



Process Data set: Stainless steel drinking water pipe; Stainless steel pipe (en) en de

Tags	Dieser Datensatz ist Bestandteil der ÖKOB AUDAT.			
<h3>Process information</h3>				
Key Data Set Information				
Location	DE			
Geographical representativeness description	The data set represents the country specific situation in Germany, focusing on the main technologies, the region specific characteristics and / or import statistics.			
Reference year	2018			
Name	Base name ; Quantitative product or process properties Stainless steel drinking water pipe; Stainless steel pipe			
Use advice for data set	The data set represents a cradle to gate inventory. It can be used to characterise the supply chain situation of the respective commodity in a representative manner. Combination with individual unit processes using this commodity enables the generation of user-specific (product) LCAs.			
Technical purpose of product or process	This product can be used in	construction.		
Classification number	4.2.03			
Classification	Class name : Hierarchy level oekobau.dat: 4.2.03 Metals / Stainless steel / Stainless steel tap water tubes			
General comment on data set	This data set has been modeled according to the European Standard EN 15804 for Sustainable Building. Results are	depicted in modules that allow the structured expression of results over the entire life cycle.		
Uncertainty margins	10			
Description	Product system almost completely covered. Good technological, temporal and geographic representativeness.			

Copyright	Yes
Owner of data set	thinkstep
Quantitative reference	
Reference flow(s)	Steel pipe - 1.0 * 1.0 kg (Mass)
Time representativeness	
Data set valid until	2022
Time representativeness description	Annual average
Technological representativeness	
Technology description including background system	<p>The dataset describes the production of a stainless steel drinking water pipe made of stainless steel (cold rolled). In so doing, the process of bending the steel sheet, the production of the welding seam as well as all necessary materials and energy expenditures have been considered. Transports from the factory to the building site are not considered and must be included according to the system boundaries.</p> <p>The main process step is the melting of stainless steel scrap in the electric arc furnace (EAF), thus the consumed energy is mainly electric power. The major feed stock for the EAF is stainless steel scrap, which may comprise of scrap from inside the steelworks (e.g. cut-offs), cut-offs from steel product manufacturers (e.g. vehicle builders) and post-consumer scrap (e.g. end of life products). As in the integrated steel plant including blast furnaces and converters, a slag is formed from lime to collect undesirable components in the steel. Thus lime is an additive as well as coal (carbon) as reducing agent and alloying elements. Oxygen lances and / or oxy-fuel burners are used to assist in the early stages of melting. For every material fraction the transport is considered in the data set. For the production of carbon steel and low alloyed steels, following main operations are performed: raw material handling and storage, furnace charging with/without scrap preheating, EAF scrap melting, steel and slag tapping, ladle furnace treatments for quality adjustment, slag handling and finally continuous casting. For high alloyed respectively stainless steels, the operation sequence is more complex and tailor-made for the end-products. In addition to the mentioned operations for carbon steels various ladle treatments (secondary metallurgy) are carried out like desulphurisation,</p>

degassing for the elimination of dissolved gases like nitrogen and hydrogen, decarburisation (AOD=Argon-Oxygen-Decarburisation or VOD=Vacuum-Oxygen-Decarburisation). The following operations are two rolling processes: the hot strip mill and the cold rolling mill. In the hot rolling mill the slab is reshaped above the recrystallization temperature. The qualities obtained in this process are e.g. strength and surface quality. During the rolling process the material passes through the furnace and the rolling line. In the furnace the metal is preheated by natural gas. There is no need for an additional warming, if the hot slabs are directly charged into the rolling mill. The forming is done in various rolling frames until the final shape is obtained. The steel scrap in this process are directly recycled. In the cold rolling mill the material is reshaped below the recrystallization temperature. Thereby a enhanced surface quality, an improved dimensional accuracy as well as a higher strength are achieved. The different process steps are: pickling, the rolling line and the heat treatment.

Background system:

Electricity: Electricity is modelled according to the individual country-specific situations. The country-specific modelling is achieved on multiple levels. Firstly, individual energy carrier specific power plants and plants for renewable energy sources are modelled according to the current national electricity grid mix. Modelling the electricity consumption mix includes transmission / distribution losses and the own use by energy producers (own consumption of power plants and "other" own consumption e.g. due to pumped storage hydro power etc.), as well as imported electricity. Secondly, the national emission and efficiency standards of the power plants are modelled as well as the share of electricity plants and combined heat and power plants (CHP). Thirdly, the country-specific energy carrier supply (share of imports and / or domestic supply) including the country-specific energy carrier properties (e.g. element and energy content) are accounted for. Fourthly, the exploration, mining/production, processing and transport processes of the energy carrier supply chains are modelled according to the specific situation of each electricity producing country. The different production and processing techniques (emissions and efficiencies) in the different energy producing countries are considered, e.g. different crude oil production technologies or different flaring rates at the oil platforms.

Thermal energy, process steam: The thermal energy and process steam supply is modelled according to the individual country-specific situation with regard to emission standards

	<p>and considered energy carriers. The thermal energy and process steam are produced at heat plants. Efficiencies for thermal energy production are by definition 100% in relation to the corresponding energy carrier input. For process steam the efficiency ranges from 85%, 90% to 95%. The energy carriers used for the generation of thermal energy and process steam are modelled according to the specific import situation (see electricity above).</p> <p>Transports: All relevant and known transport processes are included. Ocean-going and inland ship transport as well as rail, truck and pipeline transport of bulk commodities are considered.</p> <p>Energy carriers: The energy</p>	<p>carriers are modelled according to the specific supply situation (see electricity above).</p> <p>Refinery products: Diesel fuel, gasoline, technical gases, fuel oils, lubricants and residues such as bitumen are modelled with a parameterised country-specific refinery model. The refinery model represents the current national standard in refining techniques (e.g. emission level, internal energy consumption, etc.) as well as the individual country-specific product output spectrum, which can be quite different from country to country. The supply of crude oil is modelled, again, according to the country-specific situation with the respective properties of the resources.</p>
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Pictogram of technology	 metals_glo_stainless steel production.jpg
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Modelling and validation

Administrative information

Environmental indicators

Indicators of life cycle

Indicator 	Direction 	Unit 
Use of renewable primary energy (PERE)	Input	MJ

Indicator 	Direction 	Unit 
Primary energy resources used as raw materials (PERM)	Input	MJ
Total use of renewable primary energy resources (PERT)	Input	MJ
Use of non-renewable primary energy (PENRE)	Input	MJ
Non-renewable primary energy resources used as raw materials (PENRM)	Input	MJ
Total use of non-renewable primary energy resources (PENRT)	Input	MJ
Input of secondary material (SM)	Input	kg
Use of renewable secondary fuels (RSF)	Input	MJ
Use of non-renewable secondary fuels (NRSF)	Input	MJ

Indicator 	Direction 	Unit 
Use of net fresh water (FW)	Input	m³
Hazardous waste disposed (HWD)	Output	kg
Non-hazardous waste disposed (NHWD)	Output	kg
Radioactive waste disposed (RWD)	Output	kg
Components for re-use (CRU)	Output	kg
Materials for Recycling (MFR)	Output	kg
Material for Energy Recovery (MER)	Output	kg
Exported electrical energy (EEE)	Output	MJ

Indicator 	Direction 	Unit 
Exported thermal energy (EET)	Output	MJ

Environmental Impact Indicators

Indicator 	Unit 
Global warming potential (GWP)	kg CO2 eq.
Ozone Depletion Potential (ODP)	kg R11 eq.
Photochemical Ozone Creation Potential (POCP)	kg Ethene eq.
Acidification potential (AP)	kg SO2 eq.
Eutrophication potential (EP)	kg Phosphate eq.

Indicator 	Unit 
Abiotic depletion potential for non fossil resources (ADPE)	kg Sb eq.
Abiotic depletion potential for fossil resources (ADPF)	MJ