



# **ROOM-IN-ROOM SYSTEMS**

**QUIET. BRIGHT. COSY.**



A photograph of a modern building facade with a grid of panels. The Lindner logo, a stylized 'L' in a square, is mounted on the wall. Below it, the name 'Lindner' is written in large, metallic letters. A dark semi-transparent box is overlaid on the lower part of the image, containing text.

# ADD.VANTAGE RETHINKING SPACES

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

## **STABILITY AND GROWTH**

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

A photograph of an industrial manufacturing environment. In the foreground, a large, flat metal sheet is positioned on a blue industrial machine. The machine has a white protective cover on the right side. In the background, there are several blue metal racks filled with long, thin metal sheets, stacked on wooden pallets. The racks are labeled with numbers like 6015, 6012, and 6011. The floor is made of concrete, and there are some yellow safety barriers on the left side. The overall scene is well-lit, suggesting a clean and organized industrial setting.

**LONG-STANDING  
PRODUCT EXPERIENCE**

## LONG-STANDING PRODUCT EXPERIENCE

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

## OUR PRODUCTION SITES FOR ROOM-IN-ROOM SYSTEMS

### **ARNSTORF – GERMANY**

ceiling, floor and partition systems, luminaires, facades and clean rooms are produced here as well as high-quality carpentry for fitting out interiors of buildings and ships

64,250 m<sup>2</sup> production area

200,000 m<sup>2</sup> company site

### **TAICANG – CHINA**

production of ceiling and partition systems

14,000 m<sup>2</sup> production area

30,000 m<sup>2</sup> company site

### **OSTROV – CZECH REPUBLIC**

production of doors and partition systems

15,000 m<sup>2</sup> production area

30,000 m<sup>2</sup> company site

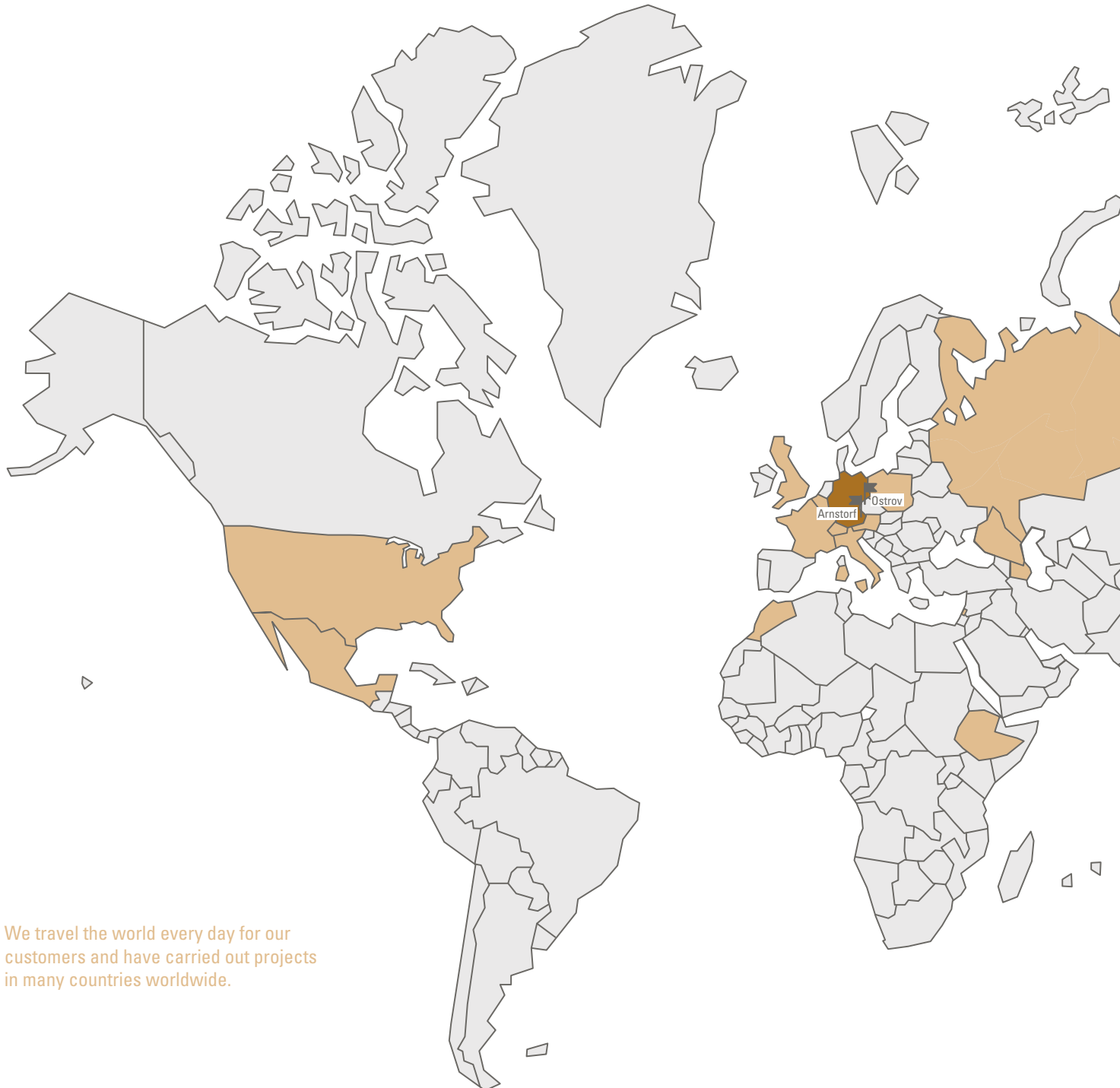


# A GLOBAL PLAYER... WITH ROOTS IN ARNSTORF

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

Contact us at our headquarters in Arnstorf or visit [www.Lindner-Group.com](http://www.Lindner-Group.com) to find your local point of contact.

**Lindner Group | Partitions**  
**Bahnhofstrasse 29 | 94424 Arnstorf | Germany**  
**[partitionsystems@Lindner-Group.com](mailto:partitionsystems@Lindner-Group.com)**



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



## **LINDNER ROOM-IN-ROOM SYSTEMS – GLOBAL REFERENCES**

Airbus, Toulouse, France  
Airbus, Bristol, United Kingdom  
Arch\_Tech\_Lab, ETH Zurich, Switzerland  
Audi, San José Chiapa, Mexico  
Bosch Automotive Products, Suzhou, China  
Breuninger Stuttgart – Head Office, Stuttgart, Germany  
Cube Baku, Azerbaijan  
Cube Beirut, Lebanon  
Cube Rabat, Morocco  
European Embassy, Washington, USA  
European Embassy, Brussels, Belgium  
European Embassy, Addis Ababa, Ethiopia  
European Embassy, Moscow, Russia  
Gruner AG, Basel, Switzerland  
Local Search, Bern, Switzerland  
Mercedes Benz Jawor – Buildings 1 & 3, Jawor, Poland  
Tenant Fit-out at the high-rise Building, Pollux, Frankfurt am Main, Germany  
Prototype Fkontract Building, Bolzano, Italy  
Prototype Lindner Cube, Munich, Germany  
New Lindner Group Headquarters, Arnstorf, Germany  
The „Neue Börse“ in Zurich, Switzerland  
Schindler, Berlin, Germany  
Südtiroler Volksbanken, Cortina, Italy  
Süwag Building C – open space conversion, Frankfurt am Main, Germany  
Swissbau 2018, Basel, Switzerland  
Telegraf 7, Vienna, Austria  
Twist Again, Bern, Switzerland  
Daimler AG Administration Building, Böblingen, Germany  
Westoffice, St. Gallen, Switzerland



# ROOM-IN-ROOM

## INDEPENDENT AND ADAPTABLE

The Lindner Cube Room-in-Room System is a self-contained, free-standing room system that does not need to be connected to surrounding structural elements.

- + maximum productivity: various sound insulation designs ensure an ideal working environment
- + pure flexibility: our modular design principle results in the ability to fluidly adapt to your needs and changing conditions at any time



# ROOM-IN-ROOM SYSTEMS

## **LINDNER CUBE** from page 10

Lindner Cube duo  
Lindner Cube solo  
Lindner Cube phone

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Thermal Comfort  
Acoustics  
Light

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Design  
Media Engineering  
Electrical Engineering  
Indoor Climate



Telegraf 7, Vienna, Austria  
© Hertha Hurnaus








## LINDNER CUBE THE RIGHT ADD-ON

Modern work environments are subject to constant transformation and need to be capable of reacting quickly and easily to new requirements. Exactly like the Room-in-Room System from Lindner. Our Lindner Cubes are replaceable as an entire unit or can be disassembled, so they can adapt to changing spatial arrangements. The Cube offers therefore the highest degree of flexibility, space comfort and design freedom.





- + individual design: a wide variety of dimensions, surfaces, materials and equipment options
- + pleasantly cosy: an attractive indoor climate due to individual solutions for ventilation and cooling



LINDNER CUBE	 TECHNICAL DATA		 ACOUSTICS	 CLIMATE CONTROL
	Dimensions L x B x H	Control System	Sound Insulation	Ventilation
<b>Lindner Cube duo</b> <b>Room-in-Room with partitioning systems</b> + customisable + with double glazed partitions and/or solid partitions + size and format are flexible + no need for connection to nearby structural elements + high sound insulation values	6.0 x 4.0 x 2.5 m  larger dimensions on request	switches, touch display, presence detector	Lindner Life Freeze 137 and GTB 100 Typ 2: $D_w =$ up to 42 dB complying with DIN EN ISO 11957	individual dimensioning of the required ventilation units, supply and exhaust air via cooling fans, combination of overflow elements and fans
<b>Lindner Cube solo</b> <b>Room-in-Room with glazed profile walls</b> + customisable + with single glazed partitions and/or solid partitions + size and format are flexible + no need for connection to nearby structural elements	6.0 x 4.0 x 2.5 m  larger dimensions on request	switches, touch display, presence detector	Lindner Life Pure 620 (12 mm laminated safety glass) and wooden door leaf: $D_w =$ up to 33 dB complying with DIN EN ISO 11957	individual dimensioning of the required ventilation units, supply and exhaust air via cooling fans, combination of overflow elements and fans
<b>Lindner Cube phone</b> <b>A retreat for phone calls</b> + customisable + with single glazed partitions and/or solid walls + no need for connection to nearby structural elements	1.35 x 1.35 x 2.5 m  larger dimensions on request	switches, presence detector	Lindner Life Pure 620 and GTB 10: $D_w =$ up to 30 dB complying with DIN EN ISO 11957	individual dimensioning of the required ventilation unit



HASPA, Hamburg, Germany

	 SUSTAINABILITY	 STATICS	 SURFACES				 ADDITIONAL EQUIPMENT
Cooling			Glass	Solid Partition	Profiles	Ceiling	Lighting
chilled ceiling, chiller, connection to building control system, connection to self-sustaining chiller	self-declaration complying with ISO 14021	installation area 1 complying with DIN 4103, use category III complying with ETAG 003	films, screen printing, enamel	wood, metal, glass, whiteboard	coated, anodised, powder coated, real wood veneer	perforation: Rg = 0,7 - 4 RAL 9010	LED lights
chilled ceiling, chiller, connection to building control system, connection to self-sustaining chiller	self-declaration complying with ISO 14021	installation area 1 complying with DIN 4103, use category III complying with ETAG 003	films, screen printing, enamel	wood, metal, glass, whiteboard	coated, anodised, powder coated, real wood veneer	perforation: Rg = 0,7 - 4 RAL 9010	LED lights
–	self-declaration complying with ISO 14021	–	films, screen printing, enamel	whiteboard	coated, anodised, powder coated, real wood veneer	perforation: Rg = 0,7 - 4 RAL 9010	LED lights

# LINDNER CUBE DUO

## ROOM-IN-ROOM WITH PARTITIONING SYSTEMS

Implementation with Lindner Cube duo is particularly impressive due to its high sound insulation values and the system's flexibility. This means that individual solid partition elements can easily be interchanged with glass elements, or vice versa. Let your imagination run wild and design your own individual Lindner Cube!

- + peaceful yet at the heart of things: high sound insulation values bring pleasant stillness amidst an office
- + total flexibility: adaptations to a Cube are very straightforward thanks to its modularity

### TECHNICAL DATA

#### Dimensions

6.0 x 4.0 x 2.5 m,  
larger dimensions on request

#### Electrical Supply






via raised/cavity floor/ceiling

#### Light

LED lights

#### Control System

push-buttons/switches,  
touch display,  
daylight and presence detector

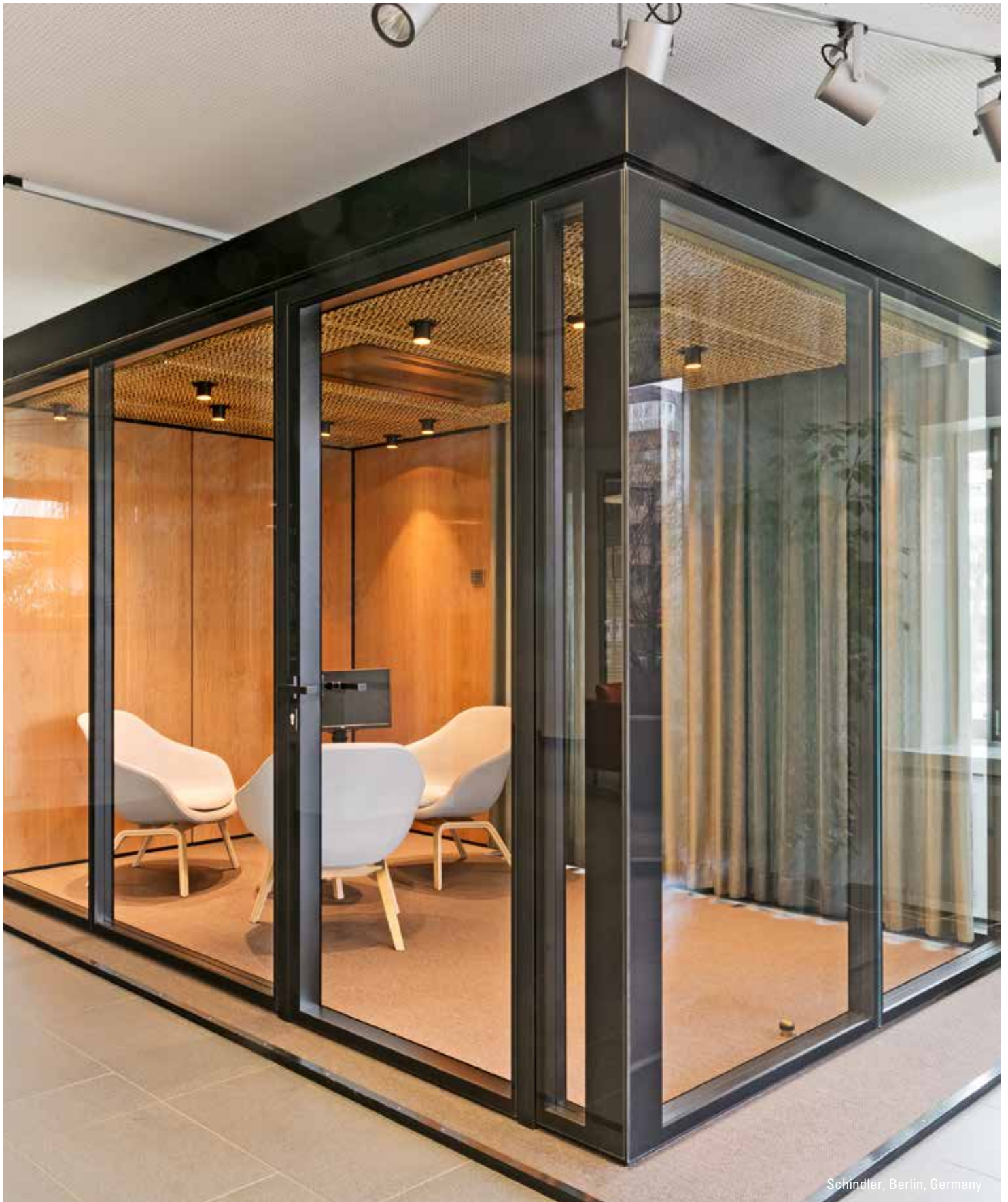
 <b>ACOUSTICS</b> <a href="#">↘ from page 42</a>	<p><b>Sound Insulation</b> example based on Lindner Life Freeze 137 and GTB 100 Type 2: <math>D_w</math> = up to 42 dB complying with DIN EN ISO 11957</p> <p><b>Reverberation Time</b> around <math>T_m</math> = 0.3 (depending on version)</p>
 <b>CLIMATE CONTROL</b>	<p><b>Ventilation</b> introduction and circulation of fresh air via supply and exhaust air slots in the ceiling panels version 1: connection to existing ventilation system version 2: independent supply installed on the ceiling of the Lindner Cube</p> <p><b>Cooling</b> optionally via chilled ceilings with longitudinal sound insulation (type Plafotherm Cube SD) to generate radiant cooling version 1: connection to existing chilled water distribution network version 2: connection to self-sufficient cooling unit (independent chiller)</p>
 <b>COMBINABLE WITH</b>	<p>Lindner Life Stereo 125, Lindner Life Contour 126, Lindner Life Freeze 137, Lindner Life Pure 620, Lindner Logic 100 Metal/Timber/Textile</p>
 <b>SUSTAINABILITY</b>	<p>self-declaration complying with ISO 14021</p>
 <b>STATICS</b>	<p>installation area 1 complying with DIN 4103, use category III complying with ETAG 003</p>



**RUN THE FILM!**

➤ **SCHINDLER, BERLIN, GERMANY**

Lift manufacturer Schindler did not merely plan a makeover for its new corporate headquarters at its Berlin Alt-Mariendorf site, but rather a complete transformation into a digital innovation hub. This involved the use of different materials, such as micro-perforated wooden absorbers, gold-coloured expanded metal ceilings and Lindner Freeze glass elements with matching black-coated door elements. The Cube's technical features are also impressive, including a powerful air conditioning system, intuitive touch display operation and sound insulation up to 42 dB.



Schindler, Berlin, Germany

# LINDNER CUBE SOLO

## ROOM-IN-ROOM WITH GLAZED PROFILE PARTITIONS

The Lindner Cube solo version with its captivating all-glass design offering maximum transparency. Its modular structure means it can also be combined with other Lindner partition systems to provide increased sound insulation. This system therefore offers an optimal degree of flexibility.

- + sophisticated and flooded with light: all-glass design for rooms full of daylight
- + perfect for every spatial requirement: appropriate design with the highest proportion of glass for modern spatial concepts

### TECHNICAL DATA

#### Dimensions

6.0 x 4.0 x 2.5 m,  
larger dimensions on request

#### Electrical Supply






via raised/cavity floor/ceiling

#### Light

LED lights

#### Control System

push-buttons/switches,  
touch display,  
daylight and presence detector

 <b>ACOUSTICS</b> <a href="#">↘ from page 42</a>	<p><b>Sound Insulation</b> example based on Lindner Life Pure 620 (12 mm laminated safety glass) and wooden door leaf <math>D_w = 33</math> dB complying with DIN EN ISO 11957</p> <p><b>Reverberation Time</b> around <math>T_m = 0.3</math> (depending on version)</p>
 <b>CLIMATE CONTROL</b>	<p><b>Ventilation</b> introduction and circulation of fresh air via supply and exhaust air slots in the ceiling panels version 1: connection to existing ventilation system version 2: independent supply installed on the ceiling of the Lindner Cube</p> <p><b>Cooling</b> optionally via chilled ceilings with longitudinal sound insulation (type Plafotherm Cube SD) to generate radiant cooling version 1: connection to existing chilled water distribution network version 2: connection to self-sufficient cooling unit (independent chiller)</p>
 <b>COMBINABLE WITH</b>	<p>Lindner Logic 100 Metal/Timber/Textile</p>
 <b>SUSTAINABILITY</b>	<p>self-declaration complying with ISO 14021</p>
 <b>STATICS</b>	<p>installation area 1 complying with DIN 4103, use category III complying with ETAG 003</p>



↳ **NEW LINDNER GROUP HEADQUARTERS, ARNSTORF, GERMANY**

Lindner Group expanded its corporate headquarters in 2018 by erecting a new building to house around 350 employees. Employee participation was a major focus, even in the planning phase. This resulted in an individualised office concept that is adapted to the teams' different work modes. It involved using Lindner Life Pure 620 to achieve demarcation between the individual work islands and Lindner Life Freeze 137 to create a meeting room. A Lindner Cube solo for confidential meetings was also introduced in the open plan office.



New Lindner Group Headquarters, Arnstorf, Germany

# LINDNER CUBE PHONE

## A RETREAT FOR PHONE CALLS

The Lindner Cube phone gives staff in open plan offices the option of retreating into a quiet working environment to conduct phone calls or conference calls. This system is a stud-free, all-glass design combined with integrated absorbers to harmoniously reconcile functionality and aesthetics.

- + pleasant conversations: acoustically optimised retreat for productive phone calls and conference calls
- + straightforward installation: this easy to install system enables rapid reaction to structural changes

### TECHNICAL DATA

#### Dimensions

1.35 x 1.35 x 2.5 m,  
larger dimensions on request

#### Electrical Supply




via raised/cavity floor,  
ceiling of the Lindner Cube phone

#### Light

recessed LED ceiling lights Type QZi with flush integration into the metal ceiling

#### Control System

push-buttons/switches,  
touch display,  
daylight and presence detector

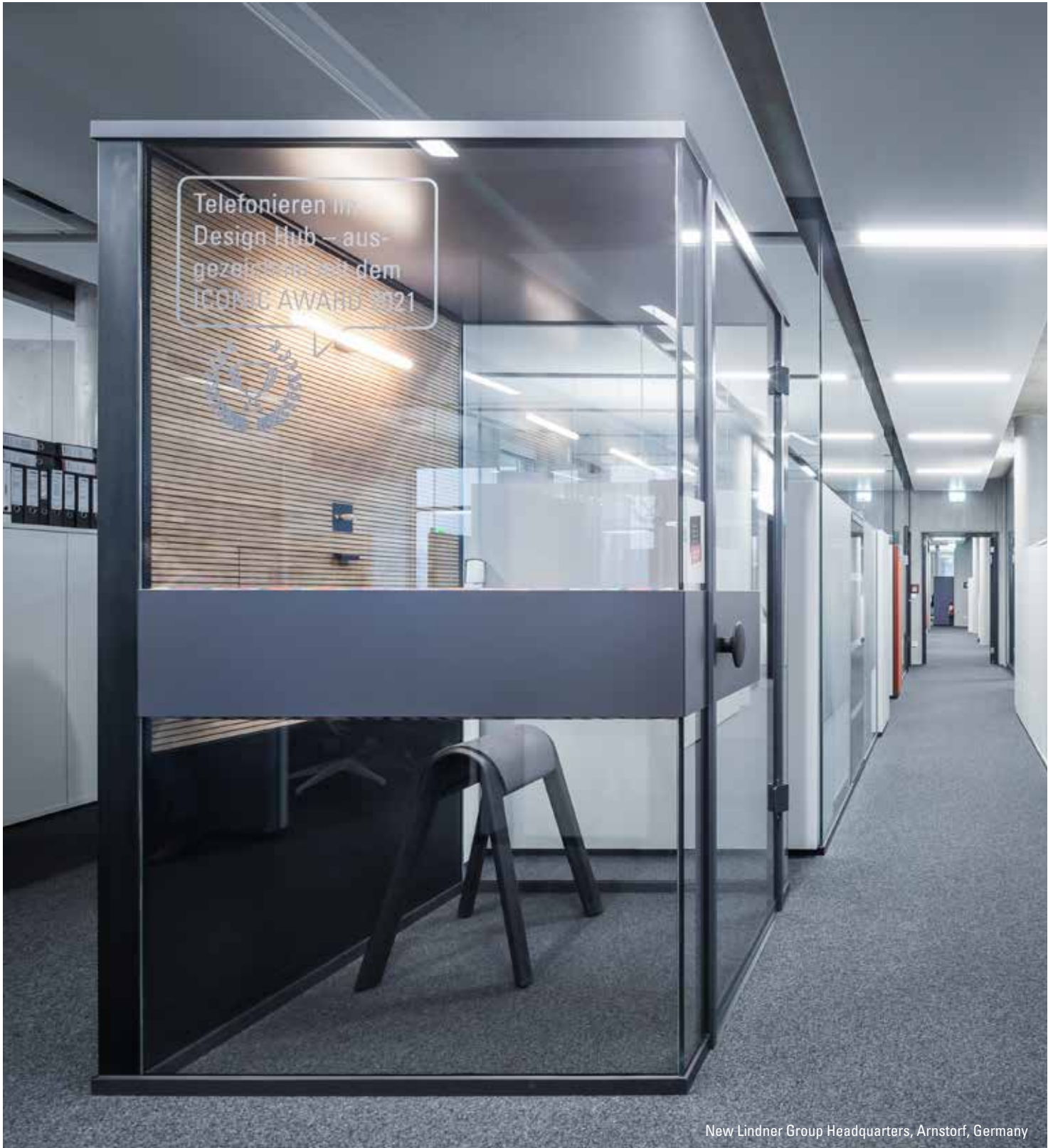
 <b>ACOUSTICS</b> <small>↘ from page 42</small>	<b>Sound Insulation</b> $D_w$ = up to 30 dB complying with DIN EN ISO 11957 <b>Reverberation Time</b> around $T_m = 0.3$
 <b>CLIMATE CONTROL</b>	independent fresh air supply via cross flow units included within the absorber elements and exhaust air via concealed exhaust air slot in the ceiling
 <b>SUSTAINABILITY</b>	self-declaration complying with ISO 14021



### ↳ NEW LINDNER GROUP HEADQUARTERS, ARNSTORF, GERMANY

Lindner Group together with architects and designers from combine design jointly developed the “Lindner Cube phone – designed by combine design”. This produced a combination of functionality and stylish aesthetics: what catches the eye is a strikingly designed upholstery, combined with a wall of slotted oak wood, burnished steel surfaces and a dimmable wall light. The upholstery is comfortable for leaning against during phone calls, while the fold-down table contains sockets and USB chargers. The three glass partitions allow a lot of daylight into the Cube phone. A sound insulation level of 30 dB nevertheless creates a quiet and confidential atmosphere. This new system is already in use in combine design’s office areas and at Lindner itself.

The German Design Council was also convinced by the “Lindner Cube phone – designed by combine design”. Their international jury of experts recognised its outstanding design quality by awarding it the ICONIC AWARD: Innovative Interior 2021 in the “Office and Workplace” category and it also received the “Selection” award.



New Lindner Group Headquarters, Arnstorf, Germany





## SURFACES

### MAXIMUM DESIGN FREEDOM

We set almost no limits when it comes to choosing your surfaces. We offer individual solutions for a wide variety of requirements, so that your rooms doesn't turn only into special but also into unique creations. By using any desired colour, custom print and design, structure and perforation we turn every wall into a functional and visual highlight. Health is also something we always consider by using materials that are free of harmful substances and well thought-out room concepts in which you will feel completely at ease.

- + large selection of different surfaces
- + innovative customisation
- + high product quality
- + well thought-out room design for greater well-being

## SURFACE COATINGS

### COATED



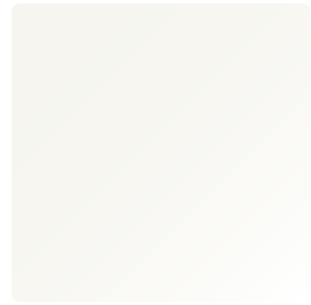
RAL 9005 (matt)



RAL 7016



RAL 7035



RAL 9016

### ANODISED



E6/EV3



E6/C0

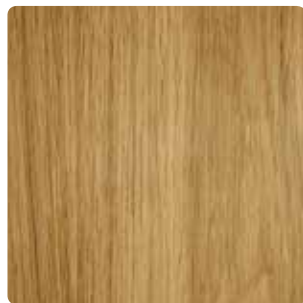


E6/C31

### WOOD VENEER



Walnut



Oak

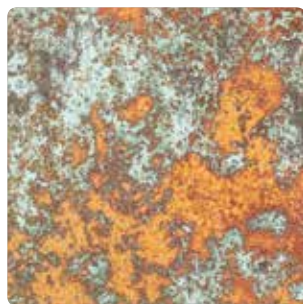


Maple

### SPECIAL SURFACES



Concrete



Rust



Natural Surfaces



Digital Printing

## TEXTILE SELECTION

### BLENDED/FULL TONE/TEXTURED



Camira  
Blazer Lite LTH 39



Camira  
Blazer Latymer CUZ 33



Camira  
Blazer Bernard CUZ 2S



Camira  
Lucia Solano YB088



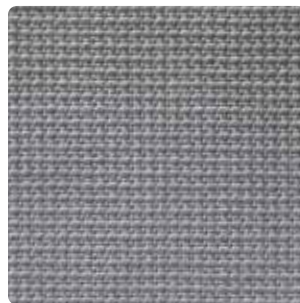
Camira  
X2 Percentage AK016



Spectrum  
Spirit² 74



Spectrum  
Spirit² 80



Spectrum  
Pin 20

In addition to the presentation examples shown, our partition systems can be realised using many other materials and surfaces. Let your imagination run wild!

Any colour deviations are due to the printing process.







## PROJECT-SPECIFIC SOLUTIONS ADD.VANTAGE FOR YOUR IDEAS

Putting your ideas and plans into practice is a challenge we welcome. Our experts in the various specialist divisions will work with you to find the ideal solution for your project and can advise you on functional, constructive and design details.

We would be happy to assist you with your concept – from planning and production through to installation. And obviously following the path to a sustainable, healthy building with the corresponding certification. We also offer you another unique Add.Vantage: we provide you with everything from one source.

- + flexible room and partition systems
- + individual solutions for design and functionality
- + support from planning through to installation
- + extensive in-house production expertise
- + demonstrably sustainable according to the Cradle to Cradle Certified® Products Program

➤ **HASPA, HAMBURG, GERMANY**

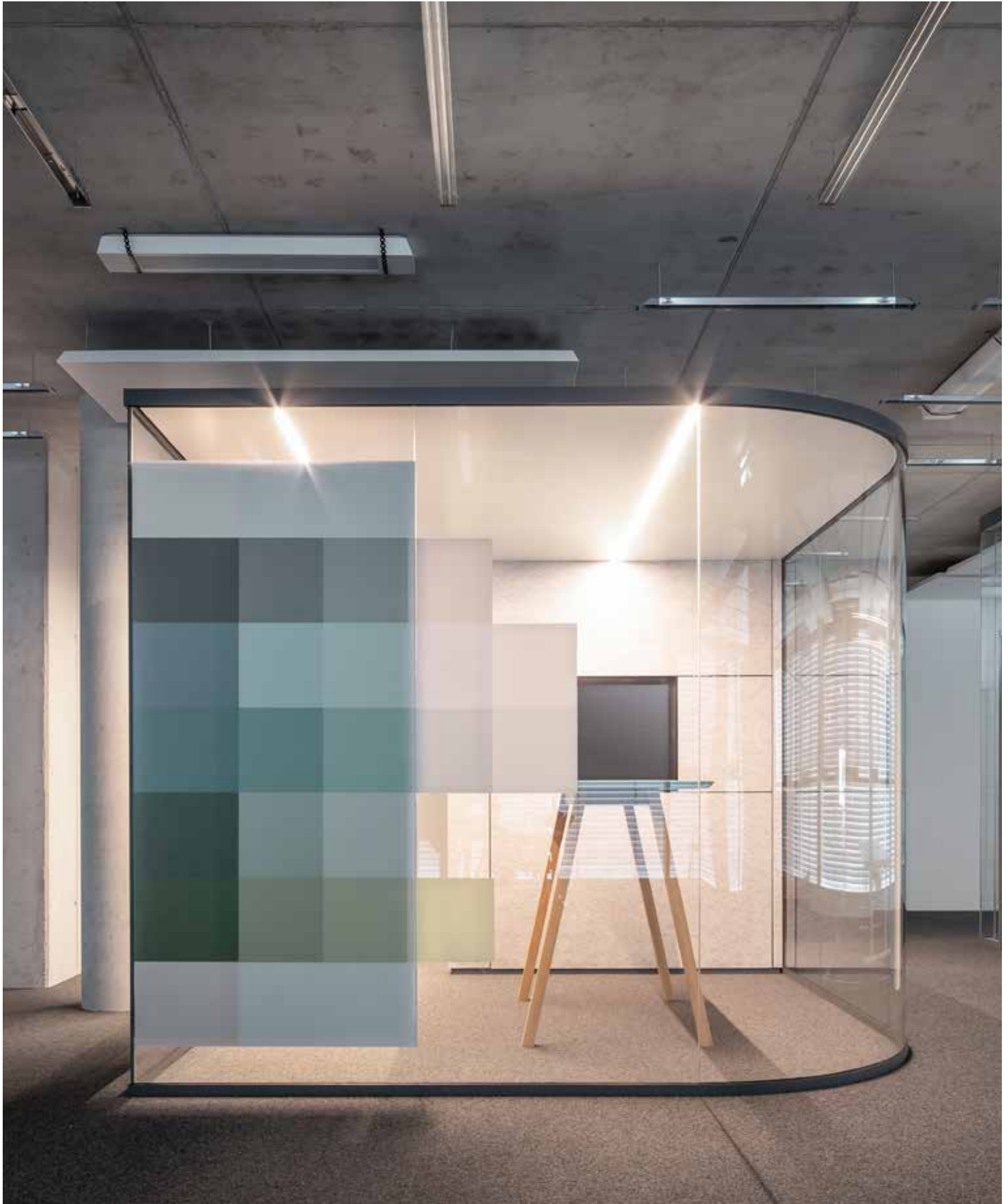
In line with the realignment of its branch business, the Hamburg Sparkasse bank converted a total of 90 of its branches in the Hamburg region. Lindner helped with realisation of the “Branches of the future” concept by producing almost 200 half-open and closed room-in-room solutions in a customer-specific design under significant time pressure. The system’s high adaptability meant that a customised solution with high recognition value could be found for each individual branch layout.





↳ **LINDNER CUBE OPEN – NEW LINDNER GROUP HEADQUARTERS, ARNSTORF, GERMANY**

Lindner's new headquarters not only provides office space, it also acts as a live showroom for Lindner system products and as a blueprint for modern working environments. The Cube open can also be found here. It adds a curved spatial form to the classic Lindner Cube. Digitally printed metal surfaces or textile covers can be added at will to the curved glass elements. An unusual design detail is the omission of a closed access or glass door: the special room geometry, combined with absorbers, creates an acoustically effective airlock and a partition column also offers space for all the Cube's technical equipment.

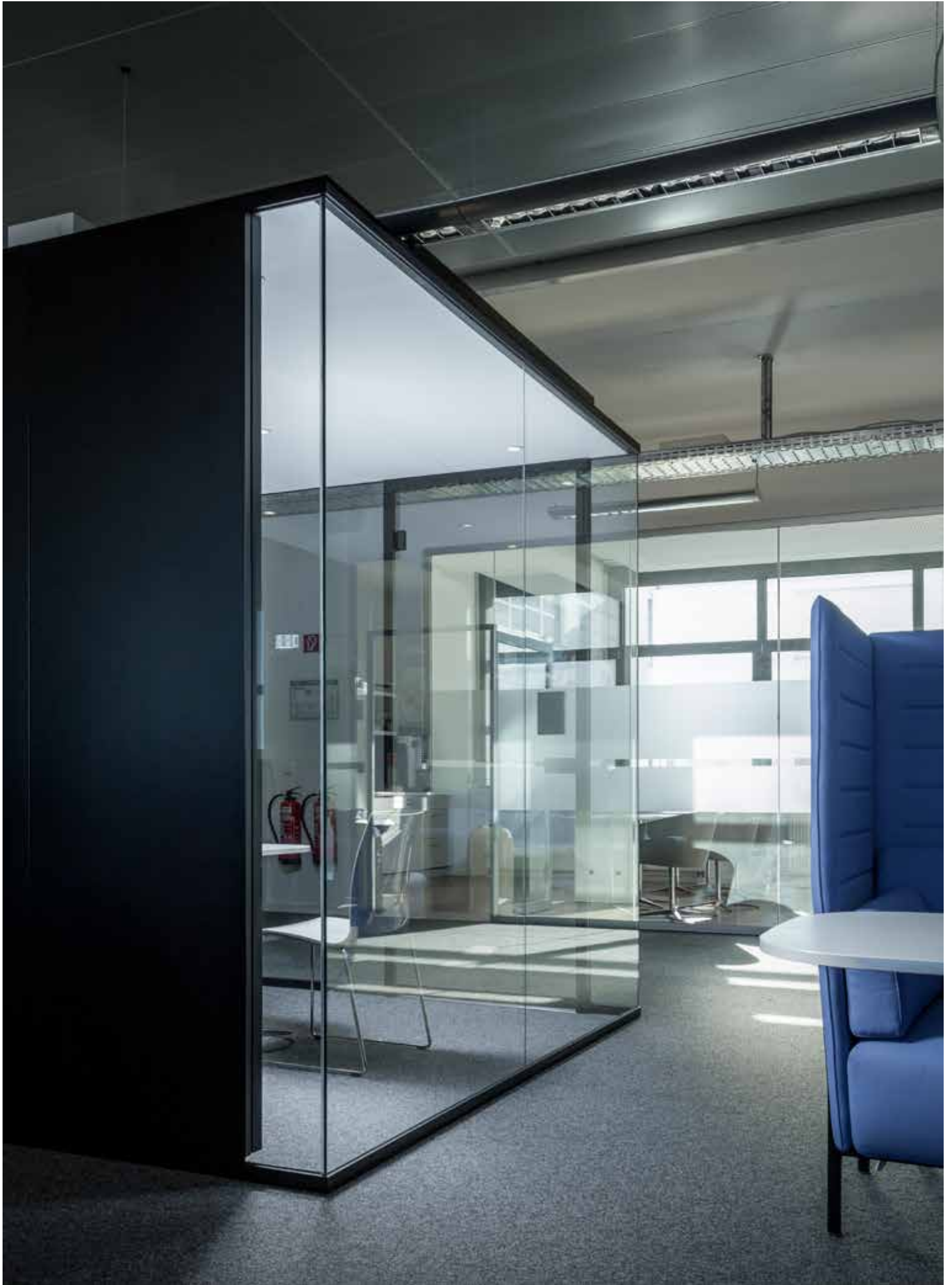




↳ **PROTOTYPE LINDNER CUBE, MUNICH, GERMANY**

A further office conversion also saw Lindner receiving the order for developing a concept for an individual Cube. In addition to a very high design standard, including implementation with a high proportion of glass, an individual lighting system and CI-compliant colour concept, there was also a focus on its acoustics and functionality. The desire for a minimalist ceiling structure was solved using cross flow elements within the partition's acoustic elements. The monobloc absorber simultaneously ensures high sound insulation and a low reverberation time.





### ↳ THE “NEUE BÖRSE” IN ZURICH, SWITZERLAND

The former stock exchange building in Zurich is enjoying a second life housing the Swiss subsidiary of the Education First (EF) education company. The building was extensively converted in preparation for its new use. The “Neue Börse” has a number of training and conference rooms plus large areas used as open plan offices and some individual offices in the management area. The Swiss branch of Lindner Group contributed to the interior fit-out of “Neue Börse” in Zurich with numerous trades and various products from the Lindner portfolio. This included the installation of freestanding Lindner Cube Room-in-Room Systems in the open plan offices. Primarily, this provided peaceful rooms in the open environment and secondly provided a way of skilfully isolating noise-generating equipment.



© EF Education First





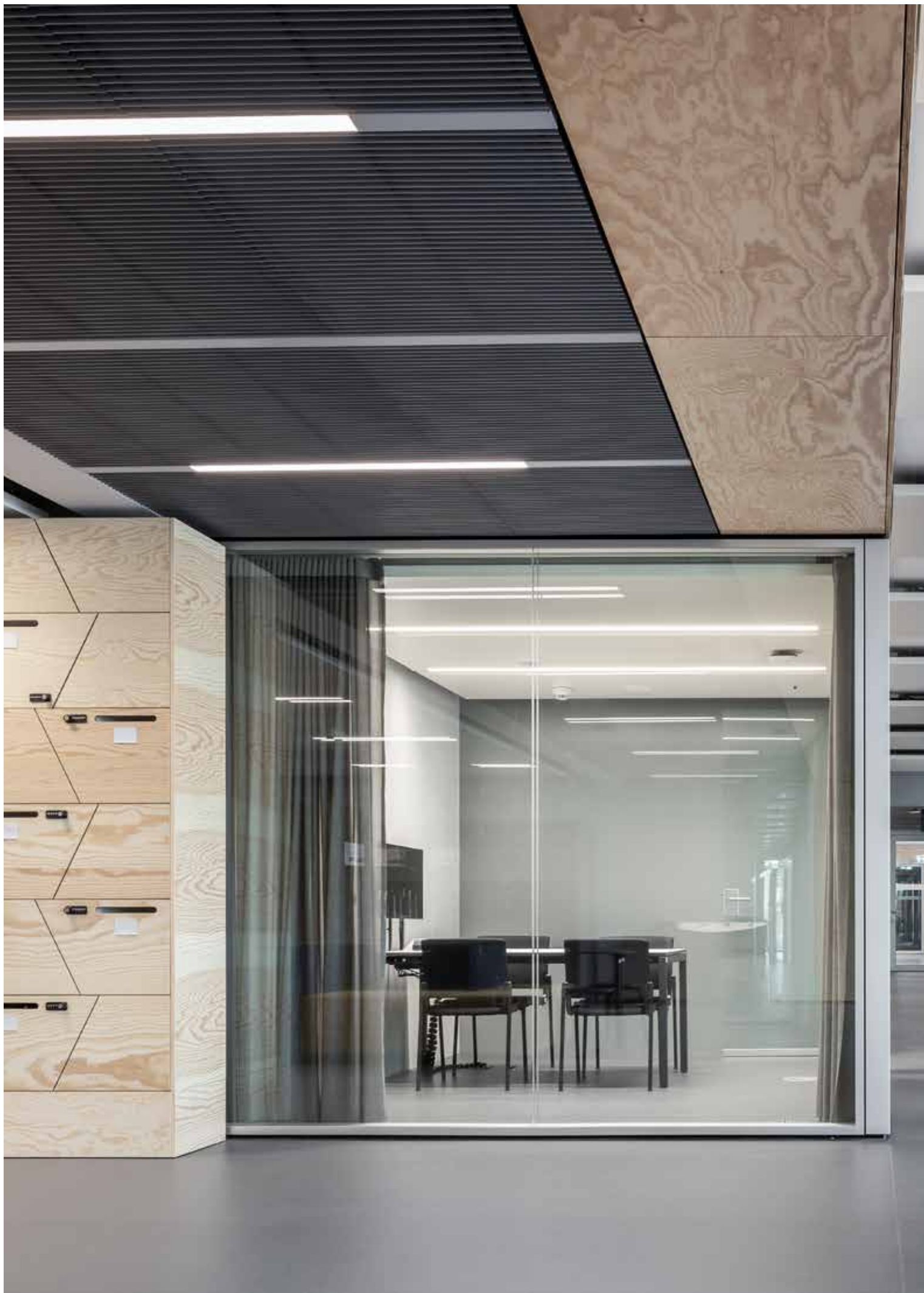
© EF Education First

➤ **TELEGRAF 7, VIENNA, AUSTRIA**

A long time ago this traditional building in Vienna's Leharasse 7 used to be a telecommunications control centre. Major refurbishment saw the creation of modern office areas that combine striking design with efficient space utilisation. This includes the installation of a large-scale room-in-room solution which basically houses numerous individual offices and meeting rooms, while the surface above is used as an office or lounge area.







A modern office interior featuring a prominent concrete pillar, glass-walled rooms, and a blue armchair. The ceiling has recessed lighting and a circular vent. The overall aesthetic is clean and industrial.

## **EXPERTISE**

### **YOUR PROJECT IS IN GOOD HANDS AT LINDNER**

To continue meeting the challenges of demanding projects and the desire for versatile room concepts in the future, we not only continuously develop our systems, but also find the right solution for your project – for new buildings, restructuring after renovation or as a useful addition to open plan offices. In order to do so, we draw on our longtime expertise in all expertise in all specialist disciplines relating to construction, including:

- + thermal comfort
- + acoustics
- + light

# THERMAL COMFORT

## SIGNIFICANT ASPECTS AT A GLANCE

Long working hours mean that offices are increasingly becoming a “living” place for employees. A comfortable indoor climate is therefore a necessity for users. An area’s ventilation, and also its air conditioning is particularly important in creating this ideal climate in a room-in-room system. Comfort increases employee performance and satisfaction – Lindner Cubes demonstrably contribute to achieving this.

The comfort zone is the zone in which the indoor climate triggers a feeling of well-being and satisfaction for the majority of people in the room. Being outside this zone can lead to a decrease in concentration and performance as well as health problems.

### GUIDELINES

Various guidelines set out criteria regarding the limit value for an ideal climate and thus for the definition of comfort:

<b>Comfort Standard</b> <b>DIN EN ISO 7730</b>	<ul style="list-style-type: none"> <li>- enables analytical determination and interpretation of thermal comfort using calculation of the PMV and PPD indices</li> <li>- applies to healthy men and women exposed to an indoor environment</li> </ul>
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### WORKPLACE REGULATIONS

Workplace regulations describe measures and practical implementation aids as well as the protection goals and requirements set out in the Workplace Ordinance in relation to the health and safety of employees.

<b>Workplace Regulation</b> <b>„A3.5 Room Temperature“</b>	<ul style="list-style-type: none"> <li>- defines the room temperature requirements in the workplace regulations</li> <li>- applies to work, break, stand-by, sanitary, canteen and first-aid rooms that do not have any specific climatic requirements for operational reasons</li> </ul>
<b>Workplace Regulation</b> <b>„A3.6 Ventilation“</b>	<ul style="list-style-type: none"> <li>- defines the ventilation requirements in the workplace regulations</li> <li>- applies to workplaces in enclosed workspaces</li> </ul>

### THERMAL COMFORT

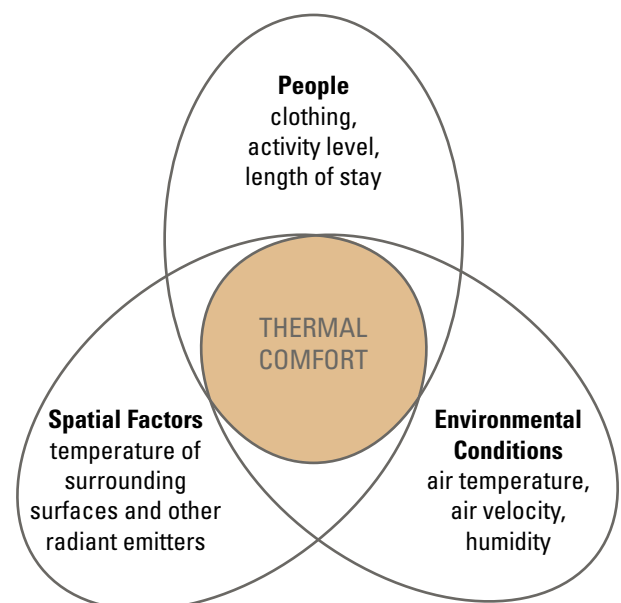
Thermal comfort can only be achieved through the interaction of people, space and environmental conditions and is described according to two main criteria, which complement each other:

#### Heat Balance Model

- the body is in thermal equilibrium with the environment
- environmental conditions according to DIN EN ISO 7730

#### Expectation Model

- the ambient climate meets user expectations
- users want to influence the indoor climate



## EVALUATING THERMAL COMFORT

All of the following factors are important in creating a satisfactory indoor climate for people.

Criteria for determining the spatial comfort perceived by people according to DIN EN ISO 7730:

- number of people in the room
- mechanical output in the room
- clothing: summer – winter (“clothing insulation value”)
- activity (activity level)
- length of stay (use intensity)

Parameters used in evaluating comfort:

- temperature
- radiation temperature
- air velocity
- humidity

These parameters form the basis for the evaluation scheme according to DIN EN ISO 7730, i.e. the PMV value.

### PMV value

The PMV value provides a statement about people’s average climate assessment and their heat balance (the heat generated in the body is equal to the heat given off to the environment).

### PPD value

The PPD value indicates the percentage of people who are dissatisfied with the ambient climate.

PMV	+ 2	+ 1	+ 0.5	0	- 0.5	- 1	- 2
Climate Perception	warm	slightly warm		neutral		slightly cool	cool
PPD	75 %	25 %	10 %	5 %	10 %	25 %	75 %



Evaluation	PMV	PPD
Category A	$- 0.2 < PMV < + 0.2$	$\leq 6 \%$
<b>Category B: Normal Level of Expectations</b>	<b><math>- 0.5 &lt; PMV &lt; + 0.5</math></b>	<b><math>&lt; 10 \%</math></b>
Category C	$- 0.7 < PMV < + 0.7$	$< 15 \%$

Unlike the PMV value, which considers the body as a whole, local thermal dissatisfaction only relates to unwanted cooling or heating of a specific region of the body.

Factors relating to local dissatisfaction:

- vertical air temperature difference
- asymmetrical radiation temperature
- draughts

## CO<sub>2</sub> CONCENTRATION IN THE ROOM

Air quality plays an important role in creating a comfortable climate so that employees feel at ease and can concentrate on their work. Workplace regulation "A3.6 Ventilation" therefore defines the limit value of 1,000 ppm for a permissible CO<sub>2</sub> concentration.

Many factors come into play when determining the carbon dioxide concentration within a room:

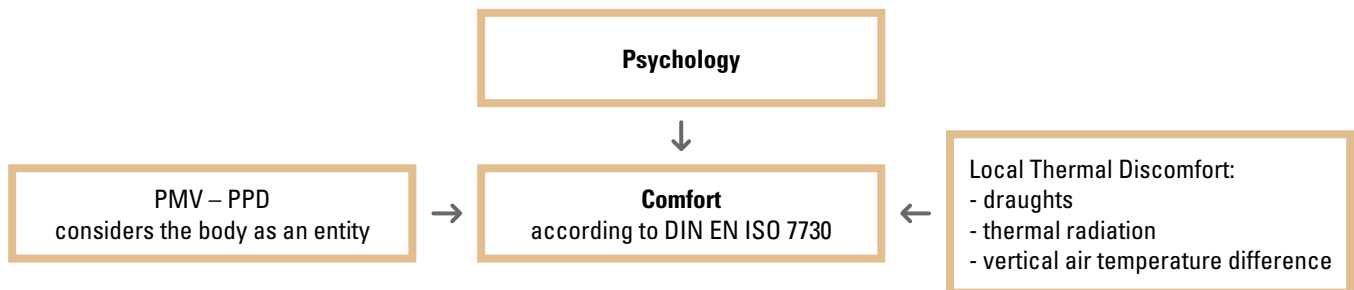
- number of people in the room
- room volume
- user activity
- duration of use
- air exchange

The following measures should be introduced to prevent an excessively high CO<sub>2</sub> concentration within room air:

CO <sub>2</sub> Concentration [ml/m <sup>3</sup> ] or [ppm]	Measures
< 1,000	- no further measures (as long as an increase in concentration above 1,000 ppm is not anticipated as a result of the room's use)
1,000 - 2,000	- review and improve the ventilation behaviour - draw up a ventilation plan (e.g. define responsibilities) - ventilation measure (e.g. increase fresh air volume flow or air exchange)
> 2,000	- further measures required (e.g. increased ventilation, reduction of the number of people using the room)

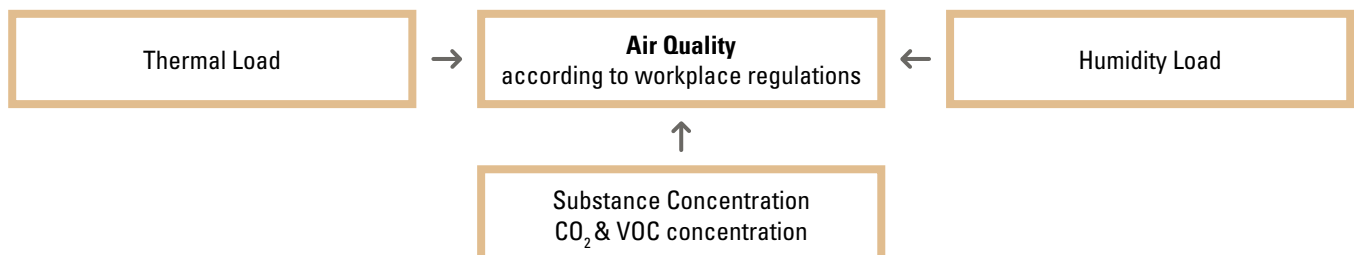
## PSYCHOLOGY

Standard DIN EN ISO 7730 also considers psychological factors in addition to the procedure for measuring and evaluating the ambient climate. People can adapt to an indoor climate not only through their choice of clothing, posture and reduction of activity – habit also plays an important role. People who are used to living in a warmer ambient climate can maintain better work performance at a higher indoor temperatures than people who are used to living in a cooler ambient climate.



Indoor air quality in workrooms can be impaired by the following loads:

- thermal loads caused by the likes of equipment and machinery, solar radiation, artificial lighting or (the number of) people
- humidity loads due to vapours emitted by people in the room or water vapour emission (people, plants, equipment)
- substance concentrations due to people present (occupancy density and associated emissions of CO<sub>2</sub> and odorous substances), emissions from furnishings, poorly maintained air conditioning systems, occurrence of mould, polluted air from other rooms





## COMFORT MEASUREMENT BASED ON A LINDNER CUBE

A simulation programme was created based on multiple comfort measurements under varied ambient conditions, which allows calculation of the comfort in a Cube in advance.

Prerequisites for this calculation:

- capacity of the facade to provide shade
- people are appropriately dressed for the weather

COMFORT CALCULATION	
Information required	
<b>Partition Structure</b>	number of glass partitions = 2 type of glass partitions = double glazing
<b>Heat Sources in the Room</b>	number of people in the room = 4 screen = yes number of lighting units = 2 type of lighting = QZI – 900 2.5
<b>Temperature</b>	temperature in open plan office – summer = 24 °C temperature in open plan office – winter = 22 °C outdoor temperature = 19 °C/22 °C/24 °C/26 °C
<b>Ventilation</b>	number of air diffusors = 2 means of ventilation = supply and exhaust air via the ceiling, cooling via chilled ceiling and chilled partition desired flow rate = 10 = 181 m <sup>3</sup> /h air exchange = 7-fold/18-fold
<b>Cooling</b>	cooling type = chilled ceiling/cold supply air
<b>Room Size</b>	width = 2.6 m length = 2.9 m height = 2.4 m

RESULTS (COMPLYING WITH DIN EN ISO 7730)			
Cooling Type: Chilled Ceiling		PPD/PD	Evaluation ↳ page 39
<b>PMV</b>	summer	5 %	category A
	winter	10 %	category B
<b>Local Thermal Discomfort</b>	draughts – summer	6 %	category A
	draughts – winter	6 %	category A
	vertical air temperature difference asymmetrical thermal radiation	0.40 % 0.60 %	category A category A

# ))) ACOUSTICS

## SIGNIFICANT ASPECTS AT A GLANCE

Lindner has over 50 years of experience in interior fit-out and acoustic construction technology, so it sees the development of concepts optimised in terms of room acoustics as being particularly important. Especially in relation to our room-in-room system, we pay attention to the best possible acoustic solutions so that you can find the right retreat for every situation.

### SOUND INSULATION

Sound insulation tests follow strict guidelines:

- DIN 4109 for partitions and doors ( $R_w$  in dB)
- DIN EN ISO 11957 for an entire room-in-room system ( $D_w$  in dB)

A sound insulation value of 30 dB in open plan offices already provides a noticeable improvement. The following recommendations are advisable for sound insulation:

<b>30 dB</b>	for phone calls
<b>35 dB</b>	for informal meetings, e.g. brainstorming
<b>40 dB and above</b>	beginning of low confidentiality, suitable for sensitive topics, e.g. personnel, R&D, management

### CONFIDENTIALITY

- key figure in acoustics
- a sound insulation value of 40 dB and above: beginning of low confidentiality

	<b>Normal Keyboard or Telephone (set to quiet), L = 60 dB (A)</b>	<b>Normal Volume Conversations in an Open Plan Office, L = 65 dB (A)</b>
<b>Sound Insulation <math>D_w = 40</math> dB Basic Sound Level in your own Room 35 dB (A)</b>	inaudible	comprehensibility no longer fully given, beginning of low confidentiality (only every fifth word is understood)
<b>Sound Insulation <math>D_w = 35</math> dB Basic Sound Level in your own Room 35 dB (A)</b>	faintly audible, but no longer disturbing	almost full comprehensibility

### REVERBERATION TIME

- time interval within which the sound pressure in a room drops by 60 dB
- testing complying with DIN EN ISO 3380
- specified in seconds ( $T_m$ )
- the recommended reverberation time for rooms is between 0.6 and 0.8 s
- dependent on room volume and absorption coefficient of the surfaces

## SOUND ABSORPTION COEFFICIENT

- this indicates the size of the absorbing part of the total incidental sound
- $\alpha = 0$ , there is no absorption, all the incidental sound is reflected
- $\alpha = 1$ , all the incidental sound is absorbed, there is no reflection

The rated sound absorption coefficients  $\alpha_w$  are divided into different sound absorption classes complying with DIN EN ISO 11654:

Absorption Class		Rated Sound Absorption Coefficient $\alpha_w$
<b>A</b>	most absorbent	0.90 - 1.00
<b>B</b>	most absorbent	0.80 - 0.85
<b>C</b>	highly absorbent	0.60 - 0.75
<b>D</b>	absorbent	0.30 - 0.55
<b>E</b>	less absorbent	0.15 - 0.25
<b>Unclassified</b>		0.00 - 0.10



RUN THE FILM!

## PRODUCT SOLUTIONS

Lindner supplies a variety of acoustically effective system products. We will find the perfect solution for an undisturbed work environment and optimal acoustics depending on your functional and design needs. We will gladly combine different ceiling, floor and partition systems to do this – in keeping with our motto “everything from one source”.

One classic solution is to use metal absorbers with especially high absorption values, optionally also as a room-high partition or as a curtain element on our Lindner Life Pure 620 All-Glass Partition. For a more homely atmosphere, we offer various designs of wood or fabric absorbers. Combining these with acoustically effective ceiling elements enables reverberation times up to  $T_m = 0.3$  s to be achieved in your Cube.

## SOUND INSULATION

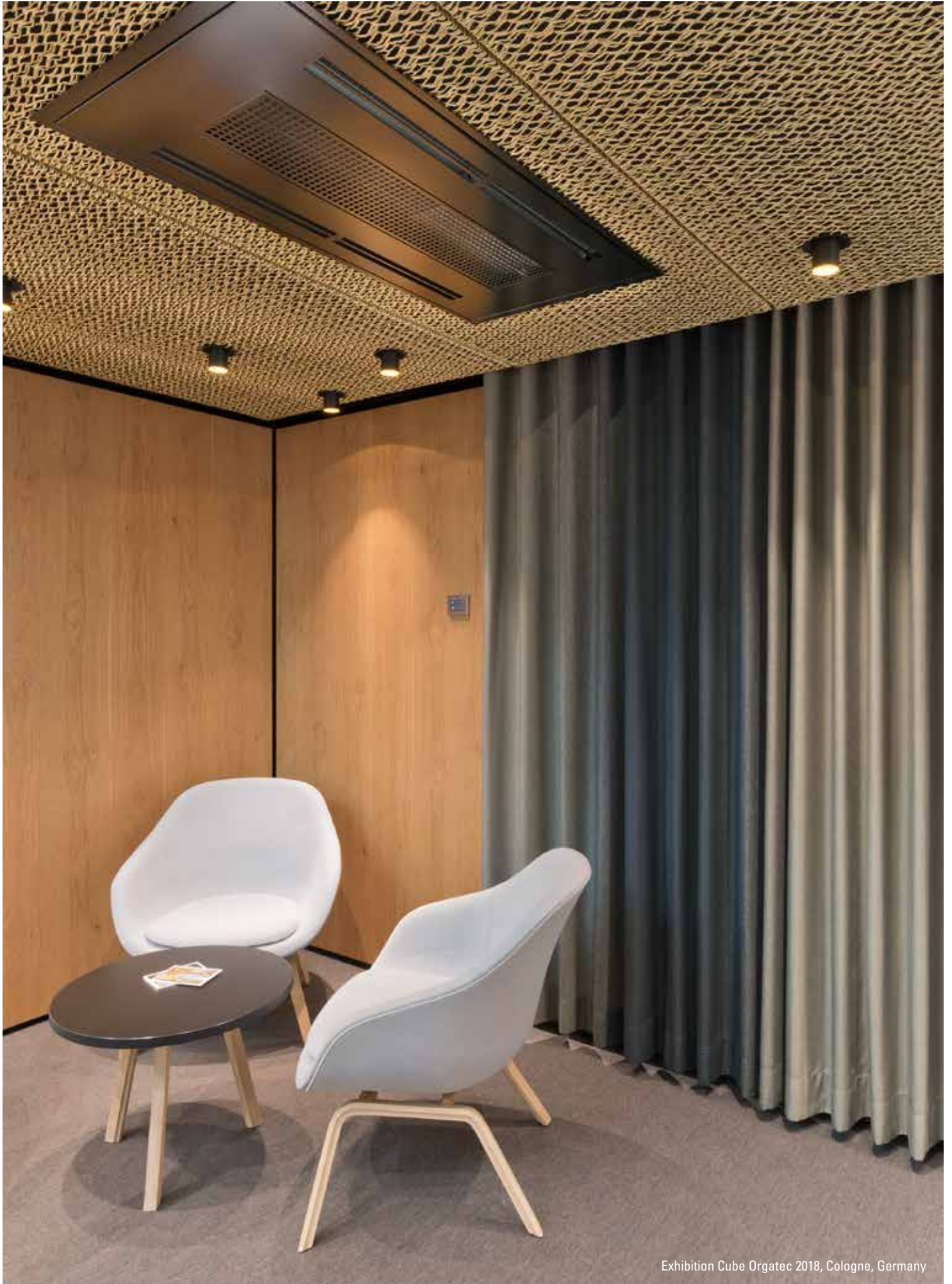


\* comprehensibility no longer fully given, beginning of low confidentiality

## REVERBERATION TIME

- different acoustic elements can be used depending on your desired reverberation time
- recommendation: equip one side of the Cube with an absorbent surface and use an acoustically effective Lindner metal ceiling
- carefully consider your furniture and floor covering





Exhibition Cube Orgatec 2018, Cologne, Germany

# LIGHT

## SIGNIFICANT ASPECTS AT A GLANCE

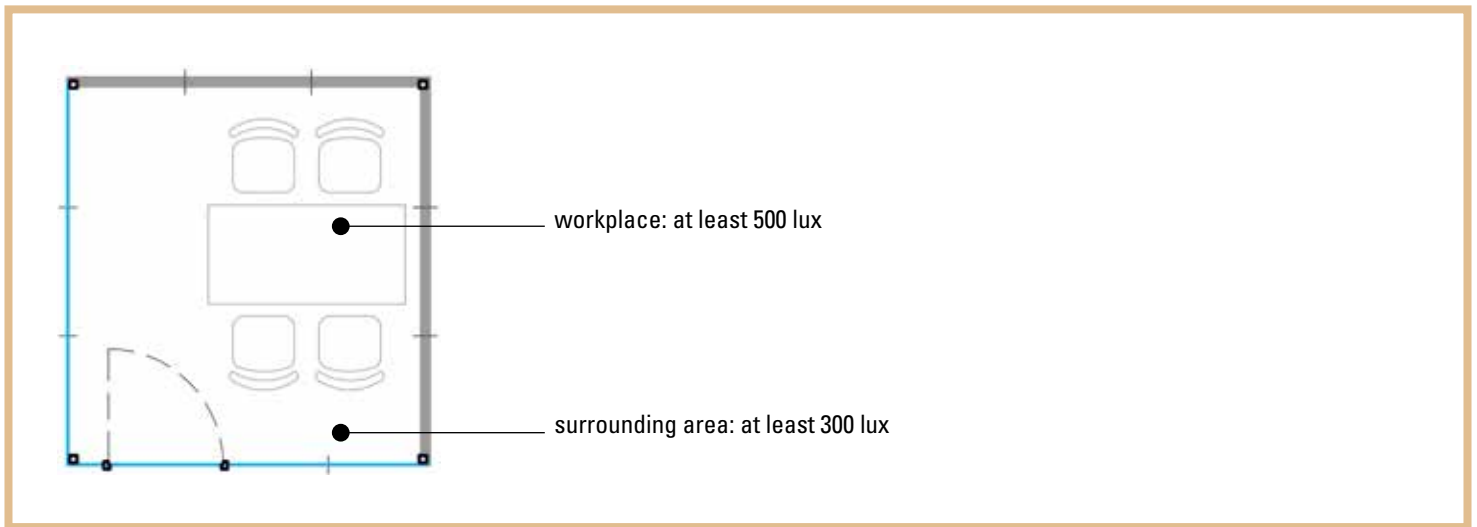
In addition to the indoor climate and acoustics, light also plays an important role in creating a healthy workplace. We ensure that our Lindner Cubes take account of your requirements for uniform and glare-free lighting. Our ability to calculate the illuminance level in advance assures the perfect solution for your project.

### WORKPLACE ILLUMINANCE

Workplace regulation "A3.4 Lighting" specifies a guide value for illuminance at fixed workplaces:

- 500 lux at the workplace
- 300 lux in the surrounding area

This workplace regulation can be used as a reference even though a Lindner Cube is not generally used as a fixed workplace, since such use is theoretically possible.



### FREEDOM FROM GLARE

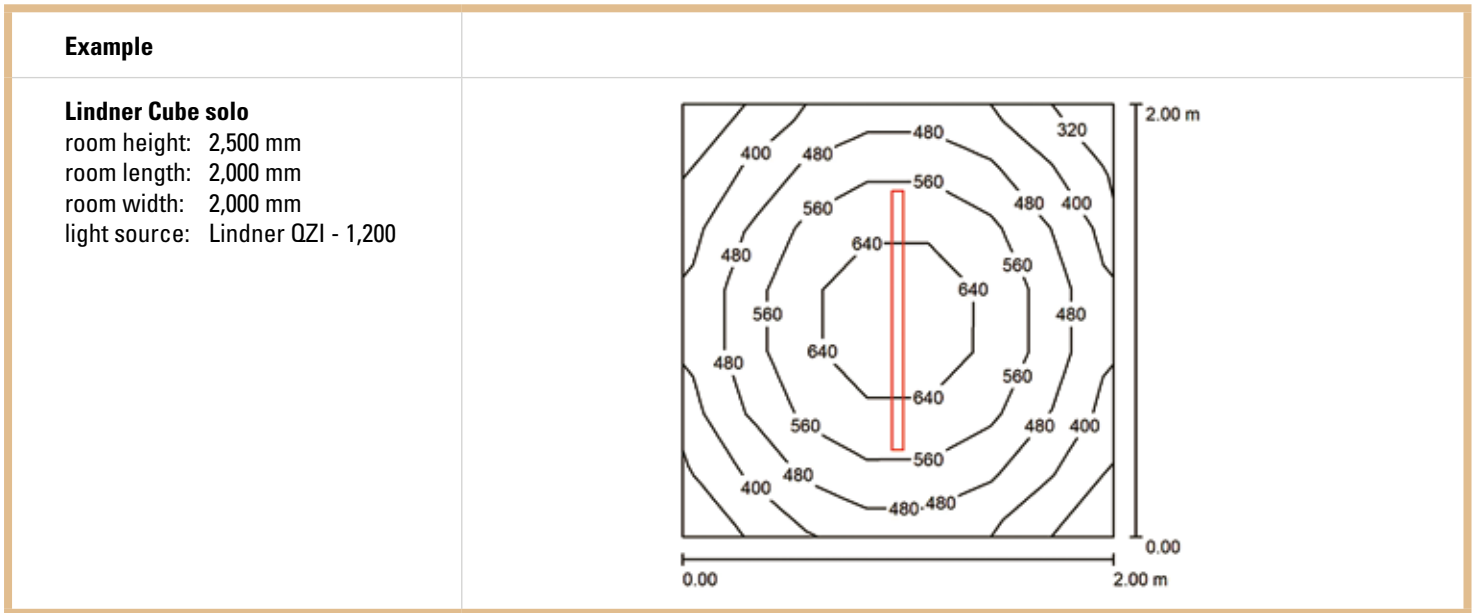
The level of perceived glare from a lighting system is determined by the unified glare rating – UGR. This results in a limit value for office work of  $UGR \leq 19$ , i.e. 65 % of observers "do not feel directly disturbed" by the glare.

This therefore requires adherence to a minimum shielding angle complying with DIN EN 12465-1 in the case of lights that radiate downwards. This can be technically achieved using diffusers.

Luminance levels should be limited to a maximum of 3,000 cd/m<sup>2</sup> to avoid reflective glare.

## LIGHTING CALCULATIONS

Depending on the lights, it is possible to perform advance calculations of the illuminance levels and the uniformity of light according to workplace regulation A3.4.



Surface	Medium Illuminance Level $E_m$ [lx]	Minimum Illuminance Level $E_{min}$ [lx]	Maximum Illuminance Level $E_{max}$ [lx]	Uniformity $g_1$ according to A3.4 at least 0.6
working plane	509	314	693	0,616
floor	353	269	400	0,763

## PRODUCT SOLUTIONS

Lindner System Lights are installed into the metal ceiling element at the factory. This ensures that the lights are integrated flush into the ceiling and that the colour tone matches. The light colour corresponds to 4,000 K as standard, but 3,000 K can also be selected as an option. Again with the control system there is a choice between a rocker switch or a presence detector. Dimmable lights can also be optionally installed to reduce the UGR value.

The following lights represent a possible selection, but in principle almost all lights can be installed:

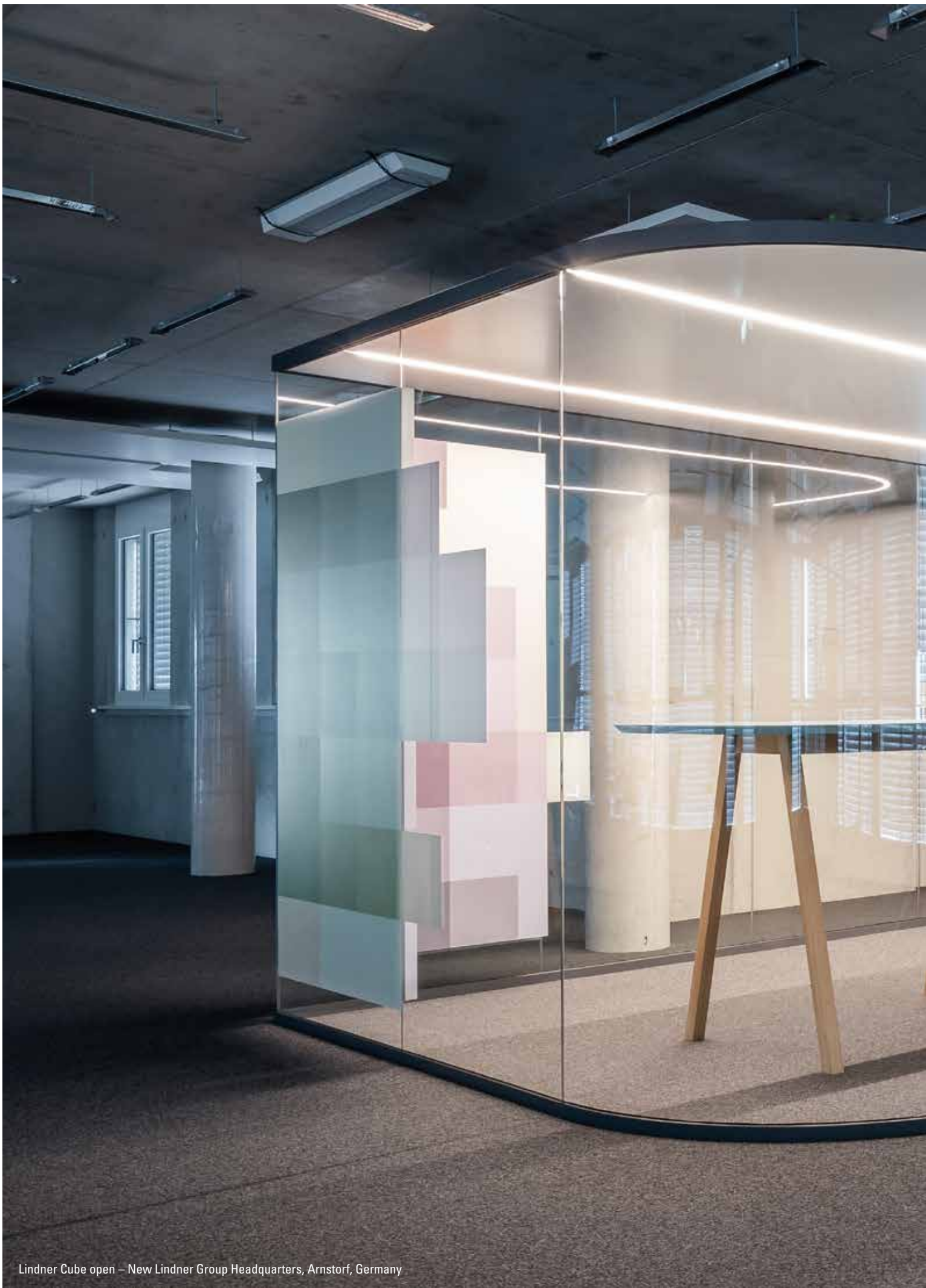
<b>Q21</b> recessed light with cell louvre	<b>IS 22</b> integrated recessed light for computer workstations	<b>Q 625</b> recessed light
		

<b>Properties</b>	<b>Advantages</b>
500 lux for office workplaces complying with the workplace regulations	+ improved performance due to freedom from glare and reflections + fatigue-free reading due to uniform illumination
ecological and economical due to low life cycle costs given LED technology	+ low power consumption → low electricity costs + low thermal load → low cooling performance required
flush integrated design	+ aesthetically pleasing lighting





New Lindner Group Headquarters, Arnstorf, Germany



Lindner Cube open – New Lindner Group Headquarters, Arnstorf, Germany



## DESIGN AND ADDITIONAL EQUIPMENT THE PLUS POINT FOR YOUR IDEAS

Our love for the details can also be seen here at Lindner when it comes to additional features for our Cubes. Besides good design, our focus is on functionality and flexibility. Our Cubes can also be supplied to include intuitive control tools and be fully equipped with media technology. Even when it comes to lighting and air conditioning, you can choose between connection to an existing building control system or a self-sustaining solution.

- + media engineering
- + electrical engineering
- + indoor climate

# DESIGN

## MODULAR AND FLEXIBLE

Our Lindner Cube is a self-sustaining, self-contained room system that requires no connection to solid walls or the ceiling. Its modular structure means the system can be relocated as an entire Cube and thus adapts precisely to the local conditions. An independent ventilation system and integrated lighting make our room-in-room system completely independent of the spatial environment. Individual combinations with our Lindner Partition Systems allow free rein to your design concepts.



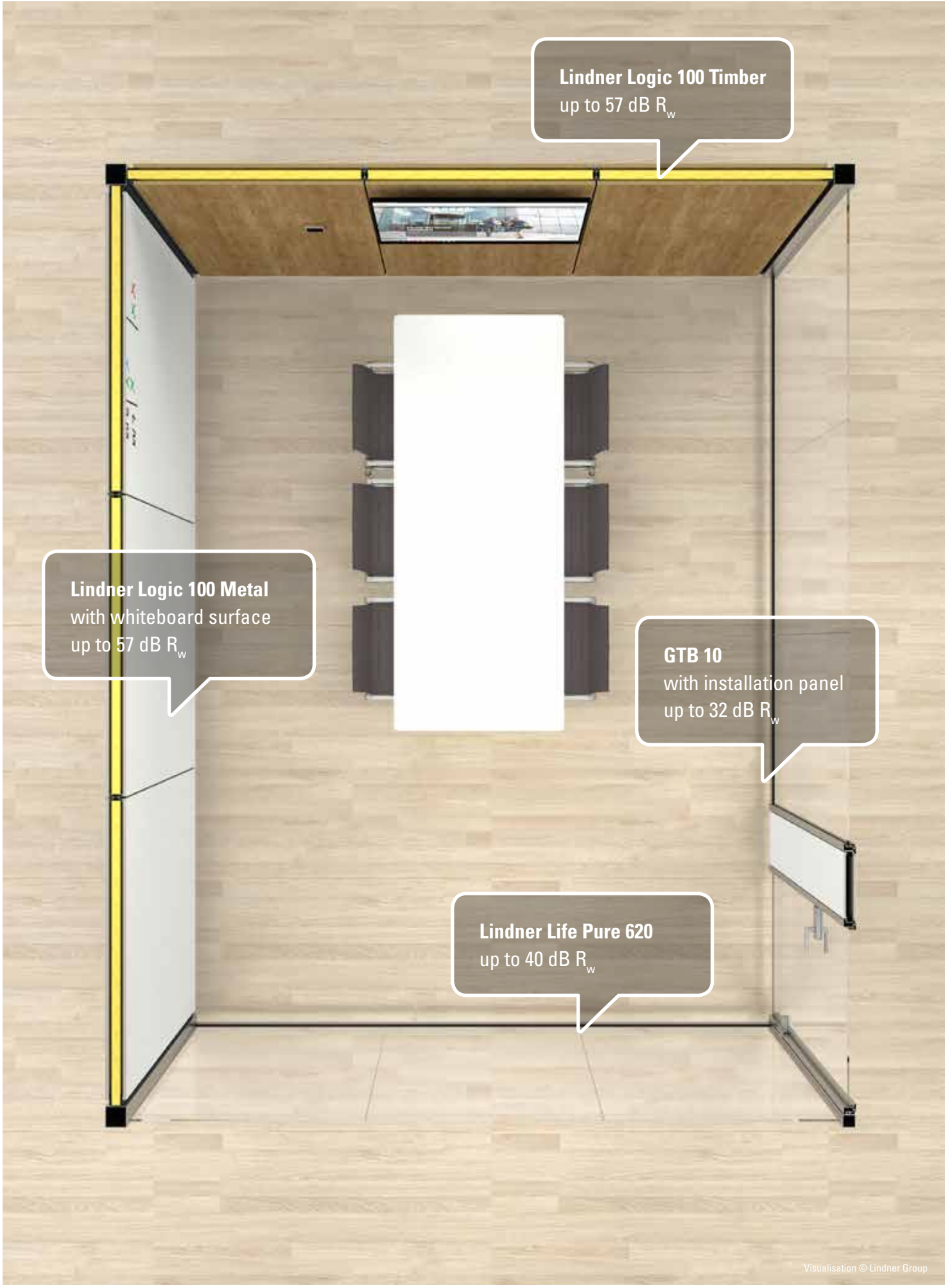
### Ventilation Unit

- + high air exchange
- + optionally with air filters
- + optionally with integrated cooling

### Plug & Play Solution

- + easy to install
- + independent of existing building services

Visualisation © Lindner Group



**Lindner Logic 100 Timber**  
up to 57 dB  $R_w$

**Lindner Logic 100 Metal**  
with whiteboard surface  
up to 57 dB  $R_w$

**GTB 10**  
with installation panel  
up to 32 dB  $R_w$

**Lindner Life Pure 620**  
up to 40 dB  $R_w$

Visualisation © Lindner Group

# MEDIA ENGINEERING

## DIGITAL ACCESS IN EVERY ROOM

Our Lindner Cubes are primarily used for meetings. And nowadays it is almost inconceivable to think of meetings without digital presentations, or meetings that are held virtually. Either way, flawlessly functioning media is essential and of course the acoustics must also be appropriate. We at Lindner also attach importance to a visually neat solution: cables should be concealed by integrating them directly into the partitions. We follow the Lindner motto "Everything from one source" to combine dry installation and electrical trades into a single step, thus minimising any interface difficulties during your fit-out.

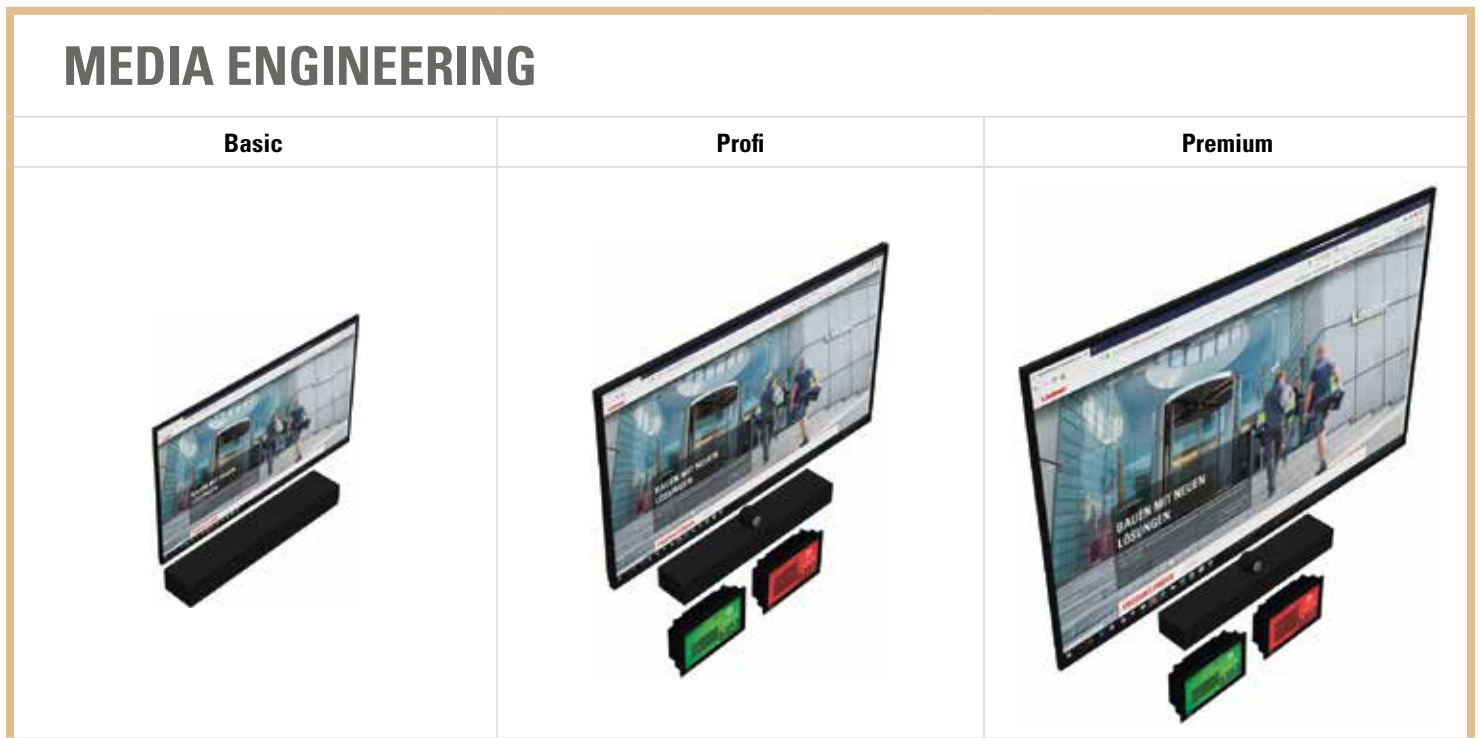
### ADVANTAGES

#### For employees

- + high image resolution and sound quality for interruption-free video conferencing
- + time saving due to the existence of presentation solutions
- + reduced susceptibility to faults through optimal integration into the room-in-room system

#### For companies

- + no interfaces between interior fit-out and electrical trades
- + employer branding and image gain with external guests through high quality room design



MEDIA ENGINEERING	FUNCTION		
	Basic	Profi	Premium
Need to bring your own Device	x	x	
Presenting	x	x	x
Listening and Speaking (loudspeaker and microphone)	x	x	x
Connection via Cable	x	x	x
Conference Calls	x	x	x
Room Reservation		x	x
Web Conferencing		x	x
Room Management incl. Connection to Network and Evaluations			x
Cable-free Connection			x
Interactive Working via Touch Display			x
Cable Management WITHIN the "Room-in-Room" via CAT cable			x



# ELECTRICAL ENGINEERING

## INDIVIDUAL COMBINATIONS

Room comfort – light, climate and air quality – plays a key role in the well-being and health of users. This is true on a large scale as well as on a small one. Good, comprehensive technical equipment in the room is also the basis for good, efficient work. That is why we offer a variety of installations and an individual configuration of switches, socket, displays and safety systems, such as smoke detectors. Visual comfort is enhanced by individual lighting solutions, transparent glass partitions and integrated blind systems, if required. A central plug & play solution concealed on the ceiling facilitates both installation and revisions to the Cube.







### ADVANTAGES

#### For employees

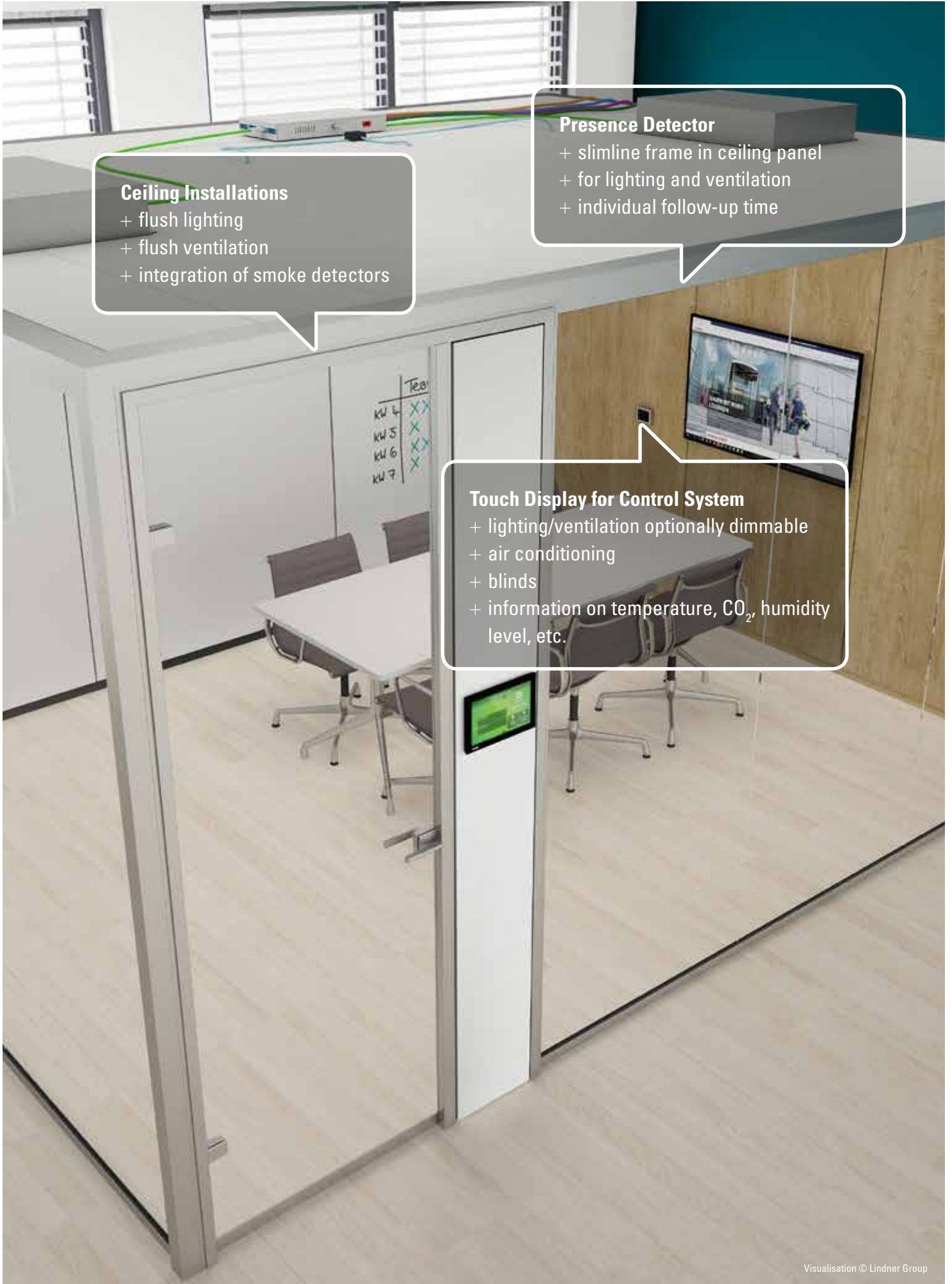
- + simple operation via automatic presence detector, via classic switches or via intuitive touch display
- + high level of comfort due to infinitely variable lights, ventilation and air conditioning, resulting in increased concentration and productivity
- + high level of safety due to optional integration of fire protection devices provided by the customer

#### For companies

- + reduced installation time
- + no need for an electrician

ELECTRICAL ENGINEERING		
<b>Socket</b>	<b>USB Charging Socket</b>	<b>HDMI Socket</b>
		
<b>Light Switch</b>	<b>Fan Control Knob</b>	<b>Touch Display</b>
		





**Ceiling Installations**  
+ flush lighting  
+ flush ventilation  
+ integration of smoke detectors

**Presence Detector**  
+ slimline frame in ceiling panel  
+ for lighting and ventilation  
+ individual follow-up time

**Touch Display for Control System**  
+ lighting/ventilation optionally dimmable  
+ air conditioning  
+ blinds  
+ information on temperature, CO<sub>2</sub>, humidity level, etc.

# INDOOR CLIMATE

## FOR ADDITIONAL INDOOR COMFORT

We spend 90 % of our time indoors. The smaller the room, the sooner we feel that we are surrounded by poor air. This also involves a constant, pleasant room temperature. A special challenge for room-in-room systems. Lindner therefore supplies four different versions of ventilation and air conditioning systems to counter this. These function both autonomously in a closed system in the Cube, but are also compatible with any systems provided by the customer.

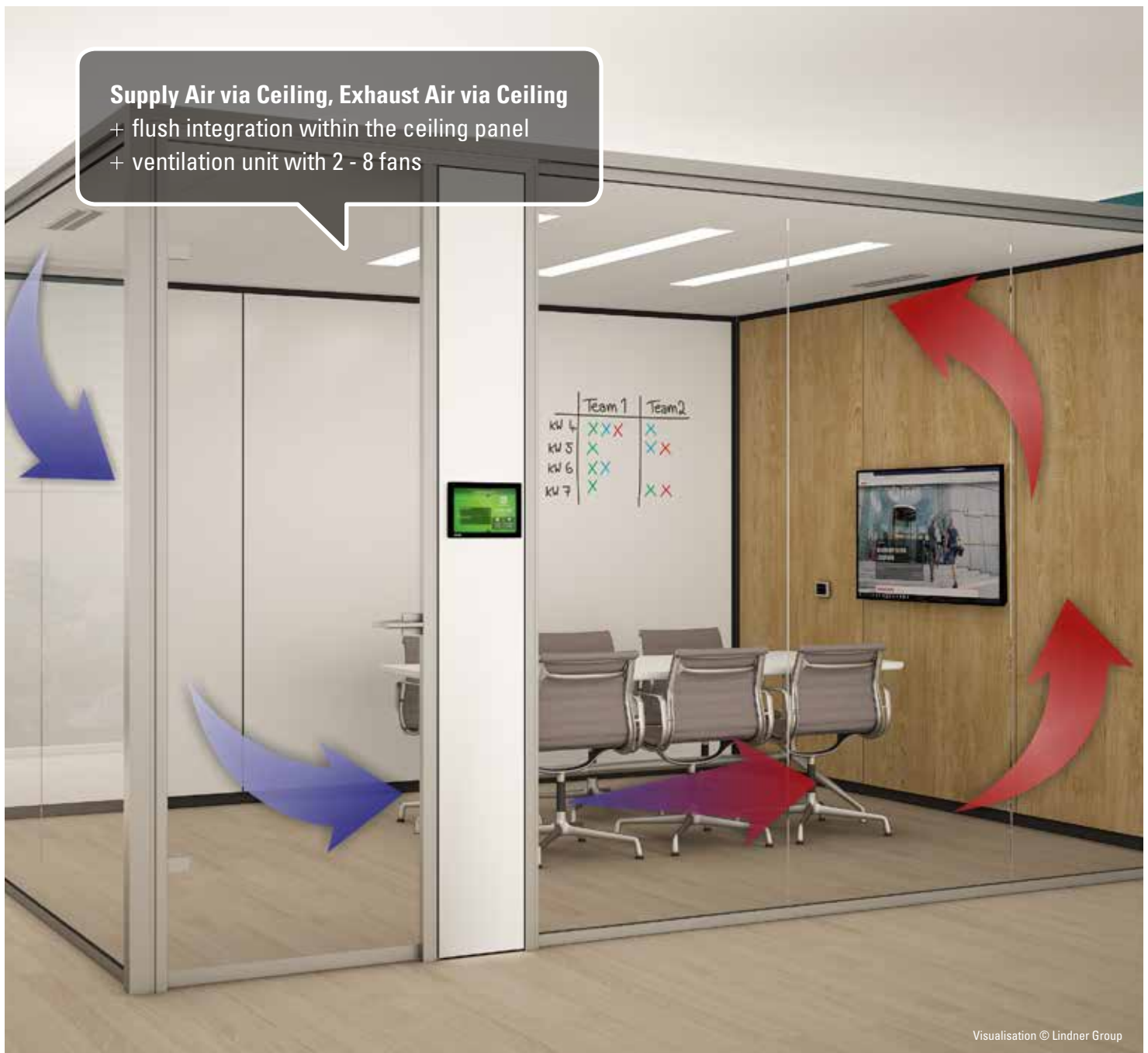
### ADVANTAGES

#### For employees

- + pleasant spatial experience due to high air exchange rate, at least 10-fold air exchange as standard
- + low-noise ventilation at 35 dB (A)
- + no draughts thanks to optimised flow behaviour using cross flow elements

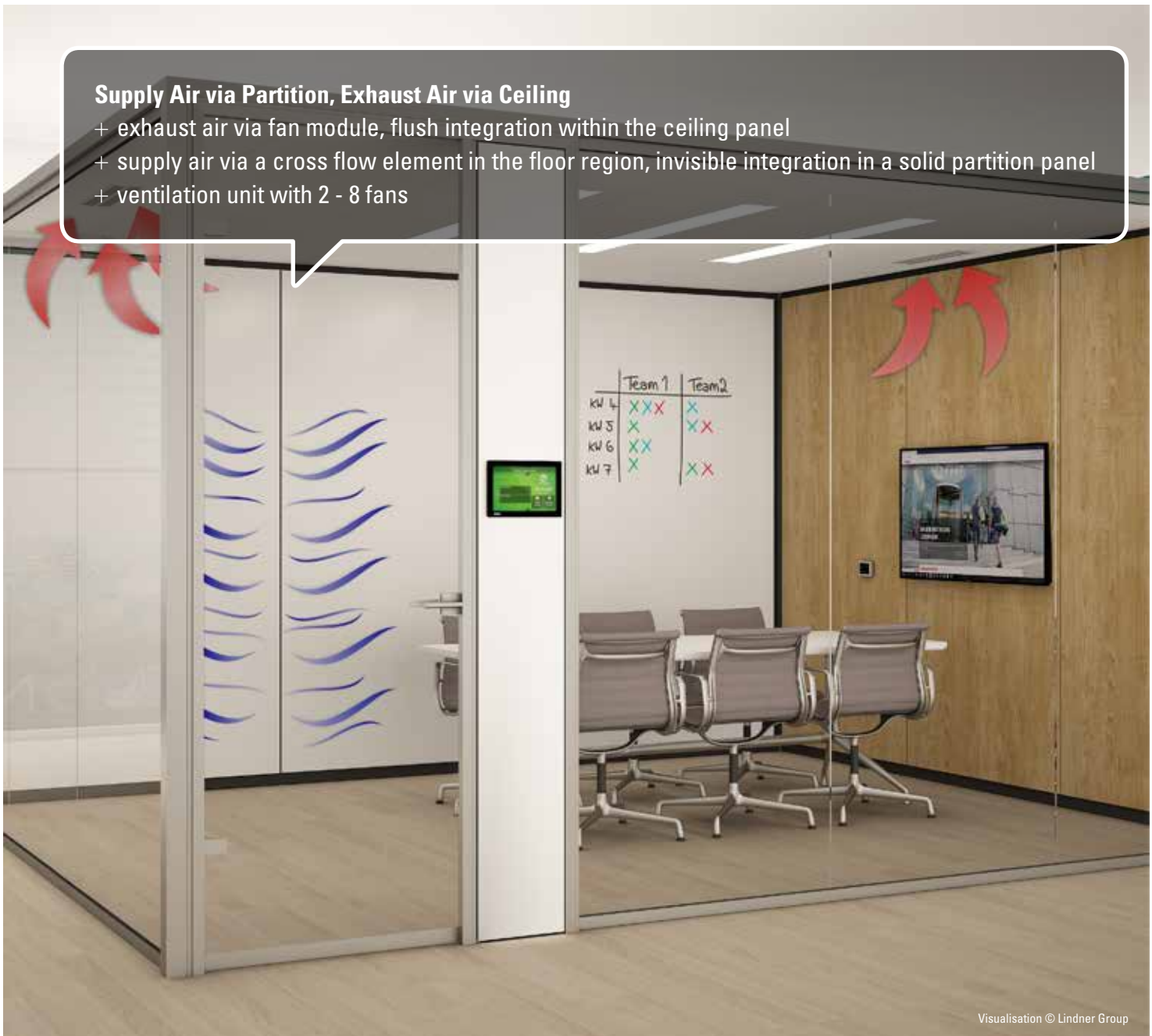
#### For companies

- + energy efficient
- + maintenance-free
- + durable



Visualisation © Lindner Group

<b>Chilled Ceiling</b>	<ul style="list-style-type: none"> <li>+ comfort due to "radiant cooling", no draughts</li> <li>+ no noise emissions</li> <li>+ perceived temperature 2 - 3 °C lower than room temperature</li> <li>+ the air is cooled via large surfaces</li> </ul>
<b>Cooling Unit</b>	<ul style="list-style-type: none"> <li>+ very high cooling performance possible, even with dry cooling</li> <li>+ the ceiling's absorption capacity remains largely intact</li> <li>+ low air velocity in the comfort zone benefits comfort</li> </ul>
<b>Connection to existing Chilled Water Network</b>	<ul style="list-style-type: none"> <li>+ cost-effective solution</li> <li>+ energy efficient</li> <li>+ eco-friendly</li> <li>+ very low noise emissions</li> </ul>
<b>Connection to self-sufficient Chilled Water Network</b>	<ul style="list-style-type: none"> <li>+ can be moved irrespective of the chilled water network</li> <li>+ variable supply temperatures</li> <li>+ cooling mode available even in winter</li> </ul>



Main Picture: Prototype Lindner Cube, Munich, Germany

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