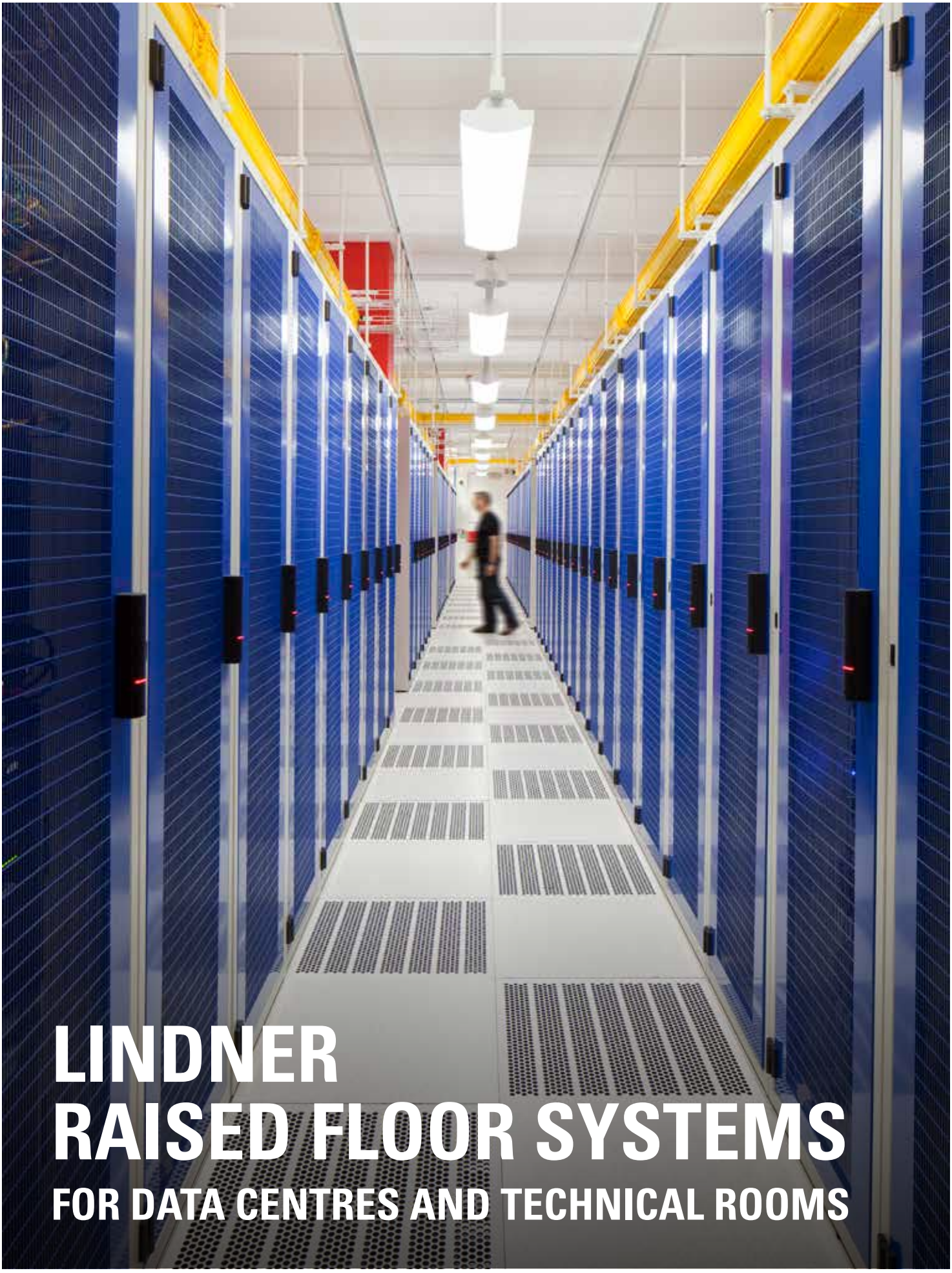


LINDNER RAISED FLOOR SYSTEMS

FOR DATA CENTRES AND TECHNICAL ROOMS

Lindner

FROM ARNSTORF THROUGHOUT THE WORLD

The Lindner Group is a family-run construction company, manufacturer of construction products and provider of construction services. We use our production facilities to produce virtually all system products for interior fit-outs, the building shell and insulation technology: floors, ceilings, luminaires, doors, walls, facades. We continuously apply the highest standards of quality, environmental compatibility and innovation to further develop this range for global use by our customers.

LINDNER FLOOR SYSTEMS

The Floors division is a market leader in international terms and offers the most extensive, top-quality range: Lindner Hollow and Raised Floor Systems are extremely loadable, highly durable and exhibit outstanding structural properties. The fibre-reinforced calcium sulphate panels for the NORTEC Raised Floor System are made to almost 100 % from recycled materials.

Over 200 employees at our site in Dettelbach, Lower Franconia, have been producing gypsum panels since 1993, and these are individually customised to your project. We extended our production capacity in January 2019 by adding our Slovakian site in Hliník nad Hronom. Here we produce a wide range of parquet floor coverings for all Lindner Raised Floors.

LINDNER
RAISED FLOOR SYSTEMS
for data centres and technical rooms

- modular systems – direct access to the floor cavity
- convenient maintenance of data lines and MEP systems
- high loadability
- high discharge capacity
- optimum fire protection properties
- flexibly adaptable
- sustainable
- ventilation can be integrated
- Made in Germany
- can be combined with various coverings

Siemens Beijing, China

New-build of TransnetBW Main Switchgear, Wendlingen am Neckar, Germany
© TransnetBW

DATA CENTRES AND TECHNICAL ROOMS

Everything under control

Data centres and technical rooms create very challenging requirements in relation to raised floor systems. Particularly important aspects are the structural load-bearing capacity, fire protection properties, connection of equipment to the floor and its ventilation and wiring. Our extensive product portfolio combined with our in-house production of the individual components enables tailor-made solutions for every individual application.

Our sustainable production means we can make a significant contribution to your data centre becoming “green”.

+ flexible and modular systems
+ high loadability
+ ventilation can be integrated
+ high discharge capacity
+ optimum fire protection properties
+ individually adaptable
+ sustainable

LINDNER
RAISED FLOOR SYSTEMS

Your technology in the best hands

Lindner NORTEC and VENTEC, PRODATA, ALUVENT and OCTOGRATE Raised Floor Systems are ideally suited to the conditions in data centres and technical rooms thanks to their great fire protection properties, extraordinary load-bearing capacity and high discharge capacity. The individual panels in these floor systems are designed for point loads of up to 15 kN – depending on the system. Our non-combustible, modular panels enable constant access to the floor cavity: they can conveniently be removed individually for maintenance of data lines and the MEP systems.

+ solutions for every requirement
+ different systems can be combined
+ lots of free space for installations in the cavity

VENTILATION PANEL
galvanised or
powder-coated

COVERING OPTIONS
PVC, HPL, etc.

ACCESSORIES
Cable outlets,
air ventilation outlets, etc.

ALUVENT
Die-cast aluminium panels

Visualisation © Lindner Group

New Lindner Group Headquarters, Arnstorf, Germany

University of Stuttgart – Computer Centre, Germany

RAISED FLOOR WITH CALCIUM SULPHATE PANELS

Place your data centre on a sustainable floor!

The NORTEC Raised Floor System is particularly impressive due to its building physical and biological properties. It is used as a base system for constructing raised floors in data centres and technical rooms. Its modular panels enable constant access to the floor cavity: they can conveniently be removed individually for maintenance of data lines and the MEP systems.

Due to its ecological and technical advantages, NORTEC is the world's first system floor to be awarded a Cradle to Cradle Certified® Silver certificate. It has generally very low carbon emissions and is available carbon-neutral. We also offer a take-back guarantee and leasing option for this system.

NORTEC power combines all the benefits of the NORTEC system with high-density, fibre-reinforced calcium sulphate panels and is suitable for extreme loads.

Perforation of the calcium sulphate panels creates our NORTEC sonic ventilation panels.

+ non-combustible
+ suitable for the highest loads
+ low air leakage rate
+ take-back guarantee and leasing option
+ direct access to the floor cavity
+ sustainable

CALCIUM SULPHATE	FIBRE-REINFORCED CALCIUM SULPHATE PANELS		
	NORTEC	NORTEC power	NORTEC sonic
TECHNICAL DATA	raised floor for standard requirements	raised floor for heavy duty areas	raised floor with ventilation
	panel thickness: 16 - 38.5 mm. system weight: 36 - 62 kg/m²	panel thickness: 30.5 - 44.5 mm, system weight: 56 - 81 kg/m²	panel thickness: 38 mm, system weight: 57 kg/m²
STATICS	**Load and Deflection Class** 1A (2 kN) - 5A (5 kN) in acc. with EN 12825	**Load and Deflection Class** 6A (6 - 15 kN) in acc. with EN 12825	**Load and Deflection Class** 1A (2 kN) - 3A (4 kN) in acc. with EN 12825
FIRE PROTECTION	**Reaction to Fire Performance** non-combustible in acc. with DIN 4102 and EN 13501	**Reaction to Fire Performance** non-combustible in acc. with DIN 4102 and EN 13501	**Reaction to Fire Performance** non-combustible in acc. with DIN 4102 and EN 13501
	Fire Resistance Class F 30 and F 60 in acc. with DIN 4102, REI 30 and REI 60 in acc. with EN 13501	**Fire Resistance Class** F 30 in acc. with DIN 4102, REI 30 and REI 60 in acc. with EN 13501	–
CLIMATE CONTROL	–	–	**Ventilation** free cross-section: 4 - 24 %, air flow: 192 - 1,294 m³/h in acc. with DIN EN 1026

RAISED FLOORS WITH DIE-CAST ALUMINIUM PANELS

Light and loadable

Raised floors made of aluminium are ideal for especially high loads – even in machinery or server areas. Additional reinforcement profiles in the substructure can selectively increase load-bearing capacity even further. Yet the dead weight of the floor panels made from high-quality die-cast aluminium remains low. Combination with other Lindner systems is always possible.

The orthotropic design of the ALUVENT floor panel provides large, free cross-sections and thus supports optimum air circulation.

The perforated OCTOGRATE aluminium floor system with its conductive coating offers free cross-sections of up to 53 %. The extensive perforation generally obviates the need for floor coverings.

The properties of floor systems with die-cast aluminium panels makes them predestined for use in clean rooms.

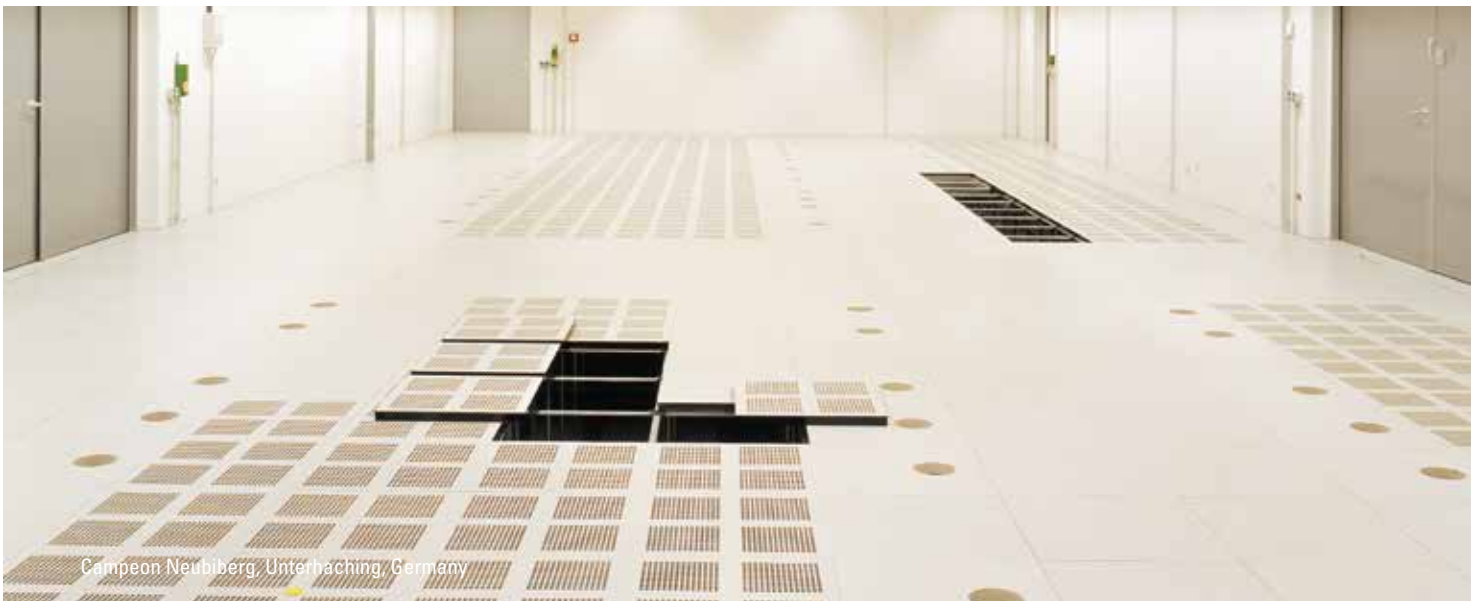
+ free cross-section up to 53 %
+ outstanding electrostatic properties
+ high load-bearing capacity
+ non-combustible
+ easy handling due to their low weight
+ non-magnetic
+ suitable for clean rooms

Campeon Neubiberg, Unterhaching, Germany

ALUMINIUM	DIE-CAST ALUMINIUM PANELS		
	PRODATA	ALUVENT	OCTOGRATE
TECHNICAL DATA	raised floor for standard and heavy duty areas	raised floor with perforations for standard and heavy duty areas	raised floor with perforations for standard and heavy duty areas
	panel thickness: 50 - 60 mm system weight: 27 - 42 kg/m²	panel thickness: 50 - 60 mm system weight: 27 - 42 kg/m²	panel thickness: 62 mm system weight: 31 kg/m²
STATICS	**Load and Deflection Class** 6B (6 - 10 kN) in acc. with EN 12825	**Load and Deflection Class** 5B (5 kN) - 6B (6 - 10 kN) in acc. with EN 12825	**Load and Deflection Class** 6B (7 kN) in acc. with EN 12825
FIRE PROTECTION	**Reaction to Fire Performance** non-combustible in acc. with DIN 4102 and EN 13501	**Reaction to Fire Performance** non-combustible in acc. with DIN 4102 and EN 13501	**Reaction to Fire Performance** non-combustible in acc. with DIN 4102 and EN 13501
CLIMATE CONTROL	–	**Perforation** free cross-section: 3.6 - 45.0 %	**Perforation** free cross-section: 53.3 %

PRODATA | ALUVENT | OCTOGRATE

Campeon Neubiberg, Unterhaching, Germany



Campeon Neubiberg, Unterhaching, Germany

ADAC Headquarters, Munich, Germany
© Xaver Lockau

RAISED FLOOR WITH STEEL VENTILATION PANELS

For heated situations

The free cross-section of the VENTEC Raised Floor System of up to 38 % provides great ventilation options within the floor cavity. This property is highly important, particularly in server rooms and data centres.
The carrier panel consists of a welded tubular frame construction with powder-coated surface. Varying perforations in the form of round or slotted holes ensure circulation in the floor cavity if desired. The panels can each be individually removed to greatly facilitate maintenance and repairs on the installations. The VENTEC floor system can be combined with other Lindner floor systems and acts as an extension option to the NORTEC systems.

+ free cross-section up to 38 %
+ panels optionally with holes or slots
+ quantity regulation can be fitted to the underside of panels
+ non-combustible
+ easy handling and direct access to the floor cavity

STEEL	POWDER-COATED STEEL VENTILATION PANELS
	VENTEC
TECHNICAL DATA	raised floor as a tubular frame construction with ventilation
	panel thickness: 30 - 50 mm system weight: 40 - 60 kg/m²
STATICS	**Load and Deflection Class** 2A - 6A (3 - 15 kN) in acc. with EN 12825
FIRE PROTECTION	**Reaction to Fire Performance** non-combustible in acc. with DIN 4102 and EN 13501
CLIMATE CONTROL	**Ventilation** air flow at 25 Pa: 375 - 2,500 m³/h (panel without floor covering) free cross-section with round hole: 15 % / 24 % / 38 % free cross-section with slotted hole: 16 % / 23 %

RAISED FLOOR WITH VENTILATION PANEL

Free up circulation

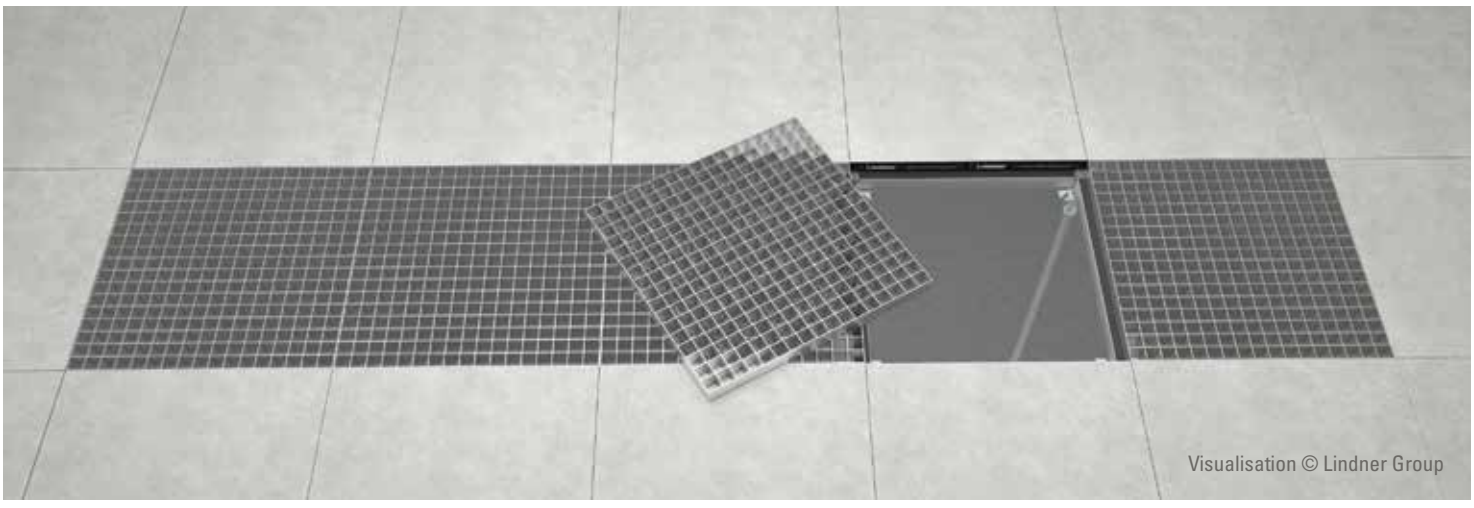
Good ventilation protects your technology from overheating. Ventilation panel raised floor panels enable particularly high air flow: they are produced with a maximum proportion of free cross-section from hot-dip galvanised or powder-coated steel. This provides a very high flow rate of supply and exhaust air. Ventilation floor panels can be used in isolation or in combination with other Lindner floor systems as required.
These panels are available with blades that are straight or angled at 45° to adjust the ventilation direction.

+ free cross-section of approx. 88 %
+ high air flow
+ non-combustible
+ easy removal and replacement of individual panels

STEEL	VENTILATION FLOOR PANELS
TECHNICAL DATA	panel thickness: 30 - 60 mm free cross-section: approx. 88 % grid spacing: 34 x 34 mm straight or angled blades (45°)
STATICS	**Load and Deflection Class** 1A (2 kN) - 6B (13 kN) in acc. with EN 12825 with a 50 x 50 mm test cube
FIRE PROTECTION	**Reaction to Fire Performance** non-combustible in acc. with EN 13501
PROTECTION AGAINST CORROSION	hot-dip galvanised or powder-coated (in acc. with RAL)

VENTILATION PANEL
powder-coated in black,
blades angled at 45°

Visualisation © Lindner Group



Visualisation © Lindner Group


Substructure made of steel pedestals
and stringers

SUBSTRUCTURE

Everything from a single source

Our floor systems have one particular advantage: they do not require any additional structures. Virtually all components – such as raised floor pedestals, profiles and switchboard frames – are produced in-house at Lindner. These substructures then serve as extremely loadable pedestals for the system or as additional options for organised placement of lines and supply lines. Our in-house production enables us to assure consistently high quality and creates the possibility to respond to individual requirements. This means that your design, planning and manufacture are all available from a single source.

+ very high loads possible
+ interface optimisation through in-house production of system components
+ high quality
+ Made in Germany

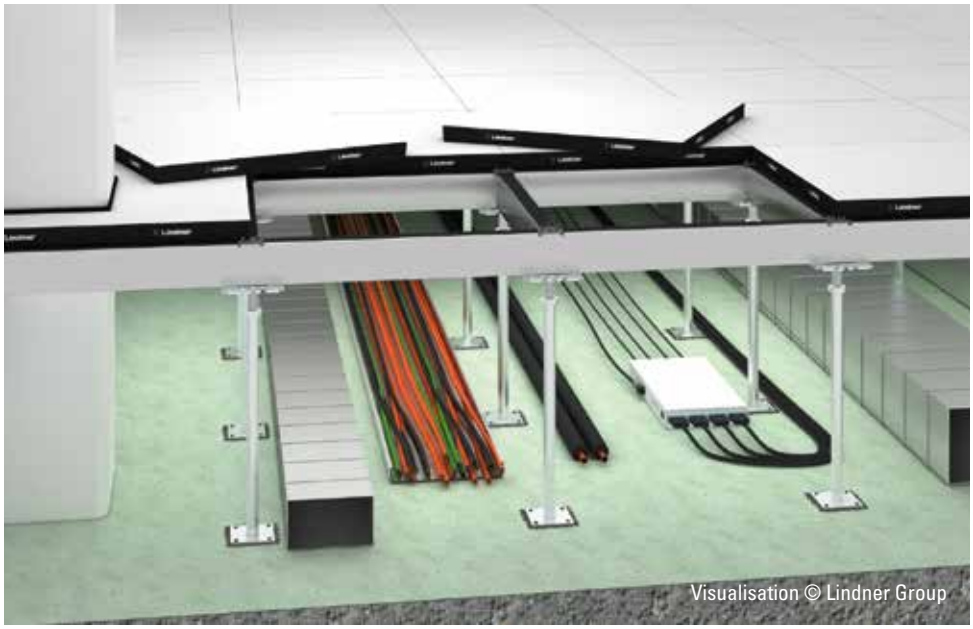
RAISED FLOOR PEDESTALS

Extra strong support from below

Raised floor panels require sturdy substructures that withstand heavy loads: our raised floor pedestals not only support the floor panels, they also create the floor cavity to accomodate supply lines. These metal pedestals are infinitely height-adjustable and can therefore compensate for any unevenness in the underground. They are entirely manufactured by Lindner in Germany – from development through to production and galvanisation. Our pedestals are extremely loadable and durable.

+ Made in Germany
+ high load-bearing capacity
+ variable height adjustment
+ high protection against corrosion
+ easy to install
+ very high installation heights possible
+ free from “zinc whiskers”

PEDESTAL TYPE	SCHEMATIC REPRESENTATION	STATICS
H SW 90	 	**Load Class** 5 in acc. with EN 12825 **Point Load** 5 kN
SWU	 	**Load Class** 5 in acc. with EN 12825 **Point Load** 5 kN
SW 120	 	**Load Class** 5 in acc. with EN 12825 **Point Load** 5 kN
SWM 120	 	**Load Class** 6 in acc. with EN 12825 **Point Load** 10 kN
SWH 120	 	**Load Class** 6 in acc. with EN 12825 **Point Load** 15 kN


Visualisation © Lindner Group

CONTROL ROOM PROFILES

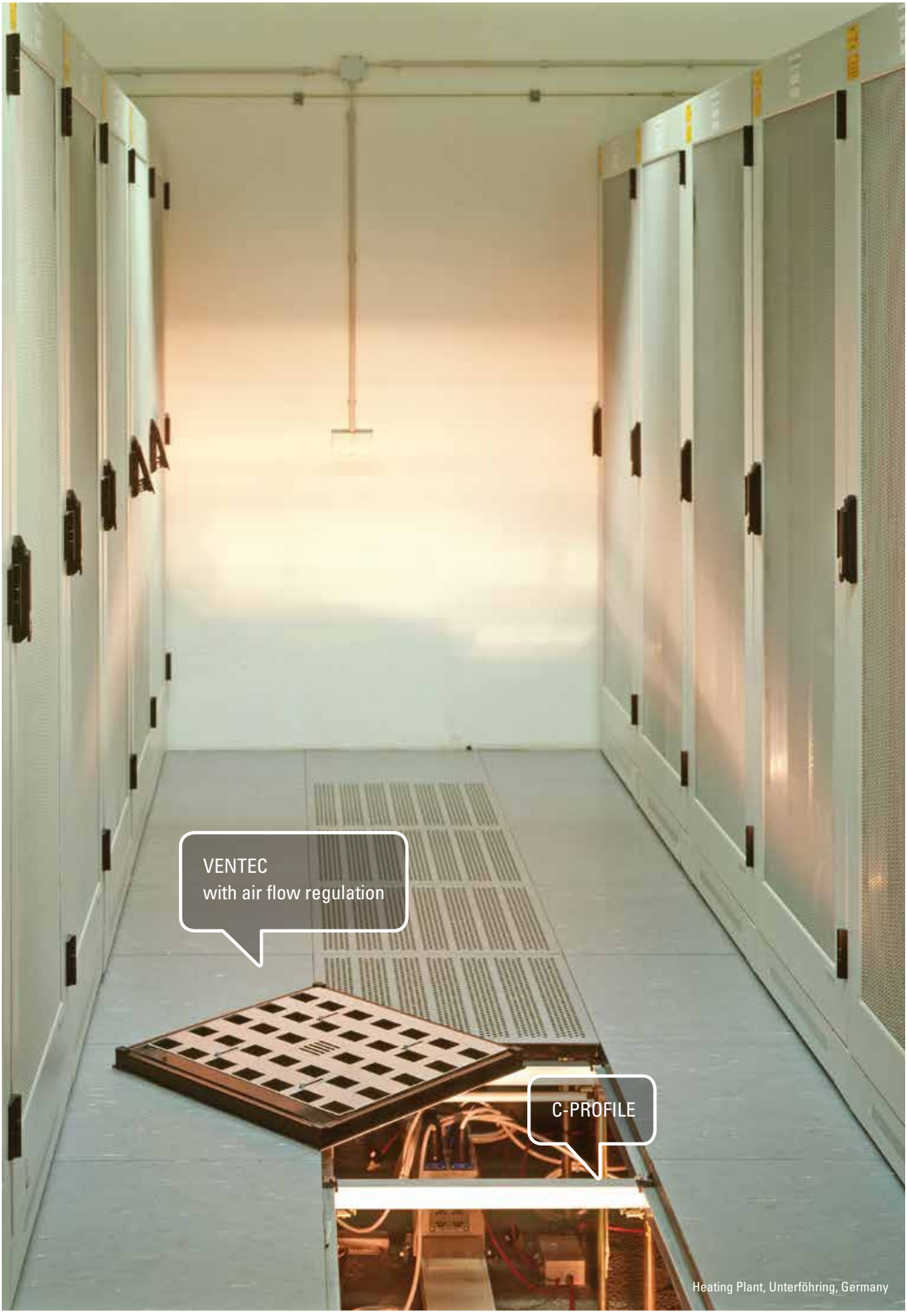
Support just where it's needed

Our C-profiles are made from cold formed, galvanised steel sheet and are used when designing control rooms. Hammer head screws are used to attach these profiles from the underside and screw them to the pedestals.

Five different types are available for a wide range of requirements. They enable a significant increase in load-bearing capacity. Our control room profiles distribute high vertical and horizontal loads, which ensures stability even in the case of extreme weight.

+ high load-bearing capacity
+ easy to install
+ additional frames for equipment on request

PROFILE TYPE	PROFILE DIMENSIONS	SCHEMATIC REPRESENTATION
CL	40 x 41 mm	
CS	40 x 41 mm	
CX	40 x 41 mm	
CM	40 x 84 mm	
CH	40 x 126 mm	



Heating Plant, Unterföhring, Germany

RAISED FLOOR SYSTEMS WITH PEDESTAL GRID OF 1,200 x 1,200 mm

More space for technology

There is often insufficient space for technology in the floor cavity. This problem is generally caused by a lack of coordination between the pedestal grid and installations. Lindner has developed an innovative solution to this: a design consisting of two layers of steel profiles can be used to increase the standard pedestal grid dimension of 600 x 600 mm to 1,200 x 1,200 mm. This does not result in any limitations to load-bearing capacity. Point loads in acc. with EN 12825 of up to 15 kN are possible as standard, even higher on request. The system can therefore be used without any issues in data centres containing heavy equipment. A layout of this easy to install floor system can also be created in acc. with fire protection requirements up to REI 60. The use of standard Lindner Raised Floor Panels also ensures the usual revision possibilities.

+ 4-times more free space for installations between the pedestals
+ potential nominal load up to 15 kN in acc. with EN 12825
+ flexibility in positioning of the profiles and pedestals
+ up to 70 % fewer pedestals
+ quick and easy installation
+ potential fire resistance of REI 60 in acc. with EN 13501-2

Visualisation © Lindner Group

FLOOR COVERING

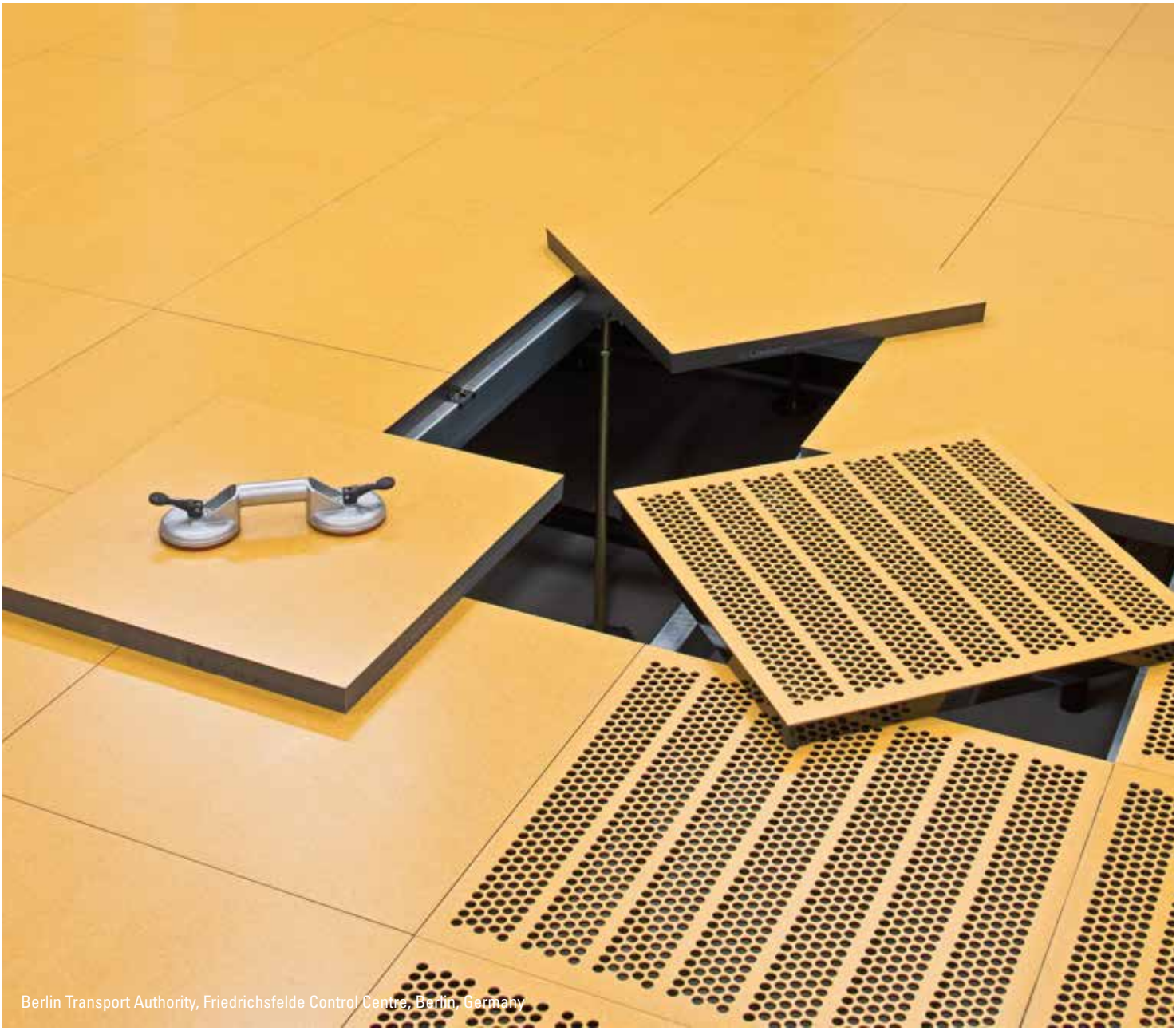
A successful conclusion

Various choices of coverings provide the finishing touch to Lindner floor systems for data centres and technical rooms. There are elastic coverings such as PVC, HPL, linoleum, etc. that are available in different colours and with a wide variety of designs to add an individual touch. Application at the factory using tested and emission-free adhesive systems ensures durability and top quality.

+ large selection of coverings
+ low-emission adhesive systems
+ durable, aesthetically pleasing and functional
+ adaptable to electrostatic requirements

Heating Plant, Unterföhring, Germany


COVERING OPTIONS
antistatic or conductive



Berlin Transport Authority, Friedrichsfelde Control Centre, Berlin, Germany

LINDNER MIPOLAM CLASSIC

PVC covering for reduced emissions

Our Lindner Mipolam Classic covering has a polyurethane surface finish. It is therefore already well protected during laying and creates an ideal basis for initial maintenance. With VOC emissions of less than 10 µ/m³ (TVOC after 28 days), this PVC covering also contributes to optimal indoor air quality. Mipolam Classic has a directional and continiously marbled monolayer.

+ antistatic
+ contributes to ideal indoor air quality
+ cost-effective

LINDNER MIPOLAM CLASSIC

0301 beige


0122 pineapple


0010 azure


0123 corallo


0121 green leaf


0255 warehouse covering


0013 pewter


0005 steel


0303 grey


0002 platinum


0108 pepper


0125 truffle


0014 brown


0006 honey

0003 ivory

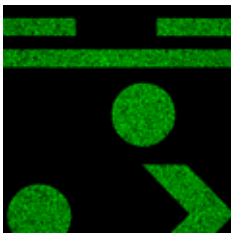
TECHNICAL DATA		STANDARD
Total Thickness	2.0 mm	EN ISO 24346 (EN 428)
Total Weight	3,300 g/m²	EN ISO 23997 (EN 430)
Electrostatic Charge from Foot Traffic in Combination with ESD Control Footwear	< 2 kV (antistatic)	EN 1815
Dimensional Stability	≤ 0.25 %	EN ISO 23999 (EN 434)
Residual Indentation	≈ 0.03 mm	EN ISO 24343-1 (EN 433)
Slip Resistance	class R9	DIN 51130 / BGR 181
Resistance to Chemicals	resistant against household chemicals, non-colouring, diluted acids and alkaline solutions with short-term exposure	EN ISO 26987 (EN 423)
Castor Chair Continuous Use	suitable	ISO 4918 (EN 425)
Light Fastness	level ≥ 6	EN 20105-B02
Reaction to Fire	class B_{fl} - s1	EN 13501-1
Thermal Conductivity	0.25 W/(m·K)	EN ISO 10456 (EN 12524)
TVOC (after 28 Days)	< 10 µg/m³	ISO 16000-6
CE Marking		EN 14041
Sustainability Made in Europe	TVOC (after 28 days) < 10 µg/m³ in acc. with ISO 16000-6	

FLOORING SYSTEMS

THE FORBO COLOREX® COLLECTION

glow
EC250299

glow JAV 200206 159
EC250299



glow JAV 200206 164
EC250299

everest
SD 150201 | EC 250201

montblanc
SD 150204 | EC 250204

adula
SD 150205 | EC 250205

moonstone
SD 150206 | EC 250206

quartz
SD 150207 | EC 250207

sahara
SD 150213 | EC 250213

assuan
SD 150219 | EC 250219

pacific
SD 150221 | EC 250221

niagara
SD 150222 | EC 250222

kiwi
SD 150225 | EC 250225

sole
SD 150231

fuego
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twilight
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amazonas
SD150237

etna
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nebo
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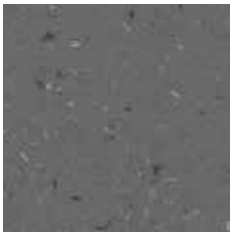


massif
SD150263 | EC250263

meru
SD150264 | EC250264

blue ridge
SD150265 | EC250265

fuji
SD150266 | EC250266

montserrat
SD150267 | EC250267

pelion
SD150268 | EC250268

FLOORING SYSTEMS

FORBO COLOREX®

Starts off where others give up

Colorex® is especially suitable in the event of high requirements in relation to discharge capacity and structural load-bearing capacity. A special production process gives the material an extremely high and uniform density. Its pore-free, totally easy-care surface meets the highest hygiene requirements up to and including clean room suitability.

+ very high discharge capacity
+ highly stressable
+ very high dimensional stability

TECHNICAL DATA			STANDARD
	Colorex® EC	**Colorex® SD**	
Total Thickness	2.0 mm (3.0 mm on request)	2.0 mm (3.0 mm on request)	EN ISO 24346
Classification	class 34, very heavy class 43, heavy	class 34, very heavy class 43, heavy	EN ISO 10874 EN ISO 10874
Total Weight	3.2 kg/m²	3.2 kg/m²	EN ISO 23997
Electrical Resistance	$5 \times 10^4 \leq R \leq 10^6$ Ω	$1 \times 10^6 \leq R \leq 10^8$ Ω	IEC 61340-4-1 ESD STM7.1
Electrical Resistance in Combination with ESD Control Footwear	$R \leq 3.5 \times 10^7$ Ω	$R \leq 1 \times 10^9$ Ω	IEC 61340-4-5 ESD STM97.1
Insulation Resistance	-	≥ 50 kΩ	DIN VDE 0100
Electrostatic Charge from Foot Traffic in Combination with ESD Control Footwear	< 100 V	< 100 V	IEC 61340-4-5 ESD STM97.2
Dimensional Stability	≤ 0.05 %	≤ 0.05 %	EN ISO 23999
Residual Indentation	≤ 0.10 mm	≤ 0.10 mm	EN ISO 24343-1
Footfall Sound Reduction	2 dB	2 dB	EN ISO 140-8
Slip Resistance	R9	R9	DIN 51130
	GS1	GS1	bfu/bpa/upi R 9729
Resistance to Chemicals	very good	very good	EN ISO 26987
Castor Chair Continuous Use	suitable (type W)	suitable (type W)	ISO 4918
Light Fastness	≥ 6	≥ 6	EN ISO 105-B02
Reaction to Fire	B_{fl}-s1, G, CS	B_{fl}-s1, G, CS	EN 13501-1
Slip Resistance	μ ≥ 0,30	μ ≥ 0,30	EN 13893
Body Voltage	≤ 2 kV	≤ 2 kV	EN 1815
Thermal Conductivity	0.25 W/(m·K)	0.25 W/(m·K)	EN 12524
CE	0201081-DoP-306	0201083-DoP-306	EN 14041

MARMOLEUM® OHMEX

Special conductive linoleum floor covering

MARMOLEUM® Ohmex static dissipative linoleum meets the higher requirements for electrical conductivity. Electrical resistance is improved to < 1-108 (EN 1081), ensuring personal safety and protecting equipment that is sensitive to static electricity. Marmoleum Ohmex, which is 2.5mm thick, is available in six colours. Typical areas of use are computer/server rooms and areas with sensitive electrical equipment

+ great discharge capacity
+ made from renewable materials
+ durable

FLOORING SYSTEMS

THE FORBO MARMOLEUM® OHMEX COLLECTION

73032
mist grey

73146
serene grey

73038
caribbean

73048
graphite

72939
black

73055
fresco blue

TECHNICAL DATA		STANDARD
	Marmoleum® Ohmex	
Total Thickness	2.5 mm	EN ISO 24346
Classification	23 / 34 / 42 / 43	EN ISO 10874
Total Weight	approx. 2,900 g/m²	EN ISO 23997
Electrical Resistance	$1 \times 10^6 \leq R \leq 1 \times 10^8$ Ω	EN 1081
Light Fastness	≥ level 6	EN ISO 105-B02
Reaction to Fire	C_{fl}-s1	EN 13501-1
Slip Resistance	μ ≥ 0,30	EN 13893
Body Voltage	≤ 2 kV	EN 1815
Thermal Conductivity	0.17 W/(m·K)	EN 12524
Roll Width	2 m	EN ISO 24341
Slip Resistance	R9	DIN 51130
Impact Sound Reduction	maximum 5 dB	EN ISO 140-8
CE	0100205-DoP-306	EN 14041

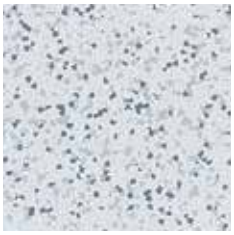
FATRA FLOORS
Elektrostatik and Dynamik

The scale of production regarding homogeneous coverings from Fatra includes floors that meet the requirements for electrostatic properties. These involve electrostatic conductive coverings – ELEKTROSTATIK – or static-dissipative coverings – DYNAMIK. They are produced with a thickness of 1.7 or 2.0 mm.

+ conductive
+ cost-effective

FATRA ELEKTROSTATIK A
FATRA DYNAMIK A


1301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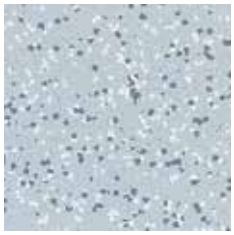
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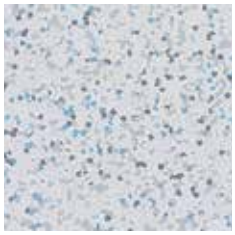
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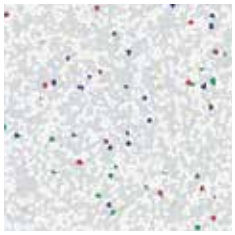
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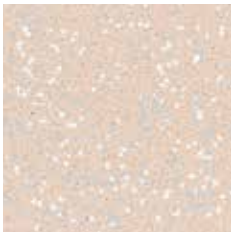
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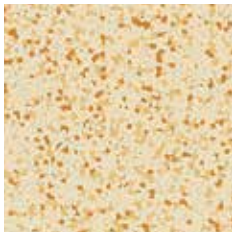
5301


7301


8301


8306


8315

TECHNICAL DATA		STANDARD
Total Thickness	1.7 / 2.0 mm	EN ISO 24346 [EN 428]
Total Weight	2,363 g/m² / 2,780 g/m²	EN ISO 23997 [EN 430]
Resistance	ELEKTROSTATIK ≤ 1 x 10^6 Ω / DYNAMIK ≤ 1 x 10^8 Ω	EN 1081 / EN 14041
Dimensional Stability	≤ 0.25 %	EN ISO 23999 [EN 434]
Residual Indentation	≤ 0.1 mm	EN ISO 24343-1 [EN 433]
Slip Resistance	ELEKTROSTATIK R11 / DYNAMIK R10	DIN 51130
Resistance to Chemicals	resistant against household chemicals, non-colouring, diluted acids and alkaline solutions with short-term exposure	EN ISO 26987 [EN 423]
Castor Chair Continuous Use	suitable	EN 425
Light Fastness	level ≥ 6	EN 20105-B02 (Method 3)
Reaction to Fire	class B_{fl} - s1	EN 13 501-1
Warranty	10 years	

Visualisation © Lindner Group

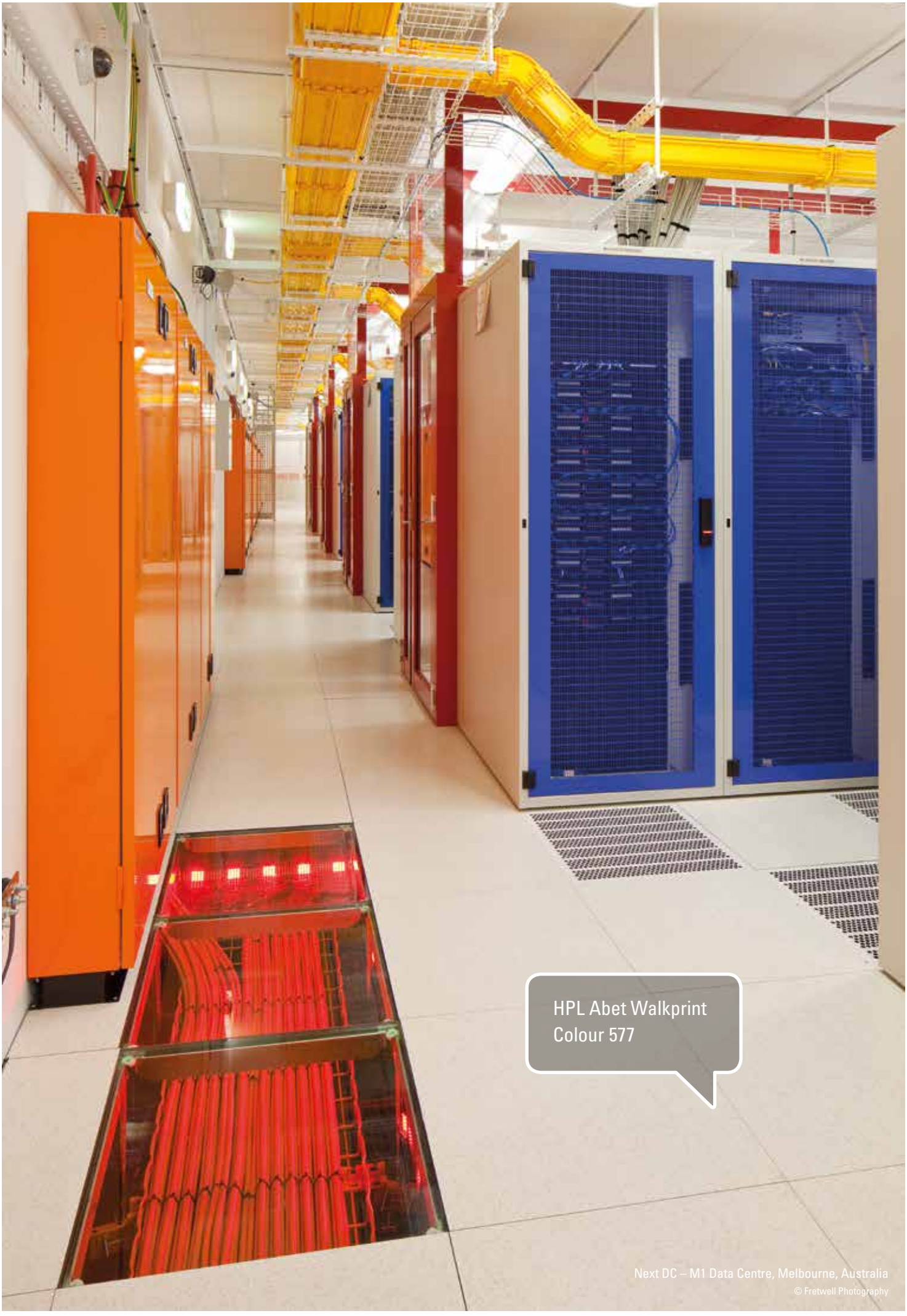
HPL COVERINGS

Resistant and hygienic

HPL laminate has a multi-layer structure and consists of decorative paper coated with melamine resin and core papers impregnated with phenolic resin. Their resistant, hygienic and sealed surface mean that HPL laminates do not require any special care. So these surfaces are easy to clean.

+ cost-effective surface for technical rooms
+ easy to clean

TECHNICAL DATA		STANDARD
	Abet Walkprint	
Total Thickness	0.9 ≤ s ≤ 1 ± 0.10 mm 1.0 < s ≤ 1.2 ± 0.15 mm	EN 438-2.5
Electrical Resistance	R_v (23°C / 50% RH) R_p (23°C / 50% RH) 1 x 10^9 - 1 x 10^{10} Ω (antistatic) DEST type (dissipative) 1 x 10^6 - 1 x 10^8 Ω	EN 61340-4-1
Slip Resistance	R10	BGR 181-10/03
Abrasion Resistance	AC 2 IP 1,500 rpm AC 3 IP 2,000 rpm AC 4 IP 4,000 rpm AC 5 IP 6,000 rpm	EN 438-2.11
Light Fastness	4 - 5	EN 438-2.27



Next DC – M1 Data Centre, Melbourne, Australia


Lindner

EXPERTISE

When it really matters

The expertise in building physics and biology involved in our floor systems assures safety and top performance in the most diverse situations: be it in earthquake-prone regions, protecting vulnerable technical systems at the outbreak of a fire or given the highest load types.
Our systems can be flexibly adapted to the particular conditions to cater for individual requirements.

+ meets the highest requirements in terms of building physics
+ adaptable to individual needs

LOAD-BEARING CAPACITY

Delivers what it promises

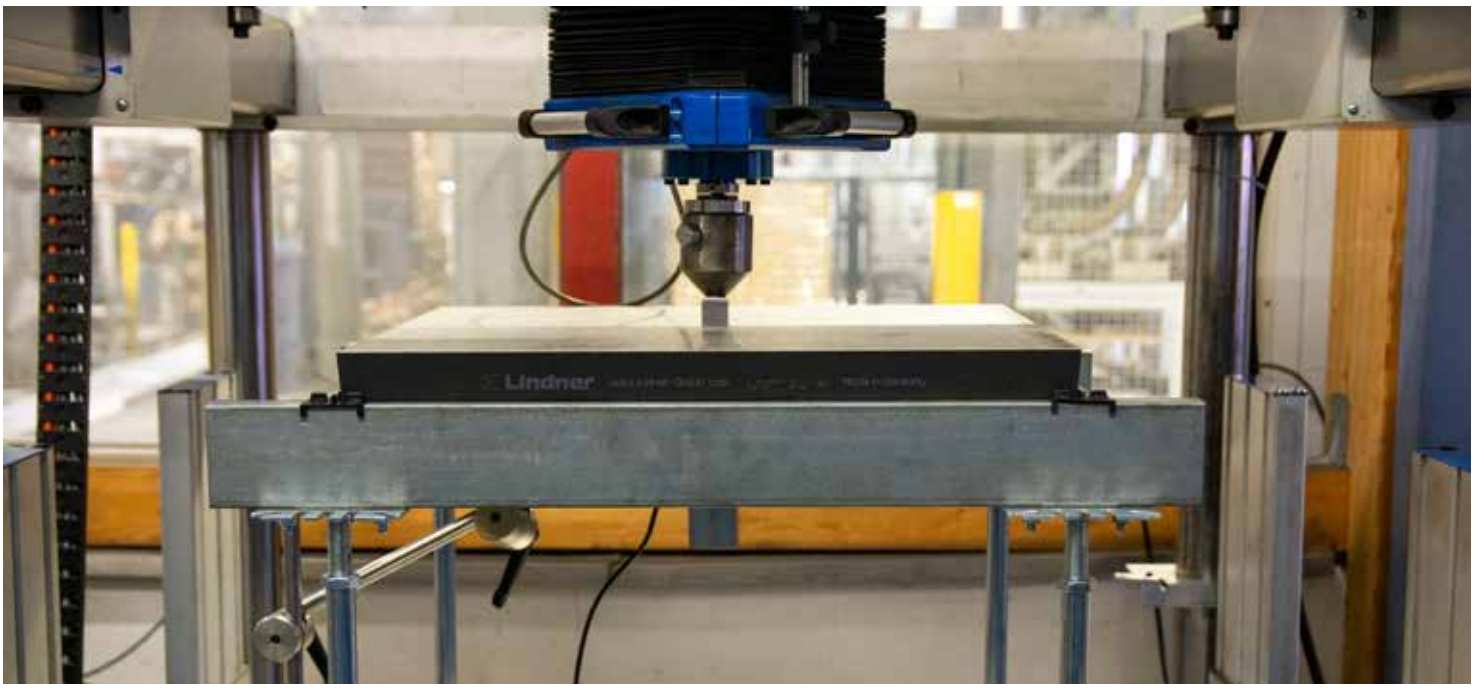
The critical load types for raised floors are the point load and the dynamic load. The assignment of floor systems to a load class is based on their structural load-bearing capacity or breaking load and the associated deflection. Strip loads and distributed loads are generally not considered, since they are not applicable.

Similar to a point load, the distributed load is a static load. In contrast to the point load, however, the surface of the "test indentor"is in this case 1 m². The term distributed load is common in connection with general building construction. Here it is used in dimensioning the load-bearing structure of a building. The specification or requirement for distributed loads is unsuitable in relation to floor systems. Practically speaking, the 1 m² test indentor spans beyond the system floor grid (60 x 60 cm) and thus the individual panel. The panel and pedestal only act as an interim layer for introducing the load into the subfloor.

Lindner floor systems are tested in acc. with EN 12825, the European raised floor standard. Precise information on the weight and dimensions of the units, their exact position in the room and the number of feet is essential in order to ensure the selection of the correct floor for your project.

+ high load-bearing capacity
+ tested in acc. with EN 12825
+ individual and cooperative planning

Siemens Beijing, China



CLASS	BREAKING LOAD	NOMINAL LOAD	ELEMENT CLASS	EXAMPLES OF APPLICATION AND USE	SUITABILITY FOR DATA CENTRES AND TECHNICAL AREAS
1	≥ 4,000 N	2,000 N	1	offices without public circulation and without heavy equipment	–
2	≥ 6,000 N	3,000 N	2	office areas with public circulation	–
3	≥ 8,000 N	4,000 N	3	rooms with increased static loads	–
4	≥ 9,000 N	4,500 N	–	areas with fixed seating, design offices	–
5	≥ 10,000 N	5,000 N	5	technical rooms, exhibition areas, workshops with light operation, storage rooms, libraries	✓
6	≥ 12,000 N	6,000 N	6	as load class 5, but with higher load requirements, industrial and workshop floors, vaults	✓
–	≥ 14,000 N	≥ 7,000 N		data centres with heavy equipment like battery devices and transformers, highly loaded floors, production areas such as clean rooms	✓

SEISMIC SAFETY

Walk on a solid foundation

Our floor systems are specifically tested and approved for use in regions that are prone to earthquakes. Buildings that must remain operational as part of the basic general provision in a disaster, such as hospitals, fire stations and power plants – even those in regions not directly affected – are subject to the Eurocode 8 construction standard DIN EN 1998-1:2010-12 relating to seismic safety.

In collaboration with the Institute of Earthquake Engineering and Engineering Seismology in Skopje, the suitability of Lindner system floors for Categories A - F in acc. with the IBC (International Building Code) was substantiated. Our floor systems are therefore approved for use in technical rooms of hospitals and power plants in regions that are prone to earthquakes.

+ tested and approved for regions at risk
+ meets the requirements of Eurocode 8 construction standard DIN EN 1998-1:2010-12 relating to seismic safety
+ suitability for Categories A - F in acc. with the IBC (International Building Code)

FIRE PROTECTION

Safety in an emergency

Floor systems installed in data centres are subject to special fire protection requirements, since there are technical equipment and cable installations located in the floor cavity. It is therefore especially important to prevent the generation of smoke and fire, stop them from spreading and ensure adequate rescue and extinguishing equipment. Lindner floor systems meet the highest fire protection standards: NORTEC is non-combustible and being reaction to fire performance class A1 it is even suitable for use in escape routes and other susceptible areas. This system enjoys the corresponding fire resistance classifications in acc. with F 30, REI 30 and REI 60.

+ suitable for the highest fire protection requirements
+ reaction to fire performance class A1 in acc. with EN 13501-1
+ classification F 30-AB in acc. with DIN 4102-4 or REI 30 and REI 60 in acc. with EN 13501-2 subject to the system combination

JOINT PERMEABILITY

Uninterrupted supply air

Ventilation of server racks and switchboard cabinets via the floor cavity is only possible if the impermeability of the floor system is guaranteed. In the case of open airflow beneath the raised floor system, specific values must be adhered to.

The Lindner NORTEC Floor System already has, without further measures a very low air leakage rate. In order to further optimise the joint permeability coefficient of a raised floor system, the wall connections can be sealed.

For NORTEC, the following measurement results have been confirmed by the Institute for System Floor Technology. These are laboratory values. On-site tests can deviate from them, sometimes considerably, due to many additional influencing factors.

Schwäbischer Verlag (Publisher), Ravensburg, Germany

PRESSURE DIFFERENCE	AIR LEAKAGE RATE	
	Area-based	**Area-based with Wall Connection**
25 Pa	0.22 l/s m²	0.24 l/s m²
50 Pa	0.36 l/s m²	0.38 l/s m²

STATIC ELECTRICITY

Relief in sight

We all recognise static electricity from everyday life, for instance from discharge flashes on door handles after walking on carpets. This is generally not harmful to people. Electronic components, on the other hand, are extremely vulnerable: they can be destroyed and/or suffer malfunctions given a discharge of just 30 V or more. This is why our raised floor systems and floor coverings can be adapted to suit your electrostatic requirements. An antistatic floor covering that does not exceed a 2 kV charge limit is generally sufficient in most areas where raised floor systems are used. Yet some areas, such as data centres, require specific earth resistance requirements to be met. Raised floor manufacturers can only adhere to low conductivity requirements of $< 10^8$ Ω by using highly conductive coverings, panel materials and adhesives. Unnecessary requirements should therefore be avoided with a view to construction costs. Wearing appropriate clothing (dissipative footwear) is also crucial: a technically flawless floor construction in terms of electrostatics is ineffective when insulating footwear is worn.

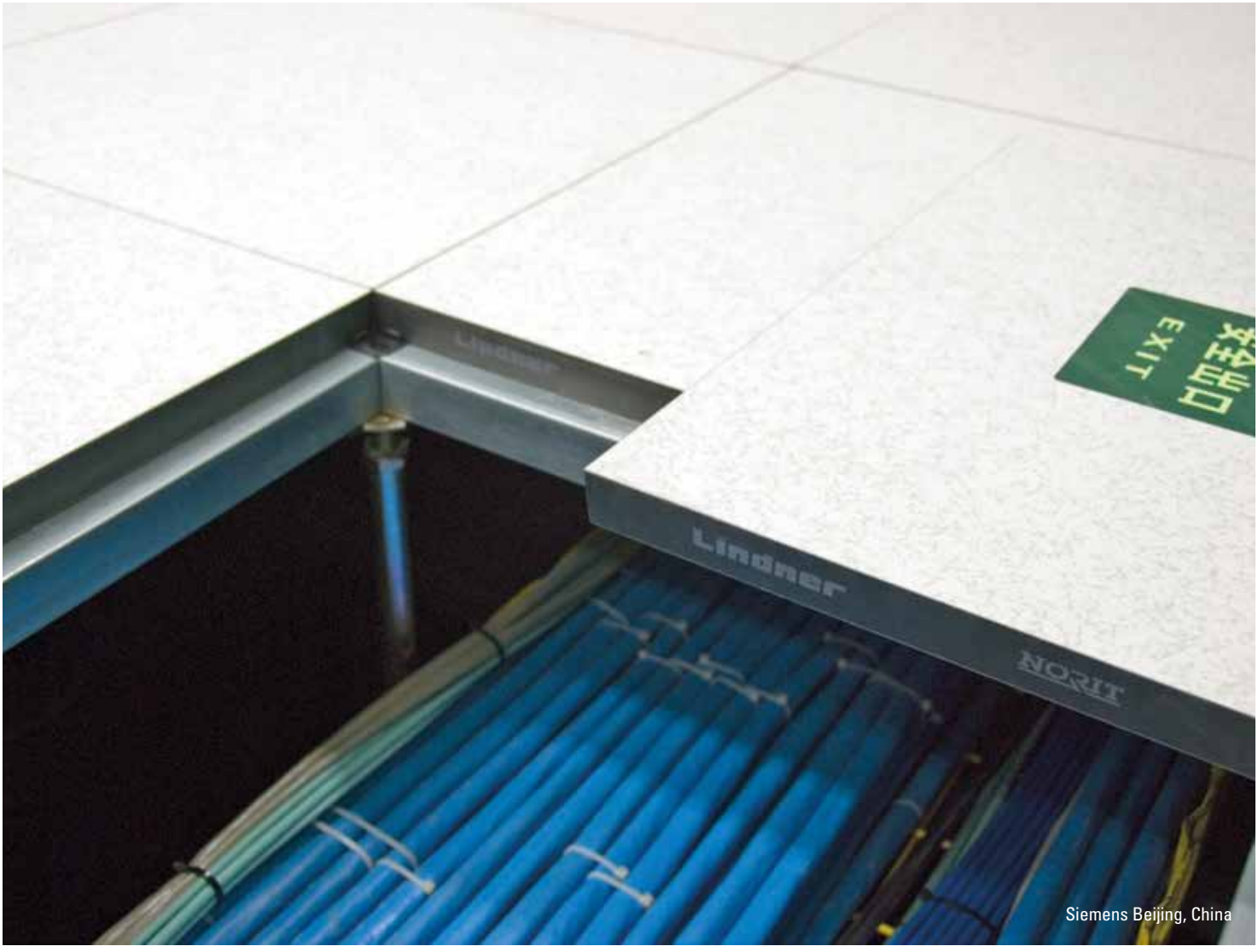
EXAMPLES OF APPLICATION AND USE	EARTH RESISTANCES
offices with terminals, sales and exhibition areas, etc.	antistatic in acc. with DIN 54-345: ≤ 2 kV charge voltage
rooms containing electronic equipment (e.g. data centres, computer operating rooms, offices with special equipment)	$R \leq 1 \times 10^9$ Ω or maximum charge voltage U of 2 kV
unprotected electronic assemblies or components necessitating personal protection requirements (e.g. test bays in an electronics production area)	$R < 1 \times 10^8$ Ω, electrical insulation to earth in acc. with VDE 0100, $R > 5 \times 10^4$ Ω or $R > 1 \times 10^5$ Ω (magnitude of the nominal voltage is decisive)
unprotected electronic modules or components (e.g. manufacturing or laboratory premises for the production, repair and testing of electronic equipment, assemblies or components)	$R < 1 \times 10^8$ Ω
explosive atmospheres in general (e.g. in laboratories with an explosion risk, gas pressure regulators, accumulator rooms)	$R < 10^8$ Ω
in rooms used for medical purposes, freshly laid	$R < 10^7$ Ω after four years $R < 10^8$ Ω electrosurgery $R < 5 \times 10^4$ Ω
explosive substances (e.g. in manufacturing and storage areas involving explosives, ammunition and pyrotechnic articles)	$R < 10^6$ Ω

ZINC WHISKERS

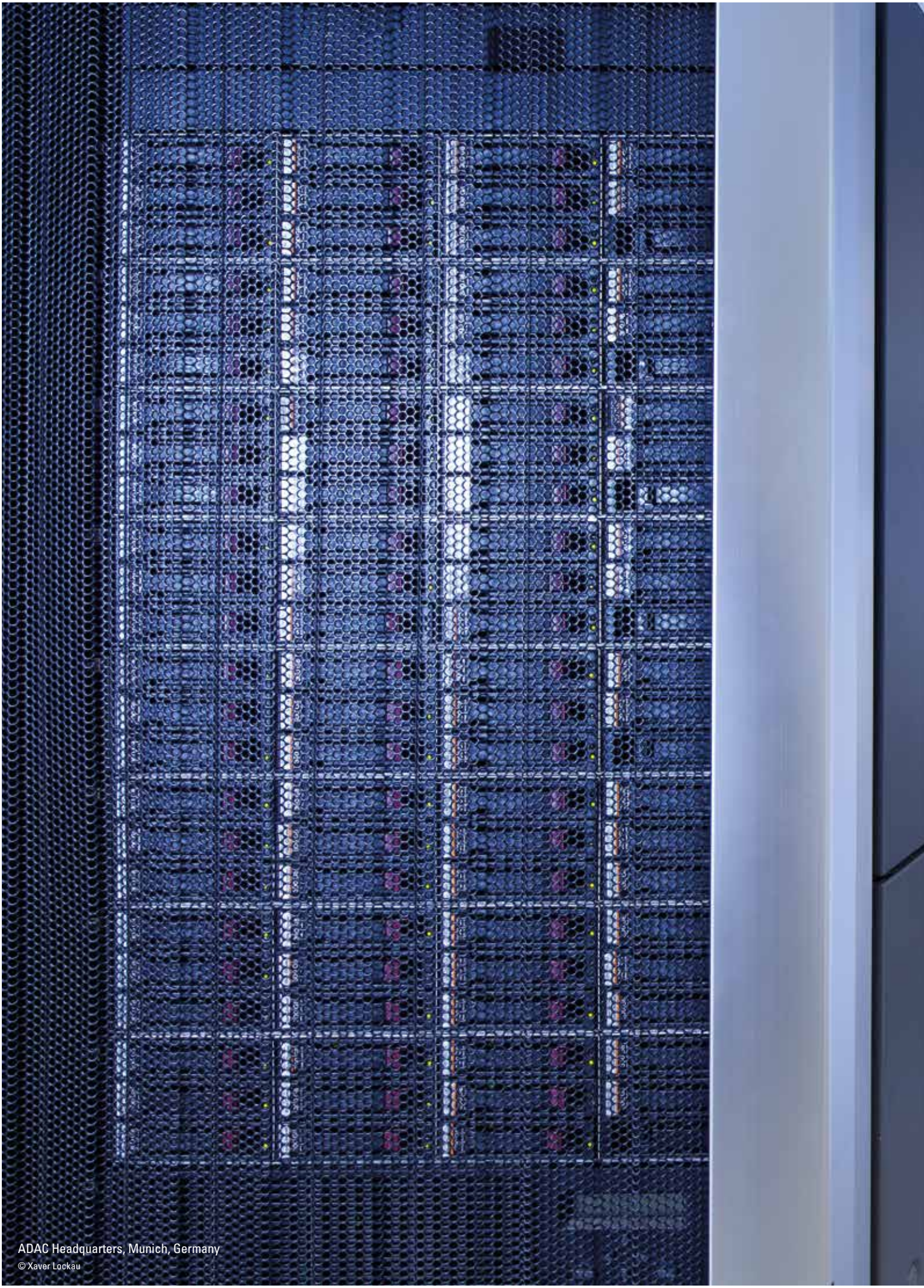
Undisturbed operation

Zinc whiskers are microscopic zinc protrusions that form on the surface of certain zinc-based galvanised coatings (like those on cable trays). These protrusions can be distributed via air circulation and settle like dust on circuit boards and other electronic components where they can cause system short circuits. We take preventive action to avoid this phenomenon: Lindner products for data centres and technical rooms are either made from materials that are not affected by this phenomenon or they are tested in relation to zinc whiskers. All our products for data centres are demonstrably free from zinc whiskers.

+ floor substructures for data centres and technical rooms that are demonstrably free from zinc whiskers
+ prevention of system short circuits



Siemens Beijing, China



ADAC Headquarters, Munich, Germany
© Xaver Lockau

REFERENCES

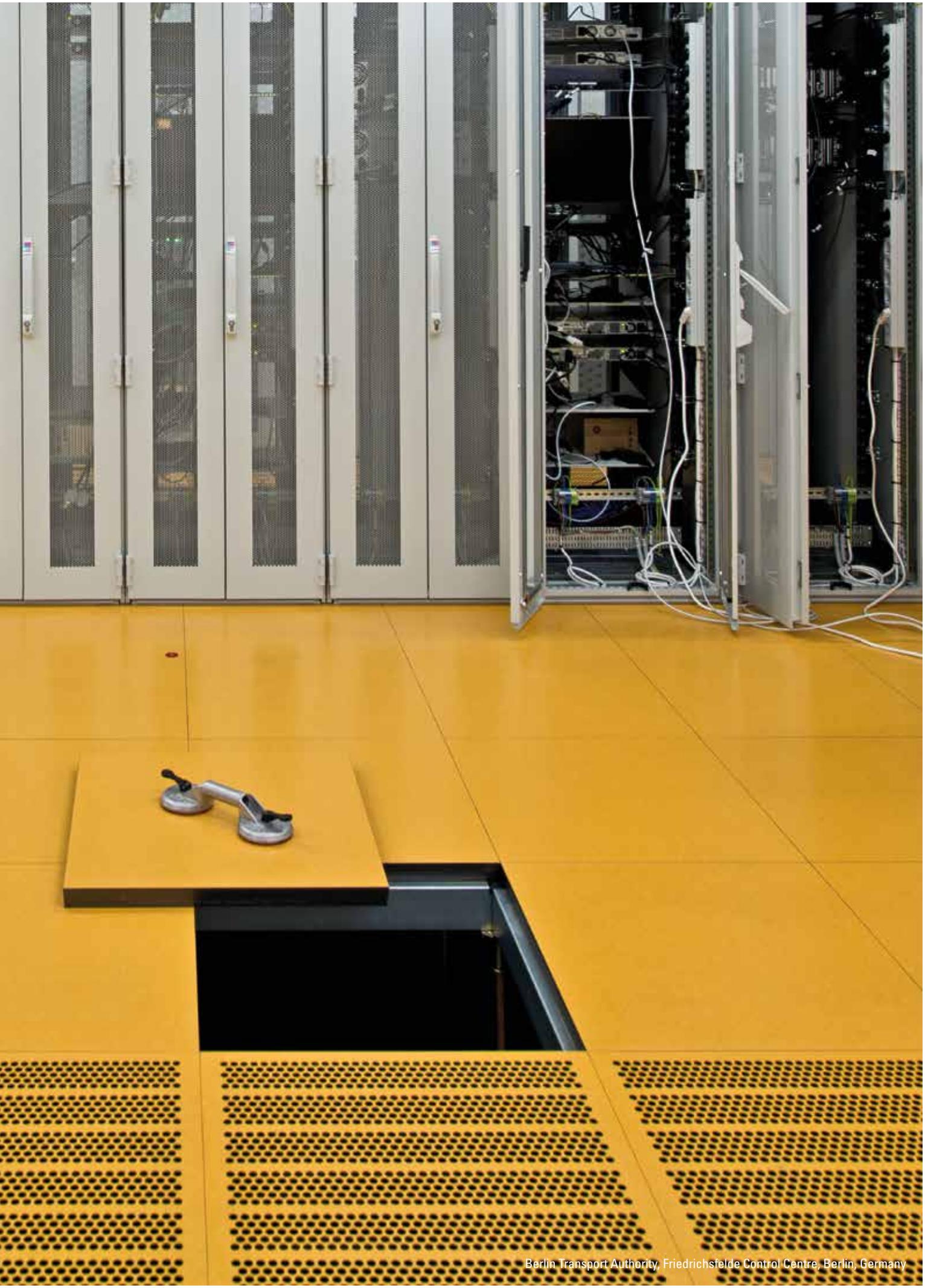
Experience and precision

The Lindner Group operates globally and has a wealth of experience garnered from a wide range of different projects. Our system floors represent the optimum in coordinated components for data centres and technical rooms. We are always happy to adapt our innovative solutions to satisfy your individual requirements. We thus jointly enable your visions to become reality.

+ optimal system solutions
+ coordinated to your requirements
+ where there's a will there's a way!

UNDERGROUND OPERATIONS CONTROL CENTRE FRIEDRICHSFELDE, BERLIN, GERMANY

The operations control centre run by the Berlin Transport Authority (Berliner Verkehrsbetriebe – BVG) centrally manages and monitors the movement of underground trains in Berlin. This involves versatile use of the three-storey building: the ground floor primarily houses servers and technical rooms, the infrastructural backbone of the operations control centre. The actual control centre is on the first floor, along with meeting rooms, break rooms and open-plan areas. The second floor contains offices and training facilities.



Berlin Transport Authority, Friedrichsfelde Control Centre, Berlin, Germany

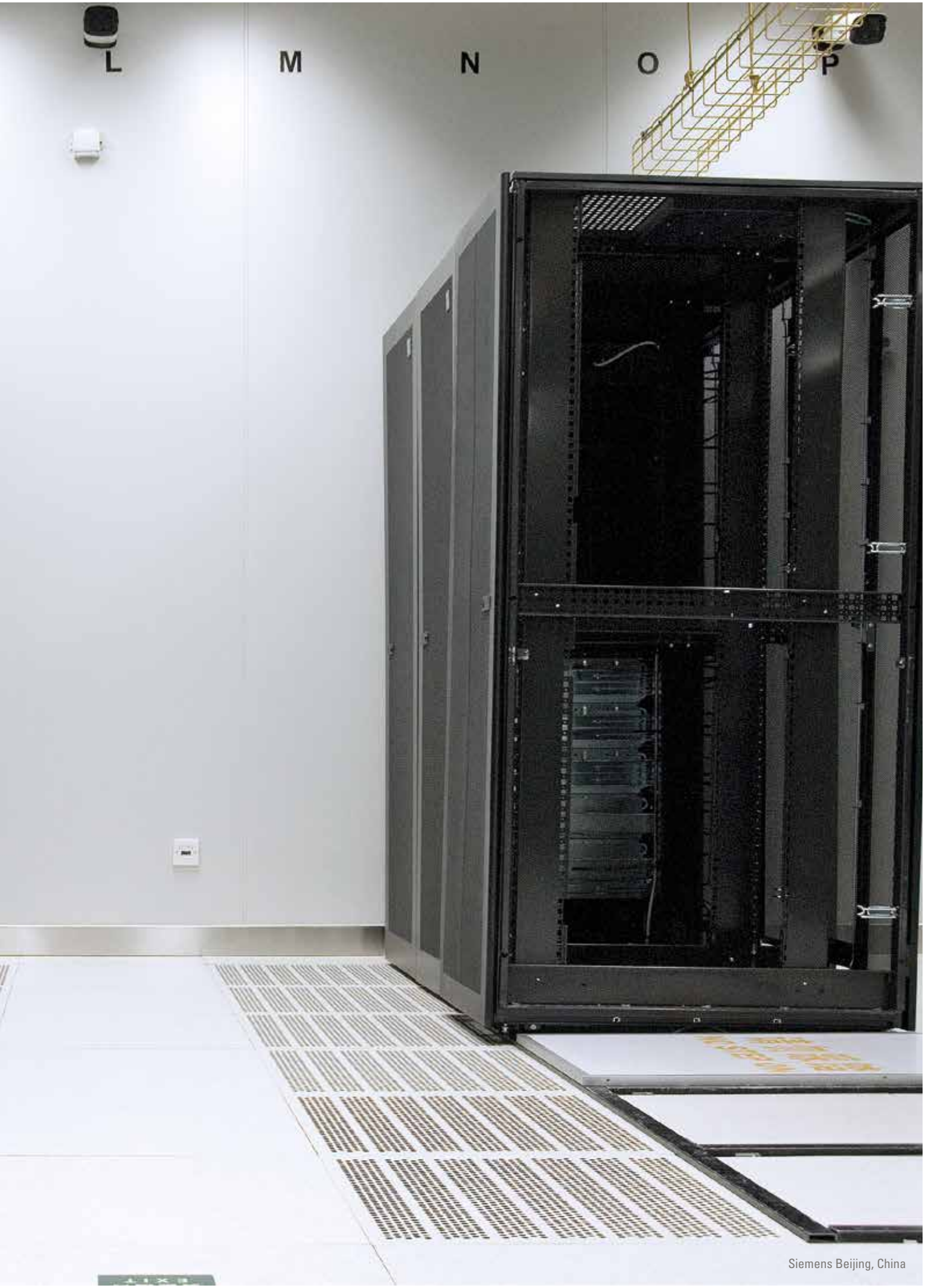
NEXTDC – M1 Data Centre, Melbourne, Australia

NEXT DC – M1 DATA CENTRE, MELBOURNE, AUSTRALIA

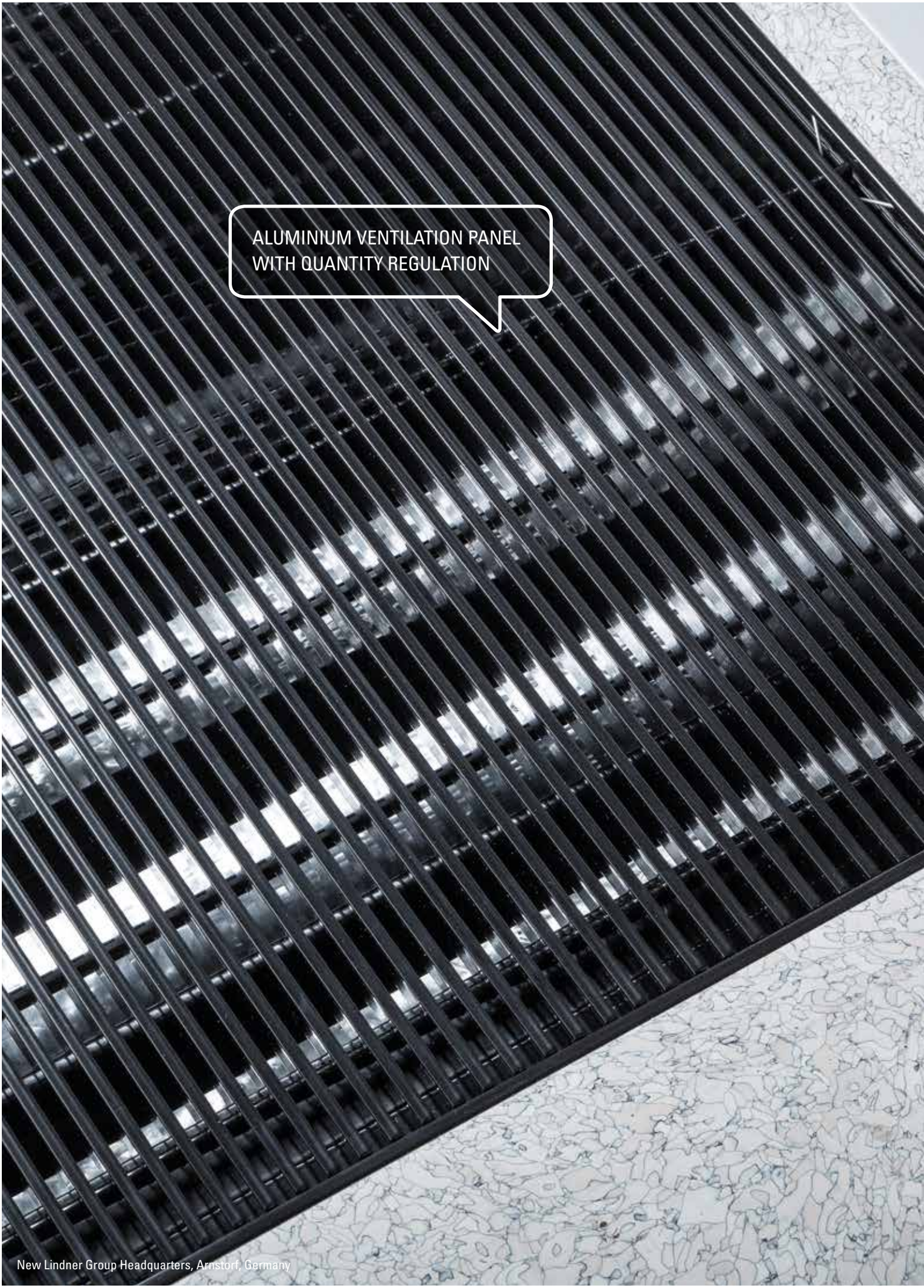
The M1 Melbourne Data Centre is the city's largest independent data storage facility, and therefore NEXT DC's flagship. It has six server farms with a total surface area of 17,500 m² including 6,000 m² of technical space. Lindner equipped the building with 5,200 m² of NORTEC Raised Floors.

SIEMENS BEIJING, CHINA

Siemens Ltd. China produces electrical components. The company develops, produces and distributes switches and other related products. Our Lindner NORTEC Raised Floor System with a specially reinforced substructure and VENTEC floor panels for optimum air distribution were laid in their computer centre in Peking.



Siemens Beijing, China



New Lindner Group Headquarters, Arnstorf, Germany

ACCESSORIES

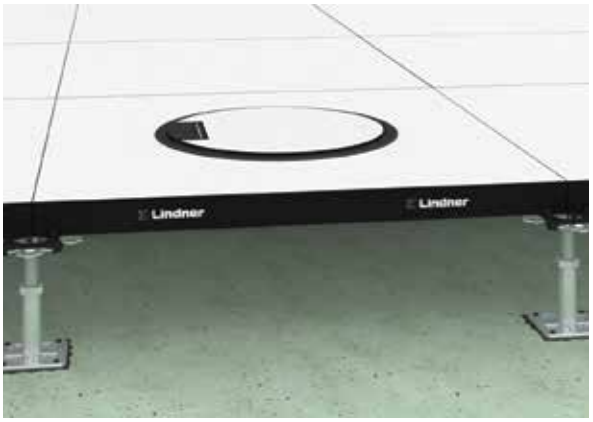
Everything you need

Our Raised Floor Systems can be fitted with efficient accessories, such as cable outlets, air ventilation outlets, bridging profiles, etc., which means that they can be ideally adapted to suit specific project requirements.

+ a range of accessories is available for adaptations
+ individual consultancy and planning
+ create the ideal conditions in your server room

ELECTRICAL OUTLETS

Leads and lines can be routed in the cavity beneath the flooring system. The installation of electrical outlets enables electrical connections to be specifically positioned.



AIR VENTILATION OUTLETS

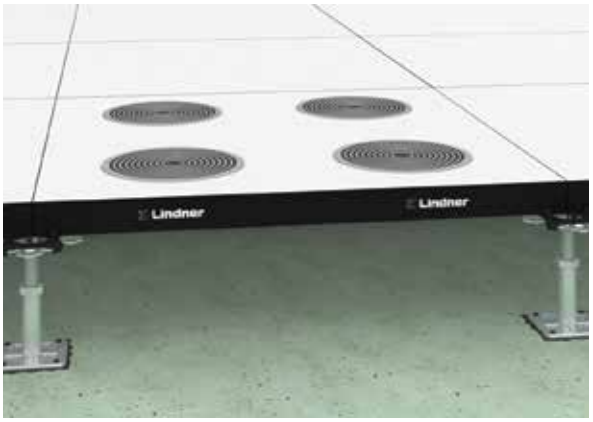
The use of ventilation inserts enables the air conditioning and ventilation of a room without creating draughts. We supply various systems for this:

Open System

Here the air forces its way directly through the installation cavity, which is designed as a pressure floor, to the corresponding ventilation inserts and thus into the room that needs to be ventilated.

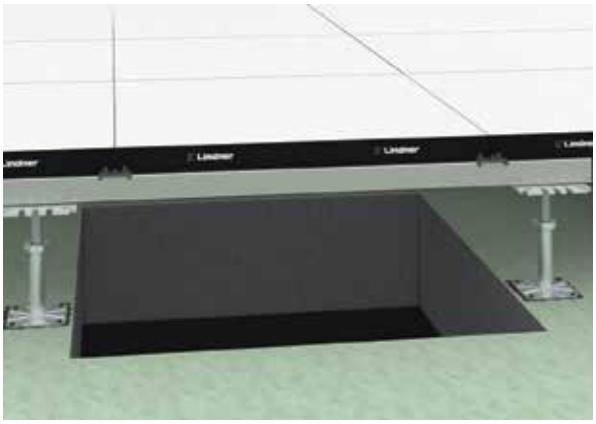
Closed System

Here the air is directed via a duct system or via bulkheads that have a fixed connection to the ventilation inserts.



BRIDGING PROFILES

Individual structural conditions in some areas of a system floors may require bridging in sections without pedestals. That is why we supply special bridging profiles. These are easy to install and enable the transfer of dynamic and static loads.

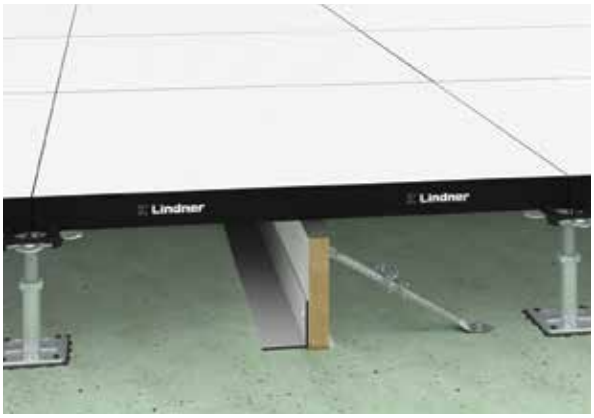


EXPANSION JOINTS

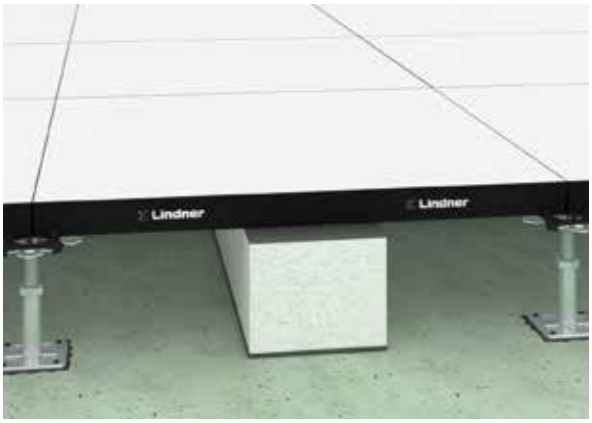
Expansion joint profiles are inserted into the system floor surface to absorb horizontal deflections and vertical settlements in a structural yet unobtrusive manner.

CAVITY BARRIERS

We supply three types of barriers for system floors to meet different requirements:
- air barriers made of coated wood-based material



- fire protection barriers made of porous concrete (≥ 115 mm)
- sound insulation barriers made of porous concrete (≥ 100 mm)

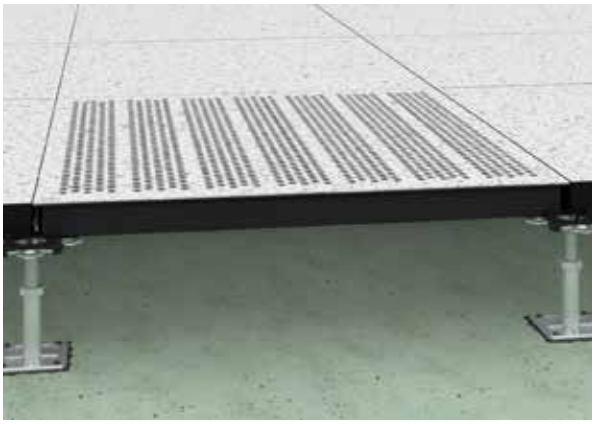


FACINGS

Front panels (covers) complete the system at staircases, platforms, etc. Stair nosing profiles cover the upper edges of the covers where required – e.g. when connections are open and visible. A bracket connection to the unfinished floor and bracing in the upper part of the cover ensure a stable method of construction.

VENTILATION PANELS

We seek to ensure the optimum ventilation volumes in the right place, so we supply various ventilation panels with optional air flow regulation.



SWITCHBOARD FRAMES

More space for installations

Our extremely stable Lindner control room profiles are eminently suitable as the substructure and frame for switchboards and server racks. The boards can be directly installed on their own frame made of steel profiles without the need for a floor panel. This leaves an opening in the floor system through which cold air can be introduced into the server racks. This air flow then regulates the components' operating temperature. The numerous lines can simply be fed through the opening beneath the switchboards for connection to the electrical components.

+ free installation space is maximised
+ high load-bearing capacity
+ straightforward wiring
+ ventilation of control cabinets and server racks from below

Berlin Transport Authority, Friedrichsfelde Control Centre, Berlin, Germany

CABLE TRAYS

Orderly conditions

Cable trays provide a necessary overview of the wiring for complicated network systems located in the floor cavity. Depending on the requirement, it can be easily and quickly fastened using pedestal clamps or – for higher loads – by screwing C-profiles and tube clamps to the pedestals. The C-profiles can also be subsequently installed on already laid floor systems.

Both fastening methods can be used to realise several layers on top of each other. They are also compatible with all cable tray systems.

Lindner floor systems can easily be combined with all cable tray systems – from a standard to a customised solution.

+ quick installation and height adjustment using pedestal clamps or tube clamps
+ accessible
+ can be realised in several layers
+ compatible with all cable tray systems

CABLE OUTLET
GTAG1 AIR-GUARD®

The GTAG1 Air-Guard® cable seal provides an easy, economical and effective air seal for cable openings in the raised access floor.

The features of our GTAG1 Air-Guard®:

+ overlapping brush for a better cable seal
+ latched removable brush section allows for easy cable release
+ installation at the edge or within the floor panel
+ manufactured from high strength flame retardant ABS and V0 rated quality nylon brush
+ RoHS-compliant
+ air-Guard foot safety cover available

TECHNICAL DATA

Dimensions	cut-out 265 x 115 mm (centre cut) / 135 mm (perimeter cut)
Overall Size	328 x 162 x 38 mm
Free Cable Area	230 x 65 mm

CABLE OUTLET
GTAG2 AIR-GUARD®EXTREME

Our GTAG2 Air-Guard® EXTREME cable bushing has a unique brush and gasket design which combine to form an excellent air seal around cables. The unit is fitted, as standard, with a strong safety cover which can be left in the housing until the grommet is ready for cabling. The GTAG2 Air-Guard® is designed to address the problems caused by bypass air flow. Correct sealing cable openings will increase cooling efficiences and dramatically reduce energy cooling costs.

- double layered engineered sealing system – brush upper & EPDM lower gasket
- unique Air-Guard® overlapping nylon 6 Brush System for an even better seal
- integrated safety cover
- frame and lid manufactured from high strength flame-retardant ABS
- easy to install and integrates with the raised floors static dissipative system
- RoHS-compliant

TECHNICAL DATA

Floor Panel Opening	230 x 165 mm 180 x 120 mm (7" x 4¾")
Overall Dimensions	275 x 210 x 40 mm
Maximum Cable Aperature	180 x 120 mm

Further outlets for a wide variety of applications on request.

ALUMINIUM VENTILATION PANEL

The volume is critical

Ventilation panels with a front frame and fixed horizontal blades made from extruded aluminium profiles are available in the standard dimensions of 597 x 597 mm and 297 x 597 mm. These ventilation panels are available in panel thicknesses of 30 or 40 mm for simple integration into all Lindner Raised Floor Systems.
Our optional, maintenance-free ventilation element is made from steel sheet and has inverse blades that can be adjusted from above using a screwdriver. All components are available in black as standard.

+ for the introduction and recirculation of air in areas with a high cooling load
+ free cross-section of approx. 45 %
+ a ventilation element can be used for variable regulation of the air volume

New Lindner Group Headquarters, Arnstorf, Germany

Main Picture:: Next DC – M1 Data Centre, Melbourne, Australia, © Fretwell Photography

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Lindner Group | Floors
Bahnhofstrasse 29 | 94424 Arnstorf | Germany
floorsystems@Lindner-Group.com | www.Lindner-Group.com