Environmental Product Declaration

ASSA ABLOY Attack Resistant Opening - Hollow Metal

Steel Door

The Ceco and Curries Attack Resistant Opening - Hollow Metal is a total opening solution (glazed or flush) intent on delaying access to an attacker and suppressing unauthorized entry until first responders are able to arrive.

ASSA ABLOY Door Group

ASSA ABLOY is committed to providing products and services that are environmentally sound throughout the entire production process and the product lifecycle. Our unconditional aim is to make sustainability a central part of our business philosophy and culture, but even more important is the job of integrating sustainability into our business strategy. The employment of EPDs will help architects, designers and LEED-APs select environmentally preferable door openings.

ASSA ABLOY will continue our efforts to protect the environment and health of our customers/end users and will utilize the EPD as one means to document those efforts.

UL CERTIFIED ENVIRONMENTAL PRODUCT DECLARATION UL.COM/EPD

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025. EPDs rely on Life Cycle Assessment (LCA) to provide information on a number of environmental impacts of products over their life cycle. Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc. Accuracy of Results: EPDs regularly rely on estimations of impacts, and the level of accuracy in estimation of effect differs for any particular product line and reported impact. Comparability: EPDs are not comparative assertions and are either not comparable or have limited comparability when they cover different life cycle stages, are based on different product category rules or are missing relevant environmental impacts. EPDs from different programs may not be comparable.

PROGRAM OPERATOR	UL Environment
DECLARATION HOLDER	ASSA ABLOY Door Group
DECLARATION NUMBER	478714321.141.1
DECLARED PRODUCT	ASSA ABLOY Attack Resistant Opening - Hollow Metal
REFERENCE PCR	Commerical Steel Doors and/or Frames 9005
DATE OF ISSUE	September 6, 2017
PERIOD OF VALIDITY	5 Years
CONTENTS OF THE DECLARATION	Product definition and information about building physics Information about basic material and the material's origin Description of the product's manufacturing Indication of product processing Information about the in-use conditions Life cycle assessment results Testing results and verifications
The PCR review was conducted by	The Independent Expert Committee, SVR
This declaration was independently verified in accordance with ISO 14025 by Underwriters Laboratories ☐ INTERNAL ☒ EXTERNAL	Wade Stout, UL Environment
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by	Thomas P. Gloria, Industrial Ecology Consultants

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Product Definition and Information

Production Description

Product name: Attack Resistant Opening (Hollow Metal)
This declaration represents a specific 3'x7'x1.75" thick steel door manufactured in the Milan, TN facility. The Attack Resistant Opening (Hollow Metal) is manufactured at Ceco and Curries and sold under the Ceco and Curries brands within the ASSA ABLOY Door Group. The Attack Resistant Opening may be either glazed or flush, and this EPD presents results for a glazed opening, as this version contains additional components and represents a worst case scenario.
The product also has an option for three different core types, and results will be presented for a glazed door in conjunction with each core type. The Attack Resistant Opening is paired with a standard hollow frame and additional assembly hardware. These additional components will be described below, however, the results presented in this EPD refer to the door only.

Additional product characteristics:
• Designed to delay access to an attacker and suppressing unauthorized entry. The door and glass will not stop a bullet; however, the opening will not weaken and will stay intact if shot at and physically attacked for at least 4 minutes according to 5-aa10 test standard.
• Pattented School Guard Glass used in the door lite
• Option for polystyrene, honeycomb, or polyurethane core
• One year warranty on materials and craftmanship
• Installtion insutructions are avaibile online.

Opening Size:
• 2'8" x 6.8" minimum size. 4'0" x 8'0" maximum size.
• Sidelight: Visible 12"- 47" x 12" - 92.75"
• Borrowed Light (horizontal): Visible 12"- 95" x 12" - 47"
• Borrowed Light (vertical): Visible 12" - 47" x 12" - 95"

Frame Construction:
• 16 Gauge hollow metal
• Available series: Ceco SU/SQ/BU/BQ or Curries M/CM/G/CG
• Three-sided frames available knocked down or welded
• Sidelights and borrowed lite frames welded only
• Sidelights from 12” – 47” (width) x 10” – 92-3/4” (height)
• Horizontal borrowed lights from 3” – 95” x 10” – 47”
• Vertical borrowed lights from 3” – 47” x 10” – 95”

Assembly Hardware:
• Sargent 8200 series mortise lock with latchbolt, deadbolt and LS escutcheon
• 3 or 4 each 4-1/2 x 4-1/2” standard weight McKinney hinges
• Pemko steel continuous hinge (optional)

Application

The Attack Resistant Opening (Hollow Metal) is used in any application where the safety of occupants is paramount, including but not limited to schools and universities, sports arenas, cafeterias, offices, conference areas, and commercial buildings.

Techincal Data

For the declared product, the following technical data in the delivery status must be provided with reference to the test standard:

Technical Data

Category	Rating
Thermal Transmittance:	Steady-state thermal transmittance and performance-rating based on NFRC 102-2014, ASTM C1363, ASTM C1199-12, and SDI 113-13 Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door and Frame Assemblies. All values are in combination with an ASSA ABLOY Standard Hollow Metal Frame. Honeycomb Core R-Value: 1.88 U-Value: 0.53 Polystyrene Core R-Value: 1.81 (half glass) / 2.22 (flush) U-Value: 0.55 (half glass) / 0.45 (flush) Polyurethane Core R-Value: 1.96 (half glass) / 2.50 (flush) U-Value: 0.51 (half glass) / 0.4 (flush)
Air Infiltration:	The product has an air leakage rate </= 0.10 cfm/f2 based on NFRC 400-2014 / ASTM E283-04(Reapproved 2012): Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen
Indoor-Outdoor Sound Attenuation:	The Attack Resistant Opening - Hollow Metal should perform in the STC range of 24-32 depending on the core option selected. The product is measured for indoor-outdoor sound attenuation according to ASTM E1332 Standard Classification for Rating Outdoor-Indoor Sound Attenuation.
Deflection/Loading:	ASSA ABLOY Hollow Metal doors are third-party testing by UL and ITS/WH certified and support design pressure of +/- 50 psf to +/- 150 psf depending on the core and design option selected. The Product is tested for deflection/loading as defined and based on ASTM E330 Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference.
Physical Endurance:	The product meets ANSI A250.4 Physical Endurance for Steel Doors, Frames & Frame Anchors Physical endurance testing: 18 gauge, 16 gauge and 14 gauge steel: Level A (1,000,000 Cycles)
Fire Rating:	Flush doors are fire rated up to three hours based on UL 10B - Standard for Fire Tests of Door Assemblies and UL 10C - Standard for Positive Pressure Fire Test of Door Assemblies

Placing on the Market / Application Rules

ASSA ABLOY Attack Resistant Opening - Hollow Metal Door shall conform to the certifications and sustainability regulations below:
• ASSA ABLOY Attack Resistant Opening - Hollow Metal Door shall be as manufactured by Ceco Door Products, Milan, TN or Curries, Mason City, IA
• ANSI/SDI A250.3-2007 (R2011) Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames
• ANSI/SDI A250.4-2011 Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors
• ANSI/SDI A250.6-2003 (R2009) Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames
• ANSI/SDI A250.7-1997 (R2002) Nomenclature for Standard Steel Doors and Steel Frames
• ANSI/SDI A250.8-2014 Specifications for Standard Steel Doors and Frames (SDI-100)
• ANSI/SDI A250.10-1998 (R2011) Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames
• ANSI /NFRC 102-2014 Procedure for Measuring the Steady-State Thermal Transmittance of Fenestration Systems,
• ANSI / NFRC 400-2014 Procedure for Determining Fenestration Product Air Leakage
• ASTM E283-04(Reapproved 2012): Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
• ASTM C1363-11 Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus,
• ASTM C1199-14 Standard Test Method for Measuring the Steady-State Thermal Transmittance of Fenestration Systems Using Hot Box Methods
• SDI-108-2010 Recommended Selection and Usage Guide for Standard Steel Doors
• SDI-111-2009 Recommended Details for Standard Steel Doors, Frames, Accessories and Related Components
• SDI-112-2008 Zinc Coated (Galvanized / Galvannealed) Standard Steel Doors and Frames
• SDI-117-2009 Manufacturing Tolerances for Standard Steel Doors and Frames
• ANSI/UL 1784-2009 Air Leakage Tests of Door Assemblies
• SDI 113-13 Standard Practice for Determining the Steady-State Thermal Transmittance of Steel Door and Frame Assemblies.
• UL 10B - Standard for Fire Tests of Door Assemblies
• UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies

Delivery Status

Attack Resistant Metal Doors are placed horizontally on a wooden pallet with a cull board and one sheet of cardboard on the bottom. Cardboard corners and plastic wrap is then applied. One sheet of cardboard is placed on the top and 5 plastic or metal bands prepare the pallet for shipment.

Base Materials / Ancillary Materials

The composition of the Attack Resistant Metal Door is as follows:

Component	Honeycomb	Polystyrene	Polyurethane
Steel	78.66%	79.08%	76.32%
Wood	0.00%	0.00%	0.00%
Core	1.79%	1.27%	4.71%
Other	19.55%	19.65%	18.97%
Total	100.00%	100.00%	100.00%

Manufacture

Metal door and frame products are manufactured primarily from a galvanized, annealed steel sheet. The production process involves stamping and bending of the steel sheet, in addition to welding and painting processes. Doors and Frame components are fabricated from 18 gauge, 16 gauge, and 14 gauge cold rolled steel conforming to ASTM A1008 or hot-dipped galvanized steel conforming to ASTM A924 and A653.

Environmental and Health During Manufacturing

ASSA ABLOY Door Group is committed to protecting human health and the environment; meeting or exceeding Federal, State, and local laws, regulations, codes, and guidelines; and employing sustainable pollution prevention practices. Painting and Welding areas of the manufacturing plant has extraction ventilation system to remove the dust, VOC and air borne materials. Sound abatement is implemented where possible and Personal Protective Equipment is provided. Waste water is pre-treated prior to dispensing into city water system.

• Environmental operations, GHG, energy, water, waste, VOC, surface treatment and H&S are being routinely monitored. Inspections, audits, and reviews are conducted periodically to ensure that applicable standards are met and Environmental Management program effectiveness is evaluated.

• Code of Conduct covers human rights, labor practices and decent work. Management of ASSA ABLOY is aware of their environmental and responsibilities, providing appropriate training, supporting accountability and recognizing outstanding performance.

Installation

Doors are typically installed into commercial applications per local, state and federal building codes, standards and requirements. Personal Protective Equipment should be provided at construction site.

Packaging

Attack Resistant Metal Doors are placed horizontally on a wooden pallet with a cull board and one sheet of cardboard on the bottom. Cardboard corners and plastic wrap is then applied. One sheet of cardboard is placed on the top and 5 metal bands prepare the pallet for shipment. The corrugated packaging is 100% recycled, Packaging material and polyethylene banding should be removed from packaging and collected separately for recycling.

Component	Percentage in mass (%)
Cardboard/Paper	84.35%
Plastic	15.65%
Other	0.00%
Total	**100.00%**

Conditions of Use

Doors arrive to the jobsite "ready to hang" meaning no finishing is required and typically no further machining is required. The location of the door and the amount of use dictates the amount of maintenance or service required to maintain the door in good working condition. No cleaning efforts need to be taken into consideration. Repairs or replacement are not usually necessary.

Environmental and Health During Use

There is no harmful emissive potential. No damage to health or impairment is expected under normal use corresponding to the intended use of the product.

Reference Service Life

Properly installed and maintained steel doors have a service life of 30 years.

Extraordinary Effects

Fire
No danger to the environment can be anticipated during exposure to fire.

Water
No substances are used which have a negative impact on ecological water quality on contact by the door with water. The door is designed for traditional locations and is not intended for flood protection.

Mechanical Destruction
No danger to the environment can be anticipated during mechanical destruction.

Re-use Phase

The product is possible to reuse during the reference service life and be moved from one similar door opening to another. The majority, by weight, of door components is steel, which can be recycled.

Disposal

The majority of components are steel and can be recycled. Additional, non metal components can be used for energy recovery in an incineration plant.

Further Information

ASSA ABLOY Door Group

Ceco Door
9159 Telecom Drive
Milan, TN 38358

Curries
12th Street NW
Mason City, IA 50401

Life Cycle Assessment

Declared Unit

The declaration refers to the functional unit of 1 unit (or piece) of ASSA ABLOY Attack Resistant Opening - Hollow Metal

Honeycomb Core

Name	Value	Unit
Declared unit	1	door
Mass	60.91	kg
Conversion factor to 1 kg	0.016	-

Polystyrene Core

Name	Value	Unit
Declared unit	1	door
Mass	60.59	kg
Conversion factor to 1 kg	0.017	-

Polyurethane Core

Name	Value	Unit
Declared unit	1	door
Mass	62.78	kg
Conversion factor to 1 kg	0.016	-

System Boundary

This is a cradle to gate with options Environmental Product Declaration. The following life cycle phases were considered:

Product Stage			Construction Process Stage		Use Stage							End of Life Stage*				Benefits and Loads Beyond the System Boundaries
Raw material supply	Transport	Manufacturing	Transport from gate to the site	Construction/ installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction /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	X	X	MND	MND	MND	MND	MND	MND	MND	MND	X	X	X	X

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

*This includes provision of all materials, products and energy, packaging processing and its transport, as well as waste processing up to the end-of waste state or disposal of final residues.

Estimates and Assumptions

End of Life
In the end of life phase, for all the materials which can be recycled, a recycling scenario with 100% collection rate was assumed.

Cut-off Criteria

In the assessment, all available data from the production process are considered, i.e. all raw materials used, auxiliary materials (e.g. lubricants), thermal energy consumption and electric power consumption - including material and energy flows contributing less than 1% of mass or energy (if available). In case a specific flow contributing less than 1% in mass or energy is not available, worst case assumption proxies are selected to represent the respective environmental impacts. Impacts relating to the production of machines and facilities required during production are out of the scope of this assessment.

Background data

For life cycle modeling of the considered products, the GaBi 8 Software System for Life Cycle Engineering, developed by thinkstep, is used. The GaBi-database contains consistent and documented datasets which are documented in the online GaBi-documentation. To ensure comparability of results in the LCA, the basic data of GaBi database were used for energy, transportation and auxiliary materials.

Data Quality

The data sources used are complete and representative of North America in terms of the geographic and technological coverage and are a recent vintage (i.e. less than ten years old). The data used for primary data are based on direct information sources of the manufacturer. Secondary data sets were used for raw materials extraction and processing, end of life, transportation, and energy production flows. Wherever secondary data is used, the study adopts critically reviewed data for consistency, precision, and reproducibility to limit uncertainty.

Period Under Review

The period under review is 2016 Calendar Year.

Allocation

Allocation was determined on a per unit basis.

Comparability

A comparison or an evaluation of EPD data is only possible if all data sets to be compared were created according to EN 15804 and the building context, respectively the product-specific characteristics of performance, are taken into account. Environmental delarations from different programs may not be comparable. Full conformance with the PCR for Commercial Steel Doors and/or Steel Frames allows EPD comparability only when all stages of a product's life cycle have been considered. However, variations and deviations are possible.

LCA: Modeling Scenarios and Additional Technical Information

The following technical information is a basis for the declared modules or can be used for developing specific scenarios in the context of a building assessment if modules are not declared.

Honeycomb Core

Installation into the building (A5)		
Name	**Value**	**Unit**
Auxiliary	-	kg
Water consumption	-	m^3
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg
Output substance following waste treatment on-site	2.30	kg
Dust in the air	-	kg
VOC in the air	-	kg

Reference Service Life		
Name	**Value**	**Unit**
Reference Service Life	30	years

End of life (C1-C4)		
Name	**Value**	**Unit**
Collected separately	60.91	kg
Collected as mixed construction waste	0.00	kg
Reuse	0.00	kg
Recycling	47.92	kg
Energy recovery	-	kg
Landfilling	13.00	kg

Polystyrene Core

Installation into the building (A5)		
Name	**Value**	**Unit**
Auxiliary	-	kg
Water consumption	-	m^3
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg
Output substance following waste treatment on-site	2.30	kg
Dust in the air	-	kg
VOC in the air	-	kg

Reference Service Life		
Name	**Value**	**Unit**
Reference Service Life	30	years

End of life (C1-C4)		
Name	**Value**	**Unit**
Collected separately	60.59	kg
Collected as mixed construction waste	0.00	kg
Reuse	0.00	kg
Recycling	47.92	kg
Energy recovery	-	kg
Landfilling	12.68	kg

Polyurethane Core

Installation into the building (A5)		
Name	**Value**	**Unit**
Auxiliary	-	kg
Water consumption	-	m^3
Other resources	-	kg
Electricity consumption	-	kWh
Other energy carriers	-	MJ
Material loss	-	kg
Output substance following waste treatment on-site	2.30	kg
Dust in the air	-	kg
VOC in the air	-	kg

Reference Service Life		
Name	**Value**	**Unit**
Reference Service Life	30	years

End of life (C1-C4)		
Name	**Value**	**Unit**
Collected separately	62.78	kg
Collected as mixed construction waste	0.00	kg
Reuse	0.00	kg
Recycling	47.92	kg
Energy recovery	-	kg
Landfilling	14.87	kg

LCA Results

Honeycomb Core

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	1.4E+02	7.3E+00	4.8E-01	5.6E-01	0.0E+00	3.0E-01	-5.9E+01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.7E-08	2.8E-10	1.3E-10	2.1E-11	0.0E+00	1.1E-13	2.0E-06
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	5.5E-01	4.4E-02	2.6E-03	3.4E-03	0.0E+00	2.4E-04	-1.4E-01
EP	Eutrophication potential	kg N-Eq.	3.6E-02	2.4E-03	9.6E-04	1.9E-04	0.0E+00	1.7E-05	-1.0E-03
SP	Smog formation potential	kg O_3-Eq.	7.5E+00	1.2E+00	1.2E-02	9.3E-02	0.0E+00	5.6E-03	-1.4E+00
FFD	Fossil Fuel Depletion	MJ-surplus	8.7E+01	1.3E+01	1.2E-01	1.0E+00	0.0E+00	3.6E-02	9.2E+00

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	1.4E+02	7.3E+00	7.1E-01	5.6E-01	0.0E+00	3.0E-01	-5.9E+01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.5E-08	2.7E-10	1.2E-10	2.1E-11	0.0E+00	1.0E-13	1.9E-06
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	5.2E-01	3.6E-02	1.0E-03	2.8E-03	0.0E+00	2.0E-04	-1.4E-01
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	5.7E-02	6.4E-03	1.1E-03	5.0E-04	0.0E+00	3.3E-05	-3.9E-03
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	4.5E-02	4.2E-03	2.7E-04	3.3E-04	0.0E+00	1.4E-05	-3.0E-02
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	2.3E-03	3.0E-09	-1.7E-08	2.3E-10	0.0E+00	1.8E-08	-6.0E-04
ADPF	Abiotic depletion potential for fossil resources	MJ	1.6E+03	9.2E+01	9.3E-01	7.1E+00	0.0E+00	3.1E-01	-6.2E+02

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	MJ, lower calorific value	1.6E+02	0.0E+00	4.1E-02	0.0E+00	0.0E+00	4.2E-02	3.2E+01
PERM	Renewable primary energy resources as material utilization	MJ, lower calorific value	3.7E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PERT	Total use of renewable primary energy resources	MJ, lower calorific value	2.0E+02	0.0E+00	4.1E-02	0.0E+00	0.0E+00	4.2E-02	3.2E+01
PENRE	Nonrenewable primary energy as energy carrier	MJ, lower calorific value	1.6E+03	9.3E+01	9.6E-01	7.2E+00	0.0E+00	3.3E-01	-5.5E+02
PENRM	Nonrenewable primary energy as material utilization	MJ, lower calorific value	1.0E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PENRT	Total use of nonrenewable primary energy resources	MJ, lower calorific value	2.6E+03	9.3E+01	9.6E-01	7.2E+00	0.0E+00	3.3E-01	-5.5E+02
SM	Use of secondary material	MJ, lower calorific value	1.1E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	Use of renewable secondary fuels	MJ, lower calorific value	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NRSF	Use of nonrenewable secondary fuels	MJ, lower calorific value	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
FW	Use of net fresh water	m^3	6.2E+01	0.0E+00	2.6E-02	0.0E+00	0.0E+00	2.4E-02	-1.1E-01

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories									
Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
HWD	Hazardous waste disposed	kg	1.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.1E-02
NHWD	Non-hazardous waste disposed	kg	2.2E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.5E+00
RWD	Radioactive waste disposed	kg	2.1E-02	0.0E+00	1.0E-05	0.0E+00	0.0E+00	9.4E-06	2.0E-02
CRU	Components for re-use	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MFR	Materials for recycling	kg	4.6E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.0E-01
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported electrical energy	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported thermal energy	MJ	0.0E+00	0.0E+00	-2.3E-01	0.0E+00	0.0E+00	-2.2E-01	0.0E+00

Polystyrene Core

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	1.4E+02	7.2E+00	4.8E-01	5.6E-01	0.0E+00	2.1E-01	-5.9E+01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.7E-08	2.7E-10	1.3E-10	2.1E-11	0.0E+00	7.8E-14	2.0E-06
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	5.6E-01	4.3E-02	2.6E-03	3.4E-03	0.0E+00	1.7E-04	-1.4E-01
EP	Eutrophication potential	kg N-Eq.	3.6E-02	2.4E-03	9.6E-04	1.9E-04	0.0E+00	1.2E-05	-1.0E-03
SP	Smog formation potential	kg O_3-Eq.	7.6E+00	1.2E+00	1.2E-02	9.3E-02	0.0E+00	4.0E-03	-1.4E+00
FFD	Fossil Fuel Depletion	MJ-surplus	9.6E+01	1.3E+01	1.2E-01	9.9E-01	0.0E+00	2.6E-02	9.2E+00

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment									
Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	1.4E+02	7.2E+00	7.1E-01	5.6E-01	0.0E+00	2.2E-01	-5.9E+01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	2.5E-08	2.7E-10	1.2E-10	2.1E-11	0.0E+00	7.4E-14	1.9E-06
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	5.3E-01	3.6E-02	1.0E-03	2.8E-03	0.0E+00	1.5E-04	-1.4E-01
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	5.7E-02	6.4E-03	1.1E-03	4.9E-04	0.0E+00	2.4E-05	-3.9E-03
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	5.7E-02	4.2E-03	2.7E-04	3.2E-04	0.0E+00	9.8E-06	-3.0E-02
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	2.3E-03	3.0E-09	-1.7E-08	2.3E-10	0.0E+00	1.3E-08	-6.0E-04
ADPF	Abiotic depletion potential for fossil resources	MJ	1.7E+03	9.1E+01	9.3E-01	7.1E+00	0.0E+00	2.2E-01	-6.2E+02

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	MJ, lower calorific value	1.5E+02	0.0E+00	4.1E-02	0.0E+00	0.0E+00	3.0E-02	3.2E+01
PERM	Renewable primary energy resources as material utilization	MJ, lower calorific value	3.7E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PERT	Total use of renewable primary energy resources	MJ, lower calorific value	1.9E+02	0.0E+00	4.1E-02	0.0E+00	0.0E+00	3.0E-02	3.2E+01
PENRE	Nonrenewable primary energy as energy carrier	MJ, lower calorific value	1.7E+03	9.2E+01	9.6E-01	7.2E+00	0.0E+00	2.4E-01	-5.5E+02
PENRM	Nonrenewable primary energy as material utilization	MJ, lower calorific value	1.0E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PENRT	Total use of nonrenewable primary energy resources	MJ, lower calorific value	2.7E+03	9.2E+01	9.6E-01	7.2E+00	0.0E+00	2.4E-01	-5.5E+02
SM	Use of secondary material	MJ, lower calorific value	1.0E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	Use of renewable secondary fuels	MJ, lower calorific value	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NRSF	Use of nonrenewable secondary fuels	MJ, lower calorific value	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
FW	Use of net fresh water	m^3	6.3E+01	0.0E+00	2.6E-02	0.0E+00	0.0E+00	1.7E-02	-1.1E-01

Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
HWD	Hazardous waste disposed	kg	1.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.1E-02
NHWD	Non-hazardous waste disposed	kg	2.2E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.5E+00
RWD	Radioactive waste disposed	kg	2.2E-02	0.0E+00	1.0E-05	0.0E+00	0.0E+00	6.7E-06	2.0E-02
CRU	Components for re-use	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MFR	Materials for recycling	kg	4.7E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.0E-01
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported electrical energy	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported thermal energy	MJ	0.0E+00	0.0E+00	-2.3E-01	0.0E+00	0.0E+00	-1.6E-01	0.0E+00

Polyurethane Core

Results shown below were calculated using TRACI 2.1 Methodology.

TRACI 2.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	2.0E+02	7.5E+00	4.8E-01	5.8E-01	0.0E+00	8.0E-01	-5.9E+01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	6.0E-06	2.8E-10	1.3E-10	2.2E-11	0.0E+00	2.9E-13	2.0E-06
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	5.8E-01	4.5E-02	2.6E-03	3.5E-03	0.0E+00	6.3E-04	-1.4E-01
EP	Eutrophication potential	kg N-Eq.	4.0E-02	2.5E-03	9.6E-04	1.9E-04	0.0E+00	4.4E-05	-1.1E-03
SP	Smog formation potential	kg O_3-Eq.	8.1E+00	1.2E+00	1.2E-02	9.6E-02	0.0E+00	1.5E-02	-1.4E+00
FFD	Fossil Fuel Depletion	MJ-surplus	1.3E+02	1.3E+01	1.2E-01	1.0E+00	0.0E+00	9.7E-02	8.9E+00

Results shown below were calculated using CML 2001 - April 2013 Methodology.

CML 4.1 Impact Assessment

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
GWP	Global warming potential	kg CO_2-Eq.	2.0E+02	7.5E+00	7.1E-01	5.8E-01	0.0E+00	8.0E-01	-5.9E+01
ODP	Depletion potential of the stratospheric ozone layer	kg CFC-11 Eq.	5.6E-06	2.8E-10	1.2E-10	2.2E-11	0.0E+00	2.7E-13	1.9E-06
AP Air	Acidification potential for air emissions	kg SO_2-Eq.	5.5E-01	3.7E-02	1.0E-03	2.9E-03	0.0E+00	5.4E-04	-1.4E-01
EP	Eutrophication potential	kg$(PO_4)^3$-Eq.	6.2E-02	6.6E-03	1.1E-03	5.1E-04	0.0E+00	8.8E-05	-3.9E-03
POCP	Formation potential of tropospheric ozone photochemical oxidants	kg ethane-Eq.	4.9E-02	4.3E-03	2.7E-04	3.4E-04	0.0E+00	3.6E-05	-3.0E-02
ADPE	Abiotic depletion potential for non-fossil resources	kg Sb-Eq.	2.3E-03	3.1E-09	-1.7E-08	2.4E-10	0.0E+00	4.8E-08	-6.0E-04
ADPF	Abiotic depletion potential for fossil resources	MJ	1.9E+03	9.5E+01	9.3E-01	7.4E+00	0.0E+00	8.1E-01	-6.2E+02

Results below contain the resource use throughout the life cycle of the product.

Resource Use

Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
PERE	Renewable primary energy as energy carrier	MJ, lower calorific value	1.8E+02	0.0E+00	4.1E-02	0.0E+00	0.0E+00	1.1E-01	3.2E+01
PERM	Renewable primary energy resources as material utilization	MJ, lower calorific value	3.7E+01	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PERT	Total use of renewable primary energy resources	MJ, lower calorific value	2.2E+02	0.0E+00	4.1E-02	0.0E+00	0.0E+00	1.1E-01	3.2E+01
PENRE	Nonrenewable primary energy as energy carrier	MJ, lower calorific value	2.0E+03	9.6E+01	9.6E-01	7.4E+00	0.0E+00	8.7E-01	-5.5E+02
PENRM	Nonrenewable primary energy as material utilization	MJ, lower calorific value	1.1E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
PENRT	Total use of nonrenewable primary energy resources	MJ, lower calorific value	3.1E+03	9.6E+01	9.6E-01	7.4E+00	0.0E+00	8.7E-01	-5.5E+02
SM	Use of secondary material	MJ, lower calorific value	1.2E+03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
RSF	Use of renewable secondary fuels	MJ, lower calorific value	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
NRSF	Use of nonrenewable secondary fuels	MJ, lower calorific value	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
FW	Use of net fresh water	m^3	7.9E+01	0.0E+00	2.6E-02	0.0E+00	0.0E+00	6.4E-02	-1.1E-01

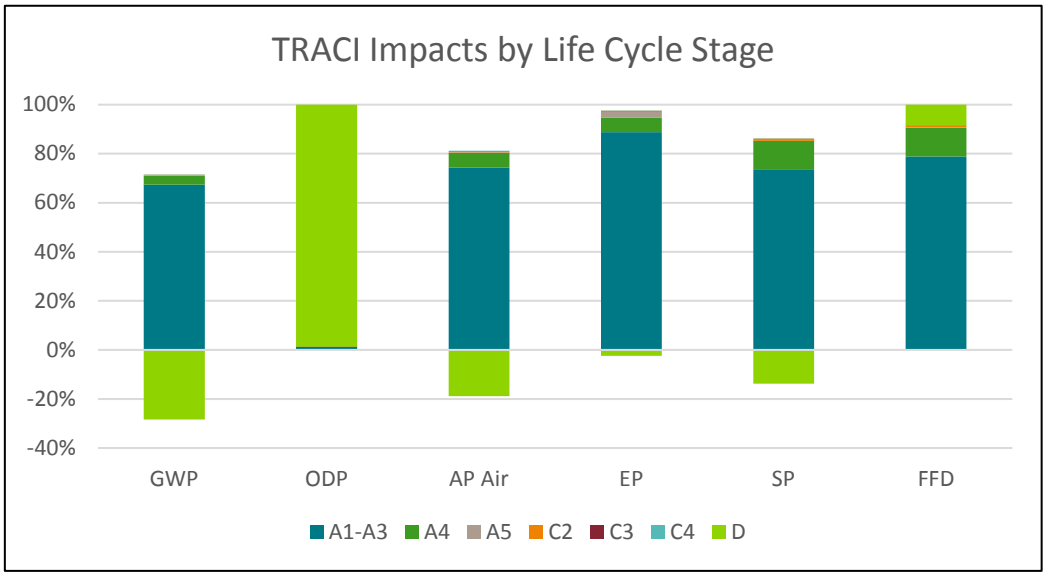
Results below contain the output flows and wastes throughout the life cycle of the product.

Output Flows and Waste Categories									
Parameter	Parameter	Unit	A1-A3	A4	A5	C2	C3	C4	D
HWD	Hazardous waste disposed	kg	1.1E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.1E-02
NHWD	Non-hazardous waste disposed	kg	2.2E-03	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	1.5E+00
RWD	Radioactive waste disposed	kg	2.8E-02	0.0E+00	1.0E-05	0.0E+00	0.0E+00	2.5E-05	2.0E-02
CRU	Components for re-use	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
MFR	Materials for recycling	kg	4.7E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	3.0E-01
MER	Materials for energy recovery	kg	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported electrical energy	MJ	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
EEE	Exported thermal energy	MJ	0.0E+00	0.0E+00	-2.3E-01	0.0E+00	0.0E+00	-5.7E-01	0.0E+00

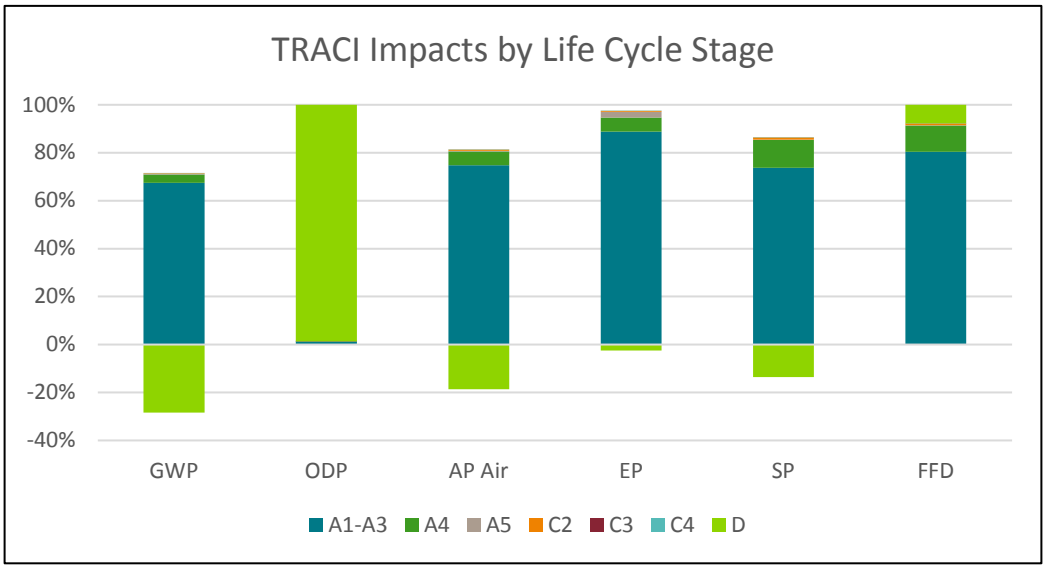
Interpretation

For each of the three core options, the production (A1-A3) life cycle stage drives the results in all of the environmental impact categories. Manufacturing impacts (A3) are primarily driven by electricity use. Raw materials, particularly steel drives the production stage (A1), as this material is the primary material within the product. Transportation impacts (A2) are a distant secondary driver of impacts.

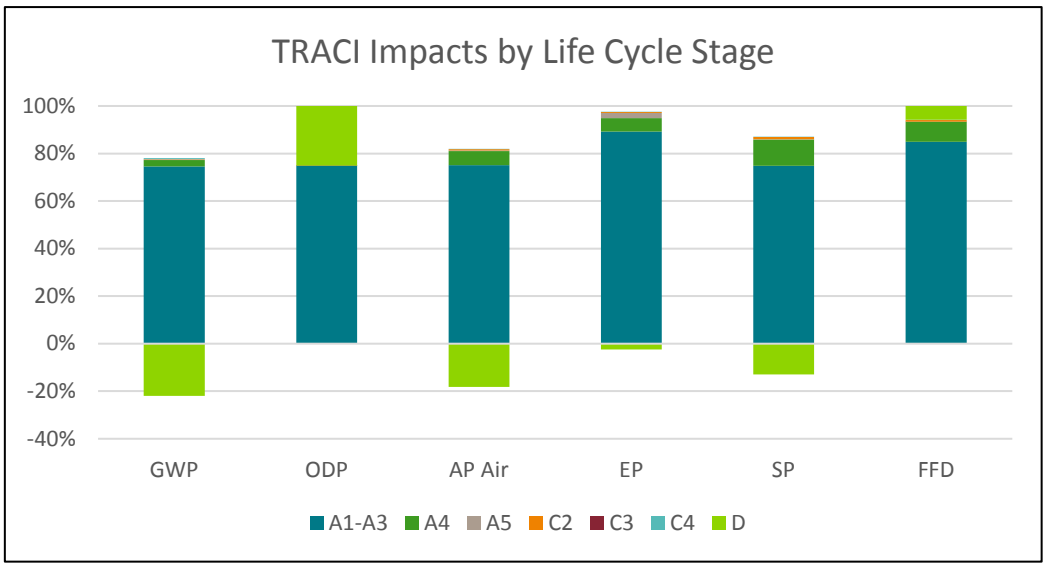
Honeycomb Core



Polvstvrene Core



Polyurethane Core



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- UL 10B Standard for Fire Tests of Door Assemblies
- UL 10C Standard for Positive Pressure Fire Tests of Door Assemblies