Declaration Owner

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Products

Staron® Acrylic Solid Surfaces

Functional Unit

The functional unit is one square meter of countertop provided and maintained for a period of 10 years in residential use.

EPD Number and Period of Validity

SCS-EPD-04751
EPD Valid November 20, 2017 through November 19, 2022
Version: January 8, 2020

Product Category Rule

Product Category Rule for Environmental Product Declarations: *PCR for Residential Countertops*. NSF International. Valid through September 17, 2018.

Program Operator

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Disclaimers: *This EPD conforms to ISO 14025, 14040, and ISO 14044.*

Scope of Results Reported: *The PCR requirements limit the scope of the LCA metrics such that the results exclude environmental and social performance benchmarks and thresholds, and exclude impacts from the depletion of natural resources, land use ecological impacts, ocean impacts related to greenhouse gas emissions, risks from hazardous wastes and impacts linked to hazardous chemical emissions.*

Accuracy of Results: *Due to PCR constraints, this EPD provides estimations of potential impacts that are inherently limited in terms of accuracy.*

Comparability: *The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the final results, due to and not limited to, the practitioner's assumptions, the source of the data used in the study, and the specifics of the product modeled.*

PCR review, was conducted by	Evan Griffing, PhD, Environmental Clarity LLC, egriffing@environmentalclarity.com
Approved Date: November 20, 2017 – End Date: November 19, 2022 Version: January 8, 2020	
Independent verification of the declaration and data, according to ISO 14025:2006	☐ internal ☑ external
Third party verifier	Tom Gloria, Ph.D., Industrial Ecology Consultants

ABOUT LOTTE

Lotte Chemical Corp., formerly Cheil Industries, established in 1954 as the founding parent company of the Samsung Group, kicked off its chemical business as part of its portfolio expansion strategy. In 1992, the company started its solid surface business and in 2009 made a foray into manufacturing of engineered stone (quartz surfaces) in a move to strengthen its business portfolio further. In May 2016, the company was renamed as Lotte Chemical Corp., a move forward toward achieving a greater vision of becoming a global supplier of high-quality, decorative surfacing materials.

PRODUCT DESCRIPTIONS

Staron® Acrylic Solid Surfaces is a homogeneous and non-porous acrylic composite surfacing material comprised predominately of polymethyl methacrylate and aluminum trihydrate. Staron offers an extensive assortment of colors and patterns and is well-suited for a range of residential and commercial interior applications. Staron is ideally used in healthcare, hospitality, corporate, retail, and residential environments. In accordance with the PCR, the product is classified as polymeric solid surface countertop. The countertop product includes 1.2% pre-consumer recycled content. The manufacturer warrants for a period of 10 years from the date of purchase.

PRODUCT CHARACTERISTICS AND PERFORMANCE

Table 1. *Product characteristics for Staron® Acrylic Solid Surfaces.*

Characteristic	Nominal Value	Unit
Sheet thickness	12 (0.50)	mm (inch)
Sheet length	3,680 (145)	mm (inch)
Sheet width	760 (30.0)	mm (inch)
Sheet weight	19.6 (4.0)	kg/m^2 (lb/ft^2)
Underlayment included	N	Y/N
VOC Emissions Test Method	GREENGUARD GOLD	-

Table 2. *Product performance test results for Staron® Acrylic Solid Surfaces.*

Properties	Results	Test Method
Tensile strength	6,000 psi	ASTM D638
Tensile modulus	600,000 psi	ASTM D638
Flexural strength	10,000 psi	ASTM D790
Flexural modulus	1,000,000 psi	ASTM D790
Elongation	0.50%	ASTM D638
Hardness	92 Rockwell "M" Scale 65 Barcol Impressor	ASTM D785 ASTM D2583
Thermal expansion	2.0 x 10-5 in/in F°	ASTM D696
Gloss (60 Gardner)	Between 5 – 20	NEMA LD-3
Color stability	No change-200hrs	NEMA LD-3
Stain resistance	Pass Rating 41	ANSI Z124
Abrasion resistance	Pass	ANSI Z124
Boiling water surface resistance	No effect	NEMA LD-3
High temperature resistance	No effect	NEMA LD-3
IZOD Impact resistance (notched)	0.28 ft.lb/in	ASTM D256
Ball drop ½" (12.3 mm) sheet	144" w/ 1/2 lb ball, No failure	NEMA LD-3
Fungi and Bacterial resistance	No growth	ASTM G21, G22
Specific gravity Solid colors Patterned colors	 1.72 1.69	ASTM D792
Water absorption	0.04% (1/2", 24hrs) 0.11%, (1/8", 24hrs)	ASTM D570
Flammability Flame spread Smoke density	Class A / Class 1 10 10	UBC 8-1 ASTM E84 ASTM E84
Radiant heat resistance	No visual effect	NEMA LD-3
Toxicity	84.4g (Solid Color) 81.8g (Patterned Color)	Pittburgh Test Protocol (LC50 Test)

MATERIAL COMPOSITION

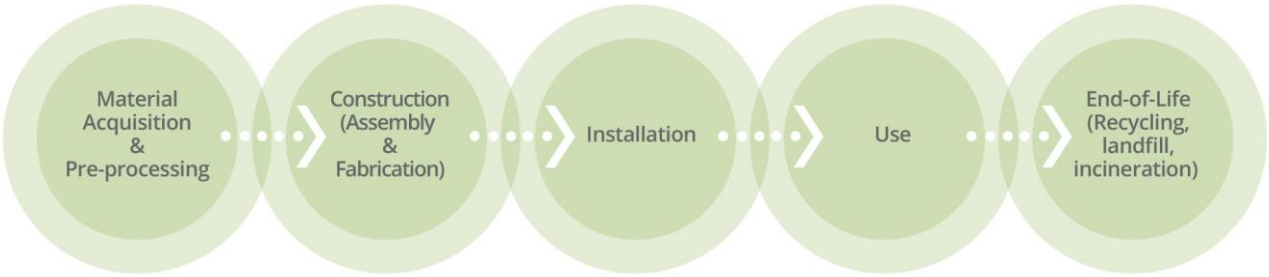
Table 3. *Material composition of Staron® Acrylic Solid Surfaces in kilograms per functional unit and in percentage of total weight.*

Material	Amount in Final Product (kg/m^2)	Percent of Total (%)	Material Resources Type
Product			
Alumina trihydrate	12.4	63.4%	Virgin non-renewable
Methyl methacrylate	5.85	29.8%	Virgin non-renewable
Polymethyl methacrylate	0.783	3.99%	Virgin non-renewable
Additives (unspecified)	0.274	1.40%	Virgin non-renewable
Recycled polymethyl methacrylate	0.245	1.25%	Recycled* non-renewable
Titanium dioxide	0.0294	0.150%	Virgin non-renewable
Total	**19.6**	**100%**	**-**
Packaging			
Protection film (LDPE)	0.060	14.3%	Virgin non-renewable
Wood pallet	0.360	85.7%	Virgin renewable
Total	**0.420**	**100%**	**-**

*100% pre-consumer recycled content

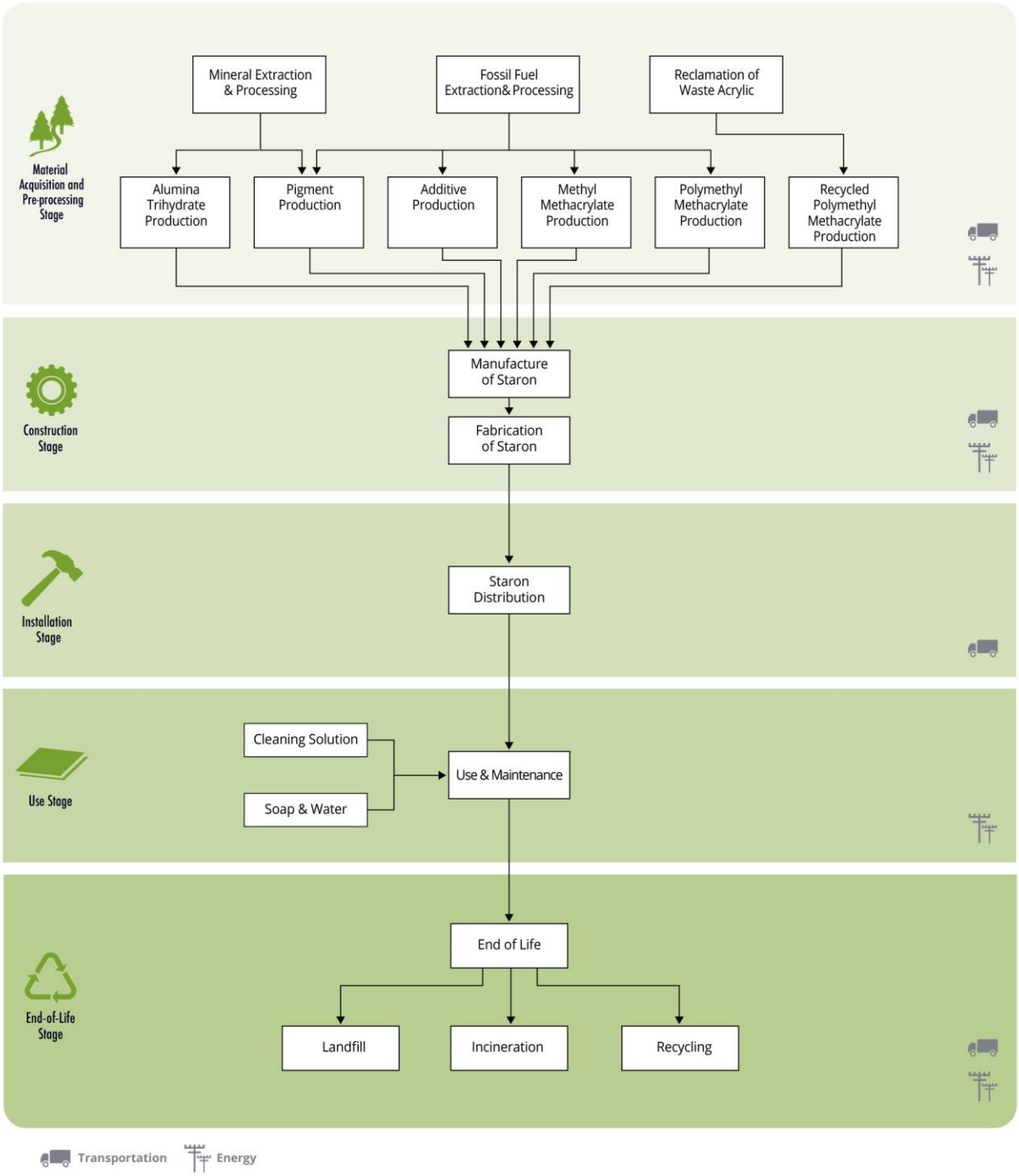
LIFE CYCLE ASSESSMENT STAGES

A cradle to grave life cycle assessment (LCA) was completed for this product in accordance with ISO 14040, ISO 14044, and the Product Category Rule for Environmental Product Declarations: *PCR for Residential Countertops*. The diagram below illustrates the life cycle stages included in this EPD.



PRODUCT LIFE CYCLE FLOW DIAGRAM

The diagrams below are a representation of the most significant contributions to the life cycle of Staron® Acrylic Solid Surfaces. This includes material acquisition and pre-processing, construction (assembly and fabrication), installation, use, and end-of-life.



LIFE CYCLE INVENTORY

The life cycle inventory (LCI) flows for the EPD are shown in Table 4 in accordance with the requirements of the PCR. Water usage from electricity generation is included.

Table 4. *Life cycle inventory flows for 1 m^2 Staron® Acrylic Solid Surfaces provided and maintained for a period of 10 years.*

Parameter	Total	Material Acquisition & Pre-processing	Construction	Installation	Use	End-of-Life
Emissions to Air (kg)						
SO_X	0.19	0.11	$6.5x10^{-2}$	$5.3x10^{-3}$	$7.9x10^{-3}$	$1.1x10^{-3}$
NO_X	0.15	$4.4x10^{-2}$	$7.9x10^{-2}$	$1.6x10^{-2}$	$1.1x10^{-2}$	$4.9x10^{-3}$
CO_2	45	17	16	3.5	8.7	0.73
Methane	$7.8x10^{-2}$	$3.9x10^{-2}$	$2.6x10^{-2}$	$3.3x10^{-3}$	$9.2x10^{-3}$	$7.7x10^{-4}$
N_2O	$3.5x10^{-3}$	$3.4x10^{-4}$	$4.0x10^{-4}$	$7.2x10^{-5}$	$2.6x10^{-3}$	$2.9x10^{-5}$
CO	0.12	$2.4x10^{-2}$	$3.3x10^{-2}$	$7.4x10^{-3}$	$5.0x10^{-2}$	$2.2x10^{-3}$
Water Usage and Emission to Water (kg)						
Water Consumption	6,500	4,600	810	40	950	9.1
Phosphates	$4.9x10^{-2}$	$2.7x10^{-2}$	$1.7x10^{-2}$	$8.5x10^{-4}$	$2.9x10^{-3}$	$9.9x10^{-5}$
Nitrates	0.17	$7.0x10^{-3}$	$6.1x10^{-3}$	$2.7x10^{-4}$	0.16	$3.8x10^{-5}$
Dioxin	0.0	0.0	0.0	0.0	0.0	0.0
Arsenic	$3.2x10^{-4}$	$2.8x10^{-4}$	$3.0x10^{-5}$	$2.9x10^{-6}$	$7.8x10^{-6}$	$3.5x10^{-7}$
Lead	$3.2x10^{-4}$	$2.8x10^{-5}$	$2.8x10^{-4}$	$2.9x10^{-6}$	$8.3x10^{-6}$	$1.2x10^{-6}$
Mercury	$3.7x10^{-6}$	$1.5x10^{-6}$	$1.8x10^{-6}$	$6.3x10^{-8}$	$3.0x10^{-7}$	$9.7x10^{-9}$
Cadmium	$6.3x10^{-5}$	$4.8x10^{-6}$	$5.2x10^{-5}$	$1.3x10^{-6}$	$3.9x10^{-6}$	$1.5x10^{-6}$
Chromium	$1.8x10^{-3}$	$1.7x10^{-3}$	$7.3x10^{-5}$	$9.6x10^{-6}$	$2.2x10^{-5}$	$9.7x10^{-7}$
Energy Type and Usages (MJ)						
Primary energy demand	1,500	1,000	270	59	100	13
Fossil fuels	1,300	1,00	260	58	30	13
Nuclear	73	36	34	0.93	2.2	0.11
Renewable*	86	6.1	6.6	0.70	72	0.14
Waste Management (kg)						
Incineration with energy recovery	INA	INA	INA	INA	INA	INA
Incineration without energy recovery	INA	INA	INA	INA	INA	INA
Landfill (Non-hazardous waste)	43	9.6	5.0	2.6	0.77	25
Hazardous waste	$9.7x10^{-4}$	$1.2x10^{-4}$	$7.7x10^{-4}$	$3.2x10^{-5}$	$5.2x10^{-5}$	$5.6x10^{-6}$
Landfill avoidance (recycling)	0.73	Negligible	0.73	Negligible	Negligible	Negligible

*Solar, wind, hydro, biomass

INA = Indicator not assessed

LIFE CYCLE IMPACT ASSESSMENT

The life cycle impact assessment (LCIA) for the EPD is conducted in accordance with requirements of the PCR. Impact category indicators are estimated using the TRACI 2.1 and CML characterization methods. The LCIA results are calculated using SimaPro 8.3 software.

Table 5. *LCIA results for 1 m^2 Staron® Acrylic Solid Surfaces provided and maintained for a period of 10 years.*

Impact Category	Units	Total	Material Acquisition & Pre-processing	Construction	Installation	Use	End-of-Life
Global warming potential	kg CO_2 eq	76	44	17	3.6	9.7	0.76
		100%	59%	23%	4.7%	13%	1.0%
Acidification potential	kg SO_2 eq	0.42	0.25	0.12	$1.6x10^{-2}$	$2.7x10^{-2}$	$4.6x10^{-3}$
		100%	59%	29%	3.9%	6.4%	1.1%
Photochemical ozone creation potential	kg O_3 eq	4.8	2.1	2.0	0.39	0.31	0.12
		100%	43%	40%	8.0%	6.4%	2.5%
Eutrophication potential	kg N eq	0.20	$8.6x10^{-2}$	$5.9x10^{-2}$	$4.0x10^{-3}$	$5.3x10^{-2}$	$1.3x10^{-3}$
		100%	42%	29%	2.0%	26%	0.66%
Ozone depletion potential	kg CFC-11 eq	$9.5x10^{-6}$	$5.4x10^{-6}$	$2.7x10^{-6}$	$8.8x10^{-7}$	$3.7x10^{-7}$	$2.0x10^{-7}$
		100%	57%	28%	9.2%	3.9%	2.1%
Abiotic depletion potential (elements)*	kg Sb eq	$1.1x10^{-4}$	$3.6x10^{-5}$	$4.3x10^{-5}$	$1.1x10^{-5}$	$1.6x10^{-5}$	$5.4x10^{-7}$
		100%	34%	41%	10%	15%	0.51%
Abiotic depletion potential (fossil fuels)	MJ	1,300	990	230	57	28	13
		100%	75%	17%	4.4%	2.1%	1.0%

* This indicator is based on assumptions regarding current reserves estimates. Users should use caution when interpreting results because there is insufficient information on which indicator is best for assessing the depletion of abiotic resources.

ADDITIONAL ENVIRONMENTAL INFORMATION

Lotte Chemical Corp. is certified to ISO 14001:2009 Environmental Management System and is committed to managing environmental impact by improving environmental performance, cutting waste, and reducing costs without compromising performance. To view the certification, please visit:
https://www.staron.com/File/download.do?fileName=1489377807825.pdf

Lotte Chemical Corp. is certified to ISO 50001: 2011 and follows a systematic approach in achieving continual improvement of energy performance, including energy efficiency, energy use, and consumption. To view the certification, please visit:
https://www.staron.com/File/download.do?fileName=1489377632329.pdf

Lotte Chemical Corp. is certified to ISO 9001: 2009 and therefore conforms to high quality management principles to ensure their products consistently meet customers' requirements, and that quality is consistently improved. To view the certification, please visit: https://www.staron.com/File/download.do?fileName=1489377775677.pdf

Scrap and waste generated during production process are recycled and re-used in the manufacture of new products. Staron® recycled series products are manufactured using pre-consumer recycled content and are certified by SCS Global Services that can contribute to LEED® v4 MR Credits for Building Product Disclosure and Optimization – Sourcing of Raw Materials, option 2, resulting in a reduction of industrial waste and energy consumption utilized during the manufacturing process. Using recycled content helps conserve energy and resources, alleviates pressure on landfill space and reduces the need for transportation during certain phases of a product's life cycle.

Staron® is GREENGUARD Gold certified and is therefore scientifically proven to meet some of the world's most rigorous, third-party chemical emission standards – helping reduce indoor air pollution and the risk of chemical exposure while aiding in the creation of healthier indoor environments. GREENGUARD Gold certification standard includes health based criteria for additional chemicals and also requires lower total VOC (volatile organic compounds) emissions levels to ensure products are acceptable for use in environments such as schools and healthcare facilities. To view the certification, please visit: https://www.staron.com/File/download.do?fileName=1507769264182.pdf

Staron® received a Certificate of Environmental Building Material (Certificate #: HB075G04-01) and achieved an outstanding grade in accordance with the regulation for environmental building materials provided by the Korea Air Cleaning Association.

Staron® is considered a re-usable material and can be refurbished to look as new. Otherwise, waste product can be incinerated or disposed of to landfill in accordance with local regulations.

SUPPORTING TECHNICAL INFORMATION

Unit processes are developed with SimaPro 8.3 software, drawing upon data from multiple sources. Primary data were provided by Lotte for their manufacturing, upstream transport, and distribution processes. The primary sources of secondary LCI data are from Ecoinvent.

Table 6. *LCI datasets and associated databases used to model the Staron® Acrylic Solid Surfaces product system.*

Flow	Dataset	Data Source	Publication Date
Staron Materials			
Alumina trihydrate	Aluminium hydroxide {GLO}| production | Alloc Rec, U	Ecoinvent	2016
Methyl methacrylate	Production of methyl methacrylate, European production mix - RER	PlasticsEurope	2014
Polymethyl methacrylate	Polymethyl methacrylate, beads - RER	PlasticsEurope	2015
Recycled polymethyl methacrylate	Recycled polymethyl methacrylate	SCS	2017
Titanium dioxide	Titanium dioxide {RoW}| production, chloride process | Alloc Rec, U	Ecoinvent	2016
Additives (unspecified)	Chemical, organic {GLO}| production | Alloc Rec, U	Ecoinvent	2016
Staron Packaging			
Protection Film	Packaging film, low density polyethylene {RoW}| production | Alloc Rec, U	Ecoinvent	2016
Wooden Pallet	Re-used wood pallet	SCS	2017
Ancillary Materials for Manufacturing Staron			
Polyvinyl Alcohol Film	Polyvinylfluoride, film {RoW}| production | Alloc Rec, U	Ecoinvent	2016
Mineral Oil	White spirit {RoW}| production | Alloc Rec, U	Ecoinvent	2016
Electricity/Heat/Resources for Manufacturing			
Electricity	Electricity, medium voltage {KR}| market for | Alloc Rec, U	Ecoinvent	2016
Natural Gas	Heat, district or industrial, natural gas {GLO}| market group for | Alloc Rec, U	Ecoinvent	2016
Steam	Steam, in chemical industry {KR}| production | Alloc Rec, U	Ecoinvent; SCS	2016; 2017
Water	Tap water {RoW}| market for | Alloc Rec, U	Ecoinvent	2010
Fabrication of Staron			
Electricity	Electricity, medium voltage {US}| market group for | Alloc Rec, U	Ecoinvent	2016
Adhesive	Methyl methacrylate {GLO}| market for | Alloc Rec, U; Chemical, organic {GLO}| market for | Alloc Rec, U	Ecoinvent	2016
Use of Staron			
Surface Cleaner	Water, deionised, from tap water, at user {RoW}| market for water, deionised, from tap water, at user | Alloc Rec, U; Citric acid {GLO}| market for | Alloc Rec, U; Potassium hydroxide {GLO}| market for | Alloc Rec, U; Chemical, organic {GLO}| market for | Alloc Rec, U	Ecoinvent	2016
Soap	Soap {GLO}| market for | Alloc Rec, U	Ecoinvent	2016
Water	Tap water {RoW}| market for | Alloc Rec, U	Ecoinvent	2016
Transportation			
Road	Transport, freight, lorry 16-32 metric ton, EURO4 {GLO}| market for | Alloc Rec, U	Ecoinvent	2016
Ship	Transport, freight, sea, transoceanic ship {GLO}| market for | Alloc Rec, U	Ecoinvent	2016

Data Quality

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	Manufacturer data (primary data) are based on 2016 annual production, respectively. Representative datasets (secondary data) used for upstream and background processes are generally less than 10 years old. All of the data used represented an average of at least one year's worth of data collection.
Geographical Coverage: Geographical area from which data for unit processes is collected to satisfy the goal of the study	The data used in the analysis provide the best possible representation available with current data. Representative data used in the assessment are representative of US, Korean, Global, or "Rest-of-World" (average for all countries in the world with uncertainty adjusted). Datasets chosen are considered sufficiently similar to actual processes.
Technology Coverage: Specific technology or technology mix	For the most part, data are representative of the actual technologies used for processing, transportation, and manufacturing operations.
Precision: Measure of the variability of the data values for each data expressed	Precision of results are not quantified due to a lack of data. Data collected for operations were typically averaged for one year and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	Except where noted, the LCA model included all known mass and energy flows. In some instances, surrogate data used to represent upstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 10% of the total environmental impact for each indicator are excluded. In total, these missing data represent less than 5% of the mass or energy flows.
Representativeness: Qualitative assessment of the degree to which the data set reflects the true population of interest	Data used in the assessment represent typical or average processes as currently reported from multiple data sources, and are therefore generally representative of the range of actual processes and technologies for production of these materials. Considerable deviation may exist among actual processes on a site-specific basis; however, such a determination would require detailed data collection throughout the supply chain back to resource extraction. Some proxy datasets are used to represent materials due to the lack of data available.
Consistency: Qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The consistency of the assessment is considered to be high. Data sources of similar quality and age are used; with a bias towards Ecoinvent data where available. Different portions of the product life cycle are equally considered.
Reproducibility: Qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Based on the description of data and assumptions used, this assessment would be reproducible by other practitioners. All assumptions, models, and data sources are documented.
Sources of the Data: Description of all primary and secondary data sources	For manufacturing and packaging, primary data were provided by Lotte. Similarly, the upstream transport of materials is based on primary data provided by Lotte. The fabrication process was derived from fabrication manuals provided by Lotte to derive key parameters for calculations. For the distribution of product from manufacturing facility to distribution center, a weighted average based on primary data was provided by Lotte. Where primary upstream data were unavailable, secondary data were used. The principal source of secondary LCI data is Ecoinvent.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to the product materials and packaging is low. Data for upstream operations relied upon use of existing representative datasets. These datasets contained relatively recent data (<10 years), but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact methods required by the PCR include impact potentials, which lack characterization of providing and receiving environments or tipping points.

Allocation

Resource use at the Yeosu-si, Jeollanam-do, South Korea facility (e.g., water and energy) was allocated to the product based on the product weight as a fraction of the total facility production.

The countertop product system includes recycled materials, which are allocated using the recycled content allocation method (also known as the 100-0 cut off method). Using the recycled content allocation approach, system inputs with recycled content do not receive any burden from the previous life cycle other than reprocessing of the waste material. At end of life, materials which are recycled leave the system boundaries with no additional burden.

Impacts from transportation were allocated based on the mass of material and distance transported.

System boundaries

The system boundaries of the life cycle assessment for the countertop was cradle to grave. A description of the system boundaries for this EPD are as follows:

- **Material acquisition and pre-processing stage –** This stage includes extraction of virgin materials and reclamation of non-virgin feedstock. Resource use, emissions, and generated wastes associated with extraction and processing of the raw materials are included. All upstream transportation, including transportation to the manufacturing facility, is included.
- **Construction stage –** This stage includes all the relevant manufacturing and fabrication processes. Resource use, emissions, and generated wastes associated with these processes are included. Transport of semi-finished products between facilities and materials used in packaging of the product are included. Production of capital goods, infrastructure, production of manufacturing equipment, and personnel related activities are excluded.
- **Installation stage –** This stage includes the delivery of the countertop to the point of installation, and energy and ancillary materials used during installation. Waste generated during countertop installation is included. Sinks, plumbing fixtures, and cook tops are excluded.
- **Use stage –** The use stage includes the cleaning of the countertop during its lifetime, as well as extraction, manufacturing and transport of all sundry material for cleaning. In accordance with the PCR, maintenance and repair of the countertop is generally insignificant and is excluded from this stage. The reference service life for the countertop in this EPD is 10 years.
- **End of life stage –** The end of life stage includes the transport of the countertop and its original packaging to end of life processes including landfill, incineration, and recycling.

Cut-off criteria

According to the PCR, mass and energy flows that consist of less than 1% may be omitted from the inventory analysis. Cumulative omitted mass or energy flows shall not exceed 5%. In the present study, except as noted, all known materials and processes were included in the life cycle inventory.

REFERENCES

1. ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA, 19428-2959 USA. http://www.astm.org/Standard/index.shtml
2. IPCC, 2013: Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 1535 pp, doi:10.1017/CBO9781107415324.
3. ISO 14025: 2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures
4. ISO 14040: 2006 Environmental Management – Life cycle assessment – Principles and framework
5. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines
6. PlasticsEurope. Eco-profiles. http://www.plasticseurope.org/plastics-sustainability-14017/eco-profiles/browse-by-list.aspx
7. Product Category Rule for Environmental Production Declarations: *PCR for Residential Countertops*. NSF International. Valid through September 17, 2018.
8. SCS Global Services. Life Cycle Assessment of Radianz and Staron Countertops. October 2017. Final Report. Prepared for Lotte Advanced Materials Co., Ltd.
9. SCS Type III Environmental Declaration Program: Program Operator Manual v8.0. April 2017. SCS Global Services
10. Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI). Version 2.1. US Environmental Production Agency.
11. US Department of Transportation. Bureau of Transportation Statistics. 2012 Commodity Flow Survey. Table 11. NAICS code 337. https://www.rita.dot.gov/bts/sites/rita.dot.gov.bts/files/ec12tcf-us.pdf
12. US EPA. Advancing Sustainable Materials Management: 2014 Fact Sheet. Assessing Trends in Material Generation, Recycling, and Disposal in the United States. November 2015.
13. US EPA. WARM Model Transportation Research - Draft. Memorandum from ICF Consulting to United States Environmental Protection Agency. September 7, 2004.
14. Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: http://link.springer.com/10.1007/s11367-016-1087-8

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