

v01.00.000

Generic

Short name

Water consumption; for process; 1L; EU-27

Complete name

Water consumption; for process; consumption mix, at consumer; 1L; Europe, EU-27

Ecobilan identifier

CODDE-2978

External identifier

4914bea1-7535-4c8f-ab6a-1322e219515f

Version

01.00.000

Internal reference

d4dd6b7a-41c6-458b-93ad-69907ba302ce

Type

Material

Process with material

No

Configurable dataset

No

Date of availability

2024 10 15

Category

Water

Activity Type

Not applicable

Sectors

Information

Impact indicators

Inputs/Outputs

Process information



Description

This data set represents the production of 1 kg of water used for industrial processes. It represents average operation of conventional treatment for the production of tap water with a conventionnal deionization. This LCI data set includes: water pumping (from surface and ground water), treatment, storage and transport to the consumer. Conventional treatment for drinking water includes: coagulation, decantation, flocculation, sedimentation, filtration and disinfection. Conventional deionization is carried out by ion exchange. The water consumption mix in Europe is based on surface and ground water withdrawal per country given by AQUASTAT (reference year: 2020): 18.29% Italy, 16.0% Spain, 14.28% France, 13.28% Germany, 5.5% Greece, 4.71% Poland, 4.51% Netherlands, 3.49% Romania, 3.33% Portugal, 2.76% Bulgaria, 2.54% Hungary, 2.28% Belgium, 1.9% Austria, 1.63% Finland, 1.35% Sweden, 0.84% Ireland, 0.74% Czechia, 0.54% Slovenia, 0.53% Denmark, 0.46% Estonia, 0.36% Croatia, 0.30% Slovakia, 0.15% Cyprus, 0.11% Lithuania, 0.08% Latvia, 0.02% Luxembourg, 0.02% Malta. Water losses within the network are included (estimated to 20%). The treatment of water after consumption is not included.

Dataset key information

Synonymes

[0:100] [100:0]

General comment on dataset

The majority of water consumed in the world comes from a water distribution network to satisfy residential, commercial and industrial requirements. In the CODDE® database, we distinguish 3 types of water consumption: water for drinking, water for process and ultrapure water for process. These LCI data sets include: water pumping (from surface and ground water), treatment, storage and transport to the consumer. Water treatment varies depending on the level of purity expected. Water for drinking includes coagulation, decantation, flocculation, sedimentation, filtration, and disinfection. Water for process includes an additional step: deionization. Ultrapure water for process includes a more advanced deionization step. Ultrapure water is reserved to industries with high requirements such as microelectronics and pharmaceutical industries. Note 1: Water consumed directly from the natural environment without pretreatment is not studied in the CODDE® database. Note 2: The treatment of water after consumption is not included. To complete your LCA model, you need to add a water treatment.

Treatment, Standards, Routes

For process



Quantitative product or process properties

1 kg of water

Mix and location types

Consumption mix, at consumer

Other content

-

CAS number

Not applicable

Process information

Description

Dataset key information

Quantitative reference

Time representativeness

Geographical representativeness

Technological representativeness

End of life characteristics

Physical characteristics

Modeling and validation

LCI method and allocation

Data sources, treatment and representativeness

Completeness

Validation

Compliance

Data Quality Ranking

Administrative information

Commissioner and objective

Creator / Modeler of the dataset

Data entry by

Publication and ownership

Quantitative reference

Reference flow (category)

Product flow / Materials production / Water

Reference flow

water; de-ionised

Reference weight in kg

1.0



Functional unit

Produce 1 kg of water



Time representativeness

Reference year

2020

Validity of the data set

2030

Description of the temporal representativity

The main environmental aspect of this data set is the electricity production required to operate the water treatment plant. The reference year for electricity is 2020.



Geographical representativeness

Location

EU-27

Description of the geographical representativeness

The water is collected, treated and distributed in Europe.

Technological representativeness

Pictogram of technology

-

Flow diagram or picture

-



Description of the technology and process included

This LCI data set includes: water pumping (from surface and ground water [1]), treatment, storage and transport to the consumer. Conventional treatment for drinking water includes coagulation, decantation, flocculation, sedimentation, filtration and disinfection. Conventiønnal deionization is carried out by ion exchange. LCI model includes energy inputs (electricity, diesel, heat) and chemicals substances (flocculation (aluminium sulfate, iron sulfate, polyacrylamide); filtration (silica sand, activated carbon); disinfection (oxygen, chlorine); softener (sodium hydroxide, sodium silicate, sodium tripolyphos)) required for a conventional water treatment plant. Water losses within the network is included (estimated to 20% [2]). The lost water returns to nature without treatment. Inventory was constructed from reported chemicals and energy inputs from European conventional plants ([3], [4], [5], [10], [11]). The main environmental aspect of this data is the electricity production required to operate the water treatment plant (average energy input, excluding water losses: ~0.4 kWh/m3 for drinking water (without desalination), ~6 kWh/m3 for process water and ~8.4 kWh/m3 for process ultrapure water).

Technological applicability

Process water is water that has been purified. Process water is used when drinking water (or top water) may adversely affect the mechanical or biological operation of industrial systems. This water is used for example for the maintenance of industrial machines and cooling systems.

End of life characteristics

Potential recyclability for dismantling (range 0 to 1)

0.0

Energy recovery potential for grinding (interval from 0 to 1)

0.0

Specific end-of-life treatment

false

Energy recovery potential for dismantling (range 0 to 1)

0.0

Potential recyclability for grinding (range 0 to 1)

0.0

Comments and advice

Physical characteristics

Lower heating value (MJ/kg)

Dimensions

Loss rate (%)

0.0		0.0
Renewable percentage (%)	Recycled content percentage (%)	Biogenic carbon content (kg)
0.0	0.0	0.0

## Modeling and validation

### LCI method and allocation

Type of dataset	LCA methodology report
Unit process black box	
Principle of the LCI method	Deviations from the principle of the LCI method
attributional	None
LCI method approach	Deviations from the LCI method approach
Allocation – mass	None
Modeling constant	Deviations from the modeling constants
None	None

### Data sources, treatment and representativeness

Principle of data cutoff and completeness	Deviations from data cut off and completeness principles
Cut-off rules for each unit process: Coverage of at least 95% of mass and energy of the input and output flows, and 98% of their environmental relevance (according to expert judgement). The water pumping from sea water is not considered in the LCI data set model.	None
Principles of data treatment and extrapolation	Deviations from data treatment and extrapolations principles
All data treated balancing with their contribution	None
Data selection and combination principles	Deviations from data selection and combination principles
All data selected and balancing with their contribution to the data set	None
Sampling procedure	
Not applicable	
Uncertainty adjustments	
Not studied	
Annual supply or production volume	Percentage of supply or production covered (%)
	-
Data handling report	Data collection period
Documentation recorded in the LCIE Bureau Veritas’ Quality System.	2024
Use advice for data set	
The treatment of water after consumption is not included. To complete your LCA model, you need to add a water treatment.	
Data sources used for this dataset	
This data set is based on the expertise of LCIE Bureau Veritas in the industrial sector (including energy, transport, electrical, electronics, digital services), statistic data and literature. Additional sources: [1] AQUASTAT Dissemination System, Reference year: 2020 [2] Eaufrance, Water losses, Reference year 2015 [3] “Life Cycle Assessment of water treatment: what is the contribution of infrastructure and operation at unit process level?”, ScienceDirect 2013 [4] “LCA of municipal wastewater treatment”, ScienceDirect 2023 [5] Life cycle assessment of ultrapure water plant in semiconductor industry (Supandy, 2009) [6] OCDE, Treatment connection rate, Reference	



Completeness

Product model completeness

All relevant flows quantified. The model is considered particularly complete. The energy consumption of the water treatment plant is modeled with the country's electricity production mix. The withdrawal flows (surface water and groundwater) are regionalized (allows to take into account the water stress of each country - influences the Water Use indicator). The desalination is taken into account for the countries with a withdrawal > 1.5% of the total flow (concerned countries for CODDE® database: Algeria, Spain and China).

Completeness

All relevant flows quantified

Per Topic	Topic	Completeness
	Climate change	All relevant flows quantified
	Ozone depletion	All relevant flows quantified
	Summer smog	All relevant flows quantified
	Eutrophication	All relevant flows quantified
	Acidification	All relevant flows quantified
	Human toxicity	All relevant flows quantified
	Freshwater eco-toxicity	All relevant flows quantified
	Seawater eco-toxicity	All relevant flows quantified
	Terrestrial eco-toxicity	All relevant flows quantified
	radioactivity	All relevant flows quantified
	Land use	No statement
	Non renewable material resource depletion	All relevant flows quantified
	Renewable material resource consumption	All relevant flows quantified
	Non renewable primary energy depletion	All relevant flows quantified
	Renewable primary energy consumption	All relevant flows quantified
	Particulate matter respiratory inorganics	All relevant flows quantified
	Species depletion	No statement
	Noise	No statement

Validation

General Review

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 Compliance


Compliance			
System name	Overall approval	Nomenclature	Methodological
ISO 14040/44/67	Fully compliant	Fully compliant	Fully compliant
	Review	Documentation	Quality
	Fully compliant	Fully compliant	Not defined

<b>System name</b> ILCD Data Network Entry Level	<b>Overall approval</b> Fully compliant	<b>Nomenclature</b> Fully compliant	<b>Methodological</b> Fully compliant
	<b>Review</b> Fully compliant	<b>Documentation</b> Fully compliant	<b>Quality</b> Not defined
<b>System name</b> PEP ecopassport® PCR ed3	<b>Overall approval</b> Fully compliant	<b>Nomenclature</b> Not defined	<b>Methodological</b> Fully compliant
	<b>Review</b> Not defined	<b>Documentation</b> Not defined	<b>Quality</b> Not defined
<b>System name</b> PEP ecopassport® PCR ed4	<b>Overall approval</b> Fully compliant	<b>Nomenclature</b> Not defined	<b>Methodological</b> Fully compliant
	<b>Review</b> Not defined	<b>Documentation</b> Not defined	<b>Quality</b> Not defined

 Data Quality Ranking

<b>Overall Data Quality</b> 2.0			
<b>Completeness</b> 2.0	<b>Methodological appropriateness and consistency</b> 2.0		<b>Time representativeness</b> 2.0
<b>Technological representativeness</b> 2.0	<b>Geographical representativeness</b> 1.0		<b>Parameter uncertainty</b> 3.0

 Administrative information

Commissioner and objective			
<b>Commissioner of dataset</b> LCIE Bureau Veritas			
<b>Project</b> CODDE® database		 <b>Intended applications</b> Dataset intended for use in the EIME software for carrying out Life Cycle Assessment (ISO 14040/44), Product Carbon Footprint (ISO 14067), and environmental product declaration (ISO 14025).	

 Creator / Modeler of the dataset

<b>Dataset generator modeler</b> Damien PRUNEL			
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Data entry by			
<b>Data entry by</b> Damien PRUNEL			
<b>Converted original data set from</b>		<b>Official approval of data set by producer operator</b>	

Publication and ownership

Workflow and Publication Status

Data set finalised; entirely published

Date of last revision

Thu, 22 Aug 2024

Provider

LCIE Bureau Veritas

Entities or persons with exclusive access to this data set

Users with a valid EIME license



Copyright

Yes

Registration authority

LCIE Bureau Veritas

License type

License fee

Access & use restrictions

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