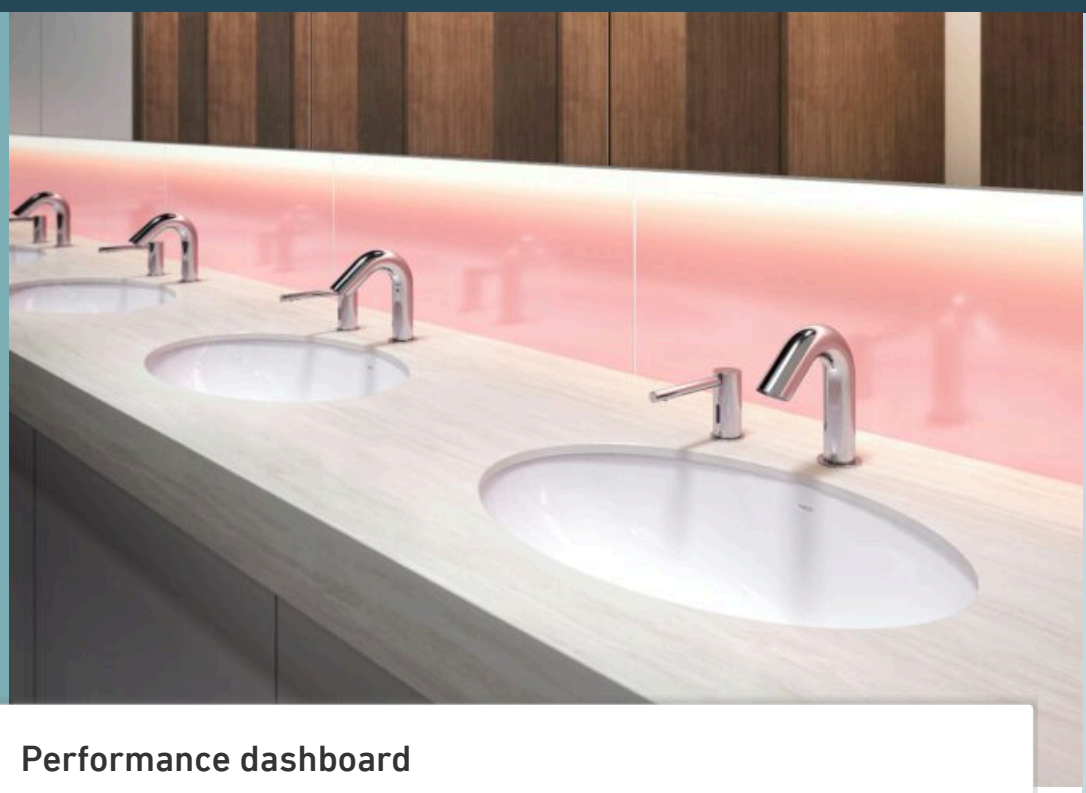
TOTO®

Standard R & S Touchless Faucets – 0.35 GPM/0.12 GPC

T28S32E, T28S32EM & T28S32ET
T27S32E, T27S32EM & T27S32ET

Ideal for high-traffic commercial spaces, the TOTO Standard EcoPower sensor faucets provide an elegant water conservation solution for LEED option. Powered by water, EcoPower's turbine creates an electrical current that is stored in rechargeable cells to power the Smart Sensor System of the faucet.



Performance dashboard

Features & functionality

Hydropower self generating system

No minimum daily usage requirement

Micro-sensor positioned underneath the spout head for accurate hand detection ensuring smooth and consistent water distribution

Durable chrome plated spout body

Single-hole mount

Kit includes spout body, controller box, and mounting hardware – less supply lines

Equipped with 0.35gpm flow control

Mixing valve options available

Visit TOTO for more product specifications:

Standard-R Touchless Faucet Series

Standard-S Touchless Faucet Series

MasterFormat® #22 42 39

WATER·PEOPLE·PLANET SMART FACT

ECO-POWER® SELF-SUSTAINING FAUCETS

- Powered by water to create an electrical current that is stored in rechargeable cells to power the Smart Sensor System of the faucet or valve.
- Reduces electricity use, lower maintenance costs and hands-free, automatic-shut-off functionality.

Environment & materials

Improved by:

Powered by the sheer force of running water

See How we make it greener for water savings information

Metal parts and electric components are able to be recycled at the end of service

Certifications, rating systems & disclosures:

30% below LEED® v4.1's Indoor Water Use Reduction baseline with its 0.35gpm flow volume

Contributes to earning credits in LEED®

CALGreen® compliant

Declare™ label

See LCA, interpretation & rating systems

See materials, interpretation & rating systems

Declare.

SM Transparency Report (EPD)™ + Material Health Overview™

EPD	LCA
3rd-party reviewed	✓ NSF
	Transparency Report (EPD)
3rd-party verified	✓ NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	✓

This environmental product declaration (EPD) was externally verified by Jack Geibig (Ecoform) on behalf of NSF according to ISO 14044; ISO 21930:2017; SM Part A: LCA calculation rules and report requirements, 2023; the reference PCR; and ISO 14025:2006.

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734 769 8010

NSF Certified Environmental Product Declaration www.nsf.org

SUMMARY

Reference PCR
SM Part B: Commercial/public metered and manual lavatory faucets, v3.0

Regions; system boundaries
North America; Cradle-to-grave

Functional unit
One metered lavatory faucet in an average commercial environment over the estimated service life of the building

LCIA methodology; LCA software; LCI database
TRACI 2.1; SimaPro Analyst 9.5; ecoinvent and USLCI databases

In accordance with ISO 14044 and the referenced PCR, the life cycle assessment was conducted by Sustainable Minds and critically reviewed by Jack Geibig (Ecoform) on behalf of NSF.

Public LCA
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024

TOTO USA
1155 Southern Road
Morrow, GA 30260
www.totousa.com

Contact us

LCA results & interpretation

Standard-R and Standard-S Faucet Series

Standard-R (no mix valve) | Standard-R (w/ mix valve) | Standard-R (w/ thermo mix valve) | Standard-S (no mix valve) | Standard-S (w/ mix valve) | Standard-S (w/ thermo mix valve) | EPD additional content | Material health

Scope and summary

○ Cradle to gate ○ Cradle to gate with options ✓ **Cradle to grave**

Functional unit

One metered lavatory faucet in an average commercial environment over the estimated service life of the building. The expected service life (ESL) of a building is 75 years, and all use stage activity and impacts are accounted for in that full ESL period. The reference service life (RSL) of the faucet is 10 years, which is an industry-accepted average lifespan based on the economic lifespan of the product. T28S32E does not include a mixing valve.

Maintenance

Regular cleaning is assumed to use 10mL of a 1% sodium lauryl sulfate (SLS) solution daily in a commercial setting for 75 years, which is the building estimated service life. The use of 10mL/clean over 260days/year for 75 years gives a total of 195L of solution. Using a density of 1.01kg/L for a 1% SLS solution, 195kg of solution will be needed over the course of 75 years. Therefore, 2kg of SLS plus 195kg of water were included in the model.

Replacement

At the end of its RSL, the faucet is assumed to be replaced. Therefore, an additional 6.5 products are included as replacements, with all life cycle modules considered, over the building's ESL of 75 years.

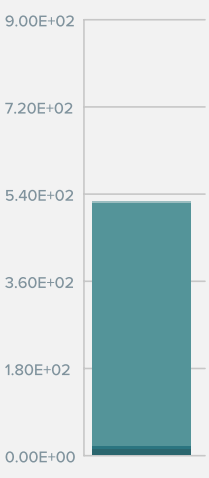
Manufacturing data

Manufacturing data has been collected and compiled for TOTO Vietnam. **Data reporting period:** 2023.

Material composition greater than 1% by weight

PART	MATERIAL	AVG. % WT
Spout body, nozzle key, mounting nut, generator coil cover, controller adapter	Brass	41.1%
Controller mounting bracket, spout mounting bracket & rod	Stainles steel	14.3%
Packaging	Cardboard and paper	11.7%
Controller cover	ABS	10.8%
Hose	PVC	4.62%
Connector	Polypropylene	2.85%
Generator and solenoid coils	Copper	2.11%
Hose clip	Steel	2.08%
Spout aerator gasket	NBR	1.42%
Board	Electronics	1.27%
Generator base	PPO	1.10%
Other	Other	6.63%

Total impacts by life cycle stage [mPts/decl unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Production	14.3
Construction	0.07
Use	509
End of life	0.02

Total impacts = 523 mPts per 75 years installed

What's causing the greatest impacts

All life cycle stages

The use stage [B1-B7] dominates the results for all impact categories. The replacements and operational water use modules are highly dominant in all categories because of the amount of water consumed during operation and the necessity to consider an additional 6.5 products as replacements. All life cycle modules are considered throughout the estimated service life (ESL) of the building, which is 75 years. The production stage [A1-A3] itself is slightly significant but does not dominate in any impact category. Additionally, the processes associated with dismantling the product and final waste treatment during the end-of-life stage do not have a significant impact.

Production stage [A1-A3]

Brass and the turning brass process, together with the printed wiring board, have significant material contributions to the production stage. Stainless steel materials and the turning steel process are relevant to the carcinogenics category. The electroplating process along with injection molding are major contributors to the ozone depletion category. Furthermore, polishing has a somewhat significant processing contribution to the results. Because these products are manufactured in Vietnam but sold in the US market, the transportation via oceanic freighter appears as a relevant contributor to the fossil fuel depletion and smog categories. The other parts and processes contribute between 5% and 20% of the overall impacts in the remaining categories.

Construction stage [A4-A5]

Installation of the product dominates impacts in the construction stage. Transportation by truck for delivery to the installation site contributes the most, and this stage contributes less than 1% of the total global warming potential impacts throughout the product's life cycle.

Use stage [B1-B7]

Product replacements dominate impacts in the use stage. The use stage itself dominates all impact categories (>95%) due to the consideration of an additional 6.5 products as replacements. The water consumed during use and embedded electricity used for the water supply are also contributors in this stage.

End-of-life stage [C1-C4]

The transportation to landfill dominates impacts in the end-of-life stage. Transportation and the processes for dismantling the product contribute to a relatively low portion (<1%) of total results for all impact categories.

Operational energy and water use

The amount of water used by the 0.35gpm faucet during each 15sec use is 0.0875 gallons. It is assumed to be used 90 times per day in a commercial environment assuming 260 days per year over 75 years, resulting in 153,563 gallons of water over its lifetime. An electricity factor of 0.000961 kWh per liter of water is used to represent energy for upstream municipal water collection, treatment, supply, and downstream management.

A mix of 70% hot water and 30% cold water is assumed to be used by the faucet, with water heating consuming a blend of 67% natural gas and 33% electricity. A natural gas factor of 0.8784 Mcf of natural gas per 1,000 gallons of water and an electricity factor of 0.1765 kWh per gallon of water were used to calculate total energy needed for water heating. Use stage electricity was modeled using a United States grid mix.

How we're making it greener

TOTO PeoplePlanetWater™ programs improving environmental performance

- Dual-Max®, E-Max®, Tornado Flush™, 1G®, and EcoPower® reduce water consumption in the use phase
- Energy efficiency programs optimize the firing process
- Modular packing methods increase the fill rate of a trailer, cutting down on the number of trips needed
- 100% of post-industrial ceramic waste is recycled

See how we make it greener

LCA results

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Information modules: **Included (X)** | Excluded (MND)*	**(X) A1 Raw materials**	**(X) A4 Transportation/ Delivery**	**(X) B1 Use**	**(X) C1 Deconstruction/ Demolition**
	(X) A2 Transportation	**(X) A5 Construction/ Installation**	**(X) B2 Maintenance**	**(X) C2 Transportation**
	(X) A3 Manufacturing		**(X) B3 Repair**	**(X) C3 Waste processing**
			(X) B4 Replacement	**(X) C4 Disposal**
			(X) B5 Refurbishment	
			(X) B6 Operational energy use	
			(X) B7 Operational water use	
				

SM Single Score

Impacts per faucet	14.3 mPts	0.07 mPts	509 mPts	0.02 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Brass parts together with the printed wiring board in addition to manufacturing processes such as brass turning.	Transportation of the product to installation site or consumer and disposal of packaging.	Volume of water used during the operation of the product and the number of replacements required over the building's lifetime.	Transport to waste processing, waste processing and disposal of material flows transported to a landfill.

Standard-R Faucet Series (no mixing valve) - TRACI v2.1 results per functional unit

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage				
Impact category / Unit				
Global warming / **kg CO_2 eq**	6.28E+01	7.85E-01	5.43E+03	1.85E-01
Ozone depletion / **kg CFC-11 eq**	4.11E-06	1.70E-09	2.57E-04	1.66E-08
Acidification / **kg SO_2 eq**	8.00E-01	7.04E-03	3.59E+01	1.05E-03
Eutrophication / **kg N eq**	4.21E-01	6.88E-04	7.70E+00	1.97E-04
Human health damage				
Impact category / Unit				
Smog / **kg O_3 eq**	6.11E+00	2.24E-01	2.69E+02	2.20E-02
Respiratory effects / **kg $PM_{2.5}$ eq**	9.63E-02	1.25E-04	2.93E+00	1.11E-04
Additional environmental information				
Impact category / Unit				
Carcinogenics / **CTU_h**	2.81E-06	8.88E-09	1.18E-04	2.32E-09
Non-carcinogenics / **CTU_h**	7.82E-05	8.29E-08	1.33E-03	7.32E-08
Ecotoxicity / **CTU_e**	2.24E+02	1.58E+00	4.99E+03	1.96E-01
Fossil fuel depletion / **MJ surplus**	4.04E+01	1.14E+00	4.55E+03	2.18E-01

References

LCA Background Report
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024; SimaPro Analyst 9.5; ecoinvent and USLCI databases; TRACI 2.1.

ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

ISO 21930:2017, "Sustainability in Building Construction — Environmental Declaration of Building Products" serves as the core PCR along with Sustainable Minds Part A.

SM Part A: LCA calculation rules and report requirements, version 2023
August, 2023. PCR review conducted by the Sustainable Minds TAB, tab@sustainableminds.com.

SM Part B: Commercial/public metered and manual lavatory faucets, v3.0
March, 2024. PCR review conducted by Hugues Imbeault-Tétreault, ing., M.Sc.A., Chair (Groupe AGÉCO) hugues.i-tetreault@groupeageco.ca; Rebe Feraldi, LCACP, CLAR (TranSustainable Enterprises, LLC); Rifat Karim (Sphera).

Download PDF SM Transparency Report/EPD

SM Transparency Reports (TR) are ISO 14025 Type III environmental declarations (EPD) that enable purchasers and users to compare the potential environmental performance of products on a life cycle basis. They are designed to present information transparently to make the limitations of comparability more understandable. Environmental declarations of products that conform to the same PCR and include the same life cycle stages, but are made by different manufacturers, may not sufficiently align to support direct comparisons. They therefore cannot be used as comparative assertions unless the conditions as defined in ISO 14025 Section 6.7.2. 'Requirements for Comparability' are satisfied. In order to support comparative assertions, this EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. Any EPD comparison must be carried out at the building level per ISO 21930 guidelines, use the same sub-category PCR where applicable, include all relevant information modules, be limited to EPDs applying a functional unit, and be based on equivalent scenarios with respect to the context of construction works. Some LCA impact categories and inventory items are still under development and can have high levels of uncertainty. To promote uniform guidance on the data collection, calculation, and reporting of results, the ACLCA methodology (ACLCA 2019) was used.

Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	½ product
✓ Product-specific Type III EPD	1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1
Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	1 product
✓ Product-specific Type III EPD	1.5 products

Collaborative for High Performance Schools National Criteria
MW C5.1 – Environmental Product Declarations

✓ Third-party certified type III EPD	2 points

Green Globes for New Construction and Sustainable Interiors
Materials and resources

✓ NC 3.5.1.2 Path B: Prescriptive Path for Building Core and Shell	
✓ NC 3.5.2.2 and SI 4.1.2 Path B: Prescriptive Path for Interior Fit-outs	

BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products

Environmental Product Declarations (EPD)

○ Industry-average EPD	.5 points
○ Multi-product specific EPD	.75 points
✓ Product-specific EPD	1 point

SM Transparency Report (EPD)™ + Material Health Overview™

EPD	LCA
3rd-party reviewed	✓ NSF
	Transparency Report (EPD)
3rd-party verified	✓ NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	✓

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www.nsf.org
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Certified Environmental Product Declaration www.nsf.org

SUMMARY

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Regions; system boundaries
North America; Cradle-to-grave

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Public LCA
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024

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LCA results & interpretation

Standard-R and Standard-S Faucet Series

Standard-R (no mix valve) | Standard-R (w/ mix valve) | Standard-R (w/ thermo mix valve) | Standard-S (no mix valve) | Standard-S (w/ mix valve) | Standard-S (w/ thermo mix valve) | EPD additional content | Material health

Scope and summary

○ Cradle to gate ○ Cradle to gate with options ✓ **Cradle to grave**

Functional unit

One metered lavatory faucet in an average commercial environment over the estimated service life of the building. The expected service life (ESL) of a building is 75 years, and all use stage activity and impacts are accounted for in that full ESL period. The reference service life (RSL) of the faucet is 10 years, which is an industry-accepted average lifespan based on the economic lifespan of the product. T28S32EM includes a mixing valve.

Maintenance

Regular cleaning is assumed to use 10mL of a 1% sodium lauryl sulfate (SLS) solution daily in a commercial setting for 75 years, which is the building estimated service life. The use of 10mL/clean over 260days/year for 75 years gives a total of 195L of solution. Using a density of 1.01kg/L for a 1% SLS solution, 195kg of solution will be needed over the course of 75 years. Therefore, 2kg of SLS plus 195kg of water were included in the model.

Replacement

At the end of its RSL, the faucet is assumed to be replaced. Therefore, an additional 6.5 products are included as replacements, with all life cycle modules considered, over the building's ESL of 75 years.

Manufacturing data

Manufacturing data has been collected and compiled for TOTO Vietnam. **Data reporting period:** 2023.

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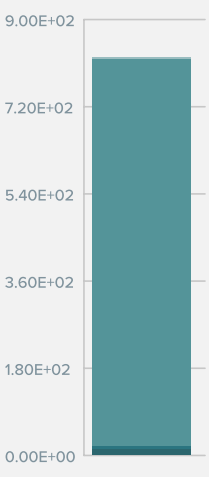
Packaging	Cardboard and paper	11.7%
Controller cover	ABS	10.8%
Hose	PVC	4.62%
Connector	Polypropylene	2.85%
Generator and solenoid coils	Copper	2.11%
Hose clip	Steel	2.08%
Spout aerator gasket	NBR	1.42%
Board	Electronics	1.27%
Generator base	PPO	1.10%
Other	Other	6.63%

Total impacts by life cycle stage [mPts/decl unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Production	17.2
Construction	0.07
Use	806
End of life	0.03

Total impacts = 823 mPts per 75 years installed

What's causing the greatest impacts

All life cycle stages

The use stage [B1-B7] dominates the results for all impact categories. The replacements and operational water use modules are highly dominant in all categories because of the amount of water consumed during operation and the necessity to consider an additional 6.5 products as replacements. All life cycle modules are considered throughout the estimated service life (ESL) of the building, which is 75 years. The production stage [A1-A3] itself is slightly significant but does not dominate in any impact category. Additionally, the processes associated with dismantling the product and final waste treatment during the end-of-life stage do not have a significant impact.

Production stage [A1-A3]

Brass and the turning brass process, together with the printed wiring board, have significant material contributions to the production stage. Stainless steel materials and the turning steel process are relevant to the carcinogenics category. The electroplating process along with injection molding are major contributors to the ozone depletion category. Furthermore, polishing has a somewhat significant processing contribution to the results. Because these products are manufactured in Vietnam but sold in the US market, the transportation via oceanic freighter appears as a relevant contributor to the fossil fuel depletion and smog categories. The other parts and processes contribute between 5% and 20% of the overall impacts in the remaining categories.

Construction stage [A4-A5]

Installation of the product dominates impacts in the construction stage. Transportation by truck for delivery to the installation site contributes the most, and this stage contributes less than 1% of the total global warming potential impacts throughout the product's life cycle.

Use stage [B1-B7]

Product replacements dominate impacts in the use stage. The use stage itself dominates all impact categories (>95%) due to the consideration of an additional 6.5 products as replacements. The water consumed during use and embedded electricity used for the water supply are also contributors in this stage.

End-of-life stage [C1-C4]

The transportation to landfill dominates impacts in the end-of-life stage. Transportation and the processes for dismantling the product contribute to a relatively low portion (<1%) of total results for all impact categories.

Operational energy and water use

The amount of water used by the 0.35gpm faucet during each 15sec use is 0.0875 gallons. It is assumed to be used 90 times per day in a commercial environment assuming 260 days per year over 75 years, resulting in 153,563 gallons of water over its lifetime. An electricity factor of 0.000961 kWh per liter of water is used to represent energy for upstream municipal water collection, treatment, supply, and downstream management.

A mix of 70% hot water and 30% cold water is assumed to be used by the faucet, with water heating consuming a blend of 67% natural gas and 33% electricity. A natural gas factor of 0.8784 Mcf of natural gas per 1,000 gallons of water and an electricity factor of 0.1765 kWh per gallon of water were used to calculate total energy needed for water heating. Use stage electricity was modeled using a United States grid mix.

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- Modular packing methods increase the fill rate of a trailer, cutting down on the number of trips needed
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See how we make it greener

LCA results

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Information modules: **Included (X)** | Excluded (MND)*	**(X) A1 Raw materials**	**(X) A4 Transportation/ Delivery**	**(X) B1 Use**	**(X) C1 Deconstruction/ Demolition**
	(X) A2 Transportation	**(X) A5 Construction/ Installation**	**(X) B2 Maintenance**	**(X) C2 Transportation**
	(X) A3 Manufacturing		**(X) B3 Repair**	**(X) C3 Waste processing**
			(X) B4 Replacement	**(X) C4 Disposal**
			(X) B5 Refurbishment	
			(X) B6 Operational energy use	
			(X) B7 Operational water use	
				

SM Single Score

Impacts per faucet	14.3 mPts	0.07 mPts	509 mPts	0.02 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Brass parts together with the printed wiring board in addition to manufacturing processes such as brass turning.	Transportation of the product to installation site or consumer and disposal of packaging.	Volume of water used during the operation of the product and the number of replacements required over the building's lifetime.	Transport to waste processing, waste processing and disposal of material flows transported to a landfill.

Standard-R Faucet Series (with mixing valve) - TRACI v2.1 results per functional unit

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage				
Impact category / Unit				
Global warming / **kg CO_2 eq**	6.67E+01	8.94E-01	1.02E+04	2.49E-01
Ozone depletion / **kg CFC-11 eq**	4.54E-06	1.97E-09	4.41E-04	2.31E-08
Acidification / **kg SO_2 eq**	8.90E-01	7.88E-03	7.38E+01	1.49E-03
Eutrophication / **kg N eq**	5.00E-01	8.00E-04	9.09E+00	2.63E-04
Human health damage				
Impact category / Unit				
Smog / **kg O_3 eq**	6.67E+00	2.52E-01	3.18E+02	3.18E-02
Respiratory effects / **kg $PM_{2.5}$ eq**	1.08E-01	1.41E-04	5.36E+00	1.61E-04
Additional environmental information				
Impact category / Unit				
Carcinogenics / **CTU_h**	3.01E-06	9.95E-09	1.48E-04	3.40E-09
Non-carcinogenics / **CTU_h**	9.98E-05	9.29E-08	1.83E-03	1.28E-07
Ecotoxicity / **CTU_e**	2.56E+02	1.76E+00	1.07E+04	3.01E-01
Fossil fuel depletion / **MJ surplus**	4.38E+01	1.27E+00	1.40E+04	3.12E-01

References

LCA Background Report
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024; SimaPro Analyst 9.5; ecoinvent and USLCI databases; TRACI 2.1.

ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

ISO 21930:2017, "Sustainability in Building Construction — Environmental Declaration of Building Products" serves as the core PCR along with Sustainable Minds Part A.

SM Part A: LCA calculation rules and report requirements, version 2023
August, 2023. PCR review conducted by the Sustainable Minds TAB, tab@sustainableminds.com.

SM Part B: Commercial/public metered and manual lavatory faucets, v3.0
March, 2024. PCR review conducted by Hugues Imbeault-Tétreault, ing., M.Sc.A., Chair (Groupe AGÉCO) hugues.i-tetreault@groupeageco.ca; Rebe Feraldi, LCACP, CLAR (TranSustainable Enterprises, LLC); Rifat Karim (Sphera).

Download PDF SM Transparency Report/EPD

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Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	½ product
✓ Product-specific Type III EPD	1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1
Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	1 product
✓ Product-specific Type III EPD	1.5 products

Collaborative for High Performance Schools National Criteria
MW C5.1 – Environmental Product Declarations

✓ Third-party certified type III EPD	2 points

Green Globes for New Construction and Sustainable Interiors
Materials and resources

- ✓ NC 3.5.1.2 Path B: Prescriptive Path for Building Core and Shell
- ✓ NC 3.5.2.2 and SI 4.1.2 Path B: Prescriptive Path for Interior Fit-outs

BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products

Environmental Product Declarations (EPD)

○ Industry-average EPD	.5 points
○ Multi-product specific EPD	.75 points
✓ Product-specific EPD	1 point

SM Transparency Report (EPD)™ + Material Health Overview™

EPD	LCA
3rd-party reviewed	✓ NSF
	Transparency Report (EPD)
3rd-party verified	✓ NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	✓

This environmental product declaration (EPD) was externally verified by Jack Geibig (Ecoform) on behalf of NSF according to ISO 14044; ISO 21930:2017; SM Part A: LCA calculation rules and report requirements, 2023; the reference PCR; and ISO 14025:2006.

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Ann Arbor, MI 48105, USA
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Certified Environmental Product Declaration www.nsf.org

SUMMARY

Reference PCR
SM Part B: Commercial/public metered and manual lavatory faucets, v3.0

Regions; system boundaries
North America; Cradle-to-grave

Functional unit
One metered lavatory faucet in an average commercial environment over the estimated service life of the building

LCIA methodology; LCA software; LCI database
TRACI 2.1; SimaPro Analyst 9.5; ecoinvent and USLCI databases

In accordance with ISO 14044 and the referenced PCR, the life cycle assessment was conducted by Sustainable Minds and critically reviewed by Jack Geibig (Ecoform) on behalf of NSF.

Public LCA
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024

TOTO USA
1155 Southern Road
Morrow, GA 30260
www.totousa.com

Contact us

LCA results & interpretation

Standard-R and Standard-S Faucet Series

Standard-R (no mix valve) | Standard-R (w/ mix valve) | Standard-R (w/ thermo mix valve) | Standard-S (no mix valve) | Standard-S (w/ mix valve) | Standard-S (w/ thermo mix valve) | EPD additional content | Material health

Scope and summary

○ Cradle to gate ○ Cradle to gate with options ✓ **Cradle to grave**

Functional unit

One metered lavatory faucet in an average commercial environment over the estimated service life of the building. The expected service life (ESL) of a building is 75 years, and all use stage activity and impacts are accounted for in that full ESL period. The reference service life (RSL) of the faucet is 10 years, which is an industry-accepted average lifespan based on the economic lifespan of the product. T28S32ET includes a thermostatic mixing valve.

Maintenance

Regular cleaning is assumed to use 10mL of a 1% sodium lauryl sulfate (SLS) solution daily in a commercial setting for 75 years, which is the building estimated service life. The use of 10mL/clean over 260days/year for 75 years gives a total of 195L of solution. Using a density of 1.01kg/L for a 1% SLS solution, 195kg of solution will be needed over the course of 75 years. Therefore, 2kg of SLS plus 195kg of water were included in the model.

Replacement

At the end of its RSL, the faucet is assumed to be replaced. Therefore, an additional 6.5 products are included as replacements, with all life cycle modules considered, over the building's ESL of 75 years.

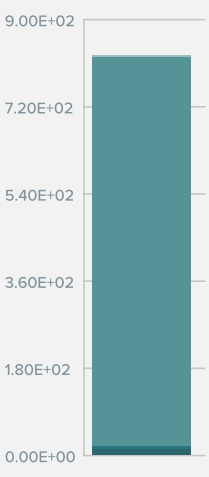
Manufacturing data

Manufacturing data has been collected and compiled for TOTO Vietnam. **Data reporting period:** 2023.

Material composition greater than 1% by weight

PART	MATERIAL	AVG. % WT
Spout body, nozzle key, mounting nut, generator coil cover, controller adapter	Brass	41.1%
Controller mounting bracket, spout mounting bracket & rod	Stainles steel	14.3%
Packaging	Cardboard and paper	11.7%
Controller cover	ABS	10.8%
Hose	PVC	4.62%
Connector	Polypropylene	2.85%
Generator and solenoid coils	Copper	2.11%
Hose clip	Steel	2.08%
Spout aerator gasket	NBR	1.42%
Board	Electronics	1.27%
Generator base	PPO	1.10%
Other	Other	6.63%

Total impacts by life cycle stage [mPts/decl unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Production	16.7
Construction	0.07
Use	797
End of life	0.02

Total impacts = 814 mPts per 75 years installed

What's causing the greatest impacts

All life cycle stages

The use stage [B1-B7] dominates the results for all impact categories. The replacements and operational water use modules are highly dominant in all categories because of the amount of water consumed during operation and the necessity to consider an additional 6.5 products as replacements. All life cycle modules are considered throughout the estimated service life (ESL) of the building, which is 75 years. The production stage [A1-A3] itself is slightly significant but does not dominate in any impact category. Additionally, the processes associated with dismantling the product and final waste treatment during the end-of-life stage do not have a significant impact.

Production stage [A1-A3]

Brass and the turning brass process, together with the printed wiring board, have significant material contributions to the production stage. Stainless steel materials and the turning steel process are relevant to the carcinogenics category. The electroplating process along with injection molding are major contributors to the ozone depletion category. Furthermore, polishing has a somewhat significant processing contribution to the results. Because these products are manufactured in Vietnam but sold in the US market, the transportation via oceanic freighter appears as a relevant contributor to the fossil fuel depletion and smog categories. The other parts and processes contribute between 5% and 20% of the overall impacts in the remaining categories.

Construction stage [A4-A5]

Installation of the product dominates impacts in the construction stage. Transportation by truck for delivery to the installation site contributes the most, and this stage contributes less than 1% of the total global warming potential impacts throughout the product's life cycle.

Use stage [B1-B7]

Product replacements dominate impacts in the use stage. The use stage itself dominates all impact categories (>95%) due to the consideration of an additional 6.5 products as replacements. The water consumed during use and embedded electricity used for the water supply are also contributors in this stage.

End-of-life stage [C1-C4]

The transportation to landfill dominates impacts in the end-of-life stage. Transportation and the processes for dismantling the product contribute to a relatively low portion (<1%) of total results for all impact categories.

Operational energy and water use

The amount of water used by the 0.35gpm faucet during each 15sec use is 0.0875 gallons. It is assumed to be used 90 times per day in a commercial environment assuming 260 days per year over 75 years, resulting in 153,563 gallons of water over its lifetime. An electricity factor of 0.000961 kWh per liter of water is used to represent energy for upstream municipal water collection, treatment, supply, and downstream management.

A mix of 70% hot water and 30% cold water is assumed to be used by the faucet, with water heating consuming a blend of 67% natural gas and 33% electricity. A natural gas factor of 0.8784 Mcf of natural gas per 1,000 gallons of water and an electricity factor of 0.1765 kWh per gallon of water were used to calculate total energy needed for water heating. Use stage electricity was modeled using a United States grid mix.

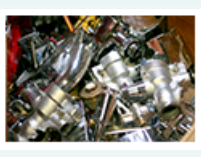
How we're making it greener

TOTO PeoplePlanetWater™ programs improving environmental performance

- Dual-Max®, E-Max®, Tornado Flush™, 1G®, and EcoPower® reduce water consumption in the use phase
- Energy efficiency programs optimize the firing process
- Modular packing methods increase the fill rate of a trailer, cutting down on the number of trips needed
- 100% of post-industrial ceramic waste is recycled

See how we make it greener

LCA results

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Information modules: **Included (X)** | Excluded (MND)*	(X) A1 Raw materials	(X) A4 Transportation/ Delivery	(X) B1 Use	(X) C1 Deconstruction/ Demolition
	(X) A2 Transportation	(X) A5 Construction/ Installation	(X) B2 Maintenance	(X) C2 Transportation
	(X) A3 Manufacturing		(X) B3 Repair	(X) C3 Waste processing
			(X) B4 Replacement	(X) C4 Disposal
			(X) B5 Refurbishment	
			(X) B6 Operational energy use	
			(X) B7 Operational water use	
				

SM Single Score

Impacts per faucet	14.3 mPts	0.07 mPts	509 mPts	0.02 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Brass parts together with the printed wiring board in addition to manufacturing processes such as brass turning.	Transportation of the product to installation site or consumer and disposal of packaging.	Volume of water used during the operation of the product and the number of replacements required over the building's lifetime.	Transport to waste processing, waste processing and disposal of material flows transported to a landfill.

Standard-R Faucet Series (with thermostatic mixing valve) - TRACI v2.1 results per functional unit

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage				
Impact category / Unit				
Global warming / **kg CO_2 eq**	6.56E+01	7.97E-01	1.02E+04	2.37E-01
Ozone depletion / **kg CFC-11 eq**	4.60E-06	1.70E-09	4.41E-04	2.18E-08
Acidification / **kg SO_2 eq**	8.85E-01	7.04E-03	7.37E+01	1.36E-03
Eutrophication / **kg N eq**	4.77E-01	6.97E-04	8.79E+00	2.55E-04
Human health damage				
Impact category / Unit				
Smog / **kg O_3 eq**	6.55E+00	2.24E-01	3.16E+02	2.78E-02
Respiratory effects / **kg $PM_{2.5}$ eq**	1.06E-01	1.25E-04	5.33E+00	1.49E-04
Additional environmental information				
Impact category / Unit				
Carcinogenics / **CTU_h**	2.95E-06	8.88E-09	1.47E-04	3.24E-09
Non-carcinogenics / **CTU_h**	9.40E-05	8.30E-08	1.75E-03	1.30E-07
Ecotoxicity / **CTU_e**	2.48E+02	1.57E+00	1.06E+04	2.86E-01
Fossil fuel depletion / **MJ surplus**	4.34E+01	1.14E+00	1.40E+04	2.81E-01

References

LCA Background Report
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024; SimaPro Analyst 9.5; ecoinvent and USLCI databases; TRACI 2.1.

ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

ISO 21930:2017, "Sustainability in Building Construction — Environmental Declaration of Building Products" serves as the core PCR along with Sustainable Minds Part A.

SM Part A: LCA calculation rules and report requirements, version 2023
August, 2023. PCR review conducted by the Sustainable Minds TAB, tab@sustainableminds.com.

SM Part B: Commercial/public metered and manual lavatory faucets, v3.0
March, 2024. PCR review conducted by Hugues Imbeault-Tétreault, ing., M.Sc.A., Chair (Groupe AGÉCO) hugues.i-tetreault@groupeageco.ca; Rebe Feraldi, LCACP, CLAR (TranSustainable Enterprises, LLC); Rifat Karim (Sphera).

Download PDF SM Transparency Report/EPD

SM Transparency Reports (TR) are ISO 14025 Type III environmental declarations (EPD) that enable purchasers and users to compare the potential environmental performance of products on a life cycle basis. They are designed to present information transparently to make the limitations of comparability more understandable. Environmental declarations of products that conform to the same PCR and include the same life cycle stages, but are made by different manufacturers, may not sufficiently align to support direct comparisons. They therefore cannot be used as comparative assertions unless the conditions as defined in ISO 14025 Section 6.7.2. 'Requirements for Comparability' are satisfied. In order to support comparative assertions, this EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. Any EPD comparison must be carried out at the building level per ISO 21930 guidelines, use the same sub-category PCR where applicable, include all relevant information modules, be limited to EPDs applying a functional unit, and be based on equivalent scenarios with respect to the context of construction works. Some LCA impact categories and inventory items are still under development and can have high levels of uncertainty. To promote uniform guidance on the data collection, calculation, and reporting of results, the ACLCA methodology (ACLCA 2019) was used.

Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	½ product
✓ Product-specific Type III EPD	1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1
Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	1 product
✓ Product-specific Type III EPD	1.5 products

Collaborative for High Performance Schools National Criteria
MW C5.1 – Environmental Product Declarations

✓ Third-party certified type III EPD	2 points

Green Globes for New Construction and Sustainable Interiors
Materials and resources

- ✓ NC 3.5.1.2 Path B: Prescriptive Path for Building Core and Shell
- ✓ NC 3.5.2.2 and SI 4.1.2 Path B: Prescriptive Path for Interior Fit-outs

BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products

Environmental Product Declarations (EPD)

○ Industry-average EPD	.5 points
○ Multi-product specific EPD	.75 points
✓ Product-specific EPD	1 point

SM Transparency Report (EPD)™ + Material Health Overview™

EPD	LCA
3rd-party reviewed	✓ NSF
Transparency Report (EPD)	
3rd-party verified	✓ NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	✓

This environmental product declaration (EPD) was externally verified by Jack Geibig (Ecoform) on behalf of NSF according to ISO 14044; ISO 21930:2017; SM Part A: LCA calculation rules and report requirements, 2023; the reference PCR; and ISO 14025:2006.

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Certified Environmental Product Declaration www.nsf.org

SUMMARY

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North America; Cradle-to-grave

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In accordance with ISO 14044 and the referenced PCR, the life cycle assessment was conducted by Sustainable Minds and critically reviewed by Jack Geibig (Ecoform) on behalf of NSF.

Public LCA
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024

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www.totousa.com

Contact us

LCA results & interpretation

Standard-R and Standard-S Faucet Series

Standard-R (no mix valve) | Standard-R (w/ mix valve) | Standard-R (w/ thermo mix valve) | Standard-S (no mix valve) | Standard-S (w/ mix valve) | Standard-S (w/ thermo mix valve) | EPD additional content | Material health

Scope and summary

○ Cradle to gate ○ Cradle to gate with options ✓ **Cradle to grave**

Functional unit

One metered lavatory faucet in an average commercial environment over the estimated service life of the building. The expected service life (ESL) of a building is 75 years, and all use stage activity and impacts are accounted for in that full ESL period. The reference service life (RSL) of the faucet is 10 years, which is an industry-accepted average lifespan based on the economic lifespan of the product. T27S32E does not include a mixing valve.

Maintenance

Regular cleaning is assumed to use 10mL of a 1% sodium lauryl sulfate (SLS) solution daily in a commercial setting for 75 years, which is the building estimated service life. The use of 10mL/clean over 260days/year for 75 years gives a total of 195L of solution. Using a density of 1.01kg/L for a 1% SLS solution, 195kg of solution will be needed over the course of 75 years. Therefore, 2kg of SLS plus 195kg of water were included in the model.

Replacement

At the end of its RSL, the faucet is assumed to be replaced. Therefore, an additional 6.5 products are included as replacements, with all life cycle modules considered, over the building's ESL of 75 years.

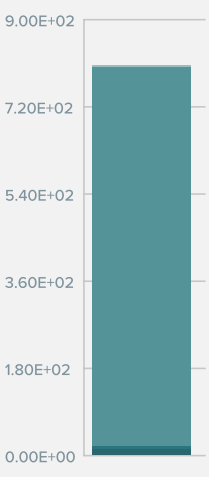
Manufacturing data

Manufacturing data has been collected and compiled for TOTO Vietnam. **Data reporting period:** 2023.

Material composition greater than 1% by weight

PART	MATERIAL	AVG. % WT
Spout body, nozzle key, mounting nut, generator coil cover, controller adapter	Brass	41.1%
Controller mounting bracket, spout mounting bracket & rod	Stainles steel	14.3%
Packaging	Cardboard and paper	11.7%
Controller cover	ABS	10.8%
Hose	PVC	4.62%
Connector	Polypropylene	2.85%
Generator and solenoid coils	Copper	2.11%
Hose clip	Steel	2.08%
Spout aerator gasket	NBR	1.42%
Board	Electronics	1.27%
Generator base	PPO	1.10%
Other	Other	6.63%

Total impacts by life cycle stage [mPts/func unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Production	16.0
Construction	0.07
Use	789
End of life	0.02

Total impacts = 805 mPts per 75 years installed

What's causing the greatest impacts

All life cycle stages

The use stage [B1-B7] dominates the results for all impact categories. The replacements and operational water use modules are highly dominant in all categories because of the amount of water consumed during operation and the necessity to consider an additional 6.5 products as replacements. All life cycle modules are considered throughout the estimated service life (ESL) of the building, which is 75 years. The production stage [A1-A3] itself is slightly significant but does not dominate in any impact category. Additionally, the processes associated with dismantling the product and final waste treatment during the end-of-life stage do not have a significant impact.

Production stage [A1-A3]

Brass and the turning brass process, together with the printed wiring board, have significant material contributions to the production stage. Stainless steel materials and the turning steel process are relevant to the carcinogenics category. The electroplating process along with injection molding are major contributors to the ozone depletion category. Furthermore, polishing has a somewhat significant processing contribution to the results. Because these products are manufactured in Vietnam but sold in the US market, the transportation via oceanic freighter appears as a relevant contributor to the fossil fuel depletion and smog categories. The other parts and processes contribute between 5% and 20% of the overall impacts in the remaining categories.

Construction stage [A4-A5]

Installation of the product dominates impacts in the construction stage. Transportation by truck for delivery to the installation site contributes the most, and this stage contributes less than 1% of the total global warming potential impacts throughout the product's life cycle.

Use stage [B1-B7]

Product replacements dominate impacts in the use stage. The use stage itself dominates all impact categories (>95%) due to the consideration of an additional 6.5 products as replacements. The water consumed during use and embedded electricity used for the water supply are also contributors in this stage.

End-of-life stage [C1-C4]

The transportation to landfill dominates impacts in the end-of-life stage. Transportation and the processes for dismantling the product contribute to a relatively low portion (<1%) of total results for all impact categories.

Operational energy and water use

The amount of water used by the 0.35gpm faucet during each 15sec use is 0.0875 gallons. It is assumed to be used 90 times per day in a commercial environment assuming 260 days per year over 75 years, resulting in 153,563 gallons of water over its lifetime. An electricity factor of 0.000961 kWh per liter of water is used to represent energy for upstream municipal water collection, treatment, supply, and downstream management.

A mix of 70% hot water and 30% cold water is assumed to be used by the faucet, with water heating consuming a blend of 67% natural gas and 33% electricity. A natural gas factor of 0.8784 Mcf of natural gas per 1,000 gallons of water and an electricity factor of 0.1765 kWh per gallon of water were used to calculate total energy needed for water heating. Use stage electricity was modeled using a United States grid mix.

How we're making it greener

TOTO PeoplePlanetWater™ programs improving environmental performance

- TOTO's EcoPower® products are powered by the force of running water.
- The electronic and mechanical components are programmed and designed to allow water flow and accurate flush volume only when needed.
- Water consumption is reduced in the use phase due to superior flushing performance.

See how we make it greener

LCA results

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Information modules: **Included (X)** | Excluded (MND)*	**(X) A1 Raw materials**	**(X) A4 Transportation/ Delivery**	**(X) B1 Use**	**(X) C1 Deconstruction/ Demolition**
	(X) A2 Transportation	**(X) A5 Construction/ Installation**	**(X) B2 Maintenance**	**(X) C2 Transportation**
	(X) A3 Manufacturing		**(X) B3 Repair**	**(X) C3 Waste processing**
			(X) B4 Replacement	**(X) C4 Disposal**
			(X) B5 Refurbishment	
			(X) B6 Operational energy use	
			(X) B7 Operational water use	
				

SM Single Score

Impacts per faucet	15.3 mPts	0.07 mPts	789 mPts	0.02 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Brass parts together with the printed wiring board in addition to manufacturing processes such as brass turning.	Transportation of the product to installation site or consumer and disposal of packaging.	Volume of water used during the operation of the product and the number of replacements required over the building's lifetime.	Transport to waste processing, waste processing and disposal of material flows transported to a landfill.

Standard-S Faucet Series (no mixing vlave) - TRACI v2.1 results per functional unit

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage				
Global warming (kg CO_2 eq)	6.48E+01	7.85E-01	1.02E+04	1.85E-01
Ozone depletion (kg CFC-11 eq)	4.17E-06	1.70E-09	4.36E-04	1.66E-08
Acidification (kg SO_2 eq)	8.45E-01	7.04E-03	7.32E+01	1.05E-03
Eutrophication (kg N eq)	4.56E-01	6.88E-04	8.53E+00	1.97E-04
Human health damage				
Smog (kg O_3 eq)	6.38E+00	2.24E-01	3.15E+02	2.20E-02
Respiratory effects (kg $PM_{2.5}$ eq)	1.02E-01	1.25E-04	5.28E+00	1.11E-04
Additional environmental information				
Carcinogenics (CTU_h)	2.88E-06	8.88E-09	1.46E-04	2.32E-09
Non-carcinogenics (CTU_h)	8.78E-05	8.29E-08	1.69E-03	7.32E-08
Ecotoxicity (CTU_e)	2.38E+02	1.58E+00	1.05E+04	1.96E-01
Fossil fuel depletion (MJ surplus)	4.16E+01	1.14E+00	1.39E+04	2.18E-01

References

LCA Background Report
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024; SimaPro Analyst 9.5; ecoinvent and USLCI databases; TRACI 2.1.

ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

ISO 21930:2017, "Sustainability in Building Construction — Environmental Declaration of Building Products" serves as the core PCR along with Sustainable Minds Part A.

SM Part A: LCA calculation rules and report requirements, version 2023
August, 2023. PCR review conducted by the Sustainable Minds TAB, tab@sustainableminds.com.

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March, 2024. PCR review conducted by Hugues Imbeault-Tétreault, ing., M.Sc.A., Chair (Groupe AGÉCO) hugues.i-tetreault@groupeageco.ca; Rebe Feraldi, LCACP, CLAR (TranSustainable Enterprises, LLC); Rifat Karim (Sphera).

Download PDF SM Transparency Report/EPD

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Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4

Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	½ product
✓ Product-specific Type III EPD	1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1

Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	1 product
✓ Product-specific Type III EPD	1.5 products

Collaborative for High Performance Schools National Criteria

MW C5.1 – Environmental Product Declarations

✓ Third-party certified type III EPD	2 points

Green Globes for New Construction and Sustainable Interiors

Materials and resources

- ✓ NC 3.5.1.2 Path B: Prescriptive Path for Building Core and Shell
- ✓ NC 3.5.2.2 and SI 4.1.2 Path B: Prescriptive Path for Interior Fit-outs

BREEAM New Construction 2018

Mat 02 - Environmental impacts from construction products

Environmental Product Declarations (EPD)

○ Industry-average EPD	.5 points
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✓ Product-specific EPD	1 point

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EPD	LCA
3rd-party reviewed	✓ NSF
	Transparency Report (EPD)
3rd-party verified	✓ NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	✓

This environmental product declaration (EPD) was externally verified by Jack Geibig (Ecoform) on behalf of NSF according to ISO 14044; ISO 21930:2017; SM Part A: LCA calculation rules and report requirements, 2023; the reference PCR; and ISO 14025:2006.

Ecoform, LLC
11903 Black Road
Knoxville, TN 37932
(865) 850-1883
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NSF International
P.O Box 130140, 789 N.Dixboro Road,
Ann Arbor, MI 48105, USA
www.nsf.org
734 769 8010

Certified Environmental Product Declaration www.nsf.org

SUMMARY

Reference PCR
SM Part B: Commercial/public metered and manual lavatory faucets, v3.0

Regions; system boundaries
North America; Cradle-to-grave

Functional unit
One metered lavatory faucet in an average commercial environment over the estimated service life of the building

LCIA methodology; LCA software; LCI database
TRACI 2.1; SimaPro Analyst 9.5; ecoinvent and USLCI databases

In accordance with ISO 14044 and the referenced PCR, the life cycle assessment was conducted by Sustainable Minds and critically reviewed by Jack Geibig (Ecoform) on behalf of NSF.

Public LCA
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024

TOTO USA
1155 Southern Road
Morrow, GA 30260
www.totousa.com

Contact us

LCA results & interpretation

Standard-R and Standard-S Faucet Series

Standard-R (no mix valve) | Standard-R (w/ mix valve) | Standard-R (w/ thermo mix valve) | Standard-S (no mix valve) | Standard-S (w/ mix valve) | Standard-S (w/ thermo mix valve) | EPD additional content | Material health

Scope and summary

○ Cradle to gate ○ Cradle to gate with options ✓ **Cradle to grave**

Functional unit

One metered lavatory faucet in an average commercial environment over the estimated service life of the building. The expected service life (ESL) of a building is 75 years, and all use stage activity and impacts are accounted for in that full ESL period. The reference service life (RSL) of the faucet is 10 years, which is an industry-accepted average lifespan based on the economic lifespan of the product. T27S32EM includes a mixing valve.

Maintenance

Regular cleaning is assumed to use 10mL of a 1% sodium lauryl sulfate (SLS) solution daily in a commercial setting for 75 years, which is the building estimated service life. The use of 10mL/clean over 260days/year for 75 years gives a total of 195L of solution. Using a density of 1.01kg/L for a 1% SLS solution, 195kg of solution will be needed over the course of 75 years. Therefore, 2kg of SLS plus 195kg of water were included in the model.

Replacement

At the end of its RSL, the faucet is assumed to be replaced. Therefore, an additional 6.5 products are included as replacements, with all life cycle modules considered, over the building's ESL of 75 years.

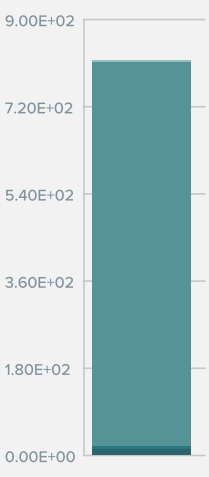
Manufacturing data

Manufacturing data has been collected and compiled for TOTO Vietnam. **Data reporting period:** 2023.

Material composition greater than 1% by weight

PART	MATERIAL	AVG. % WT
Spout body, nozzle key, mounting nut, generator coil cover, controller adapter	Brass	41.1%
Controller mounting bracket, spout mounting bracket & rod	Stainles steel	14.3%
Packaging	Cardboard and paper	11.7%
Controller cover	ABS	10.8%
Hose	PVC	4.62%
Connector	Polypropylene	2.85%
Generator and solenoid coils	Copper	2.11%
Hose clip	Steel	2.08%
Spout aerator gasket	NBR	1.42%
Board	Electronics	1.27%
Generator base	PPO	1.10%
Other	Other	6.63%

Total impacts by life cycle stage [mPts/func unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Production	17.4
Construction	0.07
Use	806
End of life	0.03

Total impacts = 824 mPts per 75 years installed

What's causing the greatest impacts

All life cycle stages

The use stage [B1-B7] dominates the results for all impact categories. The replacements and operational water use modules are highly dominant in all categories because of the amount of water consumed during operation and the necessity to consider an additional 6.5 products as replacements. All life cycle modules are considered throughout the estimated service life (ESL) of the building, which is 75 years. The production stage [A1-A3] itself is slightly significant but does not dominate in any impact category. Additionally, the processes associated with dismantling the product and final waste treatment during the end-of-life stage do not have a significant impact.

Production stage [A1-A3]

Brass and the turning brass process, together with the printed wiring board, have significant material contributions to the production stage. Stainless steel materials and the turning steel process are relevant to the carcinogenics category. The electroplating process along with injection molding are major contributors to the ozone depletion category. Furthermore, polishing has a somewhat significant processing contribution to the results. Because these products are manufactured in Vietnam but sold in the US market, the transportation via oceanic freighter appears as a relevant contributor to the fossil fuel depletion and smog categories. The other parts and processes contribute between 5% and 20% of the overall impacts in the remaining categories.

Construction stage [A4-A5]

Installation of the product dominates impacts in the construction stage. Transportation by truck for delivery to the installation site contributes the most, and this stage contributes less than 1% of the total global warming potential impacts throughout the product's life cycle.

Use stage [B1-B7]

Product replacements dominate impacts in the use stage. The use stage itself dominates all impact categories (>95%) due to the consideration of an additional 6.5 products as replacements. The water consumed during use and embedded electricity used for the water supply are also contributors in this stage.

End-of-life stage [C1-C4]

The transportation to landfill dominates impacts in the end-of-life stage. Transportation and the processes for dismantling the product contribute to a relatively low portion (<1%) of total results for all impact categories.

Operational energy and water use

The amount of water used by the 0.35gpm faucet during each 15sec use is 0.0875 gallons. It is assumed to be used 90 times per day in a commercial environment assuming 260 days per year over 75 years, resulting in 153,563 gallons of water over its lifetime. An electricity factor of 0.000961 kWh per liter of water is used to represent energy for upstream municipal water collection, treatment, supply, and downstream management.

A mix of 70% hot water and 30% cold water is assumed to be used by the faucet, with water heating consuming a blend of 67% natural gas and 33% electricity. A natural gas factor of 0.8784 Mcf of natural gas per 1,000 gallons of water and an electricity factor of 0.1765 kWh per gallon of water were used to calculate total energy needed for water heating. Use stage electricity was modeled using a United States grid mix.

How we're making it greener

TOTO PeoplePlanetWater™ programs improving environmental performance

- TOTO's EcoPower® products are powered by the force of running water.
- The electronic and mechanical components are programmed and designed to allow water flow and accurate flush volume only when needed.
- Water consumption is reduced in the use phase due to superior flushing performance.

See how we make it greener

LCA results

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
	(X) A1 Raw materials	(X) A4 Transportation/ Delivery	(X) B1 Use	(X) C1 Deconstruction/ Demolition
	(X) A2 Transportation	(X) A5 Construction/ Installation	(X) B2 Maintenance	(X) C2 Transportation
	(X) A3 Manufacturing		(X) B3 Repair	(X) C3 Waste processing
			(X) B4 Replacement	(X) C4 Disposal
Information modules: Included (X) | Excluded (MND)*			(X) B5 Refurbishment	
			(X) B6 Operational energy use	
			(X) B7 Operational water use	
				

SM Single Score

Impacts per faucet	15.3 mPts	0.07 mPts	789 mPts	0.02 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Brass parts together with the printed wiring board in addition to manufacturing processes such as brass turning.	Transportation of the product to installation site or consumer and disposal of packaging.	Volume of water used during the operation of the product and the number of replacements required over the building's lifetime.	Transport to waste processing, waste processing and disposal of material flows transported to a landfill.

Standard-S Faucet Series (with mixing valve) - TRACI v2.1 results per functional unit

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Ecological damage				
Impact category / Unit				
Global warming / **kg CO_2 eq**	6.67E+01	8.94E-01	1.02E+04	2.49E-01
Ozone depletion / **kg CFC-11 eq**	4.54E-06	1.97E-09	4.41E-04	2.31E-08
Acidification / **kg SO_2 eq**	8.90E-01	7.88E-03	7.38E+01	1.49E-03
Eutrophication / **kg N eq**	5.00E-01	8.00E-04	9.09E+00	2.63E-04
Human health damage				
Impact category / Unit				
Smog / **kg O_3 eq**	6.67E+00	2.52E-01	3.18E+02	3.18E-02
Respiratory effects / **kg $PM_{2.5}$ eq**	1.08E-01	1.41E-04	5.36E+00	1.61E-04
Additional environmental information				
Impact category / Unit				
Carcinogenics / **CTU_h**	3.01E-06	9.95E-09	1.48E-04	3.40E-09
Non-carcinogenics / **CTU_h**	9.98E-05	9.29E-08	1.83E-03	1.28E-07
Ecotoxicity / **CTU_e**	2.56E+02	1.76E+00	1.07E+04	3.01E-01
Fossil fuel depletion / **MJ surplus**	4.38E+01	1.27E+00	1.40E+04	3.12E-01

References

LCA Background Report
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024; SimaPro Analyst 9.5; ecoinvent and USLCI databases; TRACI 2.1.

ISO 14025, "Sustainability in buildings and civil engineering works -- Core rules for environmental product declarations of construction products and services"

ISO 21930:2017, "Sustainability in Building Construction — Environmental Declaration of Building Products" serves as the core PCR along with Sustainable Minds Part A.

SM Part A: LCA calculation rules and report requirements, version 2023
August, 2023. PCR review conducted by the Sustainable Minds TAB, tab@sustainableminds.com.

SM Part B: Commercial/public metered and manual lavatory faucets, v3.0
March, 2024. PCR review conducted by Hugues Imbeault-Tétreault, ing., M.Sc.A., Chair (Groupe AGÉCO) hugues.i-tetreault@groupeageco.ca; Rebe Feraldi, LCACP, CLAR (TranSustainable Enterprises, LLC); Rifat Karim (Sphera).

Download PDF SM Transparency Report/EPD

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Rating systems

The intent is to reward project teams for selecting products from manufacturers who have verified improved life-cycle environmental performance.

LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	½ product
✓ Product-specific Type III EPD	1 product

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Collaborative for High Performance Schools National Criteria
MW C5.1 – Environmental Product Declarations

✓ Third-party certified type III EPD	2 points

Green Globes for New Construction and Sustainable Interiors
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- ✓ NC 3.5.1.2 Path B: Prescriptive Path for Building Core and Shell
- ✓ NC 3.5.2.2 and SI 4.1.2 Path B: Prescriptive Path for Interior Fit-outs

BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products

Environmental Product Declarations (EPD)

○ Industry-average EPD	.5 points
○ Multi-product specific EPD	.75 points
✓ Product-specific EPD	1 point

SM Transparency Report (EPD)™ + Material Health Overview™

EPD	LCA
3rd-party reviewed	✓ NSF
	Transparency Report (EPD)
3rd-party verified	✓ NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	✓

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Maintenance
Regular cleaning is assumed to use 10mL of a 1% sodium lauryl sulfate (SLS) solution daily in a commercial setting for 75 years, which is the building estimated service life. The use of 10mL/clean over 260days/year for 75 years gives a total of 195L of solution. Using a density of 1.01kg/L for a 1% SLS solution, 195kg of solution will be needed over the course of 75 years. Therefore, 2kg of SLS plus 195kg of water were included in the model.

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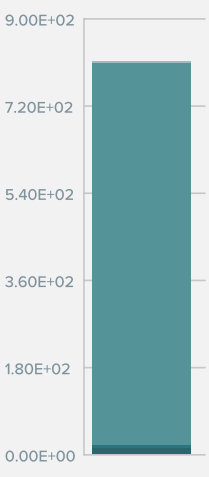
Board	Electronics	1.27%
Generator base	PPO	1.10%
Other	Other	6.63%

Total impacts by life cycle stage [mPts/func unit]



LIFE CYCLE STAGE	MPTS/FUNC. UNIT
Production	17.7
Construction	0.08
Use	810
End of life	0.02

Total impacts = 828 mPts per 75 years installed

What's causing the greatest impacts

All life cycle stages
The use stage [B1-B7] dominates the results for all impact categories. The replacements and operational water use modules are highly dominant in all categories because of the amount of water consumed during operation and the necessity to consider an additional 6.5 products as replacements. All life cycle modules are considered throughout the estimated service life (ESL) of the building, which is 75 years. The production stage [A1-A3] itself is slightly significant but does not dominate in any impact category. Additionally, the processes associated with dismantling the product and final waste treatment during the end-of-life stage do not have a significant impact.

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Use stage [B1-B7]
Product replacements dominate impacts in the use stage. The use stage itself dominates all impact categories (>95%) due to the consideration of an additional 6.5 products as replacements. The water consumed during use and embedded electricity used for the water supply are also contributors in this stage.

End-of-life stage [C1-C4]
The transportation to landfill dominates impacts in the end-of-life stage. Transportation and the processes for dismantling the product contribute to a relatively low portion (<1%) of total results for all impact categories.

Operational energy and water use
The amount of water used by the 0.35gpm faucet during each 15sec use is 0.0875 gallons. It is assumed to be used 90 times per day in a commercial environment assuming 260 days per year over 75 years, resulting in 153,563 gallons of water over its lifetime. An electricity factor of 0.000961 kWh per liter of water is used to represent energy for upstream municipal water collection, treatment, supply, and downstream management.

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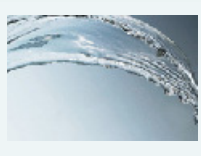
LCA results

LIFE CYCLE STAGE	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
	(X) A1 Raw materials	(X) A4 Transportation/ Delivery	(X) B1 Use	(X) C1 Deconstruction/ Demolition
	(X) A2 Transportation	(X) A5 Construction/ Installation	(X) B2 Maintenance	(X) C2 Transportation
	(X) A3 Manufacturing		(X) B3 Repair	(X) C3 Waste processing
			(X) B4 Replacement	(X) C4 Disposal
			(X) B5 Refurbishment	
Information modules: Included (X) | Excluded (MND)*			(X) B6 Operational energy use	
			(X) B7 Operational water use	
				

SM Single Score

Impacts per faucet	15.3 mPts	0.07 mPts	789 mPts	0.02 mPts
Materials or processes contributing >20% to total impacts in each life cycle stage	Brass parts together with the printed wiring board in addition to manufacturing processes such as brass turning.	Transportation of the product to installation site or consumer and disposal of packaging.	Volume of water used during the operation of the product and the number of replacements required over the building's lifetime.	Transport to waste processing, waste processing and disposal of material flows transported to a landfill.

Standard-S Faucet Series (with thermostatic mixing valve) - TRACI v2.1 results per functional unit

Ecological damage

Impact category	Unit	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Global warming	**kg CO_2 eq**	6.73E+01	9.43E-01	1.02E+04	2.37E-01
Ozone depletion	**kg CFC-11 eq**	4.67E-06	1.96E-09	4.42E-04	2.18E-08
Acidification	**kg SO_2 eq**	9.26E-01	8.90E-03	7.42E+01	1.36E-03
Eutrophication	**kg N eq**	5.12E-01	8.17E-04	9.24E+00	2.55E-04

Human health damage

Impact category	Unit	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Smog	**kg O_3 eq**	6.80E+00	2.85E-01	3.20E+02	2.78E-02
Respiratory effects	**kg $PM_{2.5}$ eq**	1.12E-01	1.58E-04	5.40E+00	1.49E-04

Additional environmental information

Impact category	Unit	PRODUCTION	CONSTRUCTION	USE	END OF LIFE
Carcinogenics	**CTU_h**	3.02E-06	1.09E-08	1.48E-04	3.24E-09
Non-carcinogenics	**CTU_h**	1.04E-04	1.02E-07	1.87E-03	1.30E-07
Ecotoxicity	**CTU_e**	2.61E+02	1.93E+00	1.08E+04	2.86E-01
Fossil fuel depletion	**MJ surplus**	4.47E+01	1.39E+00	1.40E+04	2.81E-01

References

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LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization

Environmental product declarations

○ Industry-wide (generic) EPD	½ product
● Product-specific Type III EPD	1 product

LEED BD+C: New Construction | v4.1 - LEED v4.1
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Collaborative for High Performance Schools National Criteria
MW C5.1 – Environmental Product Declarations

● Third-party certified type III EPD	2 points

Green Globes for New Construction and Sustainable Interiors
Materials and resources

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BREEAM New Construction 2018
Mat 02 - Environmental impacts from construction products

Environmental Product Declarations (EPD)

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EPD	LCA
3rd-party reviewed	● NSF
	Transparency Report (EPD)
3rd-party verified	● NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	●

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In accordance with ISO 14044 and the referenced PCR, the life cycle assessment was conducted by Sustainable Minds and critically reviewed by Jack Geibig (Ecoform) on behalf of NSF.

Public LCA
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024

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Contact us

EPD additional content

Standard-R and Standard-S Faucet Series

Standard-R (no mix valve) | Standard-R (w/ mix valve) | Standard-R (w/ thermo mix valve) | Standard-S (no mix valve) | Standard-S (w/ mix valve) | Standard-S (w/ thermo mix valve) | EPD additional content | Material health

Data

Background This product-specific plant-specific declaration was created by collecting production data from the Vietnam location. All unit processes were modeled using primary data. Secondary data sources include those available in ecoinvent and USLCI databases. Literature data was used to fill any data gaps to complete the inventory. In the manufacturing of the products, secondary materials such as scrap metals and metal bars used to hold the primary products in place were partially incorporated in the manufacturing of the primary products but were not considered due to a lack of background data in the LCA model.

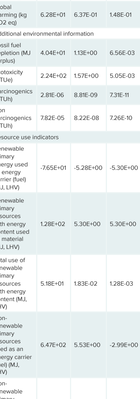
Cut-off criteria for the inclusion of mass and energy flows are 1% of renewable primary resource (energy) usage, 1% nonrenewable primary resource (energy) usage, 1% of the total mass input of that unit process, and 1% of environmental impacts. The total of neglected input flows per module does not exceed 5% of energy usage, mass, and environmental impacts. The only exceptions to these criteria are substances with hazardous and toxic properties, which must be listed even when the given process unit is under the cut-off criterion of 1% of the total mass.

Faucets include a lithium-ion battery which contains 1, 2-Dimethoxyethane (CAS# 110-71-4), a substance added to the SVHC Candidate List per the EU REACH Regulation. Because the battery is sealed, 100% of this hazardous substance is confined in the battery. A check was performed to ensure that the completeness of the overall material use is >99.0wt% of the finished product after cut-off, including the faucet and packaging materials.

Data sets contributing 5% or more to any environmental impact category

Data set name	Database name and version	Software type and version	Geography	Allocation method
Stainless steel, SUS303 (austenitic) 9% Ni 18% Cr	ecoinvent v3.10	SimaPro Analyst 9.5	China	By mass
Stainless steel, SUS304 (austenitic) 8% Ni 18% Cr	ecoinvent v3.10	SimaPro Analyst 9.5	China	By mass
Bronze, CB3600	ecoinvent v3.10	SimaPro Analyst 9.5	China	By mass
Brass, at plant	US-EI 2.2	SimaPro Analyst 9.5	United States	By mass
Turning, brass, CNC, average	US-EI 2.2	SimaPro Analyst 9.5	Vietnam	By mass
Printed wiring board, surface mounted, unspec., Pb containing, at plant	US-EI 2.2	SimaPro Analyst 9.5	Global	By mass
Tap water, at user	US-EI 2.2	SimaPro Analyst 9.5	United States	By mass
Electricity, low voltage, at grid, Vietnam	US-EI 2.2	SimaPro Analyst 9.5	Vietnam	By mass
Heat, natural gas, at boiler modulating <100kW	ecoinvent v3.10	SimaPro Analyst 9.5	Vietnam	By mass
Copper, primary, at refinery	ecoinvent v3.10	SimaPro Analyst 9.5	Global	By mass

Flow diagram



The reported values for all indicators in the below tables for B1, B5, and C1 are zero.

Scenarios and additional technical information

Distribution [A4]

Plant location	Fairburn, GA
Distance (port of Savannah to plant)	406 km
Vehicle type	Diesel truck

In 2023, outbound shipments of faucets from Fairburn were transported an average of 947 miles (1,524 km) by diesel truck and an average of 1,114 miles (1,793 km) by rail. The quantity transported by truck is 83%, and by rail 17%.

End of life [C1-C4]

The model reflects the assumptions that toilets are 100% landfilled. The product is assumed to be transported 100 km via truck to final disposal.

However, it should be noted that many of the associated metal and plastic components follow the waste scenarios as listed in the table below. TOTO ceramic materials can be recycled as aggregate in several applications, although this is not currently common practice. Secondary materials, including shredded and sorted metal waste, are valuable goods that lose their status as waste after the sorting process. No additional waste processing is needed in that case, and no credits for material recovery are given.

Material	Potential waste scenario - Recycling	Potential waste scenario - Landfill
Brass, zinc, steel, copper	70.5%	29.5%
Corrugated board, paper	66.5%	33.5%
ABS, EPDM, rubber, PP, PVC	15.0%	85.0%

Product information

Product code	ASTM or ANSI product specification	Physical properties and technical information
T28S3ZE, T28S3ZEM & T28S3ZET; T27S3ZE, T27S3ZEM & T27S3ZET	ASME A112.18.1, CSA B125.1 IAPMO(UPC)	Commercial faucet

Allocation Allocations of multi-input and multi-output processes follow a mass-based approach in the collected data, which is the most appropriate for the unit processes modeled. Allocation approaches in the background data follow the ecoinvent methodology. No co-product allocations were made in the model.

Major system boundary exclusions

- Construction of major capital equipment, water & wastewater infrastructure
- Maintenance and operation of support equipment
- Human labor and employee transport
- Manufacture & transport of packaging materials not associated w/ final product
- Energy consumption in warehouses, distribution centers, and retail facilities during the course of transport to the final customer
- Disposal of packaging materials not associated with final product
- Building operational energy and water use

Major assumptions and limitations

- Transportation of all raw materials with the mass above 1% of the cumulative mass of the model; products from vendors, is estimated based on rail lines and port information.
- Pallet use is assumed based on the average numbers per unit of product and reported pallet quantity of specific models.

Data quality assessment

Precision: The precision of the data is considered high. Product engineers provided detailed bills of materials, and facility managers provided utility information for the manufacturing facilities. The raw material transportation distances were calculated based on the raw material manufacturers' addresses, extracted from the relevant SDSs.

Proxy datasets were utilized in the LCA model when secondary data were not available, as shown in Appendix A in the published LCA background report.

Completeness: The data included is considered complete. The LCA model included all known material and energy flows. As pointed out in that section, no known flows above 1% were excluded and the sum of all excluded flows totals less than 5%, whether evaluated by mass, energy, or potential environmental impact.

Consistency: The consistency of the model is considered high. The bills of materials provided by product engineers were developed for multiple internal departments use and are maintained regularly.

The LCA practitioner also cross-referenced the installation documents and other relevant literature to ensure consistency. Furthermore, modeling assumptions were consistent across the model, with preference given towards SimaPro data, where available.

Standard-R Faucet Series (no mixing valve) - LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	A1-A3	A4	A5	B2	B3	B4	B6	B7	C2	C3	C4	Total
LCIA results												
Smog (kg O3 eq)	6.11E+00	2.24E-01	4.32E-04	3.76E-01	0.00E+00	2.38E+02	2.65E+01	4.08E+00	3.69E-03	1.44E-02	3.90E-03	2.76E+02
Ozone depletion (kg CFC-11 eq)	4.11E-06	1.12E-09	5.84E-10	4.95E-07	0.00E+00	2.06E-04	4.66E-05	3.91E-06	4.07E-11	1.11E-08	5.44E-09	2.61E-04
Eutrophication (kg N eq)	4.21E-01	4.49E-04	2.39E-04	4.83E-03	0.00E+00	7.35E+00	3.20E-01	2.91E-02	8.32E-06	9.81E-05	9.09E-05	8.12E+00
Sensitory effects (kg PM2.5 eq)	8.00E-01	7.00E-03	3.60E-05	4.33E-02	0.00E+00	2.76E+01	8.01E+00	2.60E-01	1.28E-04	6.17E-04	3.08E-04	3.68E+01
Global warming (kg CO2 eq)	6.28E+01	6.37E-01	1.48E-01	7.79E+00	0.00E+00	4.18E+03	1.17E+03	6.87E+01	2.31E-02	7.86E-02	8.32E-02	5.49E+03
Additional environmental information												
Fossil fuel depletion (MJ surplus)	4.04E+01	1.13E+00	6.56E-03	2.27E+01	0.00E+00	2.77E+03	1.70E+03	6.22E+01	4.09E-02	1.18E-01	5.92E-02	4.60E+03
Ecotoxicity (CTUe)	2.24E+02	1.57E+00	5.05E-03	3.82E+00	0.00E+00	3.99E+03	9.40E+02	5.71E+01	5.69E-02	9.81E-02	4.08E-02	5.22E+03
Human toxicity, cancer effects (CTUh)	2.81E-06	8.81E-09	7.31E-11	1.59E-07	0.00E+00	1.03E-04	1.06E-05	4.30E-06	3.20E-10	1.54E-09	4.64E-10	1.21E-04
Non carcinogenics (CTUh)	7.82E-05	8.22E-08	7.26E-10	1.56E-06	0.00E+00	1.25E-03	6.29E-05	1.74E-05	2.98E-09	6.62E-08	4.03E-09	1.41E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel) (MJ, LHV)	-7.65E+01	-5.28E+00	-5.30E+00	9.45E+00	0.00E+00	3.82E+03	3.48E+02	2.07E+02	-5.25E+00	-1.37E-01	-5.28E+00	-8.71E+01
Renewable primary resources with energy content used as material (MJ, LHV)	1.28E+02	5.30E+00	5.30E+00	5.30E+00	0.00E+00	2.53E+02	0.00E+00	0.00E+00	5.25E+00	1.39E+01	5.30E+00	1.39E+02
Total use of renewable primary resources with energy content (MJ, LHV)	5.18E+01	1.83E-02	1.28E-03	1.47E+01	0.00E+00	4.07E+03	3.48E+02	2.07E+02	6.63E-04	1.66E-01	1.36E-02	5.18E+01
Non-renewable primary resources used as an energy carrier (fuel) (MJ, LHV)	6.47E+02	5.53E+00	-2.99E+00	2.02E+02	0.00E+00	6.24E+04	1.81E+04	8.14E+02	-2.74E+00	1.13E+00	-2.45E+00	6.50E+02
Non-renewable primary resources with energy content used as material (MJ, LHV)	1.57E+01	3.05E+00	3.05E+00	3.05E+00	0.00E+00	4.65E+01	0.00E+00	0.00E+00	3.05E+00	0.00E+00	3.05E+00	2.18E+01
Total use of non-renewable primary resources with energy content (MJ, LHV)	6.63E+02	8.59E+00	6.41E-02	2.05E+02	0.00E+00	6.24E+04	1.81E+04	8.14E+02	3.12E-01	1.13E+00	6.06E-01	6.71E+02
Secondary materials (kg)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (m3)	8.23E-04	7.54E-04	1.03E-02	1.70E-04	0.00E+00	1.63E-02	6.25E-03	9.99E-03	2.74E-05	1.12E-02	1.18E-03	1.19E-02
Abiotic depletion potential, fossil (MJ)	6.45E+02	8.47E+00	5.46E-02	1.88E+02	0.00E+00	4.71E+04	1.59E+04	6.76E+02	3.07E-01	1.04E+00	5.16E-01	6.54E+02
Output flows and waste category indicators												
Hazardous waste disposed (kg)	3.38E-03	0	0	0	0	0	0	0	0	0.034	0.034	3.38E-03
Non-hazardous waste disposed (kg)	2.99E+01	1.20E+00	1.43E+00	2.93E+01	0.00E+00	9.35E+01	0.00E+00	0.00E+00	5.40E-01	0.00E+00	0.00E+00	3.26E+01
High-level radioactive waste, conditioned, to final repository (kg)	2.34E-03	1.67E-06	1.19E-07	7.76E-04	0.00E+00	2.48E-01	3.53E-02	5.11E-03	6.06E-08	1.98E-05	1.58E-06	2.34E-03
Intermediate- and low-level radioactive waste, conditioned, to final repository (kg)	1.87E-06	1.60E-08	1.03E-09	1.80E-06	0.00E+00	2.04E-03	3.10E-04	1.88E-05	5.80E-10	3.01E-08	1.02E-08	1.89E-06
Components for re-use (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling (kg)	0	0	0	2.93E+01	0.00E+00	5.45E+01	0.00E+00	0.00E+00	2.37E+00	2.37E+00	2.37E+00	0.00E+00
Materials for energy recovery (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy (MJ, LHV)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product (kg CO2)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging (kg CO2)	3.04E-01	0	0	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Packaging (kg CO2)	0	0	3.04E-01	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions (kg CO2)	0	0	0	0.00E+00	0	0.00E+00	0	0	0	0	0	0
Carbonation Carbon Removals (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion	0	0	0	0	0	0	0	0	0	0	0	0

of Waste from Renewable and Non-Renewable Sources used in Production Processes (kg CO2)												

Standard-R Faucet Series (with mixing valve) - LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	A1-A3	A4	A5	B2	B3	B4	B6	B7	C2	C3	C4	Total
LCIA results												
Smog (kg O3 eq)	6.67E+00	2.51E-01	5.35E-04	3.76E-01	0.00E+00	2.87E+02	2.65E+01	4.08E+00	5.59E-03	2.21E-02	4.12E-03	3.25E+02
Ozone depletion (kg CFC-11 eq)	4.54E-06	1.25E-09	7.22E-10	4.95E-07	0.00E+00	3.90E-04	4.66E-05	3.91E-06	6.17E-11	1.74E-08	5.68E-09	4.45E-04
Eutrophication (kg N eq)	5.00E-01	5.03E-04	2.97E-04	4.83E-03	0.00E+00	8.74E+00	3.20E-01	2.91E-02	1.26E-05	1.53E-04	9.70E-05	9.60E+00
Acidification (kg SO2 eq)	8.90E-01	7.84E-03	4.40E-05	4.33E-02	0.00E+00	6.55E+01	8.01E+00	2.60E-01	1.94E-04	9.76E-04	3.16E-04	7.47E+01
Respiratory effects (kg PM2.5 eq)	1.08E-01	1.37E-04	3.68E-06	3.73E-03	0.00E+00	4.83E+00	4.90E-01	3.79E-02	3.03E-06	1.33E-04	2.45E-05	5.47E+00
Global warming (kg CO2 eq)	6.67E+01	7.12E-01	1.82E-01	7.79E+00	0.00E+00	8.94E+03	1.17E+03	6.87E+01	3.51E-02	1.27E-01	8.73E-02	1.02E+04
Additional environmental information												
Fossil fuel depletion (MJ surplus)	4.38E+01	1.26E+00	8.14E-03	2.27E+01	0.00E+00	1.22E+04	1.70E+03	6.22E+01	6.20E-02	1.88E-01	6.17E-02	1.40E+04
Ecotoxicity (CTUe)	2.56E+02	1.75E+00	6.22E-03	3.82E+00	0.00E+00	9.70E+03	9.40E+02	5.71E+01	8.63E-02	1.70E-01	4.51E-02	1.10E+04
Carcinogenics (CTUh)	3.01E-06	9.86E-09	9.09E-11	1.59E-07	0.00E+00	1.33E-04	1.06E-05	4.30E-06	4.85E-10	2.44E-09	4.75E-10	1.51E-04
Non-carcinogenics (CTUh)	9.98E-05	9.20E-08	8.94E-10	1.56E-06	0.00E+00	1.75E-03	6.29E-05	1.74E-05	4.53E-09	1.19E-07	4.09E-09	1.93E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel) (MJ, LHV)	-6.84E+01	-5.28E+00	-5.30E+00	9.45E+00	0.00E+00	3.90E+03	3.48E+02	2.07E+02	-5.25E+00	-1.36E+01	-5.28E+00	-7.90E+01
Renewable primary resources with energy content used as material (MJ, LHV)	1.28E+02	5.30E+00	5.30E+00	5.30E+00	0.00E+00	2.53E+02	0.00E+00	0.00E+00	5.25E+00	1.39E+01	5.30E+00	1.39E+02
Total use of renewable primary resources with energy content (MJ, LHV)	5.99E+01	2.05E-02	1.60E-03	1.47E+01	0.00E+00	4.16E+03	3.48E+02	2.07E+02	1.01E-03	2.98E-01	1.37E-02	5.99E+01
Non-renewable primary resources used as an energy carrier (fuel) (MJ, LHV)	6.77E+02	6.51E+00	-3.02E+00	2.02E+02	0.00E+00	6.27E+04	1.81E+04	8.14E+02	-2.62E+00	1.83E+00	-2.47E+00	6.81E+02
Non-renewable primary resources with energy content used as material (MJ, LHV)	1.59E+01	3.10E+00	3.10E+00	3.10E+00	0.00E+00	4.72E+01	0.00E+00	0.00E+00	3.10E+00	0.00E+00	3.10E+00	2.21E+01
Total use of non-renewable primary resources with energy content (MJ, LHV)	6.93E+02	9.61E+00	7.95E-02	2.05E+02	0.00E+00	6.28E+04	1.81E+04	8.14E+02	4.73E-01	1.83E+00	6.26E-01	7.03E+02
Secondary materials (kg)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (m3)	9.14E-04	8.43E-04	1.04E-02	1.70E-04	0.00E+00	1.76E-02	6.25E-03	9.99E-03	4.15E-05	1.32E-02	1.20E-03	1.21E-02
Abiotic depletion potential, fossil (MJ)	6.71E+02	9.48E+00	6.76E-02	1.88E+02	0.00E+00	1.17E+05	1.59E+04	6.76E+02	4.66E-01	1.68E+00	5.36E-01	6.81E+02
Output flows and waste category indicators												
Hazardous waste disposed (kg)	3.38E-03	0	0	0	0	0	0	0	0	0.034	0.034	3.38E-03
Non-hazardous waste disposed (kg)	2.99E+01	1.20E+00	1.43E+00	2.93E+01	0.00E+00	9.35E+01	0.00E+00	0.00E+00	5.40E-01	0.00E+00	0.00E+00	3.26E+01
High-level radioactive waste, conditioned, to final repository (kg)	7.76E-03	1.87E-06	1.48E-07	7.76E-04	0.00E+00	3.16E-01	3.53E-02	5.11E-03	9.20E-08	3.45E-05	1.59E-06	7.76E-03
Intermediate-and low-level radioactive waste, conditioned, to final repository (kg)	2.72E-06	1.79E-08	1.28E-09	1.80E-06	0.00E+00	2.05E-03	3.10E-04	1.88E-05	8.80E-10	5.08E-08	1.03E-08	2.74E-06
Components for re-use (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling (kg)	0	0	0	2.93E+01	0.00E+00	5.58E+01	0.00E+00	0.00E+00	2.66E+00	2.66E+00	2.66E+00	0.00E+00
Materials for energy recovery (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy (MJ, LHV)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product (kg CO2)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging (kg CO2)	3.04E-01	0	0	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Packaging (kg CO2)	0	0	3.04E-01	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions (kg CO2)	0	0	0	0.00E+00	0	0.00E+00	0	0	0	0	0	0
Carbonation Carbon Removals (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Renewable and Non-Renewable Sources used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0

Standard-R Faucet Series (with thermostatic mixing valve) - LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	A1-A3	A4	A5	B2	B3	B4	B6	B7	C2	C3	C4	Total
LCIA results												
Smog (kg O3 eq)	6.55E+00	2.24E-01	4.34E-04	3.76E-01	0.00E+00	2.85E+02	2.65E+01	4.08E+00	4.29E-03	1.94E-02	4.14E-03	3.23E+02
Ozone depletion (kg CFC-11 eq)	4.60E-06	1.12E-09	5.83E-10	4.95E-07	0.00E+00	3.90E-04	4.66E-05	3.91E-06	4.73E-11	1.60E-08	5.75E-09	4.46E-04
Eutrophication (kg N eq)	4.77E-01	4.49E-04	2.48E-04	4.83E-03	0.00E+00	8.44E+00	3.20E-01	2.91E-02	9.68E-06	1.46E-04	9.95E-05	9.27E+00
Acidification (kg SO2 eq)	8.85E-01	7.00E-03	3.83E-05	4.33E-02	0.00E+00	6.54E+01	8.01E+00	2.60E-01	1.49E-04	8.95E-04	3.17E-04	7.46E+01
Respiratory effects (kg PM2.5 eq)	1.06E-01	1.22E-04	3.11E-06	3.73E-03	0.00E+00	4.80E+00	4.90E-01	3.79E-02	2.32E-06	1.22E-04	2.46E-05	5.43E+00
Global warming (kg CO2 eq)	6.56E+01	6.37E-01	1.60E-01	7.79E+00	0.00E+00	8.92E+03	1.17E+03	6.87E+01	2.69E-02	1.20E-01	8.97E-02	1.02E+04
Additional environmental information												
Fossil fuel depletion (MJ surplus)	4.34E+01	1.13E+00	6.59E-03	2.27E+01	0.00E+00	1.22E+04	1.70E+03	6.22E+01	4.76E-02	1.71E-01	6.24E-02	1.40E+04
Ecotoxicity (CTUe)	2.48E+02	1.57E+00	3.88E-03	3.82E+00	0.00E+00	9.59E+03	9.40E+02	5.71E+01	6.62E-02	1.73E-01	4.69E-02	1.08E+04
Carcinogenics (CTUh)	2.95E-06	8.81E-09	7.46E-11	1.59E-07	0.00E+00	1.32E-04	1.06E-05	4.30E-06	3.72E-10	2.39E-09	4.80E-10	1.50E-04
Non-carcinogenics (CTUh)	9.40E-05	8.22E-08	7.59E-10	1.56E-06	0.00E+00	1.67E-03	6.29E-05	1.74E-05	3.47E-09	1.22E-07	4.12E-09	1.84E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel) (MJ, LHV)	-6.76E+01	-5.27E+00	-5.30E+00	9.45E+00	0.00E+00	3.91E+03	3.48E+02	2.07E+02	-5.25E+00	-1.36E+01	-5.28E+00	-7.81E+01
Renewable primary resources with energy content used as material (MJ, LHV)	1.28E+02	5.30E+00	5.30E+00	5.30E+00	0.00E+00	2.53E+02	0.00E+00	0.00E+00	5.25E+00	1.39E+01	5.30E+00	1.39E+02
Total use of renewable primary resources with energy content (MJ, LHV)	6.07E+01	2.25E-02	1.32E-03	1.47E+01	0.00E+00	4.16E+03	3.48E+02	2.07E+02	7.72E-04	3.07E-01	1.38E-02	6.08E+01
Non-renewable primary resources used as an energy carrier (fuel) (MJ, LHV)	6.86E+02	7.46E+00	-3.03E+00	2.02E+02	0.00E+00	6.28E+04	1.81E+04	8.14E+02	-2.73E+00	1.71E+00	-2.47E+00	6.91E+02
Non-renewable primary resources with energy content used as material (MJ, LHV)	1.59E+01	3.10E+00	3.10E+00	3.10E+00	0.00E+00	4.72E+01	0.00E+00	0.00E+00	3.10E+00	0.00E+00	3.10E+00	2.21E+01
Total use of non-renewable primary resources with energy content (MJ, LHV)	7.02E+02	1.06E+01	6.47E-02	2.05E+02	0.00E+00	6.29E+04	1.81E+04	8.14E+02	3.63E-01	1.71E+00	6.32E-01	7.13E+02
Secondary materials (kg)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (m3)	8.84E-04	9.27E-04	1.03E-02	1.70E-04	0.00E+00	1.81E-02	6.25E-03	9.99E-03	3.18E-05	1.35E-02	1.21E-03	1.22E-02
Abiotic depletion potential, fossil (MJ)	6.79E+02	8.47E+00	5.49E-02	1.88E+02	0.00E+00	1.18E+05	1.59E+04	6.76E+02	3.58E-01	1.56E+00	5.41E-01	6.88E+02
Output flows and waste category indicators												

Hazardous waste disposed (kg)	3.38E-03	0	0	0	0	0	0	0	0	0.034	0.034	3.38E-03
Non-hazardous waste disposed (kg)	2.99E+01	1.20E+00	1.43E+00	2.93E+01	0.00E+00	9.35E+01	0.00E+00	0.00E+00	5.40E-01	0.00E+00	0.00E+00	3.26E+01
High-level radioactive waste, conditioned, to final repository (kg)	7.87E-03	2.05E-06	1.22E-07	7.76E-04	0.00E+00	3.13E-01	3.53E-02	5.11E-03	7.06E-08	3.54E-05	1.60E-06	7.87E-03
Intermediate-and low-level radioactive waste, conditioned, to final repository (kg)	2.79E-06	1.97E-08	1.06E-09	1.80E-06	0.00E+00	2.05E-03	3.10E-04	1.88E-05	6.75E-10	5.14E-08	1.04E-08	2.81E-06
Components for re-use (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling (kg)	0	0	0	2.93E+01	0.00E+00	5.71E+01	0.00E+00	0.00E+00	2.94E+00	2.94E+00	2.94E+00	0.00E+00
Materials for energy recovery (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy (MJ, LHV)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product (kg CO2)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging (kg CO2)	3.04E-01	0	0	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Packaging (kg CO2)	0	0	3.04E-01	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions (kg CO2)	0	0	0	0.00E+00	0	0.00E+00	0	0	0	0	0	0
Carbonation Carbon Removals (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Renewable and Non-Renewable Sources used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0

Standard-S Faucet Series (no mixing valve) - LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	A1-A3	A4	A5	B2	B3	B4	B6	B7	C2	C3	C4	Total
LCIA results												
Smog (kg O3 eq)	6.38E+00	2.24E-01	4.32E-04	3.76E-01	0.00E+00	2.84E+02	2.65E+01	4.08E+00	3.69E-03	1.44E-02	3.90E-03	3.21E+02
Ozone depletion (kg CFC-11 eq)	4.17E-06	1.12E-09	5.84E-10	4.95E-07	0.00E+00	3.85E-04	4.66E-05	3.91E-06	4.07E-11	1.11E-08	5.44E-09	4.40E-04
Eutrophication (kg SO2 eq)	4.56E-01	4.49E-04	2.39E-04	4.83E-03	0.00E+00	8.18E+00	3.20E-01	2.91E-02	8.32E-06	9.81E-05	9.09E-05	8.99E+00
Acidification (kg SO2 eq)	8.45E-01	7.00E-03	3.60E-05	4.33E-02	0.00E+00	6.49E+01	8.01E+00	2.60E-01	1.28E-04	6.17E-04	3.08E-04	7.41E+01
Respiratory effects (kg PM2.5 eq)	1.02E-01	1.22E-04	2.98E-06	3.73E-03	0.00E+00	4.75E+00	4.90E-01	3.79E-02	2.00E-06	8.50E-05	2.36E-05	5.38E+00
Global warming (kg CO2 eq)	6.48E+01	6.37E-01	1.48E-01	7.79E+00	0.00E+00	8.91E+03	1.17E+03	6.87E+01	2.31E-02	7.86E-02	8.32E-02	1.02E+04
Additional environmental information												
Fossil fuel depletion (MJ surplus)	4.16E+01	1.13E+00	6.56E-03	2.27E+01	0.00E+00	1.21E+04	1.70E+03	6.22E+01	4.09E-02	1.18E+01	5.92E-02	1.40E+04
Ecotoxicity (kg)	2.38E+02	1.57E+00	5.05E-03	3.82E+00	0.00E+00	9.49E+03	9.40E+02	5.71E+01	5.69E-02	9.81E-02	4.08E-02	1.07E+04
Carcinogenics (CTUh)	2.88E-06	8.81E-09	7.31E-11	1.59E-07	0.00E+00	1.31E-04	1.06E-05	4.30E-06	3.20E-10	1.54E-09	4.64E-10	1.49E-04
Non carcinogenics (CTUh)	8.78E-05	8.22E-08	7.26E-10	1.56E-06	0.00E+00	1.61E-03	6.29E-05	1.74E-05	2.98E-09	6.62E-08	4.03E-09	1.78E-03
Resource use indicators												
Renewable primary resources used as an energy carrier (fuel) (MJ, LHV)	-7.47E+01	-5.28E+00	-5.30E+00	9.45E+00	0.00E+00	3.84E+03	3.48E+02	2.07E+02	-5.25E+00	-1.37E+01	-5.28E+00	-8.53E+01
Renewable primary resources with energy content used as material (MJ, LHV)	1.28E+02	5.30E+00	5.30E+00	5.30E+00	0.00E+00	2.53E+02	0.00E+00	0.00E+00	5.25E+00	1.39E+01	5.30E+00	1.39E+02
Total use of renewable primary resources with energy content (MJ, LHV)	5.36E+01	1.83E-02	1.28E-03	1.47E+01	0.00E+00	4.09E+03	3.48E+02	2.07E+02	6.63E-04	1.66E-01	1.36E-02	5.36E+01
Non-renewable primary resources used as an energy carrier (fuel) (MJ, LHV)	6.67E+02	5.53E+00	-2.99E+00	2.02E+02	0.00E+00	6.26E+04	1.81E+04	8.14E+02	-2.74E+00	1.13E+00	-2.45E+00	6.70E+02
Non-renewable primary resources with energy content used as material (MJ, LHV)	1.57E+01	3.05E+00	3.05E+00	3.05E+00	0.00E+00	4.65E+01	0.00E+00	0.00E+00	3.05E+00	0.00E+00	3.05E+00	2.18E+01
Total use of non-renewable primary resources with energy content (MJ, LHV)	6.83E+02	8.59E+00	6.41E-02	2.05E+02	0.00E+00	6.27E+04	1.81E+04	8.14E+02	3.12E-01	1.13E+00	6.06E-01	6.91E+02
Secondary materials (kg)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (m3)	8.26E-04	7.54E-04	1.03E-02	1.70E-04	0.00E+00	1.63E-02	6.25E-03	9.99E-03	2.74E-05	1.12E-02	1.18E-03	1.19E-02
Abiotic depletion potential, fossil (MJ)	6.65E+02	8.47E+00	5.46E-02	1.88E+02	0.00E+00	1.17E+05	1.59E+04	6.76E+02	3.07E-01	1.04E+00	5.16E-01	6.73E+02
Output flows and waste category indicators												
Hazardous waste disposed (kg)	3.38E-03	0	0	0	0	0	0	0	0	0.034	0.034	3.38E-03
Non-hazardous waste disposed (kg)	2.99E+01	1.20E+00	1.43E+00	2.93E+01	0.00E+00	9.35E+01	0.00E+00	0.00E+00	5.40E-01	0.00E+00	0.00E+00	3.26E+01
High-level radioactive waste, conditioned, to final repository (kg)	2.38E-03	1.67E-06	1.19E-07	7.76E-04	0.00E+00	2.48E-01	3.53E-02	5.11E-03	6.06E-08	1.98E-05	1.58E-06	2.38E-03
Intermediate-and low-level radioactive waste, conditioned, to final repository (kg)	1.92E-06	1.60E-08	1.03E-09	1.80E-06	0.00E+00	2.04E-03	3.10E-04	1.88E-05	5.80E-10	3.01E-08	1.02E-08	1.94E-06
Components for re-use (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling (kg)	0	0	0	2.93E+01	0.00E+00	5.49E+01	0.00E+00	0.00E+00	2.44E+00	2.44E+00	2.44E+00	0.00E+00
Materials for energy recovery (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy (MJ, LHV)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product (kg CO2)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging (kg CO2)	3.04E-01	0	0	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Packaging (kg CO2)	0	0	3.04E-01	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions (kg CO2)	0	0	0	0.00E+00	0	0.00E+00	0	0	0	0	0	0
Carbonation Carbon Removals (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Renewable and Non-Renewable Sources used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0

Standard-S Faucet Series (with mixing valve) - LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	A1-A3	A4	A5	B2	B3	B4	B6	B7	C2	C3	C4	Total
LCIA results												
Smog (kg O3 eq)	6.67E+00	2.51E-01	5.35E-04	3.76E-01	0.00E+00	2.87E+02	2.65E+01	4.08E+00	5.59E-03	2.21E-02	4.12E-03	3.25E+02
Ozone depletion (kg CFC-11 eq)	4.54E-06	1.25E-09	7.22E-10	4.95E-07	0.00E+00	3.90E-04	4.66E-05	3.91E-06	6.17E-11	1.74E-08	5.68E-09	4.45E-04
Eutrophication (kg SO2 eq)	5.00E-01	5.03E-04	2.97E-04	4.83E-03	0.00E+00	8.74E+00	3.20E-01	2.91E-02	1.26E-05	1.53E-04	9.70E-05	9.60E+00
Acidification (kg SO2 eq)	8.90E-01	7.84E-03	4.40E-05	4.33E-02	0.00E+00	6.55E+01	8.01E+00	2.60E-01	1.94E-04	9.76E-04	3.16E-04	7.47E+01
Respiratory effects (kg PM2.5 eq)	1.08E-01	1.37E-04	3.68E-06	3.73E-03	0.00E+00	4.83E+00	4.90E-01	3.79E-02	3.03E-06	1.33E-04	2.45E-05	5.47E+00
Global warming (kg CO2 eq)	6.67E+01	7.12E-01	1.82E-01	7.79E+00	0.00E+00	8.94E+03	1.17E+03	6.87E+01	3.51E-02	1.27E-01	8.73E-02	1.02E+04
Additional environmental information												
Fossil fuel depletion (MJ surplus)	4.38E+01	1.26E+00	8.14E-03	2.27E+01	0.00E+00	1.22E+04	1.70E+03	6.22E+01	6.20E-02	1.88E+01	6.17E-02	1.40E+04

Ecotoxicity (CTUe)	2.56E+02	1.75E+00	6.22E-03	3.82E+00	0.00E+00	9.70E+03	9.40E+02	5.71E+01	8.63E-02	1.70E-01	4.51E-02	1.10E+04
Non carcinogenics (CTUh)	3.01E-06	9.86E-09	9.09E-11	1.59E-07	0.00E+00	1.33E-04	1.06E-05	4.30E-06	4.85E-10	2.44E-09	4.75E-10	1.51E-04
Non carcinogenics (CTUh)	9.98E-05	9.20E-08	8.94E-10	1.56E-06	0.00E+00	1.75E-03	6.29E-05	1.74E-05	4.53E-09	1.19E-07	4.09E-09	1.93E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel) (MJ, LHV)	-6.63E+01	-5.28E+00	-5.30E+00	9.45E+00	0.00E+00	3.93E+03	3.48E+02	2.07E+02	-5.25E+00	-1.36E+01	-5.28E+00	-7.69E+01
Renewable primary resources with energy content used as material (MJ, LHV)	1.28E+02	5.30E+00	5.30E+00	5.30E+00	0.00E+00	2.53E+02	0.00E+00	0.00E+00	5.25E+00	1.39E+01	5.30E+00	1.39E+02
Total use of renewable primary resources with energy content (MJ, LHV)	6.20E+01	2.05E-02	1.60E-03	1.47E+01	0.00E+00	4.18E+03	3.48E+02	2.07E+02	1.01E-03	2.98E-01	1.37E-02	6.20E+01
Non-renewable primary resources used as an energy carrier (fuel) (MJ, LHV)	6.96E+02	6.51E+00	-3.02E+00	2.02E+02	0.00E+00	6.30E+04	1.81E+04	8.14E+02	-2.62E+00	1.83E+00	-2.47E+00	7.00E+02
Non-renewable primary resources with energy content used as material (MJ, LHV)	1.59E+01	3.10E+00	3.10E+00	3.10E+00	0.00E+00	4.72E+01	0.00E+00	0.00E+00	3.10E+00	0.00E+00	3.10E+00	2.21E+01
Total use of non-renewable primary resources with energy content (MJ, LHV)	7.12E+02	9.61E+00	7.95E-02	2.05E+02	0.00E+00	6.30E+04	1.81E+04	8.14E+02	4.73E-01	1.83E+00	6.26E-01	7.22E+02
Secondary materials (kg)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (m3)	9.42E-04	8.43E-04	1.04E-02	1.70E-04	0.00E+00	1.76E-02	6.25E-03	9.99E-03	4.15E-05	1.32E-02	1.20E-03	1.22E-02
Abiotic depletion potential, fossil (MJ)	6.89E+02	9.48E+00	6.76E-02	1.88E+02	0.00E+00	1.18E+05	1.59E+04	6.76E+02	4.66E-01	1.68E+00	5.36E-01	6.98E+02
Output flows and waste category indicators												
Hazardous waste disposed (kg)	3.38E-03	0	0	0	0	0	0	0	0	0.034	0.034	3.38E-03
Non-hazardous waste disposed (kg)	2.99E+01	1.20E+00	1.43E+00	2.93E+01	0.00E+00	9.35E+01	0.00E+00	0.00E+00	5.40E-01	0.00E+00	0.00E+00	3.26E+01
High-level radioactive waste, conditioned, to final repository (kg)	9.12E-03	1.87E-06	1.48E-07	7.76E-04	0.00E+00	3.31E-01	3.53E-02	5.11E-03	1.08E-07	3.45E-05	1.59E-06	9.12E-03
Intermediate-and low-level radioactive waste, conditioned, to final repository (kg)	2.97E-06	1.79E-08	1.28E-09	1.80E-06	0.00E+00	2.06E-03	3.10E-04	1.88E-05	8.80E-10	5.08E-08	1.03E-08	2.99E-06
Components for re-use (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling (kg)	0	0	0	2.93E+01	0.00E+00	5.62E+01	0.00E+00	0.00E+00	2.73E+00	2.73E+00	2.73E+00	0.00E+00
Materials for energy recovery (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy (MJ, LHV)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon Removal from Product (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Biogenic Carbon Emission from Product (kg CO2)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging (kg CO2)	3.04E-01	0	0	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Packaging (kg CO2)	0	0	3.04E-01	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions (kg CO2)	0	0	0	0.00E+00	0	0.00E+00	0	0	0	0	0	0
Carbonation Carbon Removals (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Renewable and Non-Renewable Sources used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0

Standard-S Faucet Series (with thermostatic mixing valve) - LCIA results, resource use, output and waste flows, and carbon emissions & removals per functional unit

Parameter	A1-A3	A4	A5	B2	B3	B4	B6	B7	C2	C3	C4	Total
LCIA results												
Smog (kg O3 eq)	6.80E+00	2.85E-01	4.34E-04	3.76E-01	0.00E+00	2.89E+02	2.65E+01	4.08E+00	4.29E-03	1.94E-02	4.14E-03	3.27E+02
Ozone depletion (kg CFC-11 eq)	4.67E-06	1.38E-09	5.83E-10	4.95E-07	0.00E+00	3.91E-04	4.66E-05	3.91E-06	4.73E-11	1.60E-08	5.75E-09	4.47E-04
Eutrophication (kg N eq)	5.12E-01	5.69E-04	2.48E-04	4.83E-03	0.00E+00	8.89E+00	3.20E-01	2.91E-02	9.68E-06	1.46E-04	9.95E-05	9.75E+00
Acidification (kg SO2 eq)	9.26E-01	8.86E-03	3.83E-05	4.33E-02	0.00E+00	6.59E+01	8.01E+00	2.60E-01	1.49E-04	8.95E-04	3.17E-04	7.51E+01
Respiratory effects (kg PM2.5 eq)	1.12E-01	1.55E-04	3.11E-06	3.73E-03	0.00E+00	4.87E+00	4.90E-01	3.79E-02	2.32E-06	1.22E-04	2.46E-05	5.51E+00
Global warming (kg CO2 eq)	6.73E+01	7.83E-01	1.60E-01	7.79E+00	0.00E+00	8.94E+03	1.17E+03	6.87E+01	2.69E-02	1.20E-01	8.97E-02	1.03E+04
Additional environmental information												
Fossil fuel depletion (MJ surplus)	4.47E+01	1.38E+00	6.59E-03	2.27E+01	0.00E+00	1.22E+04	1.70E+03	6.22E+01	4.76E-02	1.71E-01	6.24E-02	1.40E+04
Ecotoxicity (CTUe)	2.61E+02	1.93E+00	3.88E-03	3.82E+00	0.00E+00	9.76E+03	9.40E+02	5.71E+01	6.62E-02	1.73E-01	4.69E-02	1.10E+04
Non carcinogenics (CTUh)	3.02E-06	1.08E-08	7.46E-11	1.59E-07	0.00E+00	1.33E-04	1.06E-05	4.30E-06	3.72E-10	2.39E-09	4.80E-10	1.51E-04
Non carcinogenics (CTUh)	1.04E-04	1.01E-07	7.59E-10	1.56E-06	0.00E+00	1.79E-03	6.29E-05	1.74E-05	3.47E-09	1.22E-07	4.12E-09	1.97E-03
Resource use indicators												
Renewable primary energy used as energy carrier (fuel) (MJ, LHV)	-6.55E+01	-5.27E+00	-5.30E+00	9.45E+00	0.00E+00	3.94E+03	3.48E+02	2.07E+02	-5.25E+00	-1.36E+01	-5.28E+00	-7.61E+01
Renewable primary resources with energy content used as material (MJ, LHV)	1.28E+02	5.30E+00	5.30E+00	5.30E+00	0.00E+00	2.53E+02	0.00E+00	0.00E+00	5.25E+00	1.39E+01	5.30E+00	1.39E+02
Total use of renewable primary resources with energy content (MJ, LHV)	6.28E+01	2.25E-02	1.32E-03	1.47E+01	0.00E+00	4.19E+03	3.48E+02	2.07E+02	7.72E-04	3.07E-01	1.38E-02	6.28E+01
Non-renewable primary resources used as an energy carrier (fuel) (MJ, LHV)	7.05E+02	7.46E+00	-3.03E+00	2.02E+02	0.00E+00	6.31E+04	1.81E+04	8.14E+02	-2.73E+00	1.71E+00	-2.47E+00	7.10E+02
Non-renewable primary resources with energy content used as material (MJ, LHV)	1.59E+01	3.10E+00	3.10E+00	3.10E+00	0.00E+00	4.72E+01	0.00E+00	0.00E+00	3.10E+00	0.00E+00	3.10E+00	2.21E+01
Total use of non-renewable primary resources with energy content (MJ, LHV)	7.21E+02	1.06E+01	6.47E-02	2.05E+02	0.00E+00	6.31E+04	1.81E+04	8.14E+02	3.63E-01	1.71E+00	6.32E-01	7.32E+02
Secondary materials (kg)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-renewable secondary fuels (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Recovered energy (MJ, LHV)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (m3)	8.88E-04	9.27E-04	2.90E-03	1.70E-04	0.00E+00	1.81E-02	6.25E-03	9.99E-03	3.18E-05	1.35E-02	1.21E-03	4.7E-03
Abiotic depletion potential, fossil (MJ)	6.97E+02	1.04E+01	5.49E-02	1.88E+02	0.00E+00	1.18E+05	1.59E+04	6.76E+02	3.58E-01	1.56E+00	5.41E-01	7.08E+02
Output flows and waste category indicators												
Hazardous waste disposed (kg)	3.38E-03	0	0	0	0	0	0	0	0	0.034	0.034	3.38E-03
Non-hazardous waste disposed (kg)	2.99E+01	1.20E+00	1.43E+00	2.93E+01	0.00E+00	9.35E+01	0.00E+00	0.00E+00	5.40E-01	0.00E+00	0.00E+00	3.26E+01
High-level radioactive waste, conditioned, to final repository (kg)	9.23E-03	2.05E-06	1.22E-07	7.76E-04	0.00E+00	3.30E-01	3.53E-02	5.11E-03	7.06E-08	3.54E-05	1.60E-06	9.23E-03
Intermediate-and low-level radioactive waste, conditioned, to final repository (kg)	3.04E-06	1.97E-08	1.06E-09	1.80E-06	0.00E+00	2.06E-03	3.10E-04	1.88E-05	6.75E-10	5.14E-08	1.04E-08	3.06E-06
Components for re-use (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Materials for recycling (kg)	0	0	0	2.93E+01	0.00E+00	5.74E+01	0.00E+00	0.00E+00	3.01E+00	3.01E+00	3.01E+00	0.00E+00
Materials for energy recovery (kg)	0	0	0	0	0	0	0	0	0	0	0	0
Exported energy (MJ, LHV)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon emissions and removals												
Biogenic Carbon	0	0	0	0	0	0	0	0	0	0	0	0

Removal from Product (kg CO2)												
Biogenic Carbon Emission from Product (kg CO2)	0	0	0	0.00E+00	0.00E+00	0.00E+00	0	0	0	0	0	0
Biogenic Carbon Removal from Packaging (kg CO2)	3.04E-01	0	0	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Packaging (kg CO2)	0	0	3.04E-01	0.00E+00	0	4.56E-01	0	0	0	0	0	3.04E-01
Biogenic Carbon Emission from Combustion of Waste from Renewable Sources Used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Calcination Carbon Emissions (kg CO2)	0	0	0	0.00E+00	0	0.00E+00	0	0	0	0	0	0
Carbonation Carbon Removals (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0
Carbon Emissions from Combustion of Waste from Renewable and Non-Renewable Sources used in Production Processes (kg CO2)	0	0	0	0	0	0	0	0	0	0	0	0

SM Transparency Report (EPD)™ + Material Health Overview™

EPD	LCA
3rd-party reviewed	✓ NSF
Transparency Report (EPD)	
3rd-party verified	✓ NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	✓

This environmental product declaration (EPD) was externally verified by Jack Geibig (Ecoform) on behalf of NSF according to ISO 14044; ISO 21930:2017; SM Part A: LCA calculation rules and report requirements, 2023; the reference PCR; and ISO 14025:2006.

Ecoform, LLC
11903 Black Road
Knoxville, TN 37932
(865) 850-1883
www.ecoform.com

NSF International
P.O Box 130140, 789 N.Dixboro Road,
Ann Arbor, MI 48105, USA
www.nsf.org
734 769 8010

Certified Environmental Product Declaration
www.nsf.org

SUMMARY

Reference PCR
SM Part B: Commercial/public metered and manual lavatory faucets, v3.0

Regions; system boundaries
North America; Cradle-to-grave

Functional unit
One metered lavatory faucet in an average commercial environment over the estimated service life of the building

LCIA methodology; LCA software; LCI database
TRACI 2.1; SimaPro Analyst 9.5; ecoinvent and USLCI databases

In accordance with ISO 14044 and the referenced PCR, the life cycle assessment was conducted by Sustainable Minds and critically reviewed by Jack Geibig (Ecoform) on behalf of NSF.

Public LCA
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024

TOTO USA
1155 Southern Road
Morrow, GA 30260
www.totousa.com

Contact us

LCA & material health results & interpretation

Standard-R and Standard-S Faucet Series

Standard-R (no mix valve) | Standard-R (w/ mix valve) | Standard-R (w/ thermo mix valve) | Standard-S (no mix valve) | Standard-S (w/ mix valve)
Standard-S (w/ thermo mix valve) | EPD additional content | Material health

Evaluation programs

Declare

Declare labels are issued to products disclosing ingredient inventory, sourcing, and end of life options. Declare labels are based on the Manufacturers Guide to Declare, administered by the International Living Future Institute.

How it works

Material ingredients are inventoried and screened against the Living Building Challenge (LBC) Red List which represents the 'worst in class' materials, chemicals, and elements known to pose serious risks to human health and the greater ecosystem.

The Declare product database and label are used to select products that meet the Living Building Challenge's stringent materials requirements, streamlining the materials specification and certification process.

Assessment scope and results

Declare™

Inventory threshold: 100 ppm

Declare level:
The Declare product database and label are used to select products that meet the LBC's stringent materials requirements, streamlining the materials specification and certification process.

- LBC Red List Free
- LBC Red List Approved
- Declared

Click the label to see the full declaration.

Standard-R Faucet Series

Declare.

EcoPower® Standard-R Faucets (T28 series): T28S32E, T28S32EM & T28S32ET
TOTO USA

Final Assembly: Hanoi, Vietnam
Life Expectancy: 50 Year(s)
End of Life Options: Recyclable (62%), Portions Classified as Hazardous Waste (Circuit Board Components), Landfill (38%)

Ingredients:

Controller and Valve Parts: Stainless Steel; Acrylonitrile Butadiene Styrene; Polyvinylchloride; Polypropylene; Polyoxymethylene; Steel; Copper; NBR rubber; Polyphenylene oxide; Nickel Titanium Alloy; Nickel Titanium Alloy; Magnet (Iron); Polyphenylene sulfide; Ethylene Propylene Dienemonomer; FKM Polymer; **Spout Body:** Brass; **Valve Body:** Brass; **Electrical Components:** Controller[1], Battery[1], Sensor[1]

[1]LBC Temp Exception RL-002 - Small Electrical Components

Living Building Challenge Criteria:

I-13 Red List:
☐ LBC Red List Free — % Disclosed: 100% at 100ppm
☐ LBC Red List Approved — VOC Content: Not Applicable
■ Declared

I-10 Interior Performance: Not Applicable
I-14 Responsible Sourcing: Not Applicable

TOT-0043
EXP. 01 AUG 2025
Original Issue Date: 2024

INTERNATIONAL LIVING FUTURE INSTITUTE™ living-future.org/declare

Standard-S Faucet Series

Declare.

EcoPower® Standard-S Faucets (T27 series): T27S32E, T27S32EM & T27S32ET
TOTO USA

Final Assembly: Hanoi, Vietnam
Life Expectancy: 50 Year(s)
End of Life Options: Recyclable (62%), Portions Classified as Hazardous Waste (Circuit Board Components), Landfill (38%)

Ingredients:

Controller and Valve Parts: Stainless Steel; Acrylonitrile Butadiene Styrene; Polyvinylchloride; Polypropylene; Polyoxymethylene; Steel; Copper; NBR rubber; Polyphenylene oxide; Nickel Titanium Alloy; Nickel Titanium Alloy; Magnet (Iron); Polyphenylene sulfide; Ethylene Propylene Dienemonomer; FKM Polymer; **Spout Body:** Brass; **Valve Body:** Brass; **Electrical Components:** Controller; Battery; Sensor

Living Building Challenge Criteria:

I-13 Red List:
☐ LBC Red List Free — % Disclosed: 100% at 100ppm
☐ LBC Red List Approved — VOC Content: Not Applicable
■ Declared

I-10 Interior Performance: Not Applicable
I-14 Responsible Sourcing: Not Applicable

TOT-0044
EXP. 01 AUG 2025
Original Issue Date: 2024

INTERNATIONAL LIVING FUTURE INSTITUTE™ living-future.org/declare

What's in this product and why

Declare level

'Declared' is awarded to products when all the ingredients name and CAS numbers have been disclosed. 100% disclosure qualifies the product for the LEED v4 building product disclosure and optimization - material ingredients credit option 1.

What's in the product and why

The spout assembly includes polyvinyl chloride (PVC). PVC is used in plumbing applications where corrosion-resistance and durability are required. The spout in its final form does not represent any hazards to the user.

The TOTO facility in which the faucet is manufactured is ISO 14001 certified. This means that the facility has implemented an environmental management system as part of TOTO's commitment to the health of the environment.

Where it goes at the end of its life

TOTO encourages consumers to recycle their used faucet and faucet parts. Contact your local municipality for recycling programs.

How we're making it healthier

The EcoPower technology enables the faucet to operate off the energy grid and requires no routine battery replacement. This technology helps to reduce pollution and hazardous waste, thereby mitigating human health impacts.

See how we make it greener

References

Declare

TOTO USA, Declare label for Standard-R Faucet Series
TOTO USA, Declare label for Standard-S Faucet Series

Manufacturer's Guide to Declare

A comprehensive guide providing information about the program, the assessment methodology, how to submit material data to obtain a Declare label and how they are used to meet the Health & Happiness and Materials Petals of the Living Building Challenge.

Rating systems

LEED BD+C: New Construction | v4 - LEED v4
Building product disclosure and optimization
Material Ingredients

Credit value options — 1 product each

☑ 1. Reporting ○ 2. Optimization ○ 3. Supply Chain Optimization

LEED BD+C: New Construction | v4.1 - LEED v4.1
Materials and resources
Material Ingredients

Credit value options — 1 product each

☑ 1. Reporting ○ 2. Optimization ○ 3. Supply Chain Optimization

Living Building Challenge
Materials petals imperatives

○ 10. Red List Free ○ 12. Responsible Industry ○ 13. Living Economy Sourcing

WELL Building Standard®
Air and Mind Features

☑ **X07** Materials Transparency

○ **X08** Materials Optimization

Collaborative for High Performance Schools National Criteria
EQ C7.1 Material Health Disclosures

☑ Performance Approach — 2 points

☑ Prescriptive Approach — 2 points

SM Transparency Report (EPD)™ + Material Health Overview™

EPD	LCA
3rd-party reviewed	✓ NSF
Transparency Report (EPD)	
3rd-party verified	✓ NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	✓

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734 769 8010

NSF Certified Environmental Product Declaration www.nsf.org

SUMMARY

Reference PCR
SM Part B: Commercial/public metered and manual lavatory faucets, v3.0

Regions; system boundaries
North America; Cradle-to-grave

Functional unit
One metered lavatory faucet in an average commercial environment over the estimated service life of the building

LCIA methodology; LCA software; LCI database
TRACI 2.1; SimaPro Analyst 9.5; ecoinvent and USLCI databases

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Public LCA
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024

TOTO USA
1155 Southern Road
Morrow, GA 30260
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Contact us

How we make it greener

Standard-R and Standard-S Faucet Series

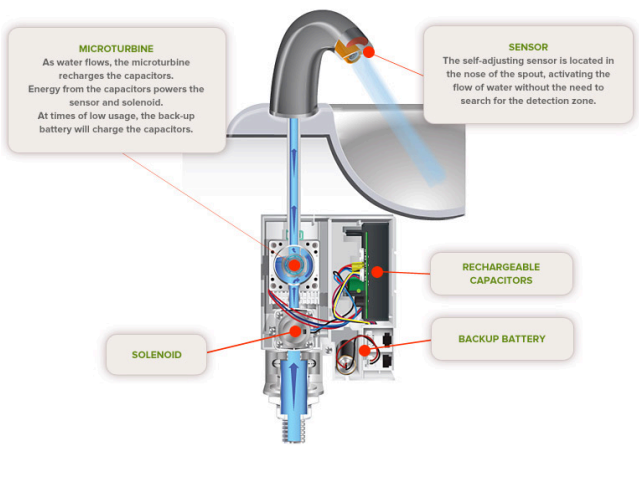
Expand all

CONSTRUCTION

TOTO participates in the UPS Carbon Neutral program. TOTO is a certified SmartWay® Transport Partner.

USE

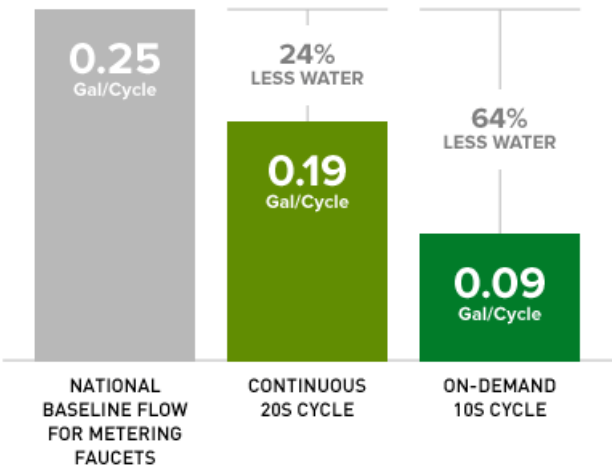
TOTO's Standard EcoPower® Faucets feature the highly regarded EcoPower technology. Engineered to reduce environmental impacts, TOTO's EcoPower products offer water and energy savings without sacrificing performance. Below are some of the features of TOTO's EcoPower technology.



SENSOR:
Located in the nose of the faucet, the EcoPower sensor ensures that water flows only when needed. The detection zone is right where you need it, eliminating the need to search with your hands to activate the flow of water. For on-demand versions, the sensor will stop the flow of water upon removal of the hands from the sensing zone, preventing wasted water.

MICROTURBINE:
TOTO's EcoPower technology enables the product to operate 100% off grid. As water flows, the hydro powered microturbine recharges the capacitors for the sensor and solenoid. Less reliance on the back-up battery results in much less battery waste.

SOLENOID:
The solenoid mechanism, a water-saving technology, maintains consistent flow rate under a range of supply pressures.



Using the same proven engineering as our legendary EcoPower TEL3/5G series, the Standard-R and Standard-S Faucet Series reinforces TOTO's performance reputation while offering additional water savings.

Metal and electronic parts can be recycled at the end of life.

SM Transparency Report (EPD)™ + Material Health Overview™

EPD	LCA
3rd-party reviewed	✓ NSF
	Transparency Report (EPD)
3rd-party verified	✓ NSF

Validity: 08/31/2024 – 08/30/2029
TOTO – 20240831 – 006

MATERIAL HEALTH	Material evaluation
Self-declared	✓

This environmental product declaration (EPD) was externally verified by Jack Geibig (Ecoform) on behalf of NSF according to ISO 14044; ISO 21930:2017; SM Part A: LCA calculation rules and report requirements, 2023; the reference PCR; and ISO 14025:2006.

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NSF Certified Environmental Product Declaration www.nsf.org

SUMMARY

Reference PCR
SM Part B: Commercial/public metered and manual lavatory faucets, v3.0

Regions; system boundaries
North America; Cradle-to-grave

Functional unit
One metered lavatory faucet in an average commercial environment over the estimated service life of the building

LCIA methodology; LCA software; LCI database
TRACI 2.1; SimaPro Analyst 9.5; ecoinvent and USLCI databases

In accordance with ISO 14044 and the referenced PCR, the life cycle assessment was conducted by Sustainable Minds and critically reviewed by Jack Geibig (Ecoform) on behalf of NSF.

Public LCA
LCA background report of TOTO Faucets, Flush Valves, and Residential Toilets, 2024

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