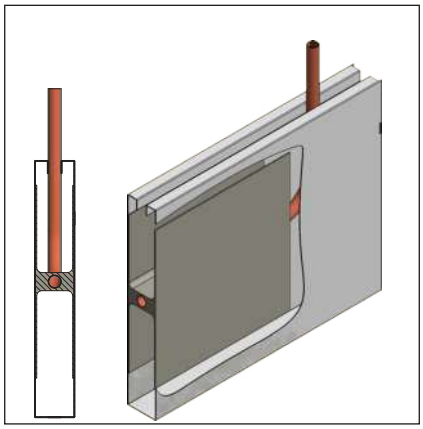
Moreover, our cooling baffles work completely without air circulation – dust swirls are prevented, draft is avoided.

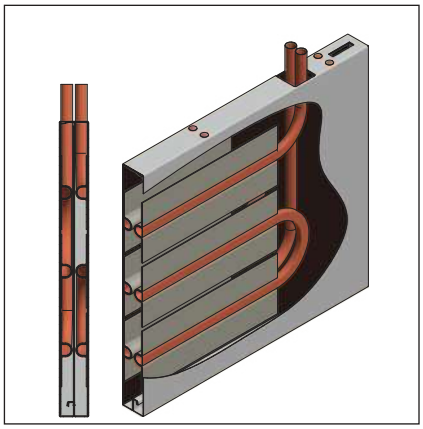
Due to the low inlet temperature of 25–35 °C, heating baffles are ideal for the combination with low-temperature heat generation – additional energy costs can be saved.

The suspended metal baffles are 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 metal baffles are retained. Quick and safe servicing of the baffles 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
- Sports facilities
- Transport buildings





BAFFLES AND LIGHT PLANNING

Baffles and lighting systems are two elements that are not just closely connected – they also ideally complement one another.
In combination, they create the basis for excellent acoustics, perfect lighting, a pleasant perception of the space and a great appearance.

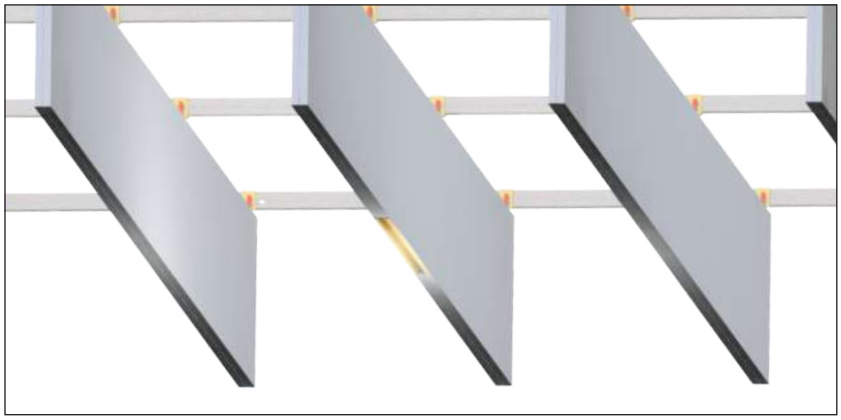
This symbiosis is created for ideal use in our baffles:
LED lighting integrated in the baffles not only improves the light situation in the room, the baffles additionally improve its acoustics. Optionally, the light elements can be supplied in a DALI-controllable version.

To guarantee a long service life, only renowned top-notch-quality brand products are used, corresponding to different room requirements.

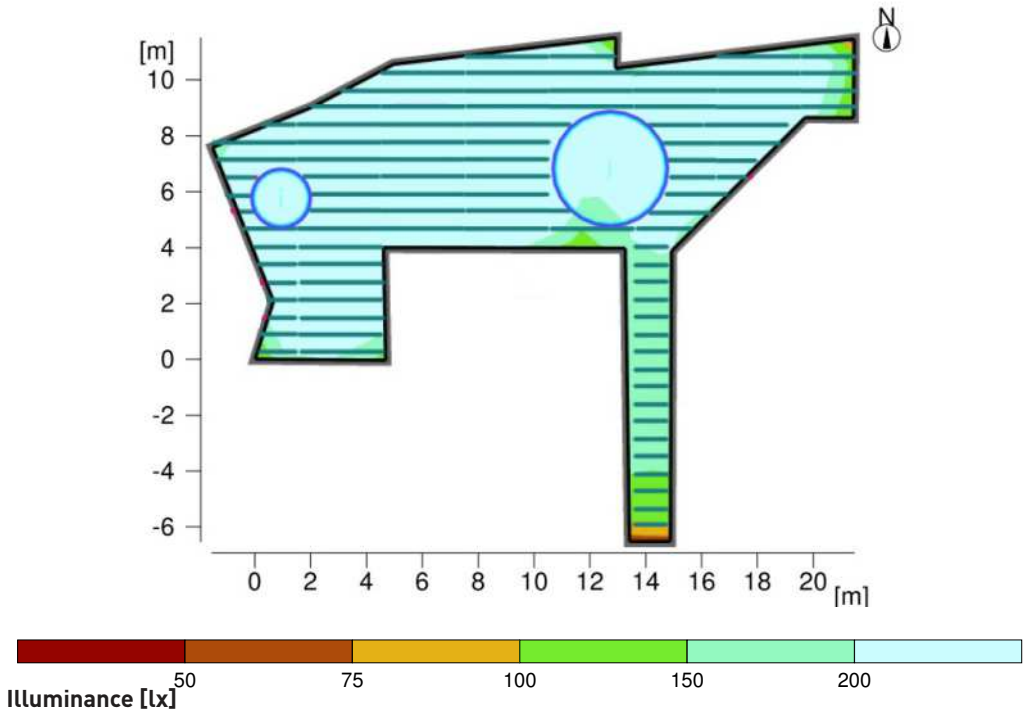
So if you opt for baffles with LED lighting, you do not just produce wonderful highlights and facilitate active lighting, you can also choose from a wide range of colours: In addition to the standard profile colours white and black, the profiles can be powder-coated in RAL colours and adapted to the colour of the baffles. On request, covers can be made in transparent, opal or black.

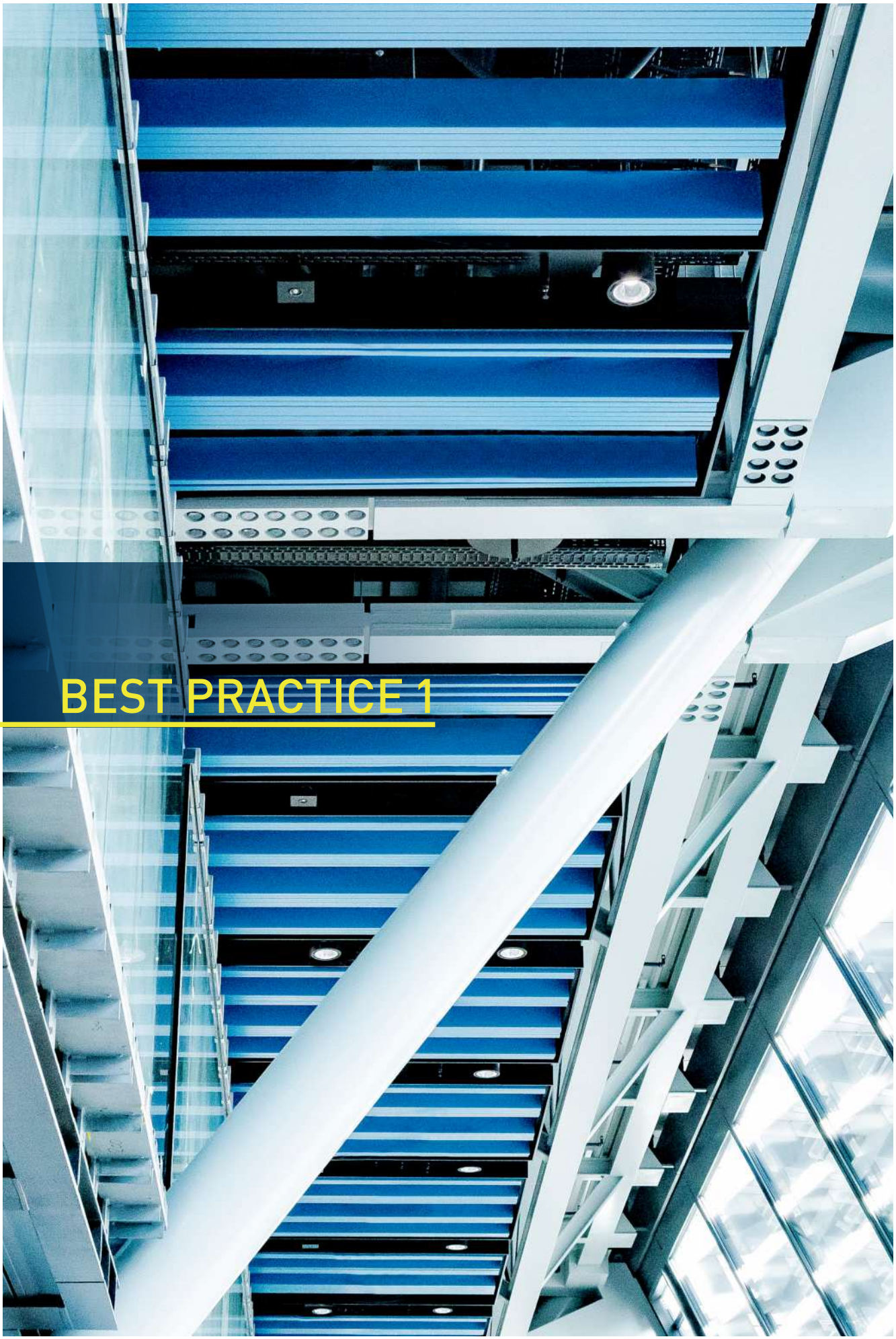
LED lighting can be integrated into baffles, can be configured in various colours and colour temperatures (2400–6000 K) and is prefabricated for 230 V ready for connection.

In summary, alongside a brilliant aesthetic effect, our baffles with integrated LED-lighting improve the auditory and visual aspects of a room, and there are no limits to creative ideas.



Lighting data		**Evaluation area 1**	**Utilisation level 1.1**
Height of light fixture level:	2.70 m		horizontal
Maintenance factor:	0.80	EM:	326 lx
Total luminous flux		Emin:	167 lx
of all light fixtures	93,240 lumen.	Emin/Em (Uo):	0.51
Overall power:	1,368.0 W	Emin/Emax (Ud):	0.34
Overall power		Position:	0.00 m
per space (159.90 m²):	8.56 W/m² (2.63 W/m²/100 lx)	Cover:	Frost



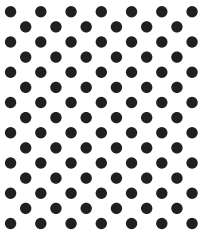


BEST PRACTICE 1

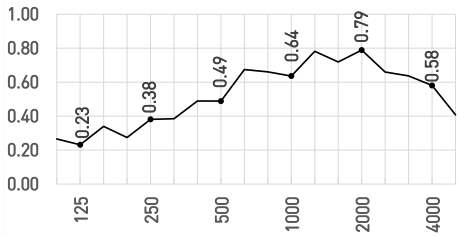
Geneva Airport

In the open high-tech architecture of the new "Aile Est" terminal with a length of 520 metres, the former long-distance terminal built in 1975, our baffle ceiling is a major player in both technical and aesthetic terms. With a total of 480 million euros, the building is a strategic investment Geneva Airport as the client made for the future. The baffle ceiling system used contributes significantly to the optimisation of the climate and the acoustics in this ultra-modern check-in building.

Architecture	Rogers Stirk Harbour + Partners
Ceiling system	Baffles, aprons
Area of metal ceilings	52,000 running metres
Material	Galvanized sheet steel
Surface	powder-coated: RAL 5005, 5012, 6018, 1023, 2003, 3001, 4006 (baffles); RAL 9005 (aprons)
Perforation	Fural Rd 1.5 - 22%
Perforation Ø	1.5 mm
Percentage of holes	22%
Perforation width max	1,488 mm
Ref. according to DIN 24041	Rd 1.50 - 2.83
Distance horizontal	4.00 mm →
Distance vertical	2.00 mm ↓
Distance diagonal	2.83 mm ↘
Perforation direction	→

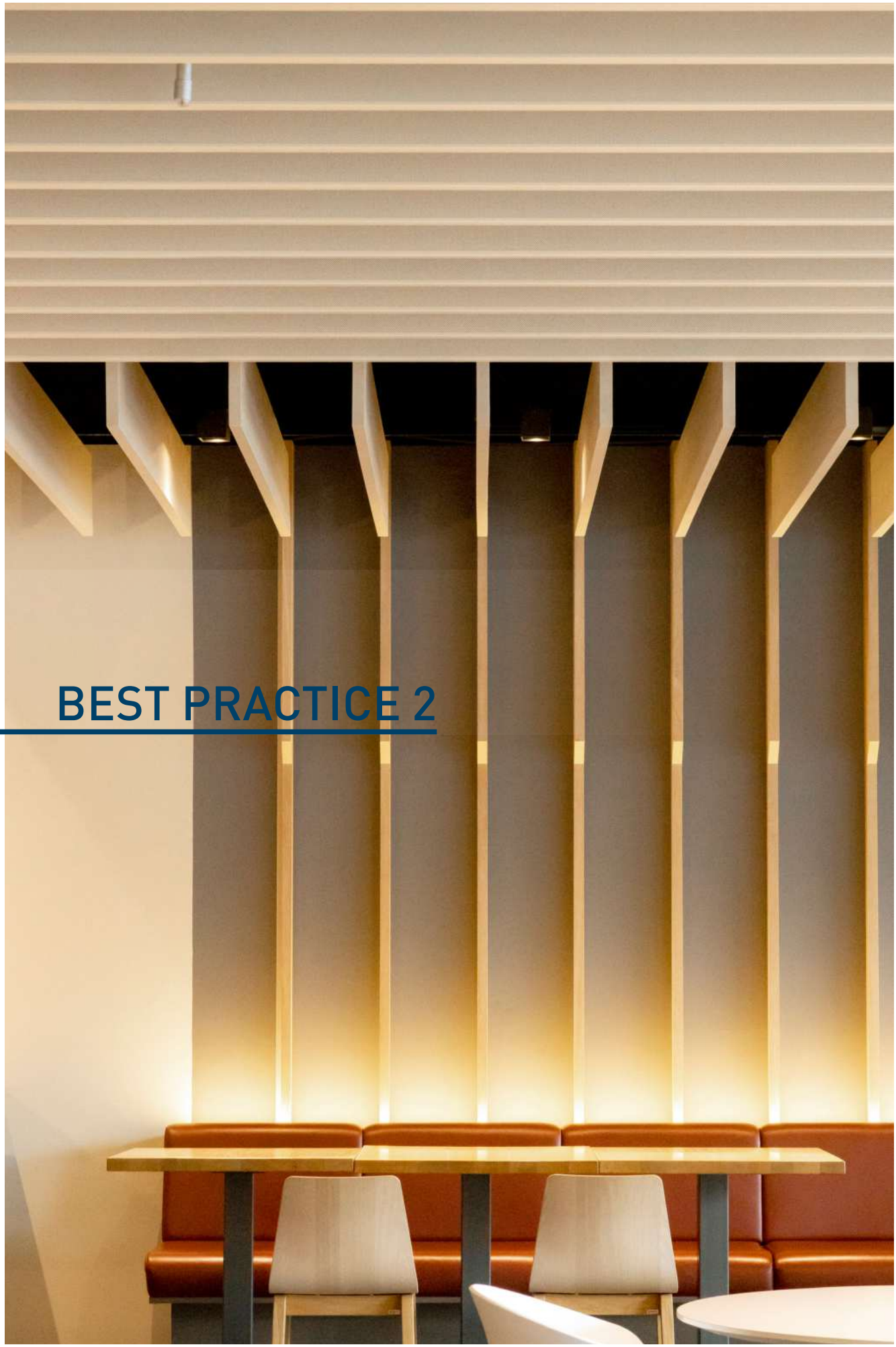


Calculated sound absorption level*



Baffle height	220 mm
Baffle thickness	35 mm
Filling	Rock wool
Type of filling	in PE foil 40 kg/m²
Suspension height	300 mm
Centre to centre distance	110 mm
Cooling	80 mm heat conducting sheet metal
Baffle type	Two-piece
a_w	0.55
Absorber class	D
Shape indicator	M, H
NRC	0.55

* Absorptions were calculated using interpolations. Tested by external room engineering office.



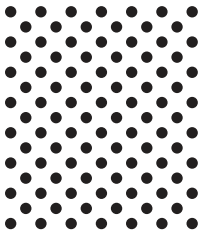
BEST PRACTICE 2

UBS Zurich

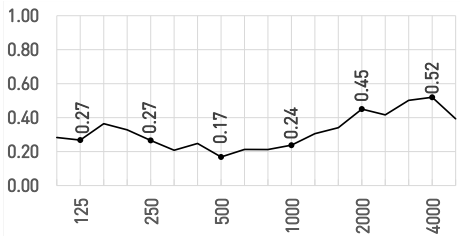
The ZFV Group is one of the largest Swiss companies in the field of hotels, restaurants and bakeries. It comprises around 200 establishments – one of them is the UBS Restaurant Flur in Zurich. It is one of staff restaurants of the Group and serves internal and external guests from Monday to Friday. The restaurant is equipped with baffles from Metalit. The 164 baffles ensure agreeable room acoustics in the open-plan restaurant and are a definite design element.

Ceiling system	Baffle
Area of metal ceilings	506 running metres
Material	Galvanized sheet steel
Surface	NCS S 2005-Y20R matt

Perforation	Fural Rd 1.5 - 22%
Perforation Ø	1.5 mm
Percentage of holes	22%
Perforation width max	1,488 mm
Ref. according to DIN 24041	Rd 1.50 - 2.83
Distance horizontal	4.00 mm →
Distance vertical	2.00 mm ↓
Distance diagonal	2.83 mm ↘
Perforation direction	→

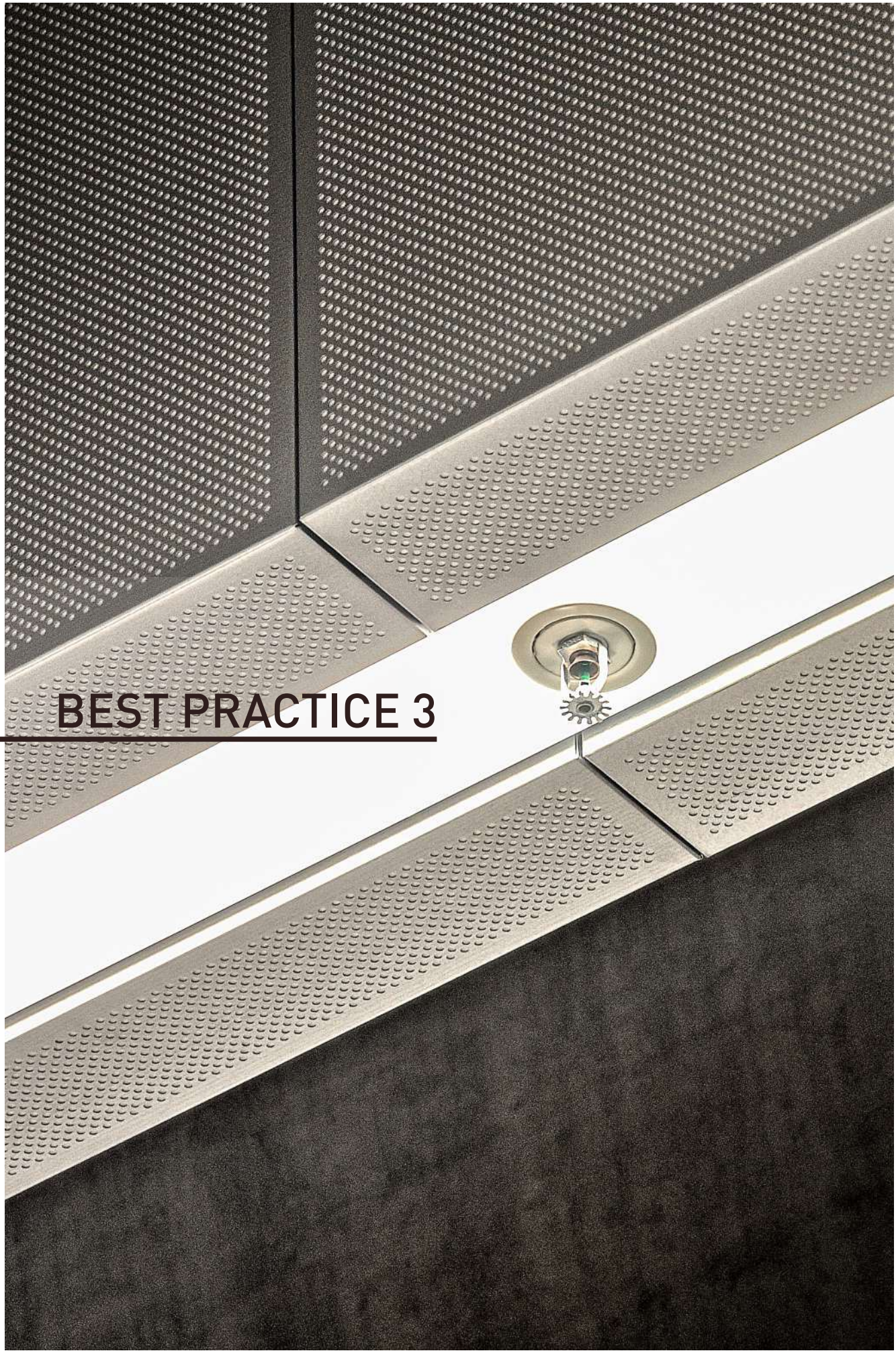


Calculated sound absorption level*



Baffle height	244 mm
Baffle thickness	30 mm
Filling	Acoustic fleece
Type of filling	in black 35 kg/m³
Suspension height	150 mm
Centre to centre distance	350 mm
Cooling	None
Baffle type	One-piece
α_w	0.25
Absorber class	E
Shape indicator	L, H
NRC	0.30

* Absorptions were calculated using interpolations. Tested by external room engineering office.



BEST PRACTICE 3

Sports equipment manufacturer, Herzogenaurach

The "HalfTime" building belongs to the campus of a sports equipment manufacturer in Herzogenaurach. Covering an area of 15,500 m², the new building offers plenty of space for employees, brand ambassadors and visitors. In addition to a spacious cafeteria, "HalfTime" houses meeting rooms, conference centres and showrooms. Between the long concrete struts of the ceiling, the baffles give the impression of an elongated strip. The visual strip effect is amplified by the light channel between the baffle rows. In general, the baffles are essential to the room acoustics of the building, since the rooms are very much open-plan.

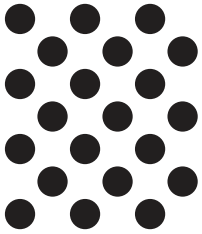
Architecture COBE

Ceiling system Baffle, clip-on system

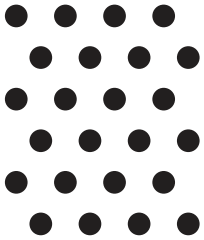
Area of metal ceilings	5,000 running metres
Material	Galvanized sheet steel
Surface	Bare/galvanised; powder coated: RAL 9010; Parzifal®: RAL 9006

Perforation

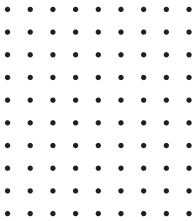
	Fural
	Rd 4.0 - 33%
Perforation Ø	4.0 mm
Percentage of holes	33%
Perforation width max	1,450 mm
Ref. according to DIN 24041	Rd 4.00 - 6.10
Distance horizontal	8.60 mm →
Distance vertical	4.30 mm ↓
Distance diagonal	6.10 mm ↘
Perforation direction	→



	Rv 3.0 - 20%
Perforation Ø	3.0 mm
Percentage of holes	20%
Perforation width max	1,402 mm
Ref. according to DIN 24041	Rv 3.00 - 6.35
Distance horizontal	6.35 mm →
Distance vertical	5.50 mm ↓
Distance diagonal	6.35 mm ↘
Perforation direction	→



	Rg 0.7 - 4 %
Perforation Ø	0.7 mm
Percentage of holes	4%
Perforation width max	1,197 mm
Ref. according to DIN 24041	Rg 0.70 - 3.00
Distance horizontal	3.00 mm →
Distance vertical	3.00 mm ↓
Distance diagonal	4.24 mm ↘
Perforation direction	→



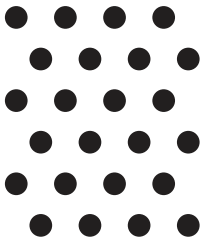
BEST PRACTICE 4

"The jumps in height of the baffles come from the extended imagined line of the crossing of the south and north wings of the floors above."
(Hans Niedermaier, FUN Architekten)

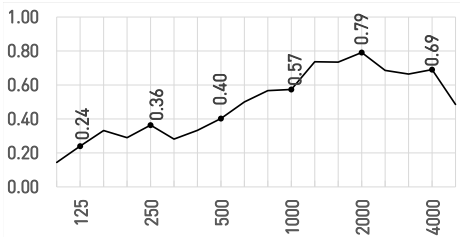
Anton Fingerle Education Centre, Munich

The Anton Fingerle Education Centre is operated by the Department of Education and Sport of the state capital of Munich and houses several municipal technical schools and academies. The Centre, which provides training in the field of occupational therapy, has given itself the following motto: "The human being takes centre stage". The new baffle ceilings in the lobby matches this philosophy, since they significantly improve the room acoustics and their colour scheme makes the large ceiling surfaces look far more friendlier.

Architecture	FUN Architekten
Ceiling system	Baffle
Area of metal ceilings	7,900 running metres
Material	Galvanized sheet steel
Surface	Powder-coated, RAL 9010, NCS S0520-B10G, NCS S0540-B10G
Perforation	Fural
	Rv 3.0 - 20%
Perforation Ø	3.0 mm
Percentage of holes	20%
Perforation width max	1,402 mm
Ref. according to DIN 24041	Rv 3.00 - 6.35
Distance horizontal	6.35 mm →
Distance vertical	5.50 mm ↓
Distance diagonal	6.35 mm ↘
Perforation direction	→

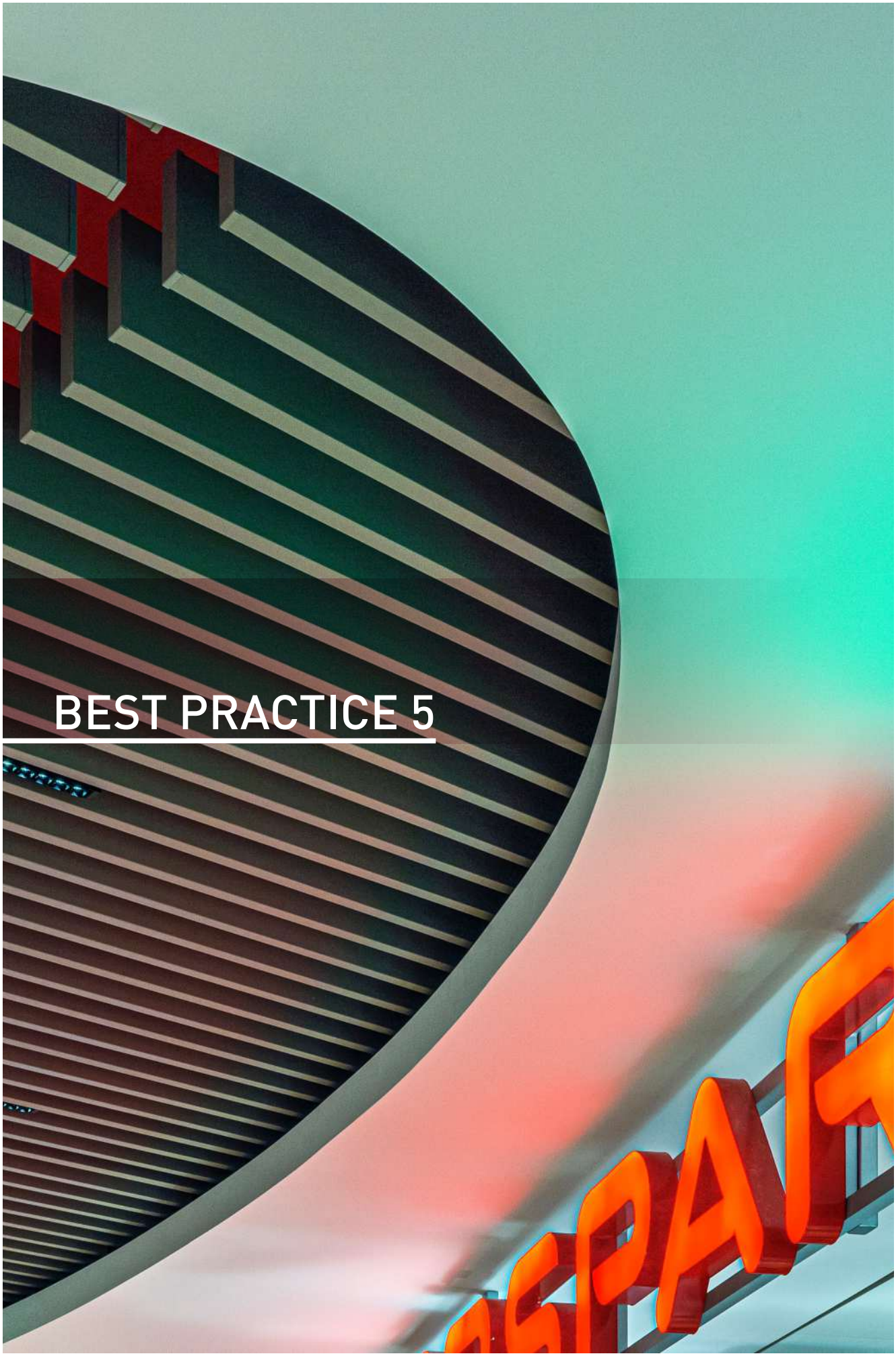


Calculated sound absorption level*



Baffle height	150 mm
Baffle thickness	32 mm
Filling	Rock wool
Type of filling	in PE foil 44 kg/m³
Suspension height	600 mm
Centre to centre distance	170 mm
Cooling	None
Baffle type	Two-piece
α_w	0.50
Absorber class	D
Shape indicator	M, H
NRC	0.55

* Absorptions were calculated using interpolations. Tested by external room engineering office.



BEST PRACTICE 5

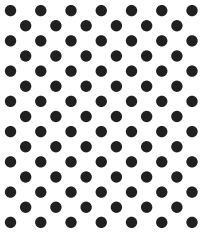
Interspar hypermarket, Bregenz	"Interspar" is the largest subsidiary of "Spar Austria" and is also the market leader in the area of hypermarkets in Austria. Since 1970, this concept of large markets serves the end-to-end supply to consumers. "Interspar" is the largest wine trader in Austria, for instance. The focus today is on the shopping adventure and thus on the topics of atmosphere and quality of stay. Partial baffle ceilings from our company are an important team player here and improve both the acoustics and appearance.
Architecture	Kulmus Bügelmayer GmbH
Ceiling system	Baffle
Area of metal ceilings	751 running metres
Material	Galvanized sheet steel
Surface	Powder-coated, RAL 4201
Perforation	Fural Smooth
Baffle height	150 mm
Baffle thickness	30 mm
Centre to centre distance	130 mm
Cooling	None
Baffle type	One-piece

BEST PRACTICE 6

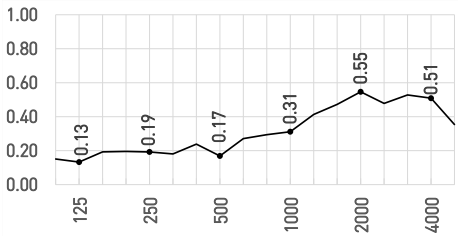
Restaurant Bellerive au Lac at Hotel Ameron, Zurich Bellerive au Lac

In high-quality catering operations like the hotel industry, the well-being of the guests, both mentally and physically, is the absolute benchmark. In terms of acoustics, interior climate and appearance. In busy areas such as restaurants and bars, in particular, a few stratagems are required in this respect. We are delighted that our baffle ceiling makes the stay pleasant and agreeable for the guests looking at the lakeside resort "Utoquai" on Lake Zurich. The ceiling system is highly effective in terms of acoustics and at the same time equipped with heating and cooling elements.

Architecture	Monoplan AG
Ceiling system	Baffle
Area of metal ceilings	384 running metres
Material	Galvanized sheet steel
Surface	Powder-coated, RAL 8022
Perforation	Fural
	Rd 1.5 - 22%
Perforation Ø	1.5 mm
Percentage of holes	22%
Perforation width max	1,488 mm
Ref. according to DIN 24041	Rd 1.50 - 2.83
Distance horizontal	4.00 mm →
Distance vertical	2.00 mm ↓
Distance diagonal	2.83 mm ↘
Perforation direction	→

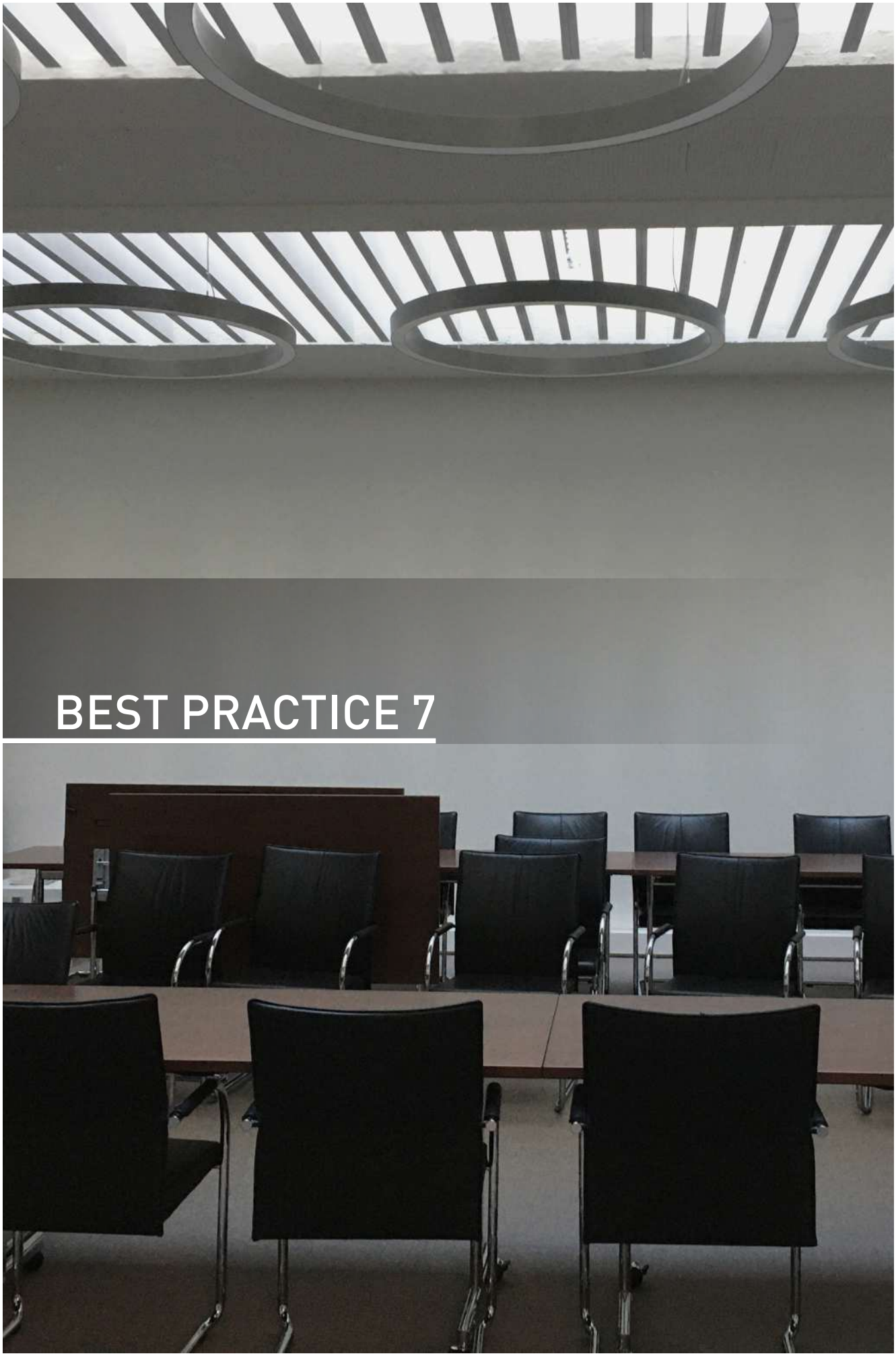


Calculated sound absorption level*



Baffle height	200 mm
Baffle thickness	35 mm
Filling	Rock wool
Type of filling	in PE foil 40 kg/m³
Suspension height	1,500 mm
Centre to centre distance	300 mm
Cooling	70 mm heat conducting sheet
Baffle type	One-piece
α_w	0.50
Absorber class	D
Shape indicator	L, H
NRC	0.30

* Absorptions were calculated using interpolations. Tested by external room engineering office.

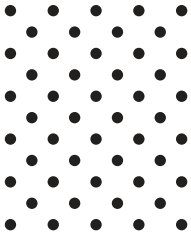


BEST PRACTICE 7

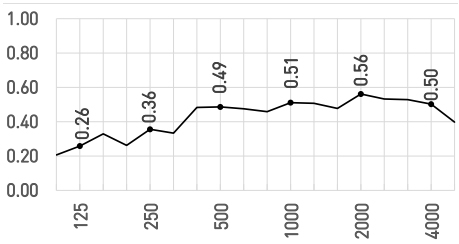
EU embassy, Bern

Places where important decisions are made concerning policies and the public sphere require special framework conditions: In the EU Embassy in Bern, for instance, a space was created to conduct negotiations and conclude treaties in the best possible way and to act as conscientious representative of the European Union in the Member States. To carry out these responsible activities optimally, the baffle system was installed that boasts an impressive design and has acoustic and cooling functions.

Architecture	Hebeisen + Vatter Architekten AG
Ceiling system	Baffle
Area of metal ceilings	198 running metres
Material	Galvanized sheet steel
Surface	Powder-coated, RAL 9016 matt
Perforation	Fural Rd 1.5 - 11% Over edge
Perforation Ø	1.5 mm
Percentage of holes	11%
Perforation width max	1,488 mm
Ref. according to DIN 24041	Rg 1.50 - 4.00
Distance horizontal	4.00 mm →
Distance vertical	4.00 mm ↓
Distance diagonal	5.65 mm ↘
Perforation direction	→



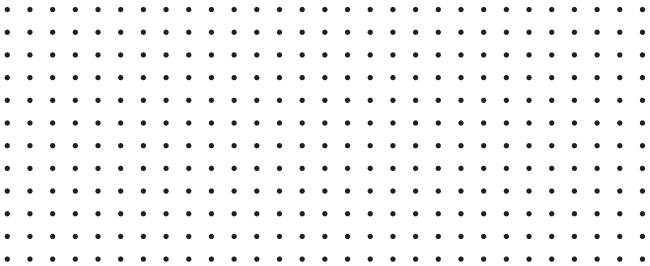
Calculated sound absorption level*



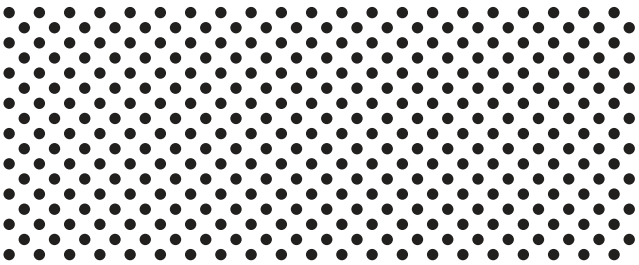
Baffle height	300 mm
Baffle thickness	50 mm
Filling	Acoustic fleece
Suspension height	850 mm
Centre to centre distance	150 mm
Cooling	60 mm WLP
Baffle type	Two-piece
α_w	0.50
Absorber class	D
Shape indicator	H
NRC	0.50

* Absorptions were calculated using interpolations. Tested by external room engineering office.

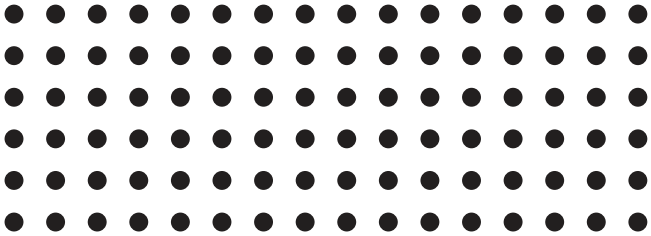
PERFORATIONS TESTED



	Fural
	Rg 0.7 - 4 %
Perforation Ø	0.7 mm
Percentage of holes	4%
Perforation width max	1,197 mm
Ref. according to DIN 24041	Rg 0.70 - 3.00
Distance horizontal	3.00 mm →
Distance vertical	3.00 mm ↓
Distance diagonal	4.24 mm ↘
Perforation direction	→
Overall structure	200 mm
Fleece	Acoustic fleece glued in
Test certificate	31.08.2007 P-BA 219/2007
NRC	0.80
α_w	0.75 (LM)
Absorber class	C (DIN EN 11654)
Lining	Without



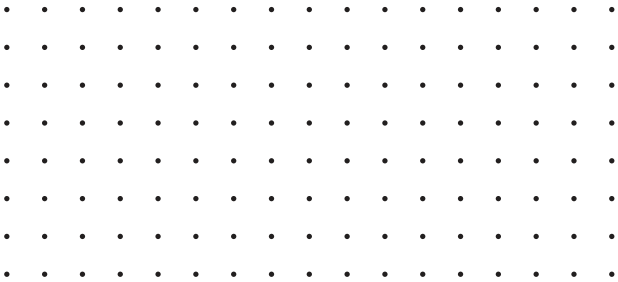
	Fural
	Rd 1.5 - 22%
Perforation Ø	1.5 mm
Percentage of holes	22%
Perforation width max	1,488 mm
Ref. according to DIN 24041	Rd 1.50 - 2.83
Distance horizontal	4.00 mm →
Distance vertical	2.00 mm ↓
Distance diagonal	2.83 mm ↘
Perforation direction	→
Overall structure	200 mm
Fleece	Acoustic fleece glued in
Test certificate	07.12.2010 M 61840/5
NRC	0.70
α_w	0.70
Absorber class	C (DIN EN 11654)
Lining	Without



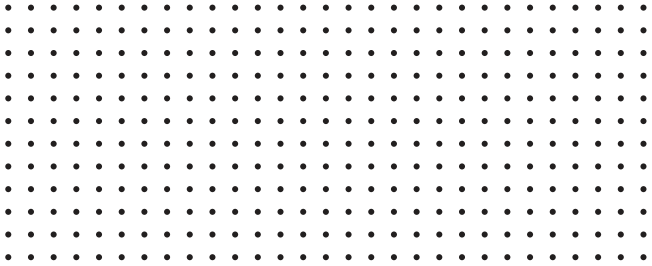
	Fural
	Rg 2.5 - 16 %
Perforation Ø	2.5 mm
Percentage of holes	16%
Perforation width max	1,460 mm
Ref. according to DIN 24041	Rg 2.50 - 5.50
Distance horizontal	5.50 mm →
Distance vertical	5.50 mm ↓
Distance diagonal	7.78 mm ↘
Perforation direction	→
Overall structure	200 mm
Fleece	Acoustic fleece glued in
Test certificate	14.12.2006 P-BA 279/2006 Picture 1
NRC	0.80
α_w	0.80
Absorber class	B (DIN EN 11654)
Lining	Without

OTHER AVAILABLE PERFORATIONS*

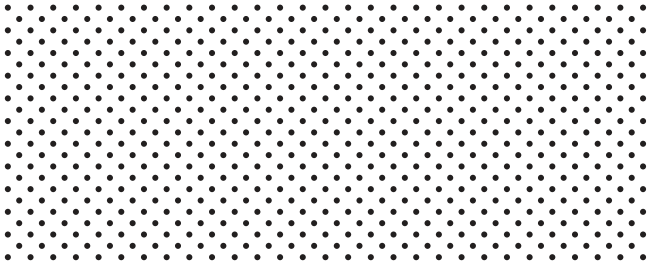
	Fural
	Rg 0.7 - 1%
Perforation Ø	0.7 mm
Percentage of holes	1%
Perforation width max	1,197 mm
Ref. according to DIN 24041	Rg 0.70 - 6.00
Distance horizontal	6.00 mm →
Distance vertical	6.00 mm ↓
Distance diagonal	8.48 mm ↘
Perforation direction	→



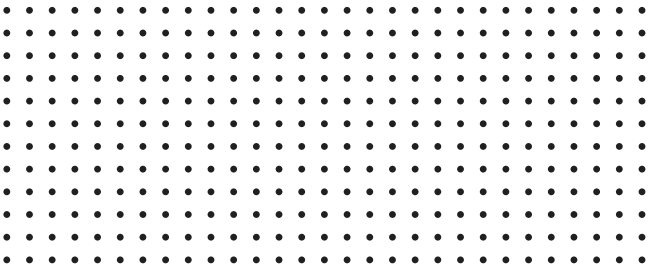
	Fural
	Rg 0.7 - 1.5%
Perforation Ø	0.7 mm
Percentage of holes	1.5%
Perforation width max	1,400 mm
Ref. according to DIN 24041	Rg 0.70 - 5.00
Distance horizontal	5.00 mm →
Distance vertical	5.00 mm ↓
Distance diagonal	7.07 mm ↘
Perforation direction	→



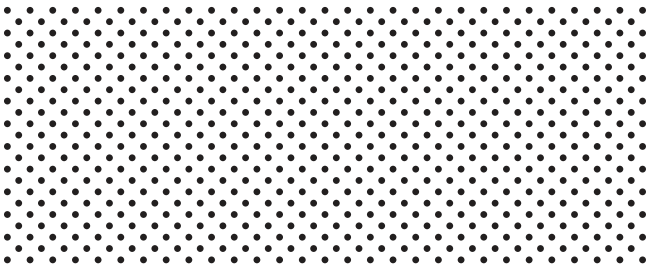
	Fural
	Rg 0.8 - 6%
Perforation Ø	0.8 mm
Percentage of holes	6%
Perforation width max	800 mm
Ref. according to DIN 24041	Rg 0.80 - 3.00
Distance horizontal	3.00 mm →
Distance vertical	3.00 mm ↓
Distance diagonal	4.24 mm ↘
Perforation direction	→



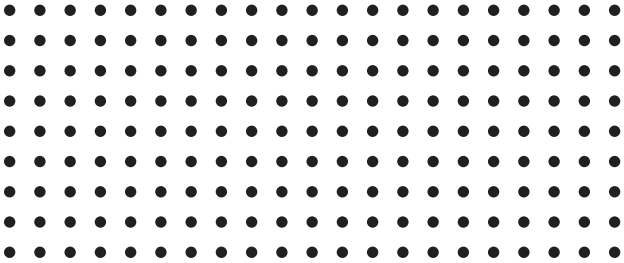
	Fural
	Rd 0.8 - 11%
Perforation Ø	0.8 mm
Percentage of holes	11%
Perforation width max	800 mm
Ref. according to DIN 24041	Rd 0.80 - 2.12
Distance horizontal	3.00 mm →
Distance vertical	1.50 mm ↓
Distance diagonal	2.12 mm ↘
Perforation direction	→



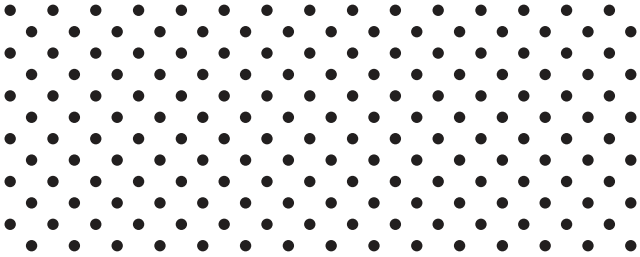
	Fural
	Rg 0.9 - 7 %
Perforation Ø	0.9 mm
Percentage of holes	7%
Perforation width max	1,022 mm
Ref. according to DIN 24041	Rg 0.90 - 3.00
Distance horizontal	3.00 mm →
Distance vertical	3.00 mm ↓
Distance diagonal	4.24 mm ↘
Perforation direction	→



	Fural
	Rd 0.9 - 14%
Perforation Ø	0.9 mm
Percentage of holes	14%
Perforation width max	1,022 mm
Ref. according to DIN 24041	Rd 0.90 - 2.12
Distance horizontal	1.50 mm →
Distance vertical	1.50 mm ↓
Distance diagonal	2.12 mm ↘
Perforation direction	→



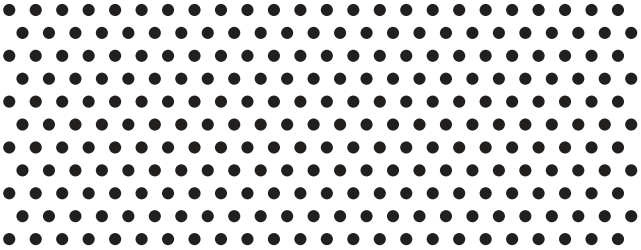
	Fural
	Rg 1.5 - 11 %
Perforation Ø	1.5 mm
Percentage of holes	11%
Perforation width max	1,488 mm
Ref. according to DIN 24041	Rg 1.50 - 4.00
Distance horizontal	4.00 mm →
Distance vertical	4.00 mm ↓
Distance diagonal	5.65 mm ↘
Perforation direction	→



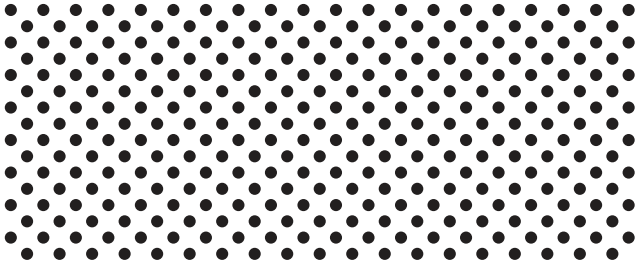
	Fural
	Rd 1.5 - 11%
Perforation Ø	1.5 mm
Percentage of holes	11%
Perforation width max	1,470 mm
Ref. according to DIN 24041	Rd 1.50 - 4.00
Distance horizontal	5.66 mm →
Distance vertical	2.83 mm ↓
Distance diagonal	4.00 mm ↘
Perforation direction	→

* Perforations are calculated using interpolations.

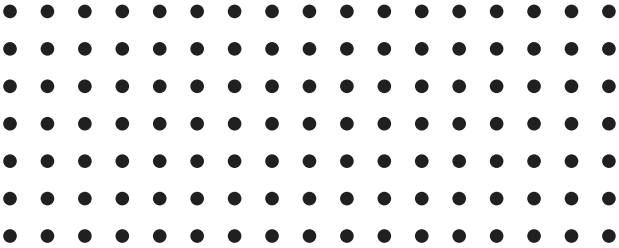
OTHER AVAILABLE PERFORATIONS*



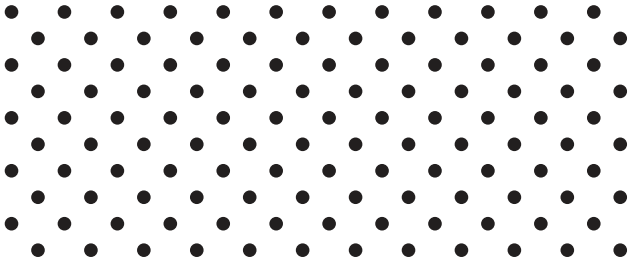
	Fural
	Rv 1.6 - 20%
Perforation Ø	1.6 mm
Percentage of holes	20%
Perforation width max	1,450 mm
Ref. according to DIN 24041	Rv 1.60 - 3.50
Distance horizontal	3.50 mm →
Distance vertical	3.03 mm ↓
Distance offset 60°	3.50 mm ↘
Perforation direction	→



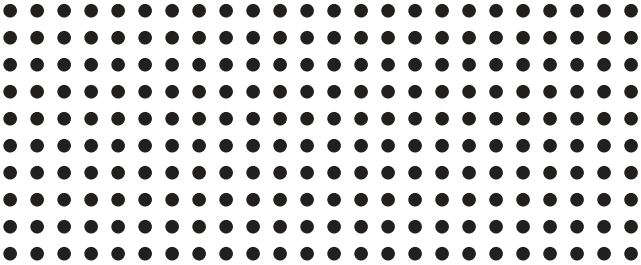
	Fural
	Rd 1.6 - 22%
Perforation Ø	1.6 mm
Percentage of holes	22%
Perforation width max	636.4 mm
Ref. according to DIN 24041	Rd 1.60 - 3.00
Distance horizontal	4.30 mm →
Distance vertical	2.15 mm ↓
Distance diagonal	3.00 mm ↘
Perforation direction	→



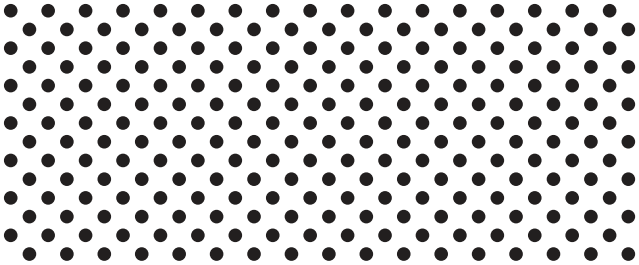
	Fural
	Rg 1.8 - 10 %
Perforation Ø	1.8 mm
Percentage of holes	10%
Perforation width max	1,400 mm
Ref. according to DIN 24041	Rg 1.80 - 4.95
Distance horizontal	4.95 mm →
Distance vertical	4.95 mm ↓
Distance diagonal	7.00 mm ↘
Perforation direction	→



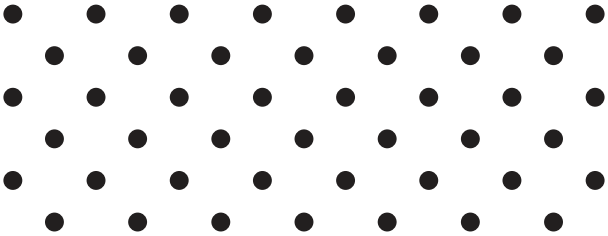
	Fural
	Rd 1.8 - 10%
Perforation Ø	1.8 mm
Percentage of holes	10%
Perforation width max	728 mm
Ref. according to DIN 24041	Rd 1.80 - 4.95
Distance horizontal	7.00 mm →
Distance vertical	3.50 mm ↓
Distance diagonal	4.95 mm ↘
Perforation direction	→



	Fural
	Rg 1.8 - 20 %
Perforation Ø	1.8 mm
Percentage of holes	20%
Perforation width max	632 mm
Ref. according to DIN 24041	Rg 1.80 - 3.57
Distance horizontal	3.57 mm →
Distance vertical	3.57 mm ↓
Distance diagonal	5.04 mm ↘
Perforation direction	→



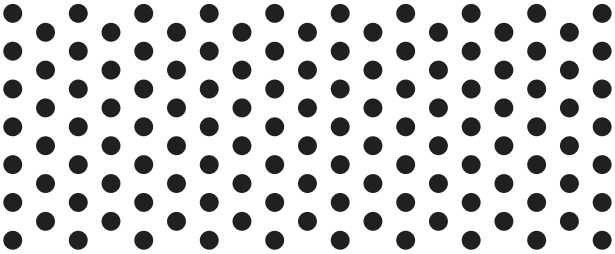
	Fural
	Rd 1.8 - 21%
Perforation Ø	1.8 mm
Percentage of holes	21%
Perforation width max	1,400 mm
Ref. according to DIN 24041	Rd 1.80 - 3.50
Distance horizontal	4.96 mm →
Distance vertical	2.48 mm ↓
Distance diagonal	3.50 mm ↘
Perforation direction	→



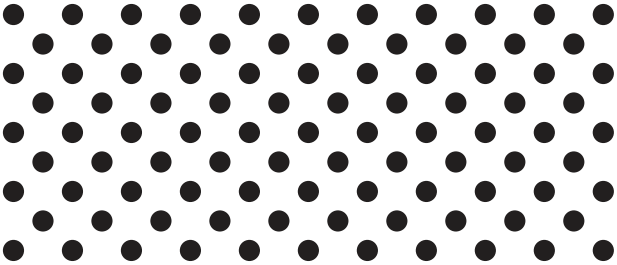
	Fural
	Rd 2.5 - 8%
Perforation Ø	2.5 mm
Percentage of holes	8%
Perforation width max	1,460 mm
Ref. according to DIN 24041	Rd 2.50 - 7.80
Distance horizontal	11.0 mm →
Distance vertical	5.50 mm ↓
Distance diagonal	7.78 mm ↘
Perforation direction	→

* Perforations are calculated using interpolations.

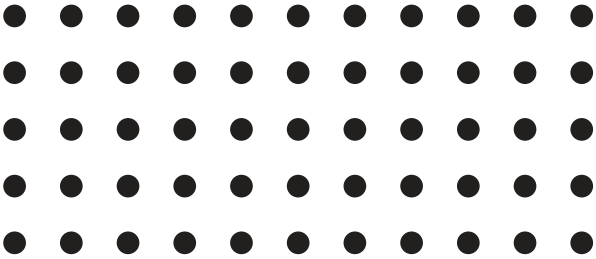
OTHER AVAILABLE PERFORATIONS*



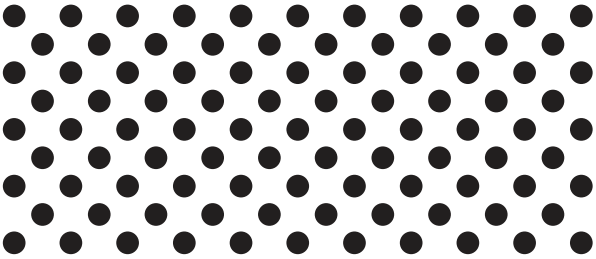
	Fural
	Rv 2.5 - 23%
Perforation Ø	2.5 mm
Percentage of holes	23%
Perforation width max	1,467 mm
Ref. according to DIN 24041	Rv 2.50 - 5.00
Distance horizontal	8.66 mm →
Distance vertical	2.50 mm ↓
Distance offset 60°	5.00 mm ↘
Perforation direction	→



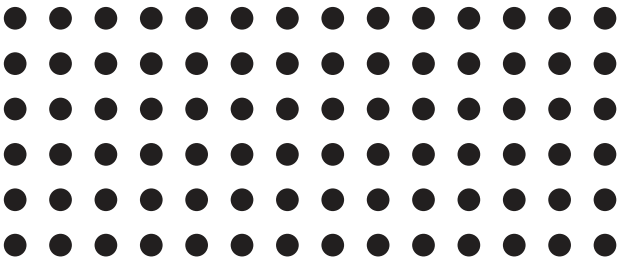
	Fural
	Rd 2.8 - 20%
Perforation Ø	2.8 mm
Percentage of holes	20%
Perforation width max	627.9 mm
Ref. according to DIN 24041	Rd 2.80 - 5.50
Distance horizontal	7.80 mm →
Distance vertical	3.90 mm ↓
Distance diagonal	5.50 mm ↘
Perforation direction	→



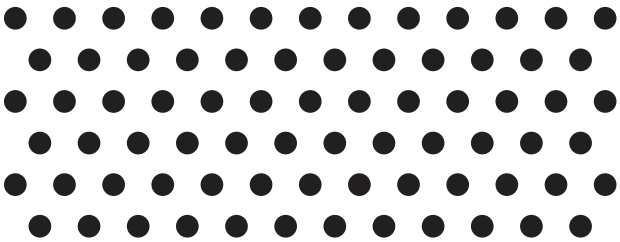
	Fural
	Rg 3.0 - 12 %
Perforation Ø	3.0 mm
Percentage of holes	12%
Perforation width max	877.5 mm
Ref. according to DIN 24041	Rg 3.00 - 7.50
Distance horizontal	7.50 mm →
Distance vertical	7.50 mm ↓
Distance diagonal	10.6 mm ↘
Perforation direction	→



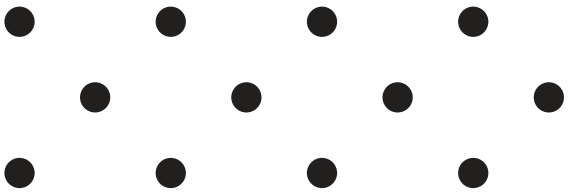
	Fural
	Rd 3.0 - 24%
Perforation Ø	3.0 mm
Percentage of holes	24%
Perforation width max	877.5 mm
Ref. according to DIN 24041	Rd 3.00 - 5.30
Distance horizontal	7.50 mm →
Distance vertical	3.75 mm ↓
Distance diagonal	5.30 mm ↘
Perforation direction	→



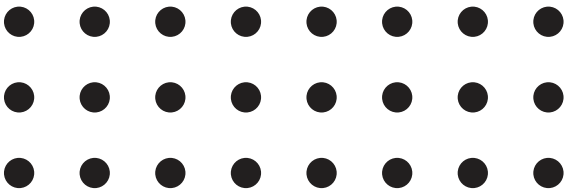
	Fural
	Rg 3.0 - 20 %
Perforation Ø	3.0 mm
Percentage of holes	20%
Perforation width max	1,434 mm
Ref. according to DIN 24041	Rg 3.00 - 6.00
Distance horizontal	6.0 mm →
Distance vertical	6.0 mm ↓
Distance diagonal	8.48 mm ↘
Perforation direction	→



	Fural
	Rv 3.0 - 20%
Perforation Ø	3.0 mm
Percentage of holes	20%
Perforation width max	1,402 mm
Ref. according to DIN 24041	Rv 3.00 - 6.35
Distance horizontal	6.35 mm →
Distance vertical	5.50 mm ↓
Distance offset 60°	6.35 mm ↘
Perforation direction	→



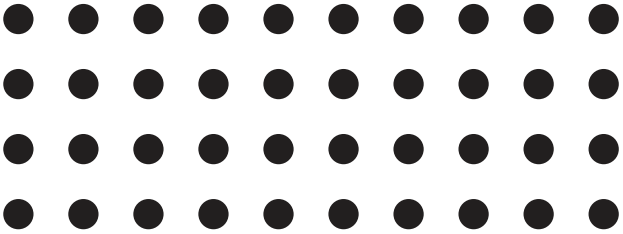
	Fural
	Rd 4.0 - 6%
Perforation Ø	4.0 mm
Percentage of holes	6%
Perforation width max	680 mm
Ref. according to DIN 24041	Rd 4.00 - 14.14
Distance horizontal	20.00 mm →
Distance vertical	10.00 mm ↓
Distance diagonal	14.14 mm ↘
Perforation direction	→



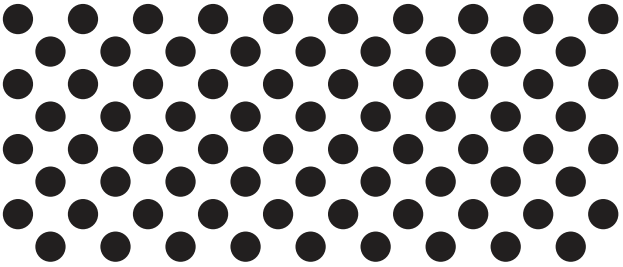
	Fural
	Rg 4.0 - 12 %
Perforation Ø	4.0 mm
Percentage of holes	12%
Perforation width max	680 mm
Ref. according to DIN 24041	Rg 4.00 - 10.00
Distance horizontal	10.00 mm →
Distance vertical	10.00 mm ↓
Distance diagonal	14.14 mm ↘
Perforation direction	→

* Perforations are calculated using interpolations.

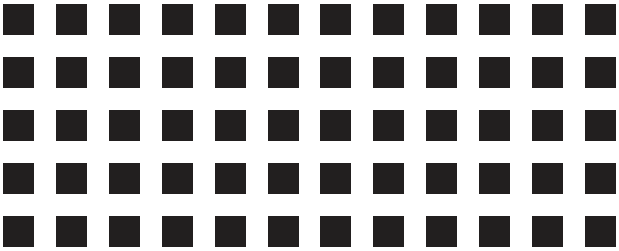
OTHER AVAILABLE PERFORATIONS*



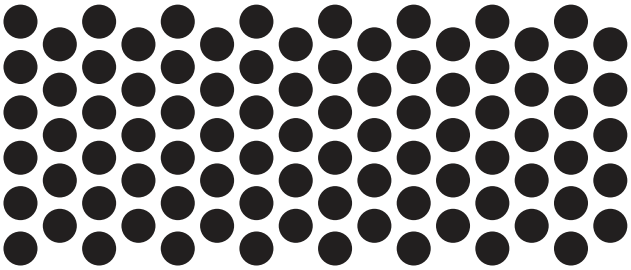
	Fural
	Rg 4.0 - 17 %
Perforation Ø	4.0 mm
Percentage of holes	17%
Perforation width max	1,453 mm
Ref. according to DIN 24041	Rg 4.00 - 8.60
Distance horizontal	8.60 mm →
Distance vertical	8.60 mm ↓
Distance diagonal	12.1 mm ↘
Perforation direction	→



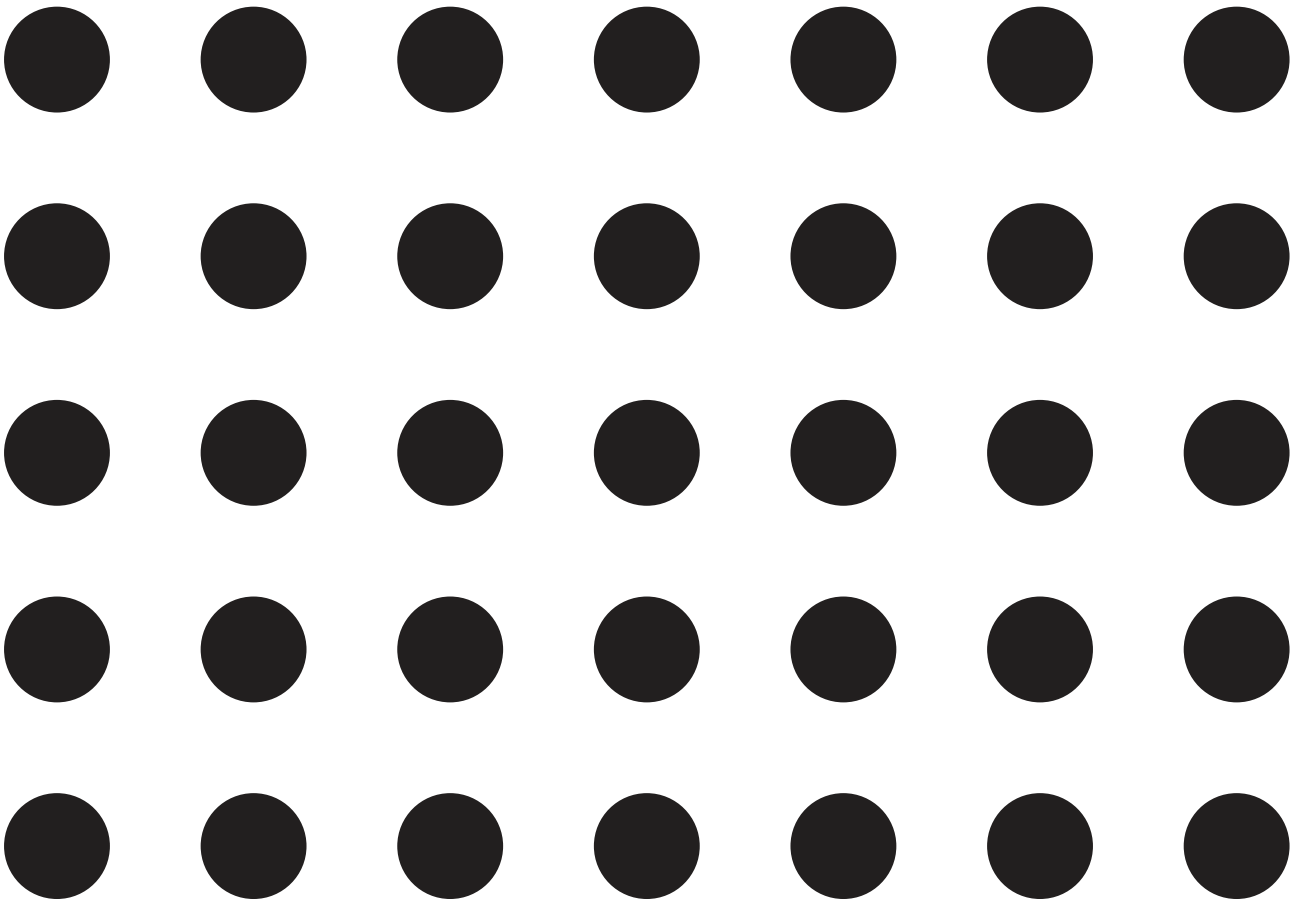
	Fural
	Rd 4.0 - 33%
Perforation Ø	4.0 mm
Percentage of holes	33%
Perforation width max	1,450 mm
Ref. according to DIN 24041	Rd 4.00 - 6.10
Distance horizontal	8.60 mm →
Distance vertical	4.30 mm ↓
Distance diagonal	6.10 mm ↘
Perforation direction	→



	Fural
	Qg 4.0 - 33%
Perforation	4.0 mm
Percentage of holes	33%
Perforation width max	630 mm
Ref. according to DIN 24041	Qg 4.00 - 7.00
Distance horizontal	7.00 mm →
Distance vertical	7.00 mm ↓
Distance diagonal	9.89 mm ↘
Perforation direction	→



	Fural
	Rv 4.5 - 51%
Perforation Ø	4.5 mm
Percentage of holes	51%
Perforation width max	627 mm
Ref. according to DIN 24041	Rv 4.50-6.00
Distance horizontal	10.4 mm →
Distance vertical	3.00 mm ↓
Distance offset 60°	6.00 mm ↘
Perforation direction	→



	Fural
	Rg 14.0 - 23%
Perforation Ø	14.0 mm
Percentage of holes	23%
Perforation width max	598 mm
Ref. according to DIN 24041	Rg 14.00 - 26.00
Distance horizontal	26.00 mm →
Distance vertical	26.00 mm ↓
Distance diagonal	36.76 mm ↘
Perforation direction	→

* Perforations are calculated using interpolations.

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