



## Hollow floor – FLOOR and more®

Environmental product declaration acc. to ISO 14021

### Holder of the declaration

Lindner AG  
Bahnhofstraße 29  
94424 Arnstorf  
Deutschland

### Content of the declaration

Product information  
Certification system DGNB  
Certification system LEED  
Certification system BREEAM  
Product certification Cradle to Cradle®  
General information



**Lindner**

Bauen mit neuen Lösungen

## Product information

**Product description** Hollow floor – FLOOR and more®  
Hollow floors are a subcategory of system floor constructions which have a continuous carrying layer in the form of a closed compound surface with an areal or channel-like cavity. The access to the cavity with hollow floors is realized by revision openings or raised floor channels.

**Application area** System floors are standardized by substructure raised extension systems for the interior.

The environment declaration relates to the hollow floor system FLORE and more® with a panel thickness of 30 to 38 mm.

**Base material**

Base materials per sqm raised floor and construction height 150 mm OKF		
System components	Material	Weight proportion [%]
Calcium sulphate panel*	FGD-gypsum cellulose	~ 93 – 95
Pedestals*	Steel galvanised	~ 3 – 5
Pedestal glue*	Polyurethan / SMP	< 0,5
FLOOR and more® Installation glue very low emitting	Polyurethane	< 0,5
1K- Floor sealant emission low	Synthetic dispersion	< 0,5
2K- Floor sealant*	Epoxy resin	< 0,5
Locking glue* solvent-free	Synthetic dispersion	< 0,5
Edge sealer* solvent-free	Synthetic dispersion	< 0,5
Wall connection tape*	PE-foam	< 0,5
Factory-made processing		
Glue applications*	Polyacrylate-dispersion	< 0,5
Humidity protection/ steel sheet*	PET-aluminum	< 0,5
Covering*	Depending on covering	< 0,5

\* data sheet on request

**Material explanation**

**FGD-gypsum**

FGD-gypsum is produced industrially by for example desulphurization of flue gas while burning coal. In addition production residues or rather trash (grit, edgings, etc.) can be input to the production process by calcining.

**Cellulose fibers**

Cellulose fibers are gained as recycling product from the industry or produced by preparation of recycling paper.

**Steel**

Steel is a metal alloying which main component is iron and shows a carbon monoxide content between 0.2 % and 2.06%.

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# Certification system



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

Not listed characteristics do not apply to this product.



## Environmental Quality

### ENV1.1 Life Cycle Impact Assessment

For the eco-balance of the products of the company Lindner eco-balance data can be gathered from the verified EPD's. \*\*

Declaration no.: EPD-LIN-20170194-IBD1-DE

\*\*Furthermore, project-related LCA data can be created promptly. If applicable, an additional expenditure of time and costs must be considered.

### ENV1.2 Local Environment Impact

Component	Weight proportion	VOC	GISCODE / Eimicode	Other
FGD-gypsum	88 %	-	-	-
Cellulose	6 %	-	-	-
Pedestals	4 %	-	-	-
Installation glue	< 0,5 %	0 %	EC 1 plus R	-
Pedestal glue	< 0,5 %	0 %	EC 1 plus R	-
1K- o.2K-Floor sealant	< 0,5 %	0 %	BSW20 / RE 1	-
Locking glue	< 0,5 %	0 %	BSW10	-
Edge sealer	< 0,5 %	0 %	BSW20	-
Covering glue	< 0,5 %	0 %	D1 / EC 1	-
<b>Total</b>	<b>100%</b>		<b>&lt; 5,1 µg/m³*</b>	

\* Test measures showed a value of < 5 µg/m³ after 28 days. The evaluation limit acc. to AgBB/DIBt is 1mg/m³

### ENV1.3 Responsible Procurement

Hollow floor type FLOOR and more® does not contain any wood-based materials. For this reason this poster is not applied.

### ENV2.1 Life Cycle Impact Assessment – Primary Energy

For the eco-balance of the products of the company Lindner eco-balance data can be gathered from the verified EPD's.

In addition project-oriented eco-balance data can be drawn up contemporary.

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**Economical Quality**

ECO1.1	Life Cycle Cost	Hollow floors can be expected to remain durable for up to 50 years (acc. to BBSR table, code no. 353 211, state 11/2011, published by the Federal Institute for Research on Building, Urban Affairs and Spatial Development). If used as suspended hollow floor system, 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.2.2	Market ability	The raised floor system is adapted regularly to the current market demands.



**Sociocultural & Functional Quality**

SOC1.1	Thermal comfort	The hollow floor system FLOOR and more® comfort obeys the limiting value of max. 29°C.
SOC1.2	Indoor Air Quality	A TVOC value of < 5,1 µg/m³ was measured in the AgBB measurement. Due to the low value, the hollow floor system positively contributes to the indoor air quality. It is many times lower than the limit value of 500 µg/m³.
SOC1.3	Acoustic Comfort	The hollow floor system FLOOR and more® acoustic (variation 1-4) with perforated panels is ideal for improvement of room acoustic. By perforation of the raised floor panels and by using qualified coverings or rather acoustic effective hollow damping depending on execution acoustic noise absorbencies of 0.45 to 0.65 are reached. The values are tested in the echo chamber acc. to ISO 354 and valued acc. to DIN EN ISO 11654.
SOC2.1	Accessibility	Through the hollow floor system, all demands of the general known rules of technique are put into action and support in this way the hired architects or expert in planning and realization.



**Technical quality**

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TEC1.2	Sound insulation	The hollow floor system FLOOR and more® can contribute to reaching of DGNB- requirements. For the hollow floor FLOOR and more® laboratory test with the corresponding sound transfer ways acc. to DIN EN ISO 10140 or rather DIN IN ISO 10848 were executed. According to requested quality level several improvement values with the available panel thicknesses from 30 mm up to 38 mm can be reached, to obey the total sound protection.
TEC1.5	Cleaning and Maintenance	The cleaning of the hollow floor system depends on the respective laid or rather applied coverings. For the several coverings the cleaning instruction coverings on system floors and the cleaning instruction of the covering producer has to be observed. Through inspection chambers in the hollow floor panels an uncomplicated access to the floor hollow for maintenance of the technical building equipment is possible.
TEC1.6	Deconstruction and Disassembly	A material exploitation of the calcium sulfate panels and the steel components is possible.



**Process quality**

PRO1.5	Documentation for Facility Management	There are using-, maintenance- and care instructions for the individual products. These are documented and are on disposal for the executing service providers.
PRO2.1	Environmental Impact of Construction	Through the delivery of modular components, which only have to be worked on selectively, the products contribute to a trash-, noise- and dust-free construction site. For the waste of the processing the Lindner intern procedural rules for waste disposal are significant. The packaging of the individual products must be chosen just like as less as possible waste is produced.
PRO2.2	Construction Quality Assurance	If necessary data sheets to the used products and components are available.

<sup>1</sup> © DGNB GmbH

# Certification system



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Not listed credits do not apply for this product.



## Sustainable Sites

Construction Activity  
Pollution Prevention

Obeying of project-specific requirements of ESC plans is guaranteed by the company-own specialist department. On request it is possible to draw up a whole ESC plan by the specialist department.



## Energy and Atmosphere

Fundamental Refrigerant  
Management

Water is the only coolant, which is used for Lindner products. It is free of additions.

Enhanced Refrigerant  
Management

Water is the only coolant, which is used for Lindner products. It is free of additions.



## Materials and Resources

Construction and  
Demolition Waste  
Management Planning

Waste, which cannot be avoided, is primary given to waste disposal plants to the recycling process. On request, a whole CWM plan can be drawn up and implemented by specialists.

Building Life Cycle  
Impact Reduction

The hollow floor system FLOOR and more® has a long life in which the calcium sulfate panel can be dismantled and also be reused after less working.

There is an eco-balance acc. to DIN EN 15804 where you can get data for the building balance. You can find the balance on the homepage of the company Lindner.

On demand it is possible to draw up a project-specific eco-balance for the product subject to the counting norms. If applicable, you have to consider a time and cost effort.

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Building Product Disclosure and Optimization – Environmental Product Declaration

For this product you can find an EPD acc. to norm ISO 14025, 14040, 14044 and EN 15804 on the homepage of Lindner.  
EPD-LIN-20170194-IBD1-DE

In addition it is possible to draw up a project-specific EPD for the product subject to the counting norms. If applicable, you have to consider a time and cost effort.

Building Product Disclosure and Optimization – Sourcing of Raw Materials

Components	Weight proportion	Recycling part		Production site
		Pre-Consumer	Post-Consumer	
Calciumsulfatepanel	~ 95 %	100%	0%	Dettelbach
Pedestal	~ 4.0 %	0%	25%	Arnstorf
Installation glue	~ 0.5 %	0%	0%	Arnstorf
Pedestal glue	~ 0.5 %	0%	0%	Arnstorf
Floor sealant	~ 0.5 %	0%	0%	Arnstorf
Locking glue	~ 0.5 %	0%	0%	Arnstorf
Edge sealer	~ 0.5 %	0%	0%	Arnstorf
Glue application	~ 0.5 %	0%	0%	Arnstorf
Hot- melt glue	~ 0.5 %	0%	0%	Arnstorf
Edge trim	~ 0.5 %	0%	0%	Arnstorf
Humidity protection	~ 0.5 %	0%	0%	Arnstorf
Covering	~ 0.5 %	0%	0%	
<b>Total</b>	<b>100%</b>	<b>48,0%</b>		

Building Product Disclosure and Optimization – Material Ingredients

The aim of the **REACH** regulation (**R**egistration, **E**valuation and **A**uthorization of **C**hemicals) is to capture materials produced and used in the EU and to determine and record their impact on health and environment.

As manufacturer of products, Lindner fulfils the obligations towards the EU chemical directive “REACH” and created its own REACH declaration.

Construction and Demolition Waste Management

Lindner Floor systems are produced in such a way that they can be installed on site as low-waste as possible. Waste, which cannot be avoided, is primary given to waste disposal plants to the recycling process.

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## Indoor Environmental Quality

Minimum Acoustic Performance	The hollow floor FLOOR and more® fulfils high requests of sound insulation and protects therefore the rooms from entering sound.
Low Emitting Materials	There are measurements for the hollow floor system FLOOR and more® acc. to AgBB measuring/AFSSET/CA Specification Section 01350 available. The claims of the General Emissions Evaluation are obeyed. AgBB measurement/AFSSET with TVOC-value >5.1 µg/m <sup>3</sup> CA Section 01350 with TVOC-value of 24 µg/m <sup>3</sup> The low values of the raised floor contribute positively to the indoor air quality.
Construction Indoor Air Quality Management Plan	The obeying of project-specific requests of an IAQ plan is secured by the company-own specialist department. On request a whole IAQ plan can be drawn up and implemented by expert staff.
Indoor Air Quality Assessment	Lindner hollow floor systems are produced with low-emission material of for example VOC and formaldehyde. As proof serve test chamber measurements acc. to AgBB measuring.  It is ensured that the highest request to the measurements of indoor air can be achieved with the hollow floor FLOOR and more®.
Thermal Comfort	The hollow floor FLOOR and more® comfort with its integrated underfloor heating sees to a high measure of convenience by thermal radiation.
Acoustic Performance	The hollow floor system FLOOR and more® acoustic (variation 1-4) with perforated panels is ideally suitable for the improvement of room acoustics. Due to perforated raised floor panels as well as the use of qualified covering or rather effective hollow dampings, sound absorption values of 0.45 up to 0.65 can be achieved, depending on execution. The values are tested in a reverberation room in accordance to ISO 354 and rated in accordance to DIN EN ISO 1654.



# Certification system



Not listed characteristics do not apply to this product.

## bre Management

Man 01	Sustainable procurement	The hollow floor system FLOOR and more® does not contain any wood, wood products or wood-based material.
Man 02	Responsible construction practices	Basically all company parts of the Lindner Group fulfill the guidelines of the environment management system. For companies in the Lindner Group which are certified acc. to ISO 14001, ISO 50001, SCC** and OHAS further specific environment and safety aims in connection with the yearly management review are defined. The realization of environment protection and all of the relevant legally rules are defined in the Lindner-intern guideline called "environment protection".
Man 03	Construction site impacts	The obeying of project-specific requests regarding trash,- noise- and dust-free construction sites as well as measures for floor and ground water protection is secured by a company-own specialist department. On request a corresponding verification can be drawn up and implemented by expert staff.
Man 05	Life cycle cost and service life planning	<p>Lindner products have a long life cycle. (Due to raw materials, production process and high production quality). In addition some products can be dismantled and can be used again after less working (C2C).</p> <p>There is an eco-balance for the hollow floor system FLOOR and more® acc. to DIN EN 15804 where you can get data for the building balance.</p> <p>Hollow floors can be expected to remain durable for up to 50 years (acc. to BBSR table, code no. 353 211, state 11/2011, published by the Federal Institute for Research on Building, Urban Affairs and Spatial Development). Due to the Lindner-intern taking back system it is guaranteed, that the components are not thrown away but get back to the recycling circle.</p>

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**bre** Health and Wellbeing

Hea 02	Indoor Air quality	Lindner hollow floor systems are produced with low-emission material of for example VOC and formaldehyde. As proof serve test chamber measurements acc. to AgBB measuring. TVOC (AgBB/DIBT) C6-C16: after 28 Tagen < 5,1 µg/m <sup>3</sup> (test report Nr. G01921, Eurofins)
Hea 03	Thermal comfort	The hollow floor FLOOR and more® comfort with its integrated underfloor heating sees to a high measure of convenience by thermal radiation.
Hea 05	Acoustic performance	The hollow floor system FLOOR and more® acoustic (variation 1-4) with perforated panels is ideally suitable for the improvement of room acoustics. Due to perforated raised floor panels as well as the use of qualified covering or rather effective hollow dampings, sound absorption values of 0.45 up to 0.65 can be achieved, depending on execution. The values are tested in a reverberation room in accordance to ISO 354 and rated in accordance to DIN EN ISO 1654.

**bre** Energie

Ene 01	Energy efficiency	For this product you can find an EPD acc. to norm ISO 14025, 14040, 14044 and EN 15804 on the homepage of Lindner. Data for the LCA can be received from the verified EPD. Declaration number: EPD-LIN-20170194-IBD1-DE  Furthermore, project related LCA data can be created promptly. If applicable, an additional expenditure of time and costs must be considered.
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**bre** Materials

Mat 01	Life cycle impacts	For this product there is an EPD acc. to norm ISO 14025, 14040, 14044 and EN 15804. Data for the eco-balance can be taken from the verified EPD. Declaration number: EPD-LIN-20170194-IBD1-DE  Furthermore, project related LCA data can be created promptly. If applicable, an additional expenditure of time and costs must be considered.
Mat 03	Responsible sourcing of materials	The hollow floor system consists of material with high recycling part. The calcium sulfate panel (main part of the system) is 100 % recyclable. (Pre-consumer). The scrap iron part of the steel pedestals is about 25% (Post-Consumer). Close suppliers are preferred. The company Lindner is certified according to DIN EN ISO 14001.

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**bre Waste****Wst 01** Construction waste management

Lindner hollow floor systems are produced in such a way that a low-waste installation on site is possible. Waste, which cannot be avoided, is primarily given to waste disposal plants to the recycling process.

**bre Pollution****Pol 05** Noise reduction

The hollow floor system FLOOR and more® acoustic (variation 1-4) with perforated panels is ideally suitable for the improvement of room acoustics. Due to perforated raised floor panels as well as the use of qualified covering or rather effective hollow dampings, sound absorption values of 0.45 up to 0.65 can be achieved, depending on execution. The values are tested in a reverberation room in accordance to ISO 354 and rated in accordance to DIN EN ISO 1654.

# Product certification

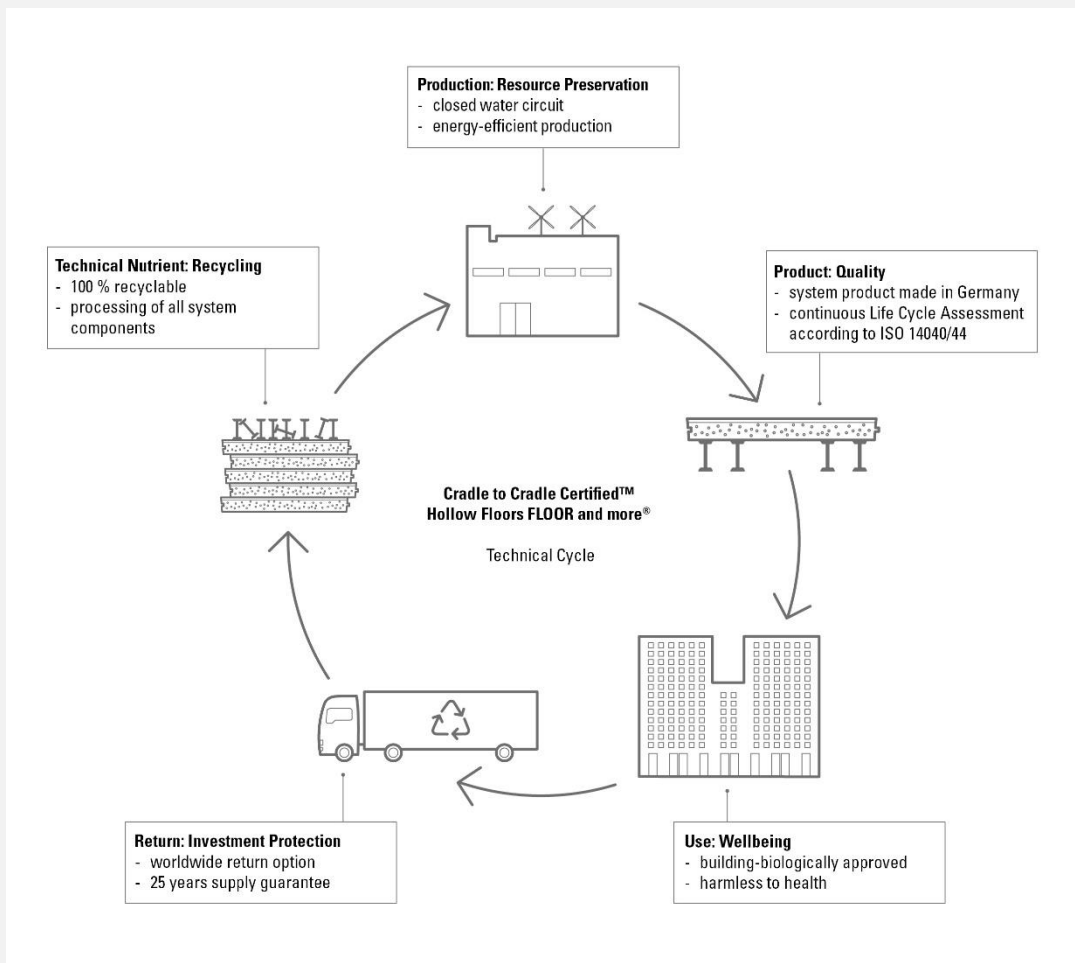


## Information to Cradle to Cradle®

The FLOOR and more® hollow floor system is the first in its kind which is Cradle to Cradle Certified™ worldwide.

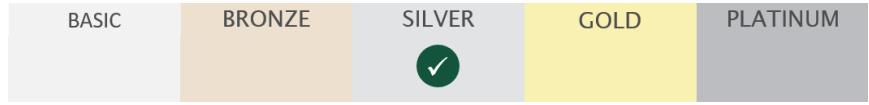
Due to the transfer of the Cradle to Cradle® thoughts we avoid waste, toxic substances and pollution. The 100 % technical cycle, we are striving for, allows a separation of types and a whole reuse of all materials.

- protection of prospective generations and eco systems through care of natural resources
- Security by choosing high-quality and contaminant-free materials
- Repurchase guarantee ensured/ offers waste disposal safety
- Safe environment for all building user



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<sup>2</sup> Cradle to Cradle Certified™ is a certification mark licensed by the Cradle to Cradle Products Innovation Institute.



The parts of the floor system have to be secure and easily digestible for health and environment.

Lindner develops hollow floor systems which are from the production up to the usage and reusage environmentally friendly and also healthy for the human being.

We know the chemical components of the material our products are made of and we are still optimizing to develop even safer materials. To fulfill several criteria of environmental tolerance and also the human health, system components were modified and also replaced.

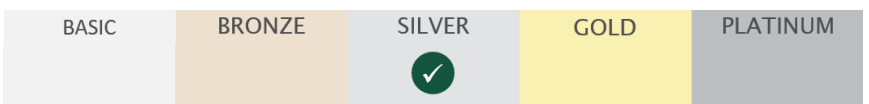
Emission tests acc. to national- and international standards (f. ex. AgBB scheme) assure that the FLOOR and more® hollow floor system is free of carcinogenic, mutagenic and reproductive chemicals (CMR's).



The FLOOR and more® hollow floor is a product with optimal reuse possibilities.

With leasing systems and repurchase guarantee all materials can be integrated again in the production cycle. As a result, all material components can be reused or even used again as raw material.

We use up to 100 % recycling part by using FGD gypsum and secondary cellulose in terms of paper and old recycled cardboard



With certified environment management and intern LCA, the whole Lindner Group takes a stand for e.g. energy reduction to reduce their ecological footprint of their production process.

Currently the part of sustainable energy is 44 %.

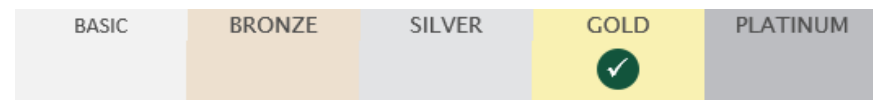
We are still working on an increase of the share of sustainable energy in our production. Our prioritized aim is it, to save energy in all of our production processes.

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A water cycle concept systematically reduces our water consumption.

Due to sedimentation and cleaning of the solid matter, the necessary process water can stay in the water cycle. In this way the fresh water consumption is reduced to a minimum.



The most important principle of the company is that the employee is the middle of the company. For this reason the compliance rules for employees were defined: "Our values".

The Lindner Group is involved in several social projects which are oriented regional and also national. 1991 the "Hans Lindner Stiftung" was founded which is a benefit to the public.

As we are a responsible producer, we are certified acc. to the international environment management norm ISO 14001. It serves the further development of our management for low resources and the further environment.

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## General information

### CO<sub>2</sub> & Waste

In order to reduce waste from demolition and building measures, waste streams are dedicated to recycling processes. The verification can be done by the company Lindner.

The used transport packaging (timber, cardboard, foils) can be recycled. Where possible, they are collected separately and supplied to a proper recycling (packaging regulation).

Lindner system products are delivered to the construction site in ready-for-assembly condition. This means that no work or possibly minor work has to be done on the product. In this way, only little waste or no waste is generated on site. The used transport packaging can in large part be recycled. Only certified waste management companies are entrusted with the disposal conforming to the law for waste that cannot be avoided.

#### **Vision 2020: Co2 neutral and waste-free location**

Less is more. Much less is our aim!

The vision: It is our aim to further develop Lindner production sites in CO<sub>2</sub> neutral and waste-free locations. We derived concrete aims from the vision to make an entrepreneurial contribution to the reduction of CO<sub>2</sub> emissions as well as all commercial waste.

The analysis of major pollutants is of course given top priority.

### Environmental Management – Acting sustainably, saving resources

For Lindner, responsibility towards humans and environment is as important as the quality of the products. For this reason, an environmental management system acc. to DIN EN ISO 14001 is established company-wide and largely certified.

Our central environment programme comprises the responsible and sustainable use of resources, the reduction of CO<sub>2</sub> emissions and a continuous improvement process to achieve our environmental objectives. An integrated management system evaluates the production of Lindner products regularly according to ecological aspects and adapts the processes to current standards.

Our principles comprise an active waste management in all business units – from waste prevention concept to waste balance. We also keep an eye on preceding stages of the value added chain. Environmental aspects also play a major role in the selection of our suppliers.

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## Energy Management

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Towards an environmentally friendly future.

The national and international supply situation asks for a targeted and effective use of resources and environmentally friendly forms of energy. At Lindner, an energy management system based on DIN EN ISO 50001 controls the procurement of energy sources centrally for all locations as well as their transformation, delivery and distribution to affiliated companies.

Energy saving and the change of fossil and nuclear energy to ecological sources of energy are the core of all measurements to implement energetic business objectives. Thus, every single employee is aware of its role in sustainable, operative project management. Due to many small improvements, for example the improvement of compressed air loss, the utilisation of waste heat and targeted light control, we could achieve massive energy savings in the last years. Especially at future-oriented investments, for example the installation of new production plants, we pay attention to the implementation of resource-saving solutions.