ENVIRONMENTAL PRODUCT DECLARATION

ALUMINUM SUN CONTROL SYSTEMS

THERMASHADE® SUNSHADES

The Genzyme Bio Surgery Center in Richfield, NJ, uses YKK AP's sun control systems to manage solar heat gains to meet sustainable design goals.

YKK AP's unique sun control energy efficient devices are constructed from high quality aluminum extrusions. These devices work in concert with the façade and other building components to improve occupant comfort.

All YKK AP® products are manufactured, finished and inspected for quality in the YKK AP environmentally certified, state-of-the-art facility in Dublin, GA

YKK AP America is taking positive steps toward sustainable manufacturing helping to balance ecology and economy—improving theenvironment and society over the longterm. YKK AP® is the proud manufacturer of architectural products,including aluminum sun control systems, which provide safe and comfortable environments for building occupants and help reduce energy usage.

A dedicated partner in green building design and sustainability, YKK AP helps create innovative, high quality architectural systems that add to the strength, energy efficiency and longevity of the building envelope.

All YKK AP® products are created in a facility that is a model of environmental responsibility. YKK AP's U.S. manufacturing plant in Dublin, GA, is ISO 14001 certified and has been recognized by the U.S. Department of Energy for exceptional leadership in industrial energy efficiency.

For additional information, visit commercial.ykkap.com.

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION ULCOM/EPD

ENVIRONMENTAL PRODUCT DECLARATION

YKK AP America

Aluminum Sun Control Systems

According to ISO 14025
and ISO 21930:2017

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL ENVIRONMENT 333 PFINGSTEN RD, NORTHBROOK, IL 60062	WWW.UL.COM WWW.SPOT.UL.COM
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	Program Operator Rules v 2.7 2022	
MANUFACTURER NAME AND ADDRESS	YKK AP Headquarters 101 Marietta Street NW, Suite 2700 Atlanta, GA 30303	
DECLARATION NUMBER	4789555932.104.1	
DECLARED PRODUCT & DECLARED UNIT	Extruded Aluminum, painted and anodized, 1000 kg	
REFERENCE PCR AND VERSION NUMBER	Product Category Rules for Building Related Products and Services, Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Edition 6 (ULE, 2022); Part B: Aluminum Construction Product EPD Requirements, UL Standard 10010-38 , Edition 1 (ULE, 2022)	
DESCRIPTION OF PRODUCT APPLICATION/USE	Extruded Aluminum, used in construction (sun control)	
MARKETS OF APPLICABILITY	North America	
DATE OF ISSUE	December 1, 2022	
PERIOD OF VALIDITY	5 years	
EPD TYPE	Company specific	
EPD SCOPE	Cradle to gate with options, C1-C4 and D included	
YEAR(S) OF REPORTED PRIMARY DATA	2019-2020	
LCA SOFTWARE & VERSION NUMBER	GaBi v10	
LCI DATABASE(S) & VERSION NUMBER	GaBi 2021 (CUP 2021.1)	
LCIA METHODOLOGY & VERSION NUMBER	IPCC AR5 (GWP 100), TRACI 2.1 and CML-IA v4.8 (ADPf)	

The sub-category PCR review was conducted by:	Institut Bauen und Umwelt (IBU) PCR review panel ibu-epd.com
This declaration was independently verified in accordance with ISO 14025: 2006. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report,", v3.2 (December 2018), in conformance with ISO 21930:2017, serves as the core PCR, with additional considerations from the USGBC/UL Environment Part A Enhancement (2017) ☐ INTERNAL ☒EXTERNAL	Cooper McC Cooper McCollum, UL Environment
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:	Sphera
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:	James Mellentine, Thrive ESG

LIMITATIONS

The environmental impact results of steel products in this document are based on a declared unit and therefore do not provide sufficient information to establish comparisons. The results shall not be used for comparisons without knowledge of how the physical properties of the steel product impact the precise function at the construction level. The environmental impact results shall be converted to a functional unit basis before any comparison is attempted. See the results section for additional EPD comparability guidelines.

Environmental declarations from different programs (ISO 14025) may not be comparable.

ENVIRONMENTAL PRODUCT DECLARATION

YKK AP America

Aluminum Sun Control Systems

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Product Definition And General Information

Description of Organization

Sun control energy efficient devices help manage solar heat gain to meet sustainable design goals. They work in concert with the façade and other building components to improve occupant comfort by redirecting sunlight.

Sunshades have a few common characteristics. A sun control device usually has an outer frame (outrigger), an inner component (louver) and fascia components. ThermaShade® sunshades can be applied to curtain wall, storefront façades and masonry walls to maintain a consistent appearance across the building envelope.

When integrated with YKK AP's thermally broken systems, innovative anchoring methods ensure that the thermal performances of the host systems are maintained. YKK AP's patented system design provides pre-engineered solutions yielding extensive flexibility, design freedom, speed of delivery and ease of installation.

Materials & Coatings

Aluminum Alloys: 6063 T5, 6063 T6, 6061 T6

Available Finishes: ANODIZED PLUS®, AAMA 2604/2605 Painted Finishes

All YKK AP® products are manufactured, finished, and inspected for quality in a single, environmentally certified, state-of-the-art facility in Dublin, GA. As a result, YKK AP products fit together without a lot of jobsite re-work.

YKK AP offers a complete suite of tools and engineering services to assist in proper system selection, specification, and installation, contact your local sales representative for more information.

Product Description

The following YKK AP® aluminum sun control systems are covered by this EPD:

ThermaShade® Sun Control System for Curtain Wall and Storefront

YKK AP's ThermaShade® system is designed to improve comfort and lower energy consumption by decreasing solar heat gain. Designers now have a solution that can be applied to both curtain wall and storefront façades to maintain a consistent appearance across the building envelope. The expanded line allows designers to maintain the functional benefit of the legacy system while offering a new industrial design option. All systems are available in all YKK AP's standard and premium finishes.

When integrated with YKK AP's thermally broken systems, innovative anchoring methods ensure that the thermal performances of the host systems are maintained. The ThermaShade® system is a Cradle to Cradle Certified™ sunshade system featuring a thermal barrier within the attachment anchor. Pre-engineered solutions provide extensive flexibility for design freedom, speed of delivery and installation.

ENVIRONMENTAL PRODUCT DECLARATION

YKK AP America

Aluminum Sun Control Systems

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Luminance® Light Shelf

The YKK AP Luminance® Light Shelf system incorporates modern design elements and maintenance features offering the most attractive and functional light shelf system on the market. This unique system is constructed from high quality aluminum extrusions and a lightweight, rigid honeycomb core panel with a durable melamine surface.

Table 1: Product description

Name	Value
Product Name	ThermaShade® aluminum sun control systems
Product Description	Aluminum extrusions: painted and anodized
Classification	Semi-fabricated, construction product
Classification (Semi-Fabricated Products Only)	Raw materials:Aluminum billet Output: Aluminum Extrusions
Finishing	Paint and Anodize
Alloy Group	6XXX series wrought aluminum (6063)

Product Average

This EPD covers the weighted average sun control product with surface finish. The results for the final product are calculated for the Dublin, GA production site.

Application

Sun control systems are used in buildings over the window coverings.

Industry Standards

ThermaShade® testing is based on material specification as performance tests for sunshades are yet to be established. Currently, there are no available approved industry testing standards for sunshade products for performance under unforeseeable influence of fire, water of mechanical destruction; therefore, ThermaShade® is not tested or rated under these extraordinary effects.

Declaration of methodological framework

This EPD is declared under “cradle to gate with options” system boundary. As such, it includes life cycle stages A1-A3, C1-C4 and D.

Delivery Status

The output of the extrusion process is a fabricated and surface finished extrusion product, ready for assembly and installation.

Properties of Declared Product as Delivered

Aluminum sun control systems are made primarily from aluminum. Some other assembly components such as screws and sealing compounds are also used.

Table 2: Technical data

Name	Value	Unit
Density		(kg/m3)
Melting Point (Typical)		°C
Electrical conductivity (Typical) at 20°C		%IACS
Thermal conductivity (Typical) at 25°C		W/(mK)
Average Coefficient of thermal expansion (Typical) 20°C to 100°C / 68°F to 212°F		10-6 per °C
Modulus of elasticity (Typical)		MPa x 103
Hardness (Typical)		HB
Yield strength (min)		MPa
Ultimate tensile strength (min)		MPa
Breaking elongation (min) (50mm & 4D)		%
Chemical composition		% by mass

Table 3: Chemical composition of 6063 aluminum alloy (% by mass) as per Teal Sheet (AA, 2018)

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others (total)	Aluminum
Minimum	0.20		--	--	0.45					remainder
Maximum	0.60	0.35	0.10	0.10	0.90	0.10	0.10	0.10	0.15	remainder

Material composition: Base and Ancillary Material

Table 4: Base and ancillary material

Material	Mass [%]
Aluminum extrusion profile	98.52
Aluminum extrusion (mill finish)	<1
Paint coat, optional	<1
Steel part (purchased)	<1

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Aluminum Sun Control Systems

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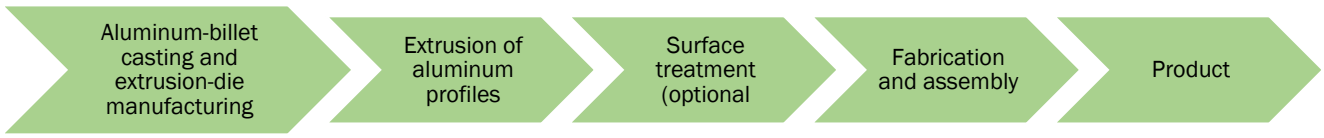
Manufacturing

All YKK AP® products are manufactured, finished, and inspected for quality in a single environmentally certified, state- of-the-art facility in Dublin, GA. The manufacturing process comprises the following production stages:



The main material input into the YKK AP manufacturing process is aluminum ingot. The ingot is first alloyed to the desired grade and cast into billets. Subsequently, the billets are extruded into profiles using steel dies which are manufactured on-site. The extruded profiles may then be anodized or painted before being fabricated and assembled to specification. In a last step, the complete product assemblies are packed for shipment.

Packaging

Packaging data were not tracked, and was below the cut-off criteria, therefore, not included in the primary data provided by YKK. The life cycle impact of the overall product would likely be dominated by metals.

Transportation

Transportation to the customer or construction site s outside the scope of this EPD.

Product Processing/Installation

Outside of the scope of this EPD.

Use

Outside of the scope of this EPD.

Reference Service Life, Condition of Use

Outside of the scope of this EPD

Recycling and Disposal

Aluminum extrusions are a highly efficient, sustainable building material. Aluminum is 100% recyclable and can be recycled repeatedly. Recycled aluminum can be identical to smelted aluminum but requires a fraction of energy to manufacture. In building and construction, aluminum scrap has a recycling rate of 95% (UNEP, 2011) (AEC, 2021). The remaining 5% is sent to landfill.

Table 5: Recycling and disposal

Name	Unit
Deconstruction	--
Transportation to the disposal site	100 km by truck
Waste processing	--
Disposal to landfill	5%
Recycling rate of the product	95%
Removals of biogenic carbon	N/A

Environment and Health

Product manufacturing: Plant emissions to air/soil/water are monitored (if applicable) and comply with local laws.

Product use: YKK AP® products are not expected to create exposure conditions that exceed safe thresholds for health impacts to humans or flora/fauna under normal operating conditions. Use stage is outside of the scope of this EPD.

Life Cycle Assessment Background Information

Declared Unit

The declared unit for an EPD is 1,000 kilogram of extruded aluminum sun control product, including surface treatments and ancillary components necessary for the system to fulfill its function.

Table 6: Declared unit

Name	Value	Unit
Declared unit	1	metric ton
Density (typical)	2700	kg/m^3

System Boundaries

Per the PCR, this “cradle-to-gate with options” analysis provides information on the Product Stage of the aluminum product life cycle, comprising modules A1–A3, modules C1-C4, module D included.

- A1: The provision of resources, additives and energy
- A2: Transport of resources and additives to the production site
- A3: Production process on site, including energy, production of additives, disposal of production residues, consideration of related emissions and recycling of production scrap (“closed loop”)
- C1: Deconstruction
- C2: Transport to the disposal site

- C3: Waste processing
- C4: Disposal at the end of the life cycle, i.e., during building deconstruction
- D: Net benefits resulting from reuse, recycling and energy recovery that take place beyond the system boundary.

Table 9 represents the system boundary and scope.

Table 7: System boundary modules included and excluded from the study

DESCRIPTION OF THE SYSTEM BOUNDARY (X = INCLUDED IN LCA; MND = MODULE NOT DECLARED)																
PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement[1]	Refurbishment[1]	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X	X

* X = module included, MND = module not declared

It should be noted here that C1 and C3 are to be reported as zero as they are assumed to fall below the cut-off criteria defined by ISO 21930. C2 is assumed as 100 km by truck. Materials for recycling (95%) for aluminum is reported in C1 module.

Time coverage: Primary data were collected on production within calendar year 2019. Background data for upstream and downstream processes (i.e., raw materials, energy resources, transportation, and ancillary materials) were obtained from GaBI CUP 2021.1 databases.

Technology coverage: Data were collected for the production of sun control system products at YKK AP's manufacturing facility in the United States.

Geographical coverage: All YKK AP® products are manufactured in Dublin, Georgia, USA. As such, the geographical coverage for this study is based on United States system boundaries for all processes and products. Whenever US background data were not readily available, European data or global data were used as proxies.

Estimates and Assumptions

All of the raw materials and energy inputs have been modeled using processes and flows that closely follow actual production data on raw materials and processes. All reported material and energy flows have been accounted for.

Packaging data were not tracked therefore excluded from this EPD.

No significant assumptions have been made beyond the aforementioned.

Proxy data were applied to some materials where no matching life cycle inventories were available, as documented in the background report.

Cut-off-Criteria

In the case of data gaps for unit processes, the cut-off criteria as defined by ISO 21930 were applied. All available energy and material flow data have been included in the model.

Product packaging information are excluded from this study.

In cases where no matching life cycle inventories are available to represent a flow, proxy data have been applied based on conservative assumptions regarding environmental impacts. No known flows are deliberately excluded from this EPD.

Period Under Review

Primary data were collected for sun control system during the years 2019 and 2020. Background data for aluminum were taken from Aluminum Association (AA) dataset and represents aluminum production during 2016 respectively. This analysis is intended to represent storefront manufacturing in 2019 (AA, 2022).

Data Sources

The LCA model was created using the GaBi 10 software system for life cycle engineering, developed by Sphera (Sphera, 2021). Background life cycle inventory data for raw materials and processes were obtained from the GaBi 2021 database (CUP 2021.1). Primary manufacturing data were provided by YKK.

In order to model the life cycle for the production and recycling of the extruded aluminum, the GaBi Professional software system developed by Sphera was used. All relevant background data necessary for the production of extruded aluminum were taken from the GaBi 2021 databases.

Industry average Aluminum Association (AA) dataset for primary Aluminum ingot is used to represent all primary Aluminum in this study. Table 8 represents the carbon intensity and share of electricity for primary Aluminum ingot (AA dataset) used in this analysis (AA, 2022).

Table 8: Data source, fuel mix, and carbon intensity for primary aluminum ingot (AA, 2022)

Source	Geographic origin	Fuel type	Share of power in the mix	Carbon intensity per 1 kg (kg CO_2eq/kWh)	kWh / kg with share
Primary Aluminum Ingot (AA)	North America	Hydro	79.99%	0.015	9.60E+00
		Coal	16.91%	1.100	4.43E-01
		Oil	0.01%	0.981	4.16E-08
		Natural Gas	2.69%	0.546	1.13E-02
		Nuclear	0.40%	0.005	2.51E-04

Data Quality

A variety of tests and checks were performed by the LCA practitioner throughout the project to ensure high quality of the completed LCA. Checks included an extensive internal review of the project-specific LCA models developed as well as the background data used. A full data quality assessment is documented in the background report.

Allocation

No multi-output (i.e., co-product) allocation was performed in the foreground system of this study.

Primary data were collected in 2 separate stages. Primary data for different unit processes (casting, extrusion, anodizing, painting, thermal) were provided by YKK for the entire Dublin (GA) facility aggregated for all products. At this stage, inputs and outputs were allocated based on the reference mass flow of each product. In the second set of data, product BOM (bill of materials) were provided for each product including the sales volume for the year of data collection. We calculated the weighted average from each product family based on the sales volume to represent that specific product. No allocation was performed at this stage.

Allocation of background data (energy and materials) taken from the GaBi 2021 databases is documented online at https://sphera.com/wp-content/uploads/2020/04/Modeling-Principles-GaBi-Databases-2021.pdf. Also please refer to the 2022 LCA report on semi-fabricated aluminum. for more information: https://www.aluminum.org/sites/default/files/2022-01/2022_Semi-Fab_LCA_Report.pdf

Per the PCR guidance, recycling and recycled content in the cradle-to-gate system are modeled using the cut-off rule (a.k.a, the recycled content rule). All materials that are recycled from unit processes are considered to have left the system boundary. Recycled content is modeled in the system only when the percent of recycled content was specified in the material purchase.

Interpreting the Results in Module D

The values in Module D include a recognition of the benefits or impacts related to aluminum recycling which occur at the end of the product's service life. The results included in Module D attempt to capture future benefits and impacts but are based on a methodology that uses current industry-average data reflecting current processes.

A net scrap approach was taken to capture the benefits related to aluminum recycling reported in Module D. The following datasets in Table 9 were used to calculate the associated aluminum credit:

Table 9: Background datasets used for module D

Background datasets (Sphera, 2021)	Reference year
RNA: Secondary aluminum ingot (95% recycled content) AA	2016
RNA: Primary aluminum ingot AA	2016

The net scrap approach is based on the perspective that material that is recycled into secondary material at end of life is able to substitute an equivalent amount of virgin material. Hence, a 'recycling credit' is given to account for this material substitution. A schematic of the Module D calculation is presented in Figure 2.

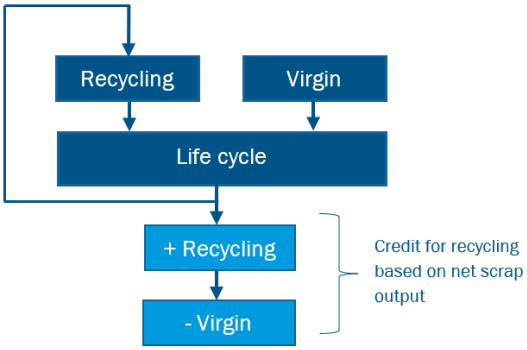


Figure 1: Schematic for the net-scrap approach (credit given at the end-of-life)

Life Cycle Assessment Results

North American life cycle impact assessment (LCIA) results are declared using TRACI 2.1 (Bare, 2012; EPA, 2012) methodology, with the exception of GWP which is reported using the IPCC AR5 (IPCC, 2013) methodology. Primary energy use represents the lower heating value (LHV) a.k.a. net calorific value (NCV).

LCIA results are relative expressions and do not predict actual impacts, the exceeding of thresholds, safety margins or risks.

Table 10: Results for Sun Control per declared unit of Sun Control

Impact Category	Unit	A1	A2	A3	C1	C2	C4	D
LIFE CYCLE IMPACTS ASSESSMENT (LCIA) RESULTS								
IPCC, AR5 (IPCC, 2013)								
Global warming potential (GWP)	kg CO_2 eq.	1.15E+04	7.64E+01	2.14E+03		1.91E+00	2.60E+00	-7.14E+03
TRACI v2.1 and CML-IA v4.8								
Ozone depletion potential (ODP)	kg CFC 11 eq.	1.15E-10	1.27E-14	7.21E-08	–	3.98E-16	8.69E-15	-2.40E-12
Acidification potential (AP)	kg SO_2 eq.	5.16E+01	1.21E+00	3.06E+00	–	5.77E-03	1.11E-02	-3.35E+01
Eutrophication potential (EP)	kg N eq.	1.18E+00	6.98E-02	2.93E-01	–	6.60E-04	6.17E-04	-7.42E-01
Smog formation potential (SFP)	kg O_3 eq.	4.35E+02	3.67E+01	9.17E+01	–	1.31E-01	1.97E-01	-2.75E+02
Abiotic resource depletion potential of non-renewable (fossil) energy resources (ADP_{fossil})	MJ	1.09E+05	9.88E+02	3.06E+04	–	2.80E+01	3.89E+01	-6.42E+04
RESOURCE USE INDICATORS								

Renewable primary resources used as energy carrier (fuel) (RPR_E)	MJ	7.01E+04	1.51E+01	4.27E+03	–	1.16E+00	3.31E+00	-4.64E+04
Renewable primary resources with energy content used as material (RPR_M)	MJ	–	–	–	–		–	–
Non-renewable primary resources used as an energy carrier (fuel) ($NRPR_E$)	MJ	1.11E+05	9.95E+02	3.13E+04	–	2.82E+01	3.98E+01	-6.54E+04
Non-renewable primary resources with energy content used as material ($NRPR_M$)	MJ	0.00E+00	0.00E+00	9.70E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Renewable secondary fuels (RSF)	MJ	–	–	–	–		–	–
Non-renewable secondary fuels (NRSF)	MJ	–	–	–	–		–	–
Recovered energy (RE)	MJ	–	–	–	–		–	–
Secondary materials (SM)	kg	6.29E+01	0.00E+00	0.00E+00	–	0.00E+00	0.00E+00	0.00E+00
Use of net fresh water resources (FW)	m^3	2.32E+05	5.59E+01	7.52E+03	–	4.97E+00	5.47E+00	-1.54E+05
OUTPUT FLOWS & WASTE FLOWS								
Hazardous waste disposed (HWD)	kg	0.00E+00	0.00E+00	3.15E+01	–	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed (NHWD)	kg	0.00E+00	0.00E+00	7.25E+00	–	0.00E+00	5.91E+01	0.00E+00
High-level radioactive waste, conditioned, to final repository (HLRW)	kg	1.05E-03	3.14E-06	3.52E-04	–	9.50E-08	3.84E-07	-5.59E-04
Intermediate- and low-level radioactive waste, conditioned, to final repository (ILLRW)	kg	1.80E-02	5.72E-05	6.43E-03	–	1.73E-06	6.81E-06	-9.44E-03
Components for re-use (CRU)	kg	9.00E-03	2.91E-05	3.23E-03	–	8.80E-07	3.40E-06	-4.71E-03
Materials for recycling (MFR)	kg	0.00E+00	0.00E+00	1.92E+02	9.41E+02	0.00E+00	0.00E+00	–
Materials for energy recovery (MER)	kg	–	–	–	–	–	–	–
Recovered energy exported from the product system (EE)	MJ	–	–	–	–	–	–	–

Comparability: Comparisons cannot be made between product-specific or industry average EPDs at the design stage of a project before a building has been specified. Comparisons may be made between product-specific or industry average EPDs at the time of product purchase when product performance and specifications have been established and serve as a functional unit for comparison. Environmental impact results shall be converted to a functional unit basis before any comparison is attempted.

Any comparison of EPDs shall be subject to the requirements of ISO 21930. EPDs are not comparative assertions and are either not comparable or have limited comparability when they have different system boundaries, are based on different product category rules or are missing relevant environmental impacts. Such comparison can be inaccurate and could lead to erroneous selection of materials or products which are higher impact, at least in some impact categories.

When comparing EPDs created using this PCR, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

Visualization of Life Cycle Impact Assessment

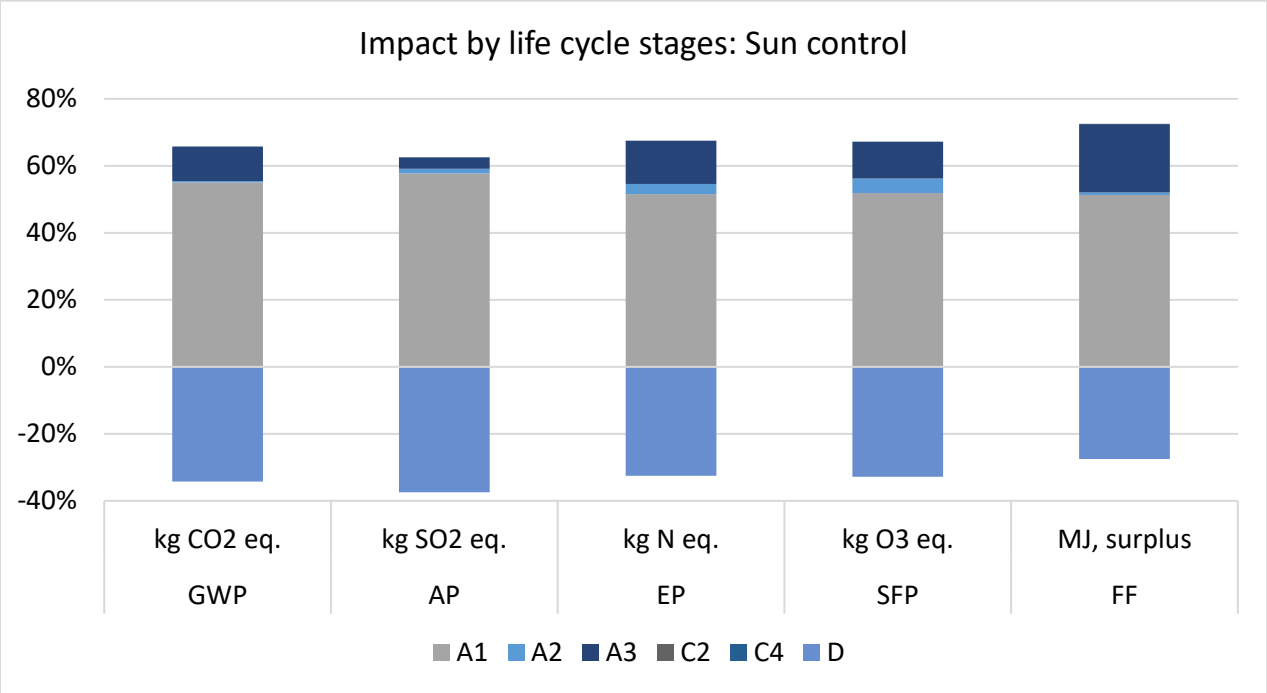


Figure 2: LCIA results for life cycle stages

Interpretation

The results represent the cradle-to- gate and disposal environmental performance of the evaluated ThermaShade sun control system. As shown in the figure above, the results indicate that the impacts are driven by the product stage (modules A1-A3). The primary impact is derived from upstream aluminum production in module A1 (raw material supply). YKK AP manufacturing processes account for a relatively small part of the manufacturing impact in comparison.

As module D (material credit at the end of life) clearly impacts the results, it is important to note that the applied recycling rate of 95% represents a defensible rate for aluminum extrusion products in the building and transportation sector. This is based on a conservative calculation for global aluminum recycling from these sectors. If a higher rate is used, the credit will increase, thus lowering the total life cycle impacts. Similarly, a lower recycling rate would raise the total life cycle impacts. As new information becomes available (e.g., the Aluminum Association publishes regional-specific recycling rates), this EPD should be modified to reflect the most current industry conditions.

Additional Environmental Information

Environment and Health During Manufacturing

Environmental, occupational health and safety practices are in accordance with OSHA and individual state requirements. The process and the products do not contain any materials or substances for which there exists a route to exposure that leads to humans or flora/fauna in the environment being exposed to said materials or substances at levels exceeding safe health thresholds.

Further Information

Further information can be found at https://www.ykkap.com/residential/company/ykk-ap-america-inc/

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Contact Information

Study Commissioner

YKK AP America

YKK AP Headquarters
101 Marietta Street NW, Suite 2700
Atlanta, GA 30303
https://sphera.com/contact-us/
www.sphera.com

LCA Practitioner

Sphera Solutions, Inc.
130 E Randolph St, #2900
Chicago, IL 60601
https://sphera.com/contact-us/
www.sphera.com