HEATED/CHILLED CEILING SYSTEM – PLAFOTHERM® B WITH CU

SELF-DECLARATION ACC. TO DIN EN ISO 14021

Holder of the declaration: Lindner AG | Bahnhofstraße 29 | 94424 Arnstorf | Germany

Content of the declaration: Product information
Certification system DGNB
Certification system LEED
Certification system BREEAM
Product Certification Cradle to Cradle®

Lindner | Building New Solutions

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PRODUCT INFORMATION

Green Building Statement
We already think in closed loops while developing our products. In this context we act as one of the specialists within the range of sustainable building since many years. Supported by our internal technical department „Green Building“, we ensure the sustainability target of your building projects.

Product description

Plafotherm® B Heated/Chilled Metal Ceiling System
Heated and chilled metal ceiling system in closed version that offers installation space for service and disposal lines with its whole surface. The modular construction allows access to the ceiling void for maintenance works.
The visible post cap profiles can be used for the installation of partitions.
The metal ceiling panels lie with their short sides on the post cap profiles. They can be removed individually.
Plafotherm® heated/chilled ceilings are water-bearing surface temperature control systems based on the principle of thermal radiation. The temperature on the ceiling surface is reduced below the room temperature when the pipe frets applied on the rear side are streamed by cooled water. Only drinking water that remains in the heating-cooling circuit serves as cooling agent. Due to the low flow temperatures, these systems can be operated with regenerative energy sources, e.g. with a heat pump.

Application area
For the application inside of buildings with high climatic, structural-physical as well as architectural requirements.

Base materials

Base materials per m²/unit = 10.3 kg*		
System components	**Material**	**Weight proportions (%)**
Metal ceiling panel	Galvanised steel sheet	~ 43.0
	Stainless steel*1	~ 43.0
Substructure	Galvanised steel sheet	~ 17.0
Pipe fret	Copper	~ 17.0
Heat conducting profile	Aluminium	~ 21.0
Surface – Powder coating of visible substructure and metal ceiling panel	Polyester powder	< 1.0
Hotmelt adhesive	Base material PUR	< 1.0
Acoustic tissue	Knitted fabrics area from glass fibre, polyester fibre, cellulose bounded with binder polyvinyl acetate and flame blocking salt free from halogen and grime pigment	< 0.5
Gasket strip	Polyolefin foamed material with flame protective agent and clad siliconized polyethylene foil	< 0.5

*) Calculation base: room size 10 x 10 m, post cap centre distance: 1,250 mm, panel width 400 mm, panel length: 1,150 mm, post cap width: 100 mm
*1) Stainless steel for 3D – surfaces like TOUCHdesign and TOUCHdesign Lunar

Material explanation

Steel
All metal alloys whose main component is iron and whose content of carbon dioxide is between 0.02 % and 2.06 % are named steel. The recycled content is approx. 25 % (Post-Consumer). More than 65% of the materials which are used in this product consist of steel.
Aluminium
All metal alloys whose main component is pure aluminium with small parts of magnesium (0.35 to 0.6 %) and silicium (0.3 to 0.6 %), material EN AW 6060 T66 (AlMgSi 0.5 F 22) are named aluminium. The recycled content is approx. 90 % (Post-Consumer).
Copper
All metal alloys whose main component is copper, chemical composition: Cu > 99.9 % and phosphor 0.015 to 0.04, material no. CW024A, are named copper.
Stainless Steel *1
Alloyed or unalloyed steel with a particular degree of purity are referred to as stainless steel.

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CERTIFICATION SYSTEM DGNB

Not listed characteristics do not apply to this product.

Die Lindner Group ist Mitglied der DGNB
Deutsche Gesellschaft für Nachhaltiges Bauen
German Sustainable Building Council

Environmental Quality

ENV 1.1 Life Cycle Assessment of the Building

A verified EPD is available and can be taken to show the ecological balance sheet data.
Declaration number: EPD-TAI-20180163-IBG1-EN
A project-specific EPD can be produced in accordance with the valid standards.
Additional time and costs have to be considered.

ENV 1.2 Local Environment Impact

Components	VOC	GISCODE	Other
Metal ceiling panel from galvanised steel sheet/ stainless steel*1	-	-	-
Visible and hidden substructure from galvanised steel sheet	-	-	without lead, quicksilver, cadmium and chrome (VI)
Surface – Powder coating of visible substructure and metal ceiling panel: polyester powder	-	Giscode BS 10 is not used for powder varnishes	without lead, quicksilver, cadmium and chrome (VI)
Cu-pipe fret	-	-	-
Hotmelt adhesive	0.0 g/l	-	-
Aluminium heat conducting profile	-	-	-
Acoustic tissue	-	-	-
Gasket strip	-	-	-
Total	**5 µg/m³**		

*) Test measures showed a value of 5 µg/m³ = 0.005 mg/m³ after 28 days. The evaluation limit acc. to AgBB/DIBt is 1 mg/m³.
*1) Stainless steel for 3D – surfaces like TOUCHdesign and TOUCHdesign Lunar
„-“ for “not relevant” according to DGNB 2018

ENV 1.3 Responsible Procurement

The product Plafotherm® B contains no timber-based materials. Thus, a FSC / PEFC proof is not necessary.

ENV 2.2 Drinking Water Demand and Waste Water Volume

The drinking water used for the heating and cooling mode is always supplied to the circuit.

Economical Quality

ECO 1.1 Life Cycle Costs

Lindner metal ceilings are manufactured to the highest international standards. Metal ceilings can be expected to remain durable for up to 50 years (acc. to BBSR table, code no. 353 211, state 02/2017, published by the Federal Institute for Research on Building, Urban Affairs and Spatial Development). If used as suspended ceiling lining, no dismantling or costs for demolition incur for this product. Due to the internal return system, it is guaranteed that components are not disposed but flow into the recycling circuit.

ECO 2.1 Flexibility and Adaptability

Every ceiling panel can be dismantled, moved or replaced individually. Post cap profiles can be used for the installation of partitions. In connection with this ceiling lining, partitions can be moved in the centre distance of the post caps without interfering with the floor and the ceiling.

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Sociocultural & Functional Quality

SOC 1.1 Thermal Comfort
A pleasant room atmosphere is influenced by air and radiation temperature, air humidity and air movement as well as room air quality. Low air movement (draught) as well as heat absorption and heat loss by means of radiation is generally considered comfortable. A heated and chilled ceiling basically works with the radiation principle. It is construed according to the required temperature limits.

SOC 1.2 Indoor Air Quality
Lindner metal ceiling systems are made of materials that are nearly free of any emission as for example VOC and formaldehyde. Test chamber measurements according to the requirements of the quality mark Indoor Air Comfort GOLD® (e. g. AgBB measurement scheme) are available as proof.
TVOC (AgBB/DIBT) C_6-C_{16}: after 28 days < 5 µg/m³
Formaldehyde value: after 28 days 6.0 µg/m³
Report no: G11625rev
For the product a Material Health Certificate „Silver“ of the Cradle to Cradle Products Innovation Institute is available.

SOC 1.3 Acoustic Comfort
Suspended ceilings are ideally suitable for the improvement of room acoustics. Due to perforated metal ceiling panels as well as acoustically effective inlays, sound absorption values up to 0.8 can be achieved, depending on the execution. The values are tested in a reverberation room in accordance with ISO 354 and rated in accordance with DIN EN ISO 11654.

SOC 1.5 User Control
The surface temperature can be regulated room by room if required.

Technical Quality

TEC 1.2 Sound Insulation
Lindner post cap ceilings can be executed as longitudinally sound reduced version. The longitudinal sound reduction is performed by heavy plating made from steel sheet, plasterboard or a plasterboard barrier in the post cap. Thus, the sound transmission to adjacent rooms is reduced.

TEC 1.5 Cleanability
The powder-coated surfaces are easy to clean. The simple dismantling of metal ceiling panels enables an uncomplicated access to the ceiling void for maintenance works.

TEC 1.6 Deconstruction and Disassembly
Lindner metal ceiling systems are produced in such a way that they can be installed on site with as little waste as possible. Waste that cannot be avoided on site is put into recycling processes by means of waste management facilities. Every ceiling panel can be dismantled and replaced individually and non-destructively. The substructure can as well be dismantled non-destructively.

Process Quality

PRO 1.5 Documentation for Facility Management
Utilisation, maintenance and care instructions are created to the usual extent and can be provided.

PRO 2.1 Environmental Impact of Construction
The compliance with project-related requirements regarding a low-waste, low-noise and low-dust construction site as well as all measures regarding soil and ground water protection are ensured by specialised in-house departments. An appropriate verification can be produced and implemented on request by specialized personnel. Due to the delivery of finished ceiling elements that do not have to be processed on site, the product contributes to a noise-free and dust-free site. The packaging is selected project-related to produce as little waste as possible.

PRO 2.2 Construction Quality Assurance
All documents relevant for project documentation can be provided.

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CERTIFICATION SYSTEM LEED

Not listed credits do not apply for this product.

Sustainable Site

Construction Activity Pollution Prevention
The compliance with project-related requirements of an ESC plan is ensured by specialised in-house departments. A complete ESC plan can be produced and implemented on request by specialised personnel.

Materials and Resources

Construction and Demolition Waste Management Planning
Waste that cannot be avoided on site will be preferentially returned to recycling processes via waste management companies. A complete CWM plan can be issued and implemented by the specialists on request.

Building Life Cycle Impact Reduction
Lindner metal ceilings are manufactured to the highest international standards. Metal ceilings can be expected to remain durable for up to 50 years (acc. to BBSR table, code no. 353 211, state 02/2017, published by the Federal Institute for Research on Building, Urban Affairs and Spatial Development). If used as suspended ceiling lining, no dismantling or costs for demolition incur for this product. Due to the internal return system, it is guaranteed that components are not disposed but flow into the recycling circuit.

Building Product Disclosure and Optimization – Environmental Product Declaration
A verified EPD is available and can be taken to show the ecological balance sheet data.
Declaration number: EPD-TAI-20180163-IBG1-EN
A project-specific EPD can be produced in accordance with the valid standards.
Additional time and costs have to be considered.

Building Product Disclosure and Optimization – Sourcing of Raw Materials

Components	Weight proportion (%)	Recycling content (%)		Production site
		Pre-Consumer	Post-Consumer	
Metal ceiling panel from galvanised steel sheet/ stainless steel*1	~ 43.0	0	25	Arnstorf
Visible and hidden substructure from galvanised steel sheet	~ 17.0	0	25	Arnstorf
Cu-pipe fret	~ 17.0	0	75	Arnstorf
Aluminium heat conducting profile	~ 21.0	0	90	Arnstorf
Surface – Powder coating of visible substructure and metal ceiling panel: polyester powder	< 1.0	0	0	Arnstorf
Hotmelt adhesive – Base material PUR	< 1.0	0	0	
Acoustic tissue	< 1.0	39	0	
Gasket strip	< 1.0	0	0	
Total	**100**	**46.8**		

*1) Stainless steel for 3D – surfaces like TOUCHdesign and TOUCHdesign Lunar

The product Plafotherm® B contains no timber-based materials. Thus, a FSC / PEFC proof is not necessary.

Building Product Disclosure and Optimization – Material Ingredients
As manufacturer of products Lindner fulfils the obligations towards the EU chemical directive „REACH“ and created its own REACH declaration.
The aim of the **REACH** regulation (**R**egistration, **E**valuation and **A**uthorization of **CH**emicals) is to capture materials produced and used in the EU and to determine and record their impact on health and environment.

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SELF-DECLARATION
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Materials and Resources

Construction and Demolition Waste Management
The compliance with project-related requirements regarding low-waste, low-noise and low-dust site as well as measures for soil and ground water protection are ensured by specialised in-house departments. An appropriate verification can be created and implemented on request by specialised personnel. Due to the delivery of finished ceiling elements that do not have to be processed on site, the product contributes to a noise-free and dust-free site. The packaging is selected project-related to produce as little waste as possible.

Indoor Environmental Quality

Minimum Acoustic Performance
Lindner post cap ceilings can be executed as longitudinally sound reduced version. The longitudinal sound reduction is performed by heavy plating made from steel sheet, plasterboard or a plasterboard barrier in the post cap.
Thus, the sound transmission to adjacent rooms is reduced.

Low Emitting Materials
A TVOC value of < 5 µg/m³ was measured in the AgBB measurement after 28 days. The use of coating materials on site is omitted as the ceiling panels are coated in factory.

Construction Indoor Air Quality Management Plan
The compliance with project-related requirements of an IAQ plan is ensured by specialised in-house departments. A complete IAQ plan can be produced and implemented on request by specialised personnel.

Indoor Air Quality Assessment
Lindner metal ceiling systems are made of materials that are nearly free of any emission as for example VOC and formaldehyde. Test chamber measurements according to the requirements of the quality mark Indoor Air Comfort GOLD® (e. g. AgBB measurement scheme) are available as proof.
TVOC (AgBB/DIBT) C_6-C_{16}: after 28 days < 5 µg/m³
Formaldehyde value: after 28 days 6.0 µg/m³
Report no.: G11625rev
For the product a Material Health Certificate „Silver“ of the Cradle to Cradle Products Innovation Institute is available.

Thermal Comfort
A pleasant room atmosphere is influenced by air and radiation temperature, air humidity and air movement as well as room air quality. Low air movement (draught) as well as heat absorption and heat loss by means of radiation is generally considered comfortable. A heated and chilled ceiling basically works with the radiation principle. It is construed according to the required temperature limits.

Acoustic Performance
Suspended ceilings are ideally suitable for the improvement of room acoustics. Due to perforated metal ceiling panels as well as acoustically effective inlays, sound absorption values up to 0.8 can be achieved, depending on the execution. The values are tested in a reverberation room in accordance with ISO 354 and rated in accordance with DIN EN ISO 11654.

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CERTIFICATION SYSTEM BREEAM

Not listed characteristics do not apply for this product.

Management

Man 02 Life cycle cost and service life planning
Lindner products have a long life expectancy (due to the raw materials, production processes and high production quality). Moreover, certain products can systematically be dismantled and reused after small processing (C2C). Metal ceilings can be expected to remain durable for up to 50 years (acc. to BBSR table, code no. 353 211, state 02/2017, published by the Federal Institute for Research on Building, Urban Affairs and Spatial Development). If used as suspended ceiling lining, no dismantling or costs for demolition incur for this product.

Man 03 Responsible construction practices
All companies pf the Lindner Group meet the requirements of an environmental management system.
For ISO 14001, ISO 50001, SCC ** and OHSAS certified companies within the Lindner Group, additional specific environmental and safety objectives are defined in conjunction with the annual management review.
The implementation of environmental protection and the relevant legal regulations are defined in the Lindner internal guideline "Environmental Protection".

Health and Wellbeing

Hea 01 Visual comfort
Due to the high light reflection of approx. 82% of a white (9010 acc. to Lindner) powder-coated metal ceiling, the incident daylight is transferred to the room.

Hea 02 Indoor air quality
Lindner metal ceiling systems are made of materials that are nearly free of any emission as for example VOC and formaldehyde. Test chamber measurements according to the requirements of the quality mark Indoor Air Comfort GOLD® (e. g. AgBB measurement scheme) are available as proof.
TVOC (AgBB/DIBT) C_6-C_{16}: after 28 days < 5 µg/m³
Formaldehyde value: after 28 days 6.0 µg/m³
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Hea 03 Thermal comfort
A pleasant room atmosphere is influenced by air and radiation temperature, air humidity and air movement as well as room air quality. Low air movement (draught) as well as heat absorption and heat loss by means of radiation is generally considered comfortable. A heated and chilled ceiling basically works with the radiation principle. It is construed according to the required temperature limits.

Hea 05 Acoustic performance
Suspended ceilings are ideally suitable for the improvement of room acoustics. Due to perforated metal ceiling panels as well as acoustically effective inlays, sound absorption values up to 0.8 can be achieved, depending on the execution. The values are tested in a reverberation room in accordance with ISO 354 and rated in accordance with DIN EN ISO 11654.

Hea 18 Volatile organic compounds (In-Use only)
Lindner metal ceiling systems are made of materials that are nearly free of any emission as for example VOC and formaldehyde. Test chamber measurements according to the requirements of the quality mark Indoor Air Comfort GOLD® (e. g. AgBB measurement scheme) are available as proof.
TVOC (AgBB/DIBT) C_6-C_{16}: after 28 days < 5 µg/m³
Report no.: G11625rev

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Materials

Mat 01 Life cycle impacts
We can provide product-specific data for the assessment of the building. Due to the long-life cycle of ceiling systems, Lindner guarantees a reuse of products over the whole useful life.

Mat 03 Responsible sourcing of construction products
Lindner metal ceiling systems are made from materials with a high recycling content. The recycling content of scrap metal of the main component steel/ stainless steel*[1] is approx. 25% (Post-Consumer), depending on the required quality of used material components. Local suppliers are preferred. The company Lindner is certified according to the environmental management system according to DIN EN ISO 14001.

Mat 06 Material efficiency
Lindner metal ceiling systems have been designed to minimize processing waste during their installation. Waste that cannot be avoided on site is preferentially put into recycling processes by means of waste management facilities.

Waste

Wst 01 Construction waste management
Lindner metal ceiling systems are produced project-specific so that they can be installed on site as low-waste as possible. Waste that cannot be avoided on site will be preferentially returned to recycling processes via waste management companies.
Due to the controlled assembly in the factory, unnecessary sources of error can be avoided.
A complete CWM plan can be issued and implemented by the specialists on request.

Wst 06 Functional adaptability (non-residential only)
Lindner products have a long life expectancy. Metal ceilings can be expected to remain durable for up to 50 years (acc. to BBSR table, code no. 353 211, state 02/2017, published by the Federal Institute for Research on Building, Urban Affairs and Spatial Development). Moreover, certain products can systematically be dismantled and reused after small processing (C2C).
Our pursued target of a 100 % technical cycle, allows a clean separation and a complete recycling of all components. Lindner products are designed in a way that they can be easily dismantled without any damages what enables to easy changes of the use of the building.

Pollution

Pol 01 Impact of refrigerants
Only drinking water that remains in the heating-cooling circuit serves as cooling agent.

Pol 05 Reduction of noise pollution
Suspended ceilings are ideally suitable for the improvement of room acoustics. Due to perforated metal ceiling panels as well as acoustically effective inlays, sound absorption values up to 0.8 can be achieved, depending on the execution. The values are tested in a reverberation room in accordance with ISO 354 and rated in accordance with DIN EN ISO 11654.

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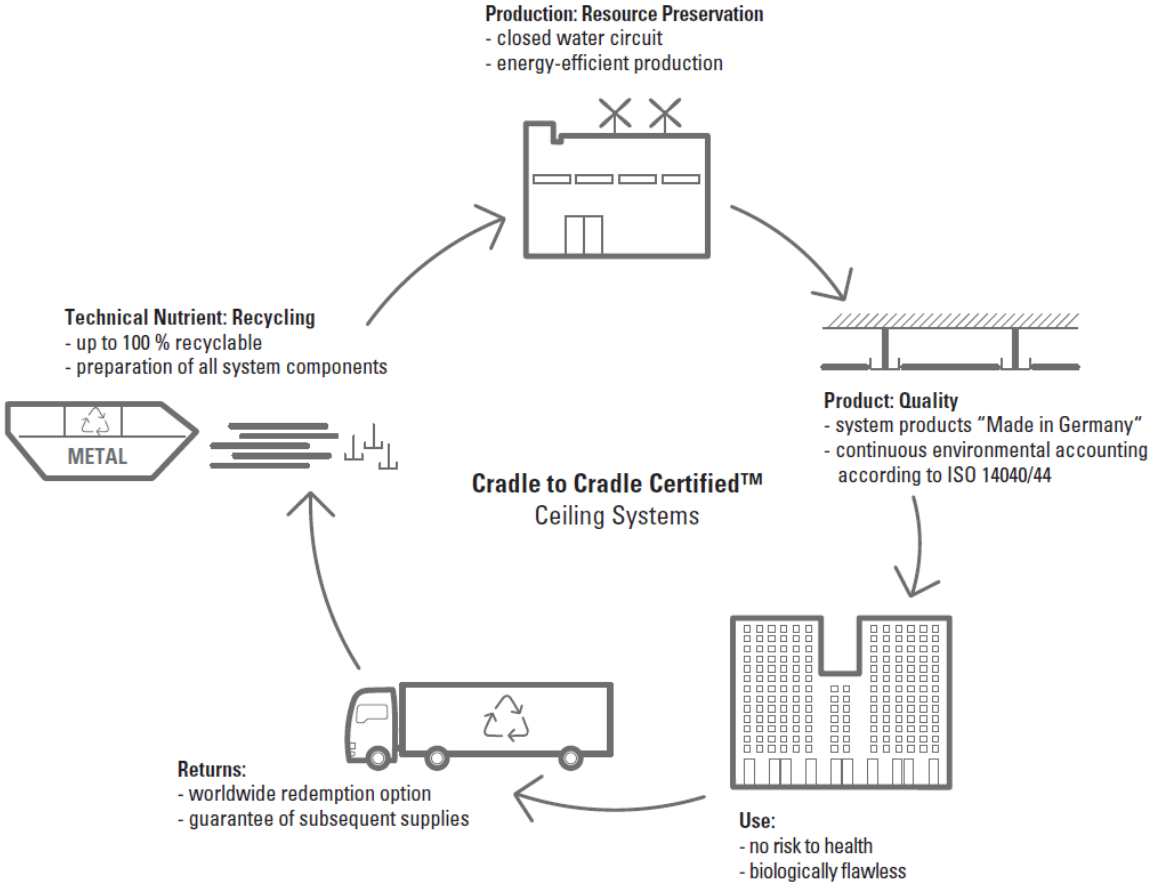
PRODUCT CERTIFICATION CRADLE TO CRADLE®

Information on Cradle to Cradle®

The Heated/Chilled Ceiling System - Plafotherm® B with Cu has a Cradle to Cradle® certification TM in silver.
Certificate number: 4475

Due to the transfer of the Circular Economy thoughts we avoid waste, toxic substances and pollution. The 100 % technical cycle we are striving for, allows a separation of types and nearly a whole reuse of all materials.

- Protection of prospective generations and eco systems through care of natural resources
- Security by choosing high-quality and contaminant-free materials
- Safe environment for all building occupants



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Material Health

BASIC	BRONZE	SILVER	GOLD	PLATINUM
		✓		

The parts of the Heated/Chilled Ceiling System - Plafotherm® B have to be secure and highly compatible for health and environment.

Lindner develops ceiling systems which are environmentally friendly and also healthy for humans, from the production up to the usage and reuse.

We do know the chemical substances of all materials and run an ongoing process to develop safer products. To meet all criteria according to sustainability and human health, system components were modified and also replaced.

Emission tests according to national and international standards (e. g. AgBB scheme) assure low-emission and harmless materials.

Material Reutilization

BASIC	BRONZE	SILVER	GOLD	PLATINUM
			✓	

The Heated/Chilled Ceiling System - Plafotherm® B is a product which can be recycled or further recovered.
Therefore, complete components can be reused or new created, after transferring to recycling processes.

Renewable Energy

BASIC	BRONZE	SILVER	GOLD	PLATINUM
		✓		

Through eco-management certification and our in-house environmental accounting, the whole Lindner Group campaigns for a reduction of the ecological footprint of their own production processes by using less energy.
The share of renewable energy is currently around 37 %.
Increasing the share of renewable energy in our production sites is an ongoing process. The reduction of energy within the production sites is our main goal.

Water Stewardship

BASIC	BRONZE	SILVER	GOLD	PLATINUM
				✓

The concept of water circulation reduces our water consumption systematically.
Due to sedimentation and cleaning of the solid matter, the process water can be pursued in a closed loop, so the fresh water consumption is reduced to a minimum.

Social Fairness

BASIC	BRONZE	SILVER	GOLD	PLATINUM
			✓	

The most important corporate principle is the focus on the individual employee. For this reason the compliance rules "Our Values" for employees were defined. The Lindner Group supports a number of social projects, which are distributed in regional and nationwide areas. Therefore, the charitable “Hans Lindner Stiftung” was founded in 1991.
As a responsible manufacturer, Lindner is certified in accordance to the international environmental management standard ISO 14001. This standard supports our further development of managing scarce resources and the environment in general.

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