Caxton® Oval K-2210-BA

17" x 14" under-mount bathroom sink with overflow and clamp assembly

Product Group

Vitreous Santiary Ceramic Ware

Product Specifications

Packaged Product Weight (kg)	9.9
Product Recycled Content	0%
Product Recyclable Content	18%
Product Life time (years)	50
Product Application	Residential

Use Phase Specifications

Flush Volume (gal/ flush)	N/A
User Frequency (flushes/day/person)	N/A
Annual Cleaing Frequency (times)	52
Cleaner	10 ml of 1% sodium lauryl sulfate

Greenhouse Gas Emission (kg CO2- eq.)

Material & Manufacturing	32
Use & Maintenance	4

Water Intensity (m3)

Material & Manufacturing	11.6
Use & Maintenance	1.53

Manufacturing Locations

Kohler, WI

Believing in Better

We believe in a better world. We are passionate about protecting the environment and enhancing the quality of life for current and future generations. And that means designing products that look beautiful and deliver exceptional performance, while being as sustainable as possible.

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

Program Operator Name, Address, Logo, and Website	UL Environment
General Program Instructions and Version Number	Program Operator Rules V2.3 February 2018
Location of Explanatory Material	Kohler, WI
Declaration Holder and Address	Kohler Co. 444 Highland Drive, Kohler, WI
Declaration Number	4788111728.145.1
Declared Product and Functional Unit	Caxton® Oval K-2210-BA, Single Lavatory sinks
Product Definition	17" x 14" under-mount bathroom sink with overflow and clamp assembly
Reference PCR and Version Number	PCR for Building-Related Products and Services. Adapted for UL Environment from the range of Environmental Product Declarations of Institute Construction and Environment e.V. (IBU). Part A (v.3): Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report. Part B (v.2): Sanitary Ceramic EPD Requirements
Markets of Applicability	North America
Date of Issue	12-Dec-18
Period of Validity	5 Years
EPD Type	Product Specific
EPD Scope	Cradle-to-grave
Year of Reported Manufacturer Primary Data	2016
LCA Software and Version Number	SimaPro v. 8.4.0.0
LCIA Database(s) and Version Numbers	Ecoinvent 3 DATASMART LCI Package (USEI 2.2)
LCIA Methodology and Version Number	TRACI 2.1 v1.04 CML-IA baseline v3.04 Cumulative Energy Demand (CED) v1.09
Applicable Green Building Certifications Schema	LEED v4/BD+C/Materials and Resources/Building Product Disclosure and Optimization-Environmental Product Declarations

The PCR review was conducted by:

This declaration was independently verified in accordance with ISO 14025:2006. The UL Environment "Part A: calculation Rules for the Life Cycle Assessment Reuirements on the Project Report" v3.0 (December 2017), based on CEN Norm EN 15804 (2012) and ISO 21930:2017, serves as the core PCR, with additional considerations from the USGBC/ UL Environment Part A Enhancement (2017).

☐ INTERNAL ☒ EXTERNAL

This life cycle assessment was conducted in accordance with ISO 14044 and reference PCR by:

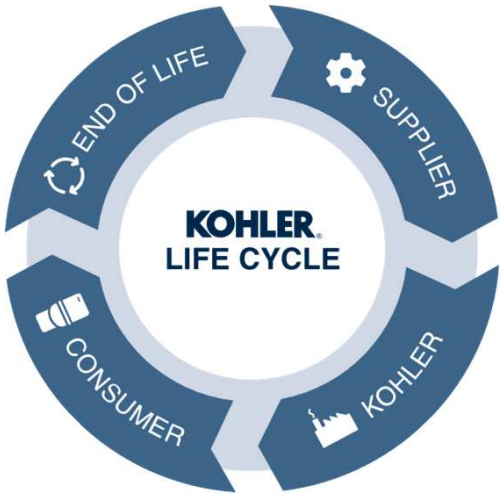
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:

Thomas Gloria, Life-Cycle Services, LLC

LIMITATIONS: 1) Environmnetal declarations from different programs (ISO 14025) may not be comparable; 2) Comparison of the environmnetal performance using EPD information shall be based on the prodcut's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building use phase as instructed under this PCR; 3) Full conformance with the PCR allows EPD comparability when all stages of a life cycle have been considered, when they comply with all referenced standards, use the same sub-category PCR, and use equivalent scenarios with respect to constrution work. However, variations and deviations are possible. example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

This document is an environmental product declaration (EPD) in accordance with ISO 21930. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycles.

At Kohler Co., we believe in protecting the environment and enhancing the quality of life for current and future generations. When developing new products, we consider the environmental impact at each stage of a product's existence - from the activities of our suppliers through the end of the product's useful life. Designing for a better world means every choice counts.



Product Description

Caxton has a simple, streamlined design that's as versatile as it is attractive. This easy-to-clean sink combines the sleek look of an integrated basin with a timeless design that suits both traditional and modern bathroom decors. Caxton creates a sleek transition from the smooth oval basin to just about any solid-surface countertop.

Additional data can be found at:

http://www.us.kohler.com/onlinecatalog/detail.jsp?prod_num=2210

Applications and Uses

- Oval basin with unglazed underside.
- Overflow drain.
- Fits standard 14- x 17-inch countertop cutout.

Product Standards, Approvals and Certifications

Specified model meets or exceeds the following:

- ASME A112.19.2/CSA B45.1
- ADA
- ICC/ANSI A117.1
- CSA B651

SUPPLIER OPERATIONS

Base Material Content of the Product

Material	Function	Quantity (% By Weight)
Clay	Slip and Glaze Ingredient	45-55
Feldspar	Slip and Glaze Ingredient	25-35
Silica	Slip and Glaze Ingredient	10-20
Balance	Miscellaneous Hardware and Packaging	5-10

KOHLER OPERATIONS

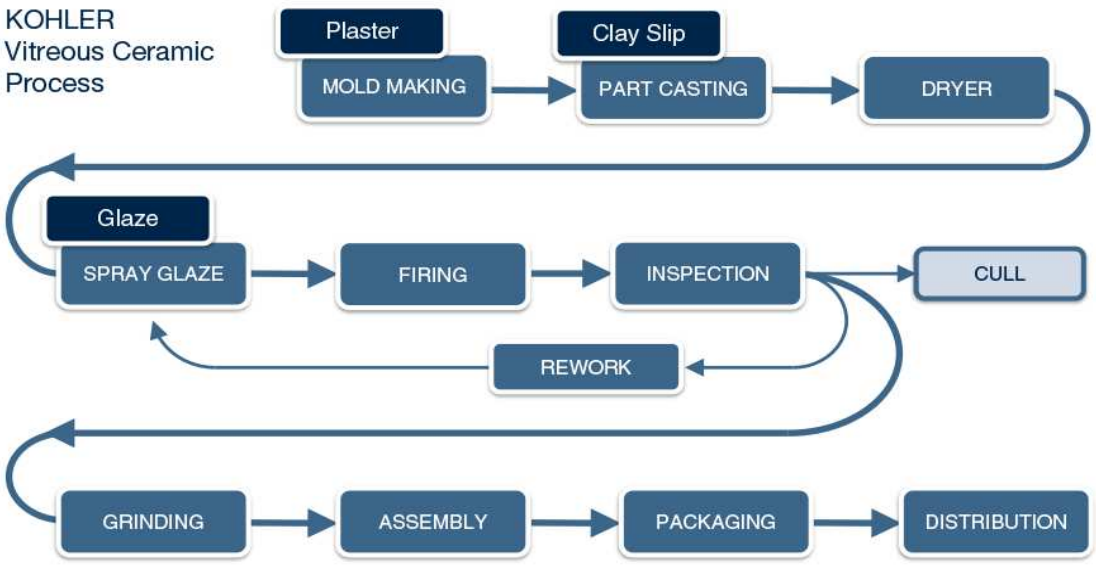
Manufacturing Process Description

The body of vitreous ceramic sanitary ware is manufactured by casting slip - a mixture of water, clay, feldspar and silica - into a reusable mold. The cast body is partially dried, sprayed with an aqueous glaze mixture, and fired in a kiln to vitrify the product. An inspection process follows that ensures a singular high level of product quality. Finally, the ware is fitted with non-vitreous components, packaged and shipped.

Manufacturing Locations

Not all products are produced in all plants. EPDs for specific models only include data from plants in which they are produced.

Manufacturing Process



Health, Safety and Environmental Aspects during Production

Kohler Co. has established program management guidelines for safety, accident prevention and environmental performance. These systems enable Kohler Co. operations to achieve world-class performance: Kohler Safety Management System (KSMS) and Kohler Environmental Management System (KEMS). The management systems are based on best management practices, and the application of these programs consistently delivers significant results.

Packaging

Vitreous ware is packaged primarily with double-wall corrugated containerboard. When utilized, white exterior wrapping is manufactured with an Elemental Chlorine Free (ECF)/Totally Chlorine Free (TCF) bleaching process. Other packaging materials can include expanded polystyrene (EPS), low density polyethylene bags (LDPE) and honeycomb paperboard blocking.
Corrugated containerboard and honeycomb blocking are 100% recyclable, and collection is available in most municipalities. Other materials are typically recyclable; however, this is dependent on local availability of collection programs.

CONSUMER USE

Conditions of Use

The majority of product use phase environmental impacts for vitreous ceramic sanitary ware are related to water throughput. It is important to note that water use impacts are assigned to the device that controls water flow rate. For example, a lavatory sink EPD will not include these impacts, as water consumption is controlled by the faucet that is paired with it. Similarly, a toilet bowl EPD will not include water use impacts, as the tank or flushometer it is paired with provides this function. However, a one-piece toilet with integrated tank and bowl will include water use impacts within its EPD.

Reference Service Life

Residential lavatory sinks are assumed to remain in service for 50 years.

Cleaning and Maintenance

Residential lavatory sinks are assumed to require 52 cleanings per year with 10 ml of 1% sodium lauryl sulfate. These impacts are included within the product use stage of the LCA.

END OF LIFE

Recycle or Reuse

Collection and processing for vitreous product beneficial reuse and end-of-life are possible, but not widely available at present time

Disposal

Upon PCR default assumsptions, The KOHLER® LCA model assumes 100% of the vitreous portion of the product, accessories and packaging materials are landfilled.

LIFE CYCLE ASSESSMENT

Description of Declared or Functional Unit

The functional unit represented here refers to a single lavatory sink.

Name	Value	Unit
Functional Unit	1 packaged product piece	
Mass	9.88	kg
Conversion factor to 1 kg	0.10	
Flush rate	0	m3/flush
Flow rate	-	m3/sec

Estimates and Assumptions

The LCI/ LCA assumptions are mentioned below:

- Product transport from DC to final customer and from customer to diposal site are modeled based on PCR specifications
- Product and packaging disposal scenarios are adopted from the PCR specifications
- Building estimated service life (ESL) is assumed to be 75 years
- Biogenic carbon content is estimated for three types of packaging materials: plywood, corrugate box and kraft paper
- Carbon calcination emission factors are sourced from FIRE database for caolin calcination

Cut-off Criteria

This LCA is in compliance with the cutoff criteria specified in the PCR, as no known processes were excluded from this assessment outside of the specific items listed within the “System Boundary” section below.

Allocation

Impacts are allocated to individual products with a unit process approach. Typically, product mass is used to build the impact allocation factors. Product-specific quality data is also employed to match impacts to products.

Data Sources

Primary manufacturing data was collected directly from process experts for the eleven Kohler vitreous plants within North America, Thailand and China, for calender year of 2016. Secondary data primarily references the DATASMART and eocinvent 3 LCI databases. Both databases are widely distributed and are referenced within the LCA community. All ecoinvent datasets have been critically reviewed.

Data Quality

Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision and reproducibility to limit uncertainty. The data sources used are complete and representative of North America, Thailand and China in terms of the geographic and technological coverage and are a recent vintage (i.e., less than ten years old). Any deviations from these initial data quality requirements for secondary data are documented in the critically reviewed LCA report. When a product is produced at more than one plant, impacts are weighted by unit volume to produce a single result.

LCA Modeling Scenarios

Transport from gate to the building site (A4)		
Name	**Value**	**Unit**
Liters of fuel	38	l/100 km
Transport distance	821.9	km
Capacity utilization (including empty runs)	89	%
Gross density of products transported	-	kg/m^3
Capacity utilization volume factor	89	-

Installation into the building (A5)		
Name	**Value**	**Unit**
Auxiliary material	-	kg
Water consumption	-	m^3
Other resources	-	km
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Product loss per functional unit	-	kg
Waste material at the construction site before waste processing	3.819	kg
Output materials resulting from on-site waste processing	-	kg
Direct emissions to ambient air, soil and water	-	kg

Reference service life		
Name	**Value**	**Unit**
Reference service life (RSL)	50	years

Maintenance (B2)		
Name	**Value**	**Unit**
Maintenance process information	-	-
Maintenance cycle	2600	Number/RSL
Maintenance cycle	3900	Number/ESL
Water consumption	-	m^3
Auxiliary material (cleaning agent)	11.79	kg
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Power output of equipment	-	kW
Material loss	-	kg
Direct emissions to ambient air, soil and water	-	kg

Repair (B3)		
Name	**Value**	**Unit**
Repair process information	-	-
Inspection process information	-	-
Repair cycle	-	Number/RSL
Repair cycle	-	Number/ ESL
Water consumption	-	m^3
Auxiliary	-	kg
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg
Direct emissions to air, soil and water	-	kg

Replacement (B4)/Refurbishment (B5)		
Name	**Value**	**Unit**
Replacement cycle	1	Number/RSL
Replacement cycle	0.5	Number/ESL
Electricity consumption	-	kWh
Liters of fuel	19	l/100 km
Water consumption	-	m^3
Auxiliary material	-	kg
Replacement of worn parts	-	kg
Direct emissions to air, soil and water	-	kg

Operational energy use (B6) and water use (B7)		
Name	**Value**	**Unit**
Water consumption	-	m3/p/RSL
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Equipment output	-	kW
Direct emissions to air, soil and water	-	kg

End of life (C1-C4)		
Name	**Value**	**Unit**
Collected separately	1.732	kg
Collected as mixed construction waste	8.152	kg
Reuse	-	kg
Recycling	-	kg
Energy recovery	-	kg
Landfilling	9.884	kg

System Boundaries

	Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Benefits and Loads Beyond the System Boundaries	
Cradle to grave with options	Raw material supply	Transport	Manufacturing	Transport from gate to the site	Assembly/ Install	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling potential	Reference Service Life
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MND	

Description of the System Boundary Stages Corresponding to the PCR
(X = Included; MND = Module Not Declared)

Results of the Assessment

TRACI 2.1 Impact Assessment						
Module	GWP	ODP	AP	EP	POCP	ADP
	(kg CO2 Eq.)	(kg CFC-11 Eq.)	(kg SO2- Eq.)	(kg N-Eq.)	(kg O3-Eq.)	(MJ surplus)
Total	3.70E+01	2.09E-06	1.38E-01	6.67E-02	1.94E+00	6.01E+01
A1- A3	3.23E+01	1.83E-06	1.15E-01	5.36E-02	1.48E+00	5.40E+01
A4	1.48E+00	1.16E-07	8.67E-03	1.09E-03	2.50E-01	2.88E+00
A5	1.30E-02	4.88E-09	9.43E-05	1.44E-05	2.66E-03	4.72E-02
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	2.99E+00	1.17E-07	1.35E-02	1.19E-02	1.74E-01	2.68E+00
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	1.48E-01	2.60E-10	8.57E-04	8.01E-05	2.50E-02	2.78E-01
C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	6.12E-02	2.30E-08	4.44E-04	6.76E-05	1.25E-02	2.22E-01

CML 4.1 Impact Assessment							
Module	GWP	ODP	AP Air	EP	POCP	ADP element	ADP fossil fuels
	(kg CO2-Eq.)	(kg CFC-11 Eq.)	(kg SO2-Eq.)	(kg (PO4)3- Eq.)	(kg C2H4 Eq.)	(kg Sb-Eq.)	(MJ, LHV)
Total	3.78E+01	1.55E-06	1.33E-01	3.75E-02	1.12E-02	3.15E-04	4.97E+02
A1- A3	3.31E+01	1.36E-06	1.13E-01	2.91E-02	6.17E-03	3.04E-04	4.49E+02
A4	1.49E+00	8.66E-08	6.95E-03	1.56E-03	2.62E-04	1.41E-06	2.07E+01
A5	1.32E-02	3.66E-09	7.62E-05	1.73E-05	2.85E-06	1.33E-08	3.38E-01
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	3.01E+00	8.68E-08	1.23E-02	6.59E-03	4.76E-03	9.45E-06	2.35E+01
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	1.49E-01	1.63E-10	6.86E-04	1.46E-04	2.83E-05	6.72E-09	1.96E+00
C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	6.21E-02	1.72E-08	3.58E-04	8.16E-05	1.34E-05	6.28E-08	1.59E+00

Rest of the World Impact Assessment					
Module	GWP	ODP	AP	EP	POCP
	(kg CO2-Eq.)	(kg CFC-11 Eq.)	(kg SO2-Eq.)	(kg N-Eq.)	(kg O3- Eq.)
Total	3.78E+01	1.55E-06	1.33E-01	3.74E-02	1.94E+00
A1- A3	3.31E+01	1.36E-06	1.13E-01	2.91E-02	1.48E+00
A4	1.49E+00	8.66E-08	6.95E-03	1.56E-03	2.50E-01
A5	1.32E-02	3.66E-09	7.62E-05	1.73E-05	2.66E-03
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	3.01E+00	8.68E-08	1.23E-02	6.59E-03	1.74E-01
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	1.49E-01	1.63E-10	6.86E-04	1.46E-04	2.50E-02
C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	6.21E-02	1.72E-08	3.58E-04	0.00E+00	1.25E-02

Resource Use											
Module	RPRe	PRPm	RPRt	NRPRe	NPRPm	NRPRt	SM	RSF	NRSF	RE	FW
	(MJ)	(MJ)	(MJ)	(MJ)	(MJ)	(MJ)	(kg)	(MJ)	(MJ)	(MJ)	(MJ)
Total	9.36E+01	0.00E+00	9.36E+01	5.49E+02	0.00E+00	5.49E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.3E+01
A1- A3	2.43E+01	0.00E+00	2.43E+01	4.90E+02	0.00E+00	4.90E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.2E+01
A4	8.59E-02	0.00E+00	8.59E-02	2.12E+01	0.00E+00	2.12E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2E-01
A5	1.46E-03	0.00E+00	1.46E-03	3.45E-01	0.00E+00	3.45E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.8E-03
B1	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	0.00E+00	0.0E+00
B2	6.92E+01	0.00E+00	6.92E+01	3.34E+01	0.00E+00	3.34E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.3E+00
B3	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	0.00E+00	0.0E+00
B4	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	0.00E+00	0.0E+00
B5	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	0.00E+00	0.0E+00
B6	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	0.00E+00	0.0E+00
B7	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	0.00E+00	0.0E+00
C1	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	0.00E+00	0.0E+00
C2	4.23E-03	0.00E+00	4.23E-03	1.99E+00	0.00E+00	1.99E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	9.8E-03
C3	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	0.00E+00	0.0E+00
C4	6.86E-03	0.00E+00	6.86E-03	1.62E+00	0.00E+00	1.62E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.3E-02

Output Flows and Waste Categories								
Module	HWD	NHWD	HLRW	ILLRW	CRU	MFR	MER	EE
	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(kg)	(MJ)
Total	0.00E+00	1.54E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A1- A3	0.00E+00	5.02E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A4	0.00E+00	5.98E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A5	0.00E+00	1.73E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	0.00E+00	3.76E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	0.00E+00	1.83E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	0.00E+00	8.22E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Greenhouse Gas Emissions and Removals								
Module	BCRP	BCEP	BCRK	BCEK	BCEW	CCE	CCR	CWNR
	(kg CO2e)	(kg CO2e)	(kg CO2e)	(kgCO2e)	(kg CO2e)	(kg CO2e)	(kg CO2e)	(kg CO2e)
Total	0.00E+00	0.00E+00	1.72E+00	1.72E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A1- A3	0.00E+00	0.00E+00	1.72E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A5	0.00E+00	0.00E+00	0.00E+00	1.72E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Interpretation

Due to the high degree of value add within the vitreous product manufacturing process, the Kohler Operations life cycle stage drives most of the environmental impact categories for vitreous ceramic sanitary ware. Exceptions are products that control water flow rate, such as toilet tanks and one-piece toilets, which will see these consumer use phase impacts dominate the product life cycle.
Manufacturing impacts are primarily driven by energy (natural gas and electricity) use. Therefore, projects that improve energy efficiency have been and will continue to be a primary area of focus. Hardware accessories, especially those that contain metals such as brass and steel, also carry a greater contribution toward overall product environmental impact. Mass reduction and material substitution are areas of focus within the supplier operations portion of the product life cycle.
Where applicable, water use reduction efforts will see the greatest return on investment due primarily to the associated reduction in energy required to pump and treat this water. These efforts must be balanced against the product and product system's capacity to operate effectively when less water is available as a motive force.

REFERENCES

- PCR Part A — UL Environment and Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Construction Products from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report. December 2017, version 3
- PCR Part B — UL Environment and Institut Bauen und Umwelt e.V. (IBU). Product Category Rules Part B: Sanitary Ceramic EPD Requirement (V.2, January 2018)
- ISO 14025 — ISO 14025:2011-10, Environmental labels and declarations — Type III environmental declarations — Principles and procedures.
- ISO 14040 — ISO 14040:2009-11, Environmental management — Life cycle assessment — Principles and framework
- ISO 14044 — ISO 14044:2006-10, Environmental management — Life cycle assessment — Requirements and guidelines
- ISO 21930 — Sustainability in buildings and civil engineering works — Core rules for environmental product declarations of construction products and services
- EN 15804 — EN 15804:2012-04: Sustainability of construction works — Environmental Product Declarations — Core rules for the product category of construction product
- WaterSense® — US EPA, Office of Wastewater Management http://www.epa.gov/watersense
- ULE 2013 — UL Environment, General Program Instructions, 2013.
- OHSAS 18001 — Occupational Health and Safety Management Systems - Requirements
- ISO 14001 — Environmental Management Systems - Requirements with guidance for use
- ASME A112.19.2/CSA B45.1 — Ceramic Plumbing Fixtures
- ADA — Americans with Disabilities Act - Standards for Accessible Design
- ICC/ANSI A117.1 — International Code Council - Accessible and Usable Buildings and Facilities
- CSA B651 — Accessible Design for Built Environment
- OBC — Ontario Building Code Section 3.8 - Barrier-Free Design
- ICES-003 — Industry Canada, Interference Causing Equipment Standard 003 - Information Technology Equipment (ITE) - Limits and methods of measurement
- FCC part 15 — Federal Communications Commission, Title 47, Part 15 - Radio Frequency Devices
- DOE-Energy Policy Act 1992 — Department of Energy - Energy Policy Act 1992
- ASME A112.19.14 — Six Liter Closets Equipped with a Dual Flushing Device
- ADA-Children's Environment — ADA Standards for Accessible Design - Clause 604.9
- ASME A112.19.19-06 — Vitreous China Nonwater Urinals
- GREENGUARD — UL Environment, http://greenguard.org/en/index.aspx