



**gO****TO**  
**zero**  
IMPACT FACTORY

## Zero Impact Factory – Site Checklist

Version: 2.1 (Feb 28, 2024)

# SITE CHECKLIST

## FIELDS OF ACTION

1

Environmental  
compliance



2

Architecture and  
perception



3

Planning



4

Digitalization



5

Water



6

Energy and CO<sub>2</sub>



7

Material



8

Soil



9

Biodiversity



10

Pollutants



11

Mobility



# 1. ENVIRONMENTAL COMPLIANCE

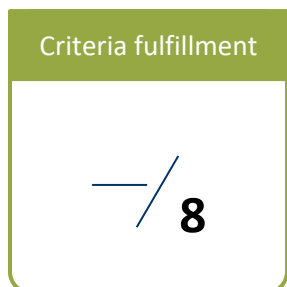


## VISION

By systematically implementing the requirements from Group Guideline, we are reinforcing the effectiveness and robustness of the Environmental Compliance Management Systems at the Volkswagen Group sites. Defined roles and responsibilities ensure a clear assignment of tasks and competences. In addition to internal audits, external certifications provide an objective evaluation of these systems and ensure that they are continuously developed and enhanced.

# 1. ENVIRONMENTAL COMPLIANCE

## 1.1. IMPLEMENTATION OF GROUP GUIDELINE 17

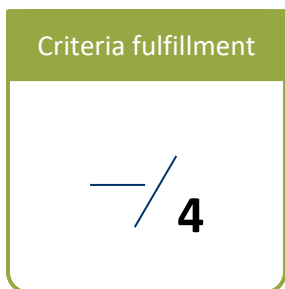


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IMPACT FACTORY

Criteria		Proven
1.1.1.	Environmental policy by plant management is approved and communicated on the intranet/internet (internal/external)	
1.1.2.	Relevant roles and responsibilities in the Environmental Compliance Management System are documented and communicated	
1.1.3.	The site's environmental strategy, including strategic environmental and energy targets, has been adopted and communicated	
1.1.4.	Measures in the operating units contribute to the strategic environmental and energy goals	
1.1.5.	Requirements from binding obligations are recorded and compliance is tracked	
1.1.6.	Operational and systemic environmental risks are recorded and evaluated	
1.1.7.	Responsibilities for environmental qualifications have been identified, competence requirements have been identified and qualifications have been carried out	
1.1.8.	Reporting of environmental performance (including status, target achievement of strategic environmental and energy targets) and environmental compliance is ensured	

# 1. ENVIRONMENTAL COMPLIANCE

## 1.2. AUDITING/CERTIFICATION/HANDLING DEVIATIONS

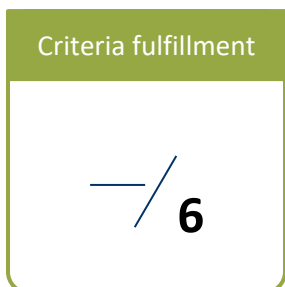


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IMPACT FACTORY

Criteria	Proven
1.2.1. Annual self-assessment to assess the effectiveness of the UCMS by the site will be conducted	
1.2.2. Regular auditing of the environmental compliance management system (internal/external)	
1.2.3. Certificates obtained according to ISO 14001 / EMAS and ISO 50001	
1.2.4. Process for reporting, investigating, root cause analysis, tracking and audit-proof documentation of deviations is defined and effective	

# 1. ENVIRONMENTAL COMPLIANCE

## 1.3 ENVIRONMENTALLY RELEVANT INCIDENTS



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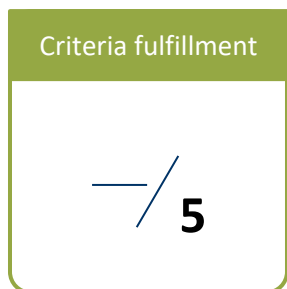
Criteria		Proven
1.3.1.	Management system for dealing with reportable, environmentally relevant incidents is in place	
1.3.2.	Extinguishing water concept to avoid environmental influences in the event of a fire is available	
1.3.3.	Equipment for the prevention / containment of environmental effects caused by weather influences is kept in stock	
1.3.4.	Equipment for the prevention / containment of environmental impacts caused by incidents or malfunctions is kept in stock	
1.3.5.	Measures are in place to ensure that no water-polluting substances escape	
1.3.6.	No negative effects due to environmentally relevant deviations in the last two years	



Our sites have a positive external image and are visually adapted to the ecological environment. Employees, neighbors and visitors have a positive impression of the appearance of our factory.

## 2. ARCHITECTURE AND PERCEPTION

### 2.1. EMPLOYEES AND NEIGHBORS



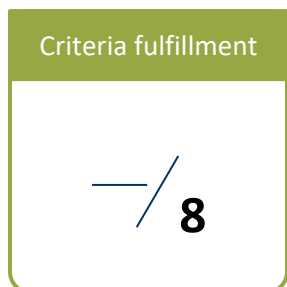
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IMPACT FACTORY

Criteria		Proven
2.1.1.	Break areas are designed to be close to nature (indoor/outdoor areas or on the roof)	
2.1.2.	There is a process in place to deal with complaints from neighbors	
2.1.3.	The factory buildings are in good visual condition	
2.1.4.	The requirements and expectations of interested parties (stakeholders) are well known. Dialogue with relevant stakeholders established (at least 1x per year)	
2.1.5.	≥ 50% of the building envelope (roof surfaces and external facades) is green	



## 2. ARCHITECTURE AND PERCEPTION

### 2.2. LIGHT, NOISE/VIBRATIONS, AIR EXCHANGE



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IMPACT FACTORY

Criteria		Proven
2.2.1.	No complaints from neighbors about light emissions, odor nuisance, noise or vibration	
2.2.2.	Natural lighting in $\geq 80\%$ of the office space and in production areas where ecologically sensible / without countervailing other environmental aspects	
2.2.3.	New buildings and conversions are accompanied by acoustic planning	
2.2.4.	No disturbing/impulsive noises in the vicinity of neighbors	
2.2.5.	No disturbing effects of light emissions on ecosystems	
2.2.6.	Microclimatic effects of the site on the environment were analysed and evaluated	
2.2.7.	Factory does not interfere with the supply of fresh/cold air as well as the removal of pollutants and the temperature compensation of adjacent conurbations	
2.2.8.	The factory is odourless	

### 3. PLANNING



## VISION

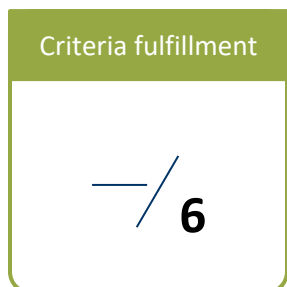
We consider planning projects holistically and integrate environmental issues into their processes.

To do this, we define clear project objectives in planning that correspond to the vision of the zero-impact factory, and systematically employ a life cycle approach (TCO\*).

\* TCO – Total Cost of Ownership

## 3. PLANNING

### 3.1. GENERAL

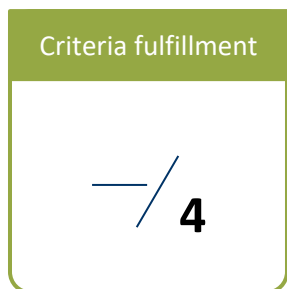


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IMPACT FACTORY

Criteria		Proven
3.1.1.	The responsible environmental department is involved in environmentally relevant planning processes during the project	
3.1.2.	The minimum standards regarding the environment and energy (environmental specifications, Production Manual for Standardization – PHS, White Paper on the entire factory) are considered in all planning processes	
3.1.3.	Planning projects include quantified environmental and energy targets (environmental indicators)	
3.1.4.	Qualified persons for environment and energy are appointed in the planning department and are trained annually on new environmental requirements	
3.1.5.	Planning projects for the environment and energy are evaluated and decided according to a binding TCO process (Total Cost of Ownership)	
3.1.6.	Plant development plans describe a path to the technical realization of the Zero Impact Factory	

## 3. PLANNING

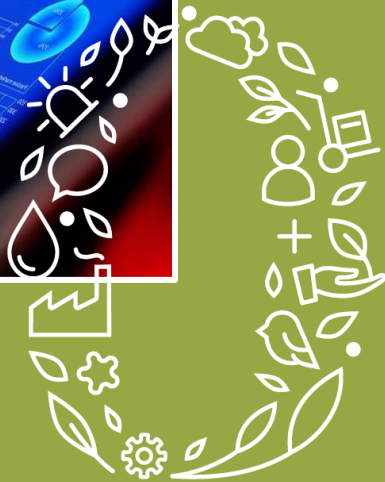
### 3.2. SITE



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IMPACT FACTORY

Criteria		Proven
3.2.1.	Construction projects or plant expansions are built on previously used land	
3.2.2.	Risks from extreme weather and natural disasters were assessed and sustainable measures to minimise risks were implemented	
3.2.3.	Traffic emissions due to new construction, conversion or expansion are evaluated and optimized	
3.2.4.	The ecological and social performance of the site has been externally validated and certified	

## 4. DIGITALIZATION



## VISION

Production is digitally connected and transparent. Consumption is minimized on the basis of Industry 4.0 technologies and maintenance processes are designed in advance. Digital processes allow us to make optimal use of resources and production technology.

## 4. DIGITALIZATION

### 4.1. TRANSPARENT AND PREDICTIVE FACTORY



Criteria fulfillment

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IMPACT FACTORY

Criteria		Proven
4.1.1.	Implementation of a digital use case for measuring, analysing or optimising environmental aspects	
4.1.2.	Buildings / Technical Building Equipment - Resource consumption of halls, buildings and energy-intensive consumers is recorded separately by measurement	
4.1.3.	Plant technology - Resource consumption of all energy- and environment-relevant plants is recorded separately by measurement	
4.1.4.	Measurement data of all energy- and environmentally-relevant facilities are brought together in a central IT landscape (e.g. DPP/Cloud System or similar)	
4.1.5.	Measurement data of all energy- and environmentally-relevant facilities are analysed and evaluated in a central IT landscape (e.g. DPP/Cloud System or similar)	
4.1.6.	≥ 50% of the equipment recorded in maintenance plans is monitored by a system for early detection of weak points and repair cycles	
4.1.7.	All energy data and production data relevant to the environment are recorded, linked and evaluated for autonomous decision-making	

## 5. WATER



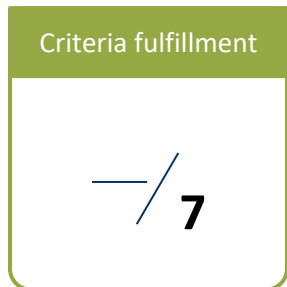
### VISION

We design our production sites in such a way that the local water resource is not negatively impacted by its use.

In addition, we do not use waste water to introduce into a body of water any substances that are harmful to the body of water's natural condition.

## 5. WATER

### 5.1. GENERAL REQUIREMENTS AND WATER EXTRACTION



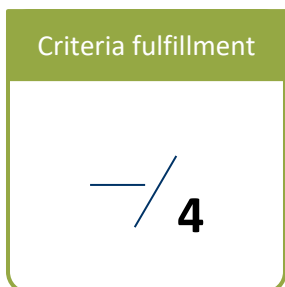
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IMPACT FACTORY

Criteria		Proven
5.1.1.	Two-barrier principle of all containers with water-polluting substances is ensured and documented	X
5.1.2.	No fossil aquifers that are not replenished by precipitation are used	X
5.1.3.	Share of wastewater recycling is $\geq 50\%$ of the wastewater volume	X
5.1.4.	Proportion of precipitation used on sealed surfaces is $\geq 50\%$ of the total precipitation volume	
5.1.5.	KPI fresh water $\leq 1.0 \text{ m}^3/\text{vehicle}$ for vehicle production sites or reduction of 50% per production unit compared to the base year for component sites	
5.1.6.	Unused, uncontaminated rainwater is 100% infiltrated close to the site	
5.1.7.	Amount of fresh water per person in the factory and production day $\leq 100$ liters	



## 5. WATER

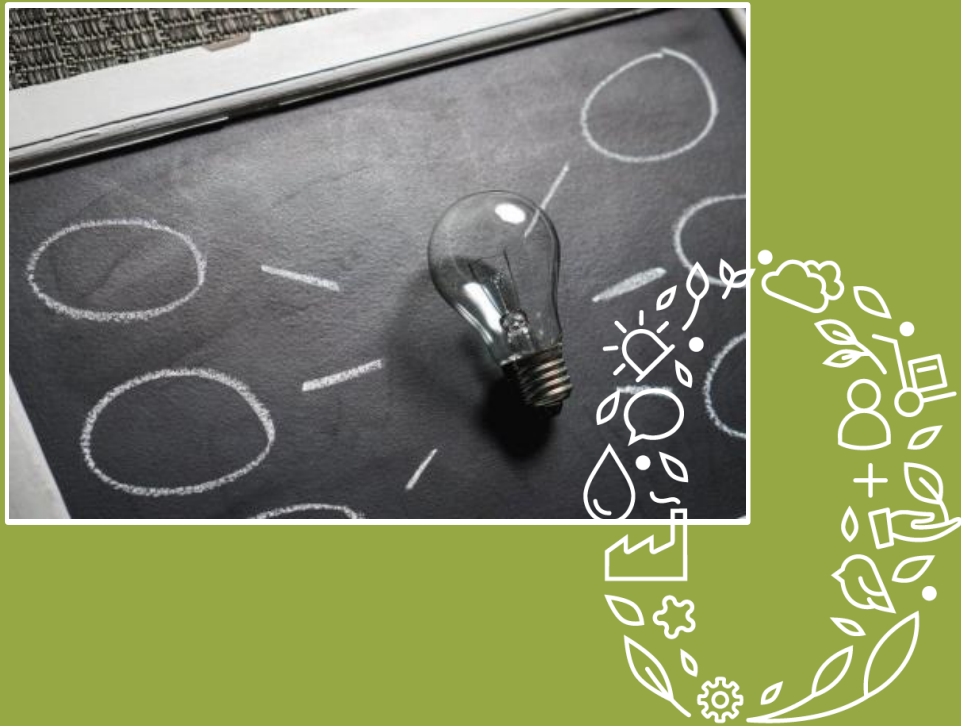
### 5.2. WASTEWATER: DIRECT DISCHARGER AND INDIRECT DISCHARGER



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IMPACT FACTORY

Criteria		Proven
<b><u>For direct discharge into water</u></b>		
5.2.1.a	Pollutant concentrations are adhered to: Cl <sup>-</sup> : 500 mg/l, SO <sub>4</sub> <sup>2-</sup> : 500 mg/l, Ni: 0.05 mg/l, Zn: 0.05 mg/l, Mn: 0.05 mg/l, COD: 50 mg/l, conductivity: 1500 µS/cm	
5.2.2.a	Discharge into the receiving waters does not deteriorate the good ecological and chemical status of the water body	
5.2.3.a	Further treatment for the removal of trace substances (fourth purification stage including final filtration) is available	
5.2.4.a	Pollutant concentrations in the receiving waters are not increased by wastewater discharge	
<b><u>For indirect dischargers into communal treatment plants</u></b>		
5.2.1.b	Pollutant concentrations are complied with the effluent of the plant (indirect discharger): Cl <sup>-</sup> : 600 mg/l, SO <sub>4</sub> <sup>2-</sup> : 600 mg/l, Ni: 0.2 mg/l, Zn: 0.2 mg/l, Mn: 0.2 mg/l, conductivity: 1800 µS/cm	
5.2.2.b	Biological aeration process incl. nitrification / denitrification and phosphorus elimination is available	
5.2.3.b	Further treatment for the removal of trace substances (fourth purification stage including final filtration) is available	
5.2.4.b	Pollutant concentrations are maintained in the effluent of the municipal sewage treatment plant: Cl <sup>-</sup> : 500 mg/l, SO <sub>4</sub> <sup>2-</sup> : 500 mg/l, Ni: 0.05 mg/l, Zn: 0.05 mg/l, Mn: 0.05 mg/l, COD: 50 mg/l, conductivity: 1500 µS/cm	

## 6. ENERGY AND CO<sub>2</sub>

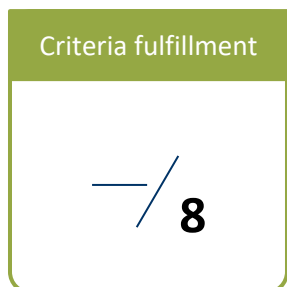


### VISION

We design our production facilities so that they are climate-neutral, taking into account maximum energy efficiency and renewable energy supply.

## 6. ENERGY AND CO<sub>2</sub>

### 6.1. ENERGY-EFFICIENT INFRASTRUCTURE

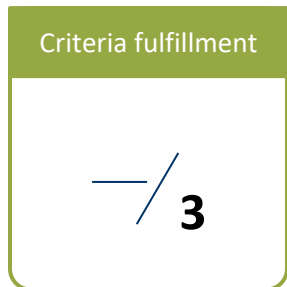


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IMPACT FACTORY

Criteria		Proven
6.1.1.	Efficient heat supply: annual efficiency $\geq 90\%$	
6.1.2.	Efficient refrigeration: TEPP > 6.5 for compression chillers, TEPP > 0.7 for absorption chillers (TEPP = Total Energy Performance Factor)	
6.1.3.	Efficient compressed air supply: generation efficiency $\leq 0.12 \text{ kWhel/Nm}^3$	
6.1.4.	Waste heat register is kept (in accordance with requirements incl. measures)	
6.1.5.	The proportion of lighting provided by LED lamps is $\geq 90\%$ of the usable area of the site	
6.1.6.	Efficient central ventilation and air conditioning systems: Return heat coefficient for supply air systems $\geq 75\%$ and high-efficiency drives $\geq \text{IE3}$	
6.1.7.	Demand-based switching of central ventilation and air conditioning systems in $\geq 90\%$ of the systems	
6.1.8.	Demand-based control in $\geq 90\%$ of central ventilation and air conditioning systems	

## 6. ENERGY AND CO<sub>2</sub>

### 6.2. ENERGY-EFFICIENT PRODUCTION

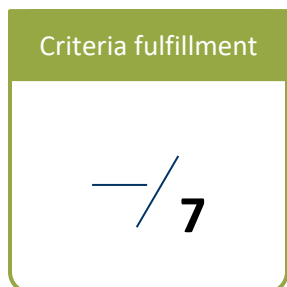


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IMPACT FACTORY

Criteria		Proven
6.2.1.	Plant-specific monitoring and optimisation of the electrical base load during non-production periods	
6.2.2.	Energy-efficient paint shop (total energy) $\leq 5$ kWh / m <sup>2</sup> surface	
6.2.3.	Energy-efficient vehicle production (electrical energy) $\leq 0.4$ MWhel / vehicle or reduction of 40% per production unit compared to the base year for component sites	

## 6. ENERGY AND CO<sub>2</sub>

### 6.3. DECARBONIZATION



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IMPACT FACTORY

Criteria		Proven
6.3.1.	Evaluation and prioritization of energy and supply concepts for CO <sub>2</sub> neutrality according to CO <sub>2</sub> avoidance costs	
6.3.2.	Implementation plan for all measures with CO <sub>2</sub> avoidance costs ≤ 30€/t is available	
6.3.3.	100% renewable energies in external electricity supply	
6.3.4.	The plant is on a 1.5°C greenhouse gas pathway	
6.3.5.	The site covers ≥ 10% of its heating needs from renewable sources	
6.3.6.	The site generates ≥ 10% of its electricity needs from renewable sources on its own premises or close to the site	
6.3.7.	The factory is operated in a CO <sub>2e</sub> -neutral manner (including neutralization of CO <sub>2e</sub> emissions)	

## 7. MATERIAL

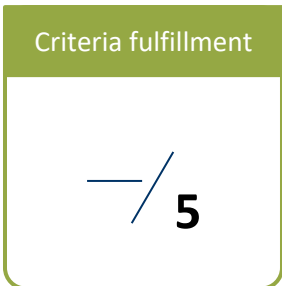


## VISION

We design the processes in the factory in such a way that materials are used and reused efficiently and sustainably, amounts of waste are reduced to a minimum and the resulting waste is recycled.

## 7. MATERIAL

### 7.1. MATERIAL EFFICIENCY

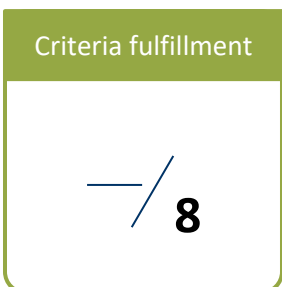


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IMPACT FACTORY

Criteria		Proven
7.1.1.	Regular testing of the substitution of input materials that generate hazardous waste is available	
7.1.2.	Annual monitoring of material flows with high waste output is carried out	
7.1.3.	Measures to promote the circular economy are implemented in a structured manner	
7.1.4.	Closed-loop recycling is being tested and implemented	
7.1.5.	Annual monitoring of all plastic flows is implemented	

## 7. MATERIAL

### 7.2. WASTE DISPOSAL: RECYCLING / DISPOSAL



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IMPACT FACTORY

Criteria		Proven
7.2.1.	Waste management audits for relevant (hazardous and quantitative) waste streams are carried out every three years	
7.2.2.	Regular processes exist for the continuous review of higher-quality disposal methods and their implementation	
7.2.3.	No landfilling of production-specific waste (Zero Landfill)	
7.2.4.	≥ 60% by weight of the plastic waste is sorted separately according to composition and material	
7.2.5.	≤ 10% by weight of all production-specific recycling waste is thermally recovered	
7.2.6.	≤ 1% by weight of all production-related waste is for disposal	
7.2.7.	Non-recyclable waste ≤ 5 kg/vehicle for vehicle production sites or reduction of 60% per production unit compared to the base year for component sites	
7.2.8.	≥ 99% by weight of all production-specific waste is recycled	



## 7. MATERIAL

### 7.3. PACKAGING AND DISPOSABLE PRODUCTS



Criteria fulfillment

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IMPACT FACTORY

Criteria		Proven
7.3.1.	Compliance with the requirements of the standard logistics specifications for suppliers is checked annually	
7.3.2.	Action plan and process to support the standardization of packaging materials for products shipped by the site exist	
7.3.3.	Disposable material and packaging for to-go products in company catering are completely substituted by reusable alternatives	
7.3.4.	Process for ecological assessment of single-use packaging and potential switch to reusable alternatives exists	
7.3.5.	Packaging materials are fully recycled	

## 8. SOIL



### VISION

Our actions do not negatively impact the function of the soil:

- Surface paving is reduced to the necessary level
- The natural soil function is restored

## 8. SOIL

### 8.1. GENERAL



Criteria fulfillment

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IMPACT FACTORY

Criteria		Proven
8.1.1.	For all plant expansions, the soil is checked for contaminated sites and existing contaminated sites are removed or secured	
8.1.2.	Plan for the reduction of surface sealing – incl. milestones exists	
8.1.3.	Structural changes to the subsoil have no further impact on the environment	
8.1.4.	In the context of land recycling, at least the natural function of the soil is restored	
8.1.5.	The proportion of unsealed surfaces at the site is $\geq 40\%$ of the total area	
8.1.6.	Buildings / land consumption is compensated	

## 9. BIODIVERSITY



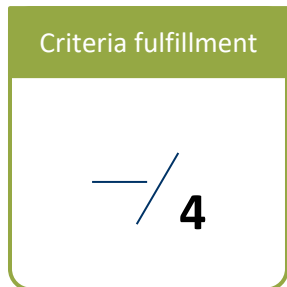
### VISION

We take the preservation and protection of biological diversity into account in our economic activities:

- We are aware of the influence of our actions on biodiversity and have compensated for them
- Employees are sensitized to and involved in the topic

## 9. BIODIVERSITY

### 9.1. CONTINUOUS MANAGEMENT

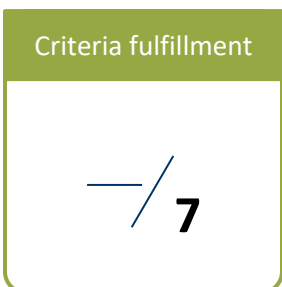


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IMPACT FACTORY

Criteria		Proven
9.1.1.	Biodiversity goals and action plans are tracked and updated as part of a continuous improvement process	
9.1.2.	The biodiversity at the site and in surrounding protected areas is known and evaluated with regard to the impact of production	
9.1.3.	Support programs for biodiversity engagement and environmental education are established	
9.1.4.	The result (KPI) from the application of the biodiversity site assessment tool is $\geq 50\%$	

## 9. BIODIVERSITY

### 9.2. VOLUNTARY PROJECTS AND MEASURES



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IMPACT FACTORY

Criteria		Proven
9.2.1.	Regionally indigenous species of plants are used for planting and the spread of invasive species is to be prevented	
9.2.2.	≥ 50% of all green spaces, including peripheral areas, are designed to be close to nature	
9.2.3.	Every year, at least one new measure to increase biodiversity is implemented on or off the factory grounds	
9.2.4.	Bird strikes on existing buildings and new buildings/extensions are counteracted	
9.2.5.	There is targeted support for endangered and/or threatened species	
9.2.6.	Areas and zones with special protection status are designated on the factory premises	
9.2.7.	At the site, all unused (non-productive) areas are designed to be close to nature	

## 10. POLLUTANTS

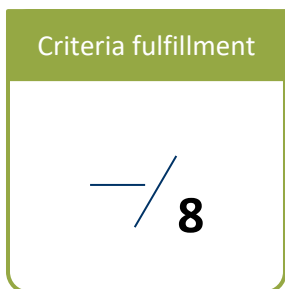


## VISION

We design our production facilities in a way that avoids the emission of any pollutants that are harmful to human health, animals and vegetation, the soil, water or air.

# 10. POLLUTANTS

## 10.1. POLLUTANT EMISSIONS



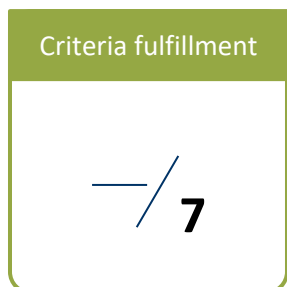
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IMPACT FACTORY

Criteria	Proven
10.1.1. All substances or mixtures used are evaluated with regard to their properties and approved for use	
10.1.2. There is an established process for monitoring and reducing legionella emissions from cooling towers, wet separators, evaporative cooling systems	
10.1.3. Regenerative / thermal afterburners comply with the following limit values: Cges 10 mg/Nm <sup>3</sup> , CO 100 mg/Nm <sup>3</sup> , NOx 100 mg/Nm <sup>3</sup>	
10.1.4. Use of VOC-reduced rinsing thinners: no use of butyl glycol in the filler and basecoat area	
10.1.5. Use of VOC-reduced coatings: VOC content ≤ 7% filler, ≤ 15% basecoat, ≤ 45% clear coat	
10.1.6. Captured dust emissions (total dust) from the paint shop are ≤ 1 mg/Nm <sup>3</sup>	
10.1.7. Captured dust emissions (total dust) from the trades are ≤ 3mg/Nm <sup>3</sup>	
10.1.8. VOC emissions from the paint shops are ≤ 8 g/m <sup>2</sup> body surface	



# 10. POLLUTANTS

## 10.2. USE OF POLLUTANTS



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IMPACT FACTORY

Criteria	Proven
10.2.1. The site is free of asbestos	
10.2.2. No use of building materials containing PVC in new buildings and conversions	
10.2.3. No use of heavy metals according to the accompanying documents	
10.2.4. No use of halogenated compounds according to the accompanying documents	
10.2.5. No use of plant protection products according to the accompanying documents	
10.2.6. No use of other hazardous substances and chemicals according to the accompanying documents	
10.2.7. No use of hydrocarbons and refrigerants containing SF6, cleaning agents and inert gases	

## 11. MOBILITY

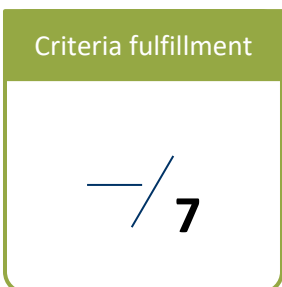


### VISION

Employees have the option of getting to their workplace in a CO<sub>2</sub>-neutral manner.  
By means of alternative drives and new logistics concepts, we do not emit CO<sub>2</sub> during the transport of goods.

# 11. MOBILITY

## 11.1. EMPLOYEE

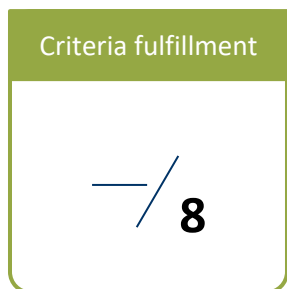


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IMPACT FACTORY

Criteria	Proven
11.1.1. Working time models that help to reduce the need for employees to travel to the factory are established	
11.1.2. The site has a direct connection to local and long-distance public transport	
11.1.3. The site provides offers for employees to use local and long-distance public transportation	
11.1.4. The site actively influences transportation close to the factory	
11.1.5. Charging facilities for electric vehicles are available in the employee parking spaces	
11.1.6. Proportion of employees who come to work individually by car has decreased compared to the previous year or is $\leq 10\%$	
11.1.7. $\geq 90\%$ of employees come to work CO2-neutral	

# 11. MOBILITY

## 11.2. FREIGHT TRANSPORT



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IMPACT FACTORY

Criteria	Proven
11.2.1. A strategy and implementation plan for alternative drive systems and transport concepts are introduced	
11.2.2. The site follows a strategy of purchasing as locally as possible	
11.2.3. The specifications for transport equipment must always reflect the current state of the art	
11.2.4. Regular review of transport volumes to switch to more environmentally friendly modes of transport	
11.2.5. Capacity utilization of modes of transport is regularly analyzed and continuously optimized	
11.2.6. Packing density utilization of packaging is regularly analysed and continuously optimized	
11.2.7. The site-specific stockpiling of production materials takes into account the avoidance of air freight as well as environmentally optimal order sizes	
11.2.8. Logistics operations are generally CO2-neutral	