MULL-it-OVER®
Sound Solutions for Glass Buildings

VERIFIED by SCS GLOBAL SERVICES
ENVIRONMENTAL PRODUCT DECLARATION
BASED ON LCA

Declaration Owner
Mull-It-Over Products
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Product
60 Classic - Extruded Aluminum Mullion Trim Cap with Closed Cell Foam
UN CPC 42120

Declared Unit
1 meter length of mullion trim cap of 102 mm width. Results are also presented for a 1 foot length of mullion trim cap of 4 inch width.

Applicable Geographic Region:
North America

EPD Number and Period of Validity
SCS-EPD-04726
EPD Valid October 30, 2017 through October 29, 2022

Product Category Rule
Product Category Rule for Construction Products and Construction Services. Product Group Classification: Multiple UN CPC Codes. International EPD® System. 2012:01. Version 2.2. May 2017.

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SCSglobal SERVICES

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Disclaimers: *This EPD conforms to ISO 14025, 14040, ISO 14044, and ISO 21930.*

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	The Technical Committee of the International EPD® System. Chair: Massimo Marino Contact via info@environdec.com.
Approved Date: October 30, 2017 – End Date: October 29, 2022	
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 Mull-It-Over® Products

Mull-It-Over Products is dedicated to identifying and improving poor performing transition details in building design. Initial efforts have been focused on improvement of the interior to exterior transition details for buildings with glass facades. Mull-It-Over Products holds national and international patents with a goal to make simple products that produce obvious improvement.

PRODUCT DESCRIPTION

The Mull-It-Over® Mullion Trim Cap provides a coordinated transition between interior partition walls and exterior glass facade systems so they both perform to their full potential. The traditional detail between interior walls and curtain wall or store front facades has been to terminate the drywall partition wall at the aluminum mullion framing with the aluminum mullion becoming the last several inches of the partition wall. Sound easily travels between rooms through the hollow aluminum mullions. Mull-It-Over sound barrier mullion trim caps provide a simple, aesthetically attractive, durable and easy to install wall trim that also blocks the flanking path for sound through the aluminum mullion framing. Noise transfer between rooms is no longer a problem and building requirements can be met or exceeded. Building code requirements, confidentiality, privacy, productivity and HIPAA (Health Insurance Portability and Accountability Act of 1996) compliance for buildings with glass facades now have a simple design solution.

The *60 Classic - Extruded Aluminum Mullion Trim Cap with Closed Cell Foam* with a low profile 7/8" (22 mm) return leg, delivers high performance in a compact size. The trim cap allows for differential movement between interior partitions and exterior facade; can be custom finished to match any curtain wall finish; is compatible with most standard manufactured curtain wall or storefront systems and can be installed in new construction or added as a retrofit. The 60 Classic is designed to be attractive, durable and cleanable.

PRODUCT CHARACTERISTICS AND PERFORMANCE

A standard mullion has a Sound Transmission Class (STC) rating of 28. If left exposed, sound transfer between rooms will be a problem due to the poor noise deadening performance of the mullion.

- The Mull-It-Over® Mullion Trim Cap increases the STC rating at the mullion to minimize sound flanking.
- ASTM E90 tested to deliver an STC 60 for the partition wall / mullion assembly.
- Facility Guidelines Institute (FGI) Guidelines for Health Care Construction and International Building Code for Multi-Family Housing have minimum STC requirements for demising walls. When tested as an assembly, minimum code requirements will not be met if a demising wall terminates at an exposed mullion.
- The Mull-It-Over® Mullion Trim Cap is a simple and clean trim detail for the exposed end of a partition wall that allows for differential movement between the partition and glass systems.
- Easy to install during new construction or added during retrofit to correct existing sound transfer problems or code violations.
- The Mull-It-Over® Mullion Trim Cap has become the standard design detail for many leading architectural firms.

MATERIAL COMPOSITION

Table 1. *Material composition for 1 meter of 102 mm wide of 60 Classic - Extruded Aluminum Mullion Trim Cap with Closed Cell Foam by mass in kilograms (per 1 m length) and as a percentage of total mass.*

Component	Material	Availability				60 Classic	
		Renewable	Non-Renewable	Recycled (% pre-/post-consumer)	Origin of Materials	(kg)	(%)
Polydamp Barrier	Acrylic adhesive, Melamine, Vinyl		Fossil, Limited		Global	0.59	24%
Extruded Aluminum Trim Cap	Aluminum	Mineral, Abundant		53%/20%	Global	1.1	46%
Aluminum Snap cover	Aluminum	Mineral, Abundant		53%/20%	Global	0.25	10%
Closed Cell Foam Gasket	Ethylene propylene diene monomer rubber (EPDM), Acrylic, Vinyl		Fossil, Limited		Global	0.49	20%
					Total	2.4	100%

Table 2. *Material composition for 1 foot of 4" wide of 60 Classic - Extruded Aluminum Mullion Trim Cap with Closed Cell Foam by mass in pounds (per 1 foot length) and as a percentage of total mass.*

Component	Material	Availability				60 Classic	
		Renewable	Non-Renewable	Recycled (% pre-/post-consumer)	Origin of Materials	(kg)	(%)
Polydamp Barrier	Acrylic adhesive, Melamine, Vinyl		Fossil, Limited		Global	0.40	24%
Extruded Aluminum Trim Cap	Aluminum	Mineral, Abundant		53%/20%	Global	0.75	46%
Aluminum Snap cover	Aluminum	Mineral, Abundant		53%/20%	Global	0.16	10%
Closed Cell Foam Gasket	Ethylene propylene diene monomer rubber (EPDM), Acrylic, Vinyl		Fossil, Limited		Global	0.33	20%
					Total	1.6	100%

No hazardous materials required for disclosure are included in the product.

LIFE CYCLE ASSESSMENT STAGES AND REPORTED INFORMATION

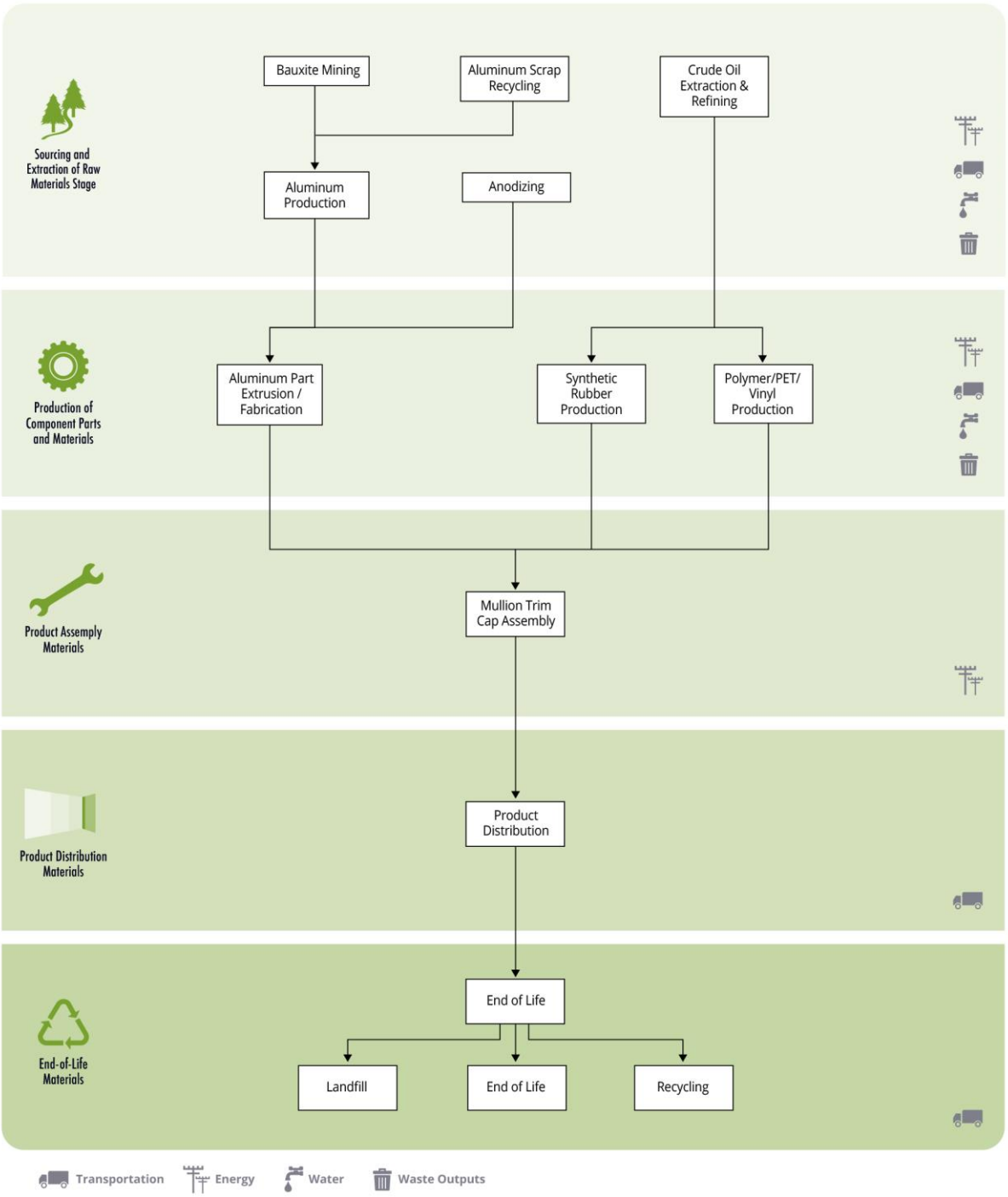
The system boundary is cradle-to-gate with options and includes resource extraction and processing, product manufacture and assembly, distribution/transport, and end-of-life. The table below illustrates the life cycle stages included in this EPD.

Production			Construction Process		Use							End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	B1	B1	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material extraction and processing	Transport to manufacturer	Manufacturing	Transport	Construction - installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse, recovery and/or recycling potential
x	x	x	x	MND	MND	MND	MND	MND	MND	MND	MND	MND	x	MND	x	MND

MND = Module not declared

PRODUCT LIFE CYCLE FLOW DIAGRAM

The diagram below is a representation of the most significant contributions to the life cycle of the *60 Classic - Extruded Aluminum Mullion Trim Cap with Closed Cell Foam*. This includes material acquisition and pre-processing, transport, product manufacturing, distribution and disposal.



LIFE CYCLE IMPACT ASSESSMENT

Impact category indicators are calculated using the CML-IA and TRACI 2.1 characterization methods. TRACI 2.1 impact category indicators include global warming potential (100 years), acidification potential, smog potential, ozone depletion potential, and eutrophication potential. CML-IA impact category indicators include global warming potential (100 years), acidification potential, eutrophication potential, Photochemical Ozone Creation potential, ozone depletion potential, and abiotic resource depletion, in accordance with the PCR. The LCIA results are calculated using OpenLCA 1.6.2 software. The results for these indicators are shown in Table 3 and Table 4.

Table 3. *Life cycle impact assessment results for 1 meter of 102 mm wide 60 Classic - Extruded Aluminum Mullion Trim Cap with Closed Cell Foam.*

Impact category	Unit	Total	A1 – Sourcing & Extraction	A2 - Transport	A3 - Production	A4 - Distribution	C2- Transport	C4 – Disposal
LCIA Results - TRACI								
Global warming	kg CO_2 eq	11	9.5	0.31	$1.1x10^{-3}$	0.41	$1.3x10^{-2}$	0.56
	%	100%	88%	2.9%	0.01%	3.8%	0.12%	5.2%
Acidification	kg SO_2 eq	$5.2x10^{-2}$	$4.7x10^{-2}$	$2.0x10^{-3}$	$4.4x10^{-6}$	$1.9x10^{-3}$	$6.0x10^{-5}$	$4.3x10^{-4}$
	%	100%	92%	3.9%	0.01%	3.6%	0.12%	0.83%
Eutrophication	kg N eq	$6.4x10^{-2}$	$5.3x10^{-2}$	$3.7x10^{-4}$	$8.0x10^{-6}$	$4.5x10^{-4}$	$1.5x10^{-5}$	$1.1x10^{-2}$
	%	100%	82%	0.57%	0.01%	0.70%	0.02%	16%
Ozone depletion	kg CFC-11 eq	$1.0x10^{-6}$	$8.6x10^{-7}$	$7.4x10^{-8}$	$1.2x10^{-10}$	$1.0x10^{-7}$	$3.2x10^{-9}$	$6.1x10^{-9}$
	%	100%	82%	7.1%	0.01%	9.6%	0.31%	0.59%
Smog	kg O_3 eq	0.45	0.36	$4.1x10^{-2}$	$2.3x10^{-5}$	$4.4x10^{-2}$	$1.4x10^{-3}$	$5.9x10^{-3}$
	%	100%	80%	9.0%	0.01%	9.7%	0.31%	1.3%
LCIA Results - CML								
Global warming	kg CO_2 eq	11	9.6	0.31	$1.1x10^{-3}$	0.41	$1.3x10^{-2}$	0.56
	%	100%	88%	2.8%	0.01%	3.7%	0.12%	5.2%
Acidification potential	kg SO_2 eq	$5.1x10^{-2}$	$4.7x10^{-2}$	$1.8x10^{-3}$	$4.8x10^{-6}$	$1.6x10^{-3}$	$5.2x10^{-5}$	$2.2x10^{-4}$
	%	100%	93%	3.6%	0.01%	3.2%	0.10%	0.43%
Eutrophication potential	kg PO_4^{3-} eq	$2.8x10^{-2}$	$2.4x10^{-2}$	$3.2x10^{-4}$	$3.5x10^{-6}$	$3.7x10^{-4}$	$1.2x10^{-5}$	$3.9x10^{-3}$
	%	100%	84%	1.1%	0.01%	1.3%	0.04%	14%
Ozone layer depletion	kg CFC-11 eq	$7.9x10^{-7}$	$6.5x10^{-7}$	$5.6x10^{-8}$	$9.2x10^{-11}$	$7.5x10^{-8}$	$2.4x10^{-9}$	$4.7x10^{-9}$
	%	100%	83%	7.1%	0.01%	9.5%	0.31%	0.60%
Photochemical oxidation	kg C_2H_4 eq	$3.4x10^{-3}$	$3.2x10^{-3}$	$7.1x10^{-5}$	$2.2x10^{-7}$	$6.9x10^{-5}$	$2.2x10^{-6}$	$2.2x10^{-5}$
	%	100%	95%	2.1%	0.01%	2.1%	0.07%	0.65%
Abiotic depletion, elements	kg Sb eq	$2.5x10^{-8}$	$2.5x10^{-8}$	$2.3x10^{-10}$	$5.7x10^{-12}$	$2.7x10^{-10}$	$8.5x10^{-12}$	$5.7x10^{-11}$
	%	100%	98%	0.92%	0.02%	1.1%	0.03%	0.23%
Abiotic depletion, fossil fuels	MJ	150	140	4.6	$1.4x10^{-2}$	6.1	0.20	0.48
	%	100%	92%	3.1%	0.01%	4.1%	0.13%	0.32%

Table 4. *Life cycle impact assessment results for 1 foot of 4" wide 60 Classic - Extruded Aluminum Mullion Trim Cap with Closed Cell Foam.*

Impact category	Unit	Total	A1 – Sourcing & Extraction	A2 - Transport	A3 - Production	A4 - Distribution	C2- Transport	C4 – Disposal
LCIA Results - TRACI								
Global warming	lb CO_2 eq	7.3	6.4	0.21	$7.4x10^{-4}$	0.27	$8.8x10^{-3}$	0.38
	%	100%	88%	2.9%	0.01%	3.8%	0.12%	5.2%
Acidification	lb SO_2 eq	$3.5x10^{-2}$	$3.2x10^{-2}$	$1.3x10^{-3}$	$3.0x10^{-6}$	$1.3x10^{-3}$	$4.0x10^{-5}$	$2.9x10^{-4}$
	%	100%	92%	3.9%	0.01%	3.6%	0.12%	0.83%
Eutrophication	lb N eq	$4.3x10^{-2}$	$3.6x10^{-2}$	$2.5x10^{-4}$	$5.3x10^{-6}$	$3.0x10^{-4}$	$9.8x10^{-6}$	$7.1x10^{-3}$
	%	100%	82%	0.57%	0.01%	0.70%	0.02%	16%
Ozone depletion	lb CFC-11 eq	$7.0x10^{-7}$	$5.8x10^{-7}$	$5.0x10^{-8}$	$8.1x10^{-11}$	$6.7x10^{-8}$	$2.2x10^{-9}$	$4.1x10^{-9}$
	%	100%	82%	7.1%	0.01%	9.6%	0.31%	0.59%
Smog	lb O_3 eq	0.30	0.24	$2.7x10^{-2}$	$1.6x10^{-5}$	$3.0x10^{-2}$	$9.5x10^{-4}$	$4.0x10^{-3}$
	%	100%	80%	9.0%	0.01%	9.7%	0.31%	1.3%
LCIA Results - CML								
Global warming	lb CO_2 eq	7.3	6.5	0.21	$7.4x10^{-4}$	0.27	$8.8x10^{-3}$	0.38
	%	100%	88%	2.8%	0.01%	3.7%	0.12%	5.2%
Acidification potential	lb SO_2 eq	$3.4x10^{-2}$	$3.2x10^{-2}$	$1.2x10^{-3}$	$3.2x10^{-6}$	$1.1x10^{-3}$	$3.5x10^{-5}$	$1.5x10^{-4}$
	%	100%	93%	3.6%	0.01%	3.2%	0.10%	0.43%
Eutrophication potential	lb PO_4^{3-} eq	$1.9x10^{-2}$	$1.6x10^{-2}$	$2.2x10^{-4}$	$2.3x10^{-6}$	$2.5x10^{-4}$	$7.9x10^{-6}$	$2.6x10^{-3}$
	%	100%	84%	1.1%	0.01%	1.3%	0.04%	14%
Ozone layer depletion	lb CFC-11 eq	$5.3x10^{-7}$	$4.4x10^{-7}$	$3.8x10^{-8}$	$6.2x10^{-11}$	$5.0x10^{-8}$	$1.6x10^{-9}$	$3.2x10^{-9}$
	%	100%	83%	7.1%	0.01%	9.5%	0.31%	0.60%
Photochemical oxidation	lb C_2H_4 eq	$2.3x10^{-3}$	$2.1x10^{-3}$	$4.7x10^{-5}$	$1.5x10^{-7}$	$4.6x10^{-5}$	$1.5x10^{-6}$	$1.5x10^{-5}$
	%	100%	95%	2.1%	0.01%	2.1%	0.07%	0.65%
Abiotic depletion, elements	lb Sb eq	$1.7x10^{-8}$	$1.7x10^{-8}$	$1.6x10^{-10}$	$3.9x10^{-12}$	$1.8x10^{-10}$	$5.7x10^{-12}$	$3.9x10^{-11}$
	%	100%	98%	0.92%	0.02%	1.1%	0.03%	0.23%
Abiotic depletion, fossil fuels	Btu	43,000	40,000	1,300	3.9	1,800	57	140
	%	100%	92%	3.1%	0.01%	4.1%	0.13%	0.32%

Resource Use and Wastes

The PCR requires that several parameters be reported in the EPD, including resource use, wastes and output flows, and other environmental information. The results for these parameters are declared in Table 5 and Table 6.

Table 5. *Resource use and waste results for 1 meter of 4" wide 60 Classic - Extruded Aluminum Mullion Trim Cap with Closed Cell Foam.*

Parameter	Unit	Total	A1 – Sourcing & Extraction	A2 - Transport	A3 - Production	A4 - Distribution	C2- Transport	C4 – Disposal
Use of Resources								
Use of renewable primary energy excluding the renewable primary energy resources used as raw materials	MJ	16	16	$6.5x10^{-2}$	$6.2x10^{-4}$	$7.9x10^{-2}$	$2.5x10^{-3}$	$2.0x10^{-2}$
	%	100%	99%	0.42%	0.00%	0.50%	0.02%	0.12%
Use of renewable primary energy resources used as raw materials	MJ	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-
Total use of renewable primary energy resources	MJ	16	16	$6.5x10^{-2}$	$6.2x10^{-4}$	$7.9x10^{-2}$	$2.5x10^{-3}$	$2.0x10^{-2}$
	%	100%	99%	0.42%	0.00%	0.50%	0.02%	0.12%
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources	MJ	170	160	5.0	$1.7x10^{-2}$	6.6	0.21	0.54
	%	100%	93%	2.9%	0.01%	3.9%	0.13%	0.32%
Use of secondary materials	kg	-	-	-	-	-	-	-
	%	0%	0%	0%	0%	0%	0%	0%
Use of renewable secondary fuels	MJ	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Use of non-renewable secondary fuels	MJ	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Net use of fresh water resources	m^3	0.63	0.62	$5.0x10^{-3}$	$7.9x10^{-5}$	$4.5x10^{-3}$	-	$3.7x10^{-3}$
	%	100%	98%	0.80%	0.01%	0.72%	-	0.58%
Waste Flows								
Non-hazardous waste disposed	kg	3.3	0.99	0.28	$1.2x10^{-2}$	0.29	-	1.7
	%	100%	30%	8.5%	0.38%	8.8%	-	53%
Hazardous waste disposed	kg	$6.7x10^{-3}$	$6.7x10^{-3}$	$3.9x10^{-6}$	$4.0x10^{-8}$	$3.7x10^{-6}$	-	$1.6x10^{-6}$
	%	100%	100%	0.06%	0.00%	0.06%	-	0.02%
Radioactive waste disposed	kg	$4.2x10^{-4}$	$3.3x10^{-4}$	$4.4x10^{-5}$	$8.4x10^{-8}$	$4.3x10^{-5}$	-	$5.7x10^{-6}$
	%	100%	78%	11%	0.02%	10%	-	1.4%

INA = Indicator not assessed

Table 6. *Resource use and waste results for 1 foot of 4" wide 60 Classic - Extruded Aluminum Mullion Trim Cap with Closed Cell Foam.*

Parameter	Unit	Total	A1 – Sourcing & Extraction	A2 - Transport	A3 - Production	A4 - Distribution	C2- Transport	C4 – Disposal
Use of Resources								
Use of renewable primary energy excluding the renewable primary energy resources used as raw materials	Btu	4,500	4,500	19	0.18	23	0.73	5.7
	%	100%	99%	0.42%	0.00%	0.50%	0.02%	0.12%
Use of renewable primary energy resources used as raw materials	Btu	-	-	-	-	-	-	-
	%	-	-	-	-	-	-	-
Total use of renewable primary energy resources	Btu	4,500	4,500	19	0.18	23	0.73	5.7
	%	100%	99%	0.42%	0.00%	0.50%	0.02%	0.12%
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	INA	INA	INA	INA	INA	INA	INA	INA
Use of non-renewable primary energy resources used as raw materials	INA	INA	INA	INA	INA	INA	INA	INA
Total use of non-renewable primary energy resources	Btu	49,000	45,000	1,400	4.9	1,900	61	150
	%	100%	93%	2.9%	0.01%	3.9%	0.13%	0.32%
Use of secondary materials	lb	-	-	-	-	-	-	-
	%	0%	0%	0%	0%	0%	0%	0%
Use of renewable secondary fuels	Btu	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Use of non-renewable secondary fuels	Btu	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible	Negligible
Net use of fresh water resources	ft^3	6.8	6.6	$5.4x10^{-2}$	$8.5x10^{-4}$	$4.9x10^{-2}$	-	$4.0x10^{-2}$
	%	100%	98%	0.80%	0.01%	0.72%	-	0.58%
Waste Flows								
Non-hazardous waste disposed	lb	2.2	0.66	0.19	$8.4x10^{-3}$	0.19	-	1.2
	%	100%	30%	8.5%	0.38%	8.8%	-	53%
Hazardous waste disposed	lb	$4.5x10^{-3}$	$4.5x10^{-3}$	$2.6x10^{-6}$	$2.7x10^{-8}$	$2.5x10^{-6}$	-	$1.1x10^{-6}$
	%	100%	100%	0.06%	0.00%	0.06%	-	0.02%
Radioactive waste disposed	lb	$2.8x10^{-4}$	$2.2x10^{-4}$	$3.0x10^{-5}$	$5.6x10^{-8}$	$2.9x10^{-5}$	-	$3.8x10^{-6}$
	%	100%	78%	11%	0.02%	10%	-	1.4%

INA = Indicator not assessed

SUPPORTING TECHNICAL INFORMATION

Unit processes are developed with OpenLCA 1.6.2 software, drawing upon data from multiple sources. Primary data were provided by Mull-It-Over® Products for their manufacturing and fabrication processes. The primary sources of secondary LCI data are from Ecoinvent Database and Plastics Europe manufacturers' association.

Table 7. *Data sources used for the LCA study.*

Material	Dataset	Publication Date
Product		
Aluminum Snap cover	- aluminium scrap, post-consumer | aluminium scrap, post-consumer, Recycled Content cut-off - anodizing, aluminium sheet - aluminium scrap, new | aluminium scrap, new, Recycled Content cut-off - aluminium, primary, ingot - sheet rolling, aluminium	2016
Extruded Aluminum Trim Cap	- aluminium scrap, new | aluminium scrap, new, Recycled Content cut-off - aluminium scrap, post-consumer | aluminium scrap, post-consumer, Recycled Content cut-off - aluminium, primary, ingot - section bar extrusion, aluminium	2016
Polydamp Barrier	- acrylic binder, without water, in 34% solution state - melamine - ethylene vinyl acetate copolymer	2016
EPDM Closed Cell Foam Gasket	- kraft paper, unbleached - acrylic binder, without water, in 34% solution state - polyvinylchloride, bulk polymerized - synthetic rubber	2016
Transportation		
Truck	transport, freight, lorry 16-32 metric ton, EURO4	2016
Ship	transport, freight, sea, transoceanic ship	2016

Allocation

Electricity use at the Grand Haven, Michigan facility was allocated to the product based on the unit length of the product as a fraction of the total facility production.

The Mullion Trim Cap 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.

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.

Data Quality

Table 8. *Data quality assessment for the LCA study.*

Data Quality Parameter	Data Quality Discussion
Time-Related Coverage: Age of data and the minimum length of time over which data is collected	Manufacturer-supplied data (primary data) are based on 2017 production data. Representative datasets (secondary data) used for upstream and background processes are generally less than 5 years old (typically 2016 or more recent). All of the data used represented an average of at least one year's worth of data collection, and up to three years in some cases.
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. Actual processes for upstream operations are primarily North American. Secondary data used in the assessment are generally representative of North American or European operations. Data for European operations are considered sufficiently similar to actual processes. Data representing product disposal are based on US statistics.
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. In some cases, specific information regarding metal and plastic component manufacturing was not available. Representative aluminum fabrication datasets are used to represent the actual processes. Similarly, representative datasets are used to represent anodizing of aluminum components.
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 or more years and over multiple operations, which is expected to reduce the variability of results.
Completeness: Percentage of flow that is measured or estimated	The LCA model included all known mass and energy flows for production of the trim cap products. In some instances, surrogate data used to represent upstream and downstream operations may be missing some data which is propagated in the model. No known processes or activities contributing to more than 1% 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.
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; however, it must be noted that final disposition of the product is based on assumptions of current average practices in the United States.
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	Data representing energy use at the Grand Haven, MI facility represent an annual average and are considered of high quality due to the length of time over which these data are collected, as compared to a snapshot that may not accurately reflect fluctuations in production. Secondary LCI datasets from the Ecoinvent database are used as appropriate.
Uncertainty of the Information: Uncertainty related to data, models, and assumptions	Uncertainty related to the mullion trim cap materials is low. Actual supplier data for upstream operations was not available for all suppliers and relied upon use of existing representative datasets. These datasets contained relatively recent data (<5 years), but lacked geographical representativeness. Uncertainty related to the impact assessment methods used in the study are high. The impact assessment method required by the PCR includes impact potentials, which lack characterization of providing and receiving environments or tipping points.

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