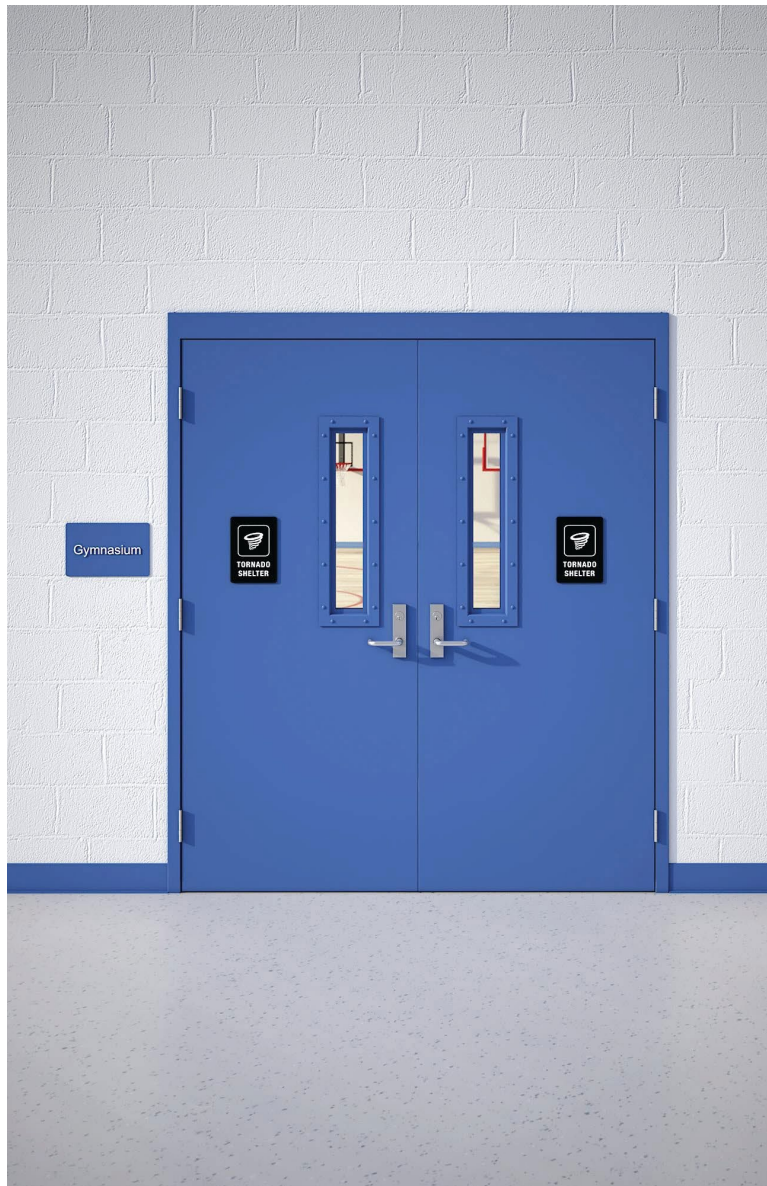


ENVIRONMENTAL PRODUCT DECLARATION

REPUBLIC DF SERIES FLUSH DOOR AND FRAME ASSEMBLY



This EPD was created using a UL-verified EPD generator for Allegion's full product portfolio. For additional product specific EPDs, please contact Allegion at sustainability@allegion.com.



Allegion is pioneering safety by protecting people where they live and work – and protecting our environment at the same time. We promote the health and safety of our employees, customers and local community members worldwide through our commitment to conducting business in a safe and environmentally responsible manner.

Additionally, Allegion recognizes the value of the Leadership in Energy and Environmental Design (LEED) rating system to building environmentally safe and sustainable structures. By using Life Cycle Assessment and Environmental Product Declarations, we aim to provide our customers with the information they need to make decisions regarding their own sustainable building concepts and green solutions.

At Allegion, we value the importance of a cleaner world and are committed to being a responsible member of our global communities.



ENVIRONMENTAL PRODUCT DECLARATION



Allegion plc
Republic DF Series Flush Door and Frame Assembly



According to ISO 14025,
EN 15804, and ISO21930:2017

PROGRAM OPERATOR	UL Solutions	
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	Program Operator Rules v.2.7 2022	
MANUFACTURER NAME AND ADDRESS	Allegion plc 9017 Blue Ash Road, Blue Ash, OH 45242	
DECLARATION NUMBER	4790767890.139.1	
DECLARED PRODUCT & FUNCTIONAL UNIT	Republic DF Series Flush Door and Frame Assembly One commercial steel door, nominal dimensions of 3-feet x 7-feet with One three-sided steel frame that can fit a door with nominal dimensions of 3-feet x 7-feet	
REFERENCE PCR AND VERSION NUMBER	UL PCR Part A - Version 3.2 UL Part B for Commercial Steel Doors and Frames - Version 2.0	
DESCRIPTION OF PRODUCT'S INTENDED APPLICATION AND USE	Door and frame assembly tested and approved showing tornado resistance to extreme effects of 250 mph winds for impact and wind load pressure	
PRODUCT RSL DESCRIPTION	25 Years	
MARKETS OF APPLIABILITY	Americas	
DATE OF ISSUE	April 1, 2024	
PERIOD OF VALIDITY	5 Years	
EPD TYPE	Product-specific	
EPD SCOPE	Cradle to grave	
YEAR OF REPORTED MANUFACTURER PRIMARY DATA	2019	
LCA SOFTWARE & VERSION NUMBER	Sphera LCA for Experts (formerly GaBi) Version 10.7	
LCI DATABASE & VERSION NUMBER	Sphera Managed Life Cycle Content (formerly GaBi) Version 2020.2	
LCIA METHODOLOGY & VERSION NUMBER	CML 2001-Jan 2016 and TRACI 2.1	
The sub-category PCR review was conducted by:	UL Solutions	
	PCR Review Panel	
	epd@ul.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 (Dec 2018), based on ISO 21930:2017, serves as the core PR, with additional considerations from CEN Norm EN 15804 (2013) and the USGBC/UL Environment Part A Enhancement (2017) <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL		 Cooper McCollum, UL Solutions
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:		WAP Sustainability Consulting
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:		 Thomas P. Gloria, Industrial Ecology Consultants
LIMITATIONS Environmental declarations from different programs (ISO 14025) may not be comparable. Comparison of the environmental performance of products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR. Full conformance with this PCR allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.		



Allegion plc
Republic DF Series Flush Door and Frame Assembly

According to ISO 14025,
EN 15804 and ISO 21930:2017

1. Product Definition and Information

1.1. Description of Company

Allegion Plc is a publicly traded global company that manufactures security door products. More than 25 global brands included under the Allegion parent company umbrella are sold in 120 different countries. Among these brands are Schlage (locks), Von Duprin (exit devices), Ives (hinges, stops and miscellaneous builders' hardware), Falcon (locks, exit devices and closers), Glynn Johnson (holders/ stops and push/pull latches), and Steelcraft (steel door and frames). Allegion operates plants across the United States and internationally.

1.2. Product Description

The Republic DF Series Tornado Door and Frame Assembly is a system designed to offer exceptional protection during severe weather events. This robust solution is assembly tested and approved to withstand extreme winds of up to 250 mph, meeting the stringent standards set by ICC-500 and FEMA 320/361. Its superior corrosion-resistant, 14-gauge A60 galvanized steel construction ensures long-lasting performance and durability. The door features a steel-stiffened core, welded and bonded for superior strength and security, while tight tolerances and a full-height, epoxy-filled mechanical interlock edge provide exceptional weather resistance. Additionally, patented universal hinge preparations allow for easy field conversion between standard and heavy-weight hinges, offering adaptability to different needs. The Republic DF Series also meets UL10C fire rating requirement, demonstrating its commitment to comprehensive building protection. Furthermore, Republic's SDI certification, UL, and Intertek listing for the DF series guarantee adherence to relevant codes and quality standards. This system is ideal for schools, hospitals, and other buildings requiring exceptional protection from severe weather events.

The declared DF Series door is made of galvanized steel panels with a polystyrene core, and the frame is made of galvanized steel. This door is also offered with other core variations, though they are out of scope for this product. These doors come with full-height, epoxy filled mechanical interlock visible edge seams that provide structural support and stability across the full height of the door.

The EPD presents product specific results for the DF Series flush door with a polystyrene core. Since this is a product specific EPD, there was no averaging method applied.

Table 1: Technical Details

PARAMETER	VALUE	UNIT
Sound Transmission Coefficient	Not tested	-
U-value	Not tested	-
Declared product properties	UL ICC500-2020 Listed and Labeled (Tornado-resistant assembly) Compliant with FEMA 320/361 ANSI A250.8-2017 (SDI 100) ANSI/SDI A1250.10 (Prime Paint) ANSI UL10C (Fire) ANSI UL1784 (Air Leakage) ANSI/SDI A250.4 (Physical Endurance) ANSI/SDI A250.6 (Hardware Reinforcing)	-



ENVIRONMENTAL PRODUCT DECLARATION



Allegion plc
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PARAMETER	VALUE	UNIT
	ANSI/SDI A150.3 (Finish Coating) ASTM A653 (Galvannealed) ANSI A115 (Locations) SDI 117 (Tolerances)	

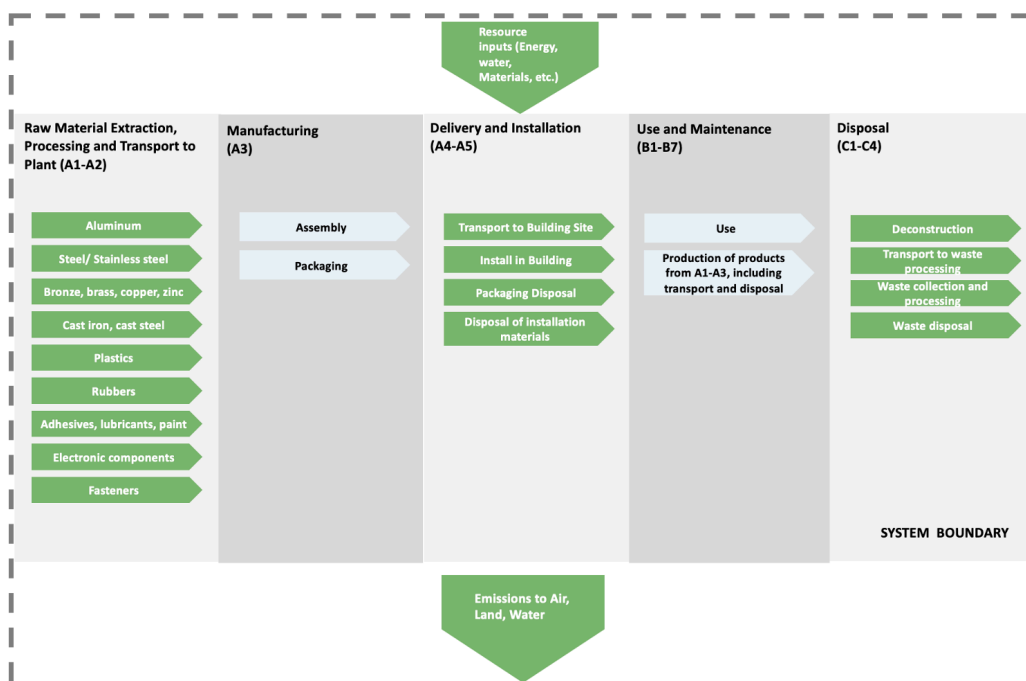
The EPD presents product specific results for the DF Series flush door with a polystyrene core. Since this is a product specific EPD, there was no averaging method applied.

1.3. Application

Commercial buildings in tornado alley (FEMA 361) as well as residential shelters (FEMA 320). Most common are new school gymnasiums constructed as ICC500 compliant tornado shelters for K-12 and higher education. Typical hardware includes the Schlage LM9300 Levers (rods factory installed) and Von Duprin WS98/9927 or -57 panic exits, which is supplied separately and not included in the scope of this EPD.

1.4. Declaration of Methodological Framework

This EPD is cradle-to-grave, as represented by the flow diagram below. A summary of the life cycle stages can be found in Table 4. The reference service life (RSL) is outlined in Table 7. The cut-off criteria are described in Cut-off Rules, and the allocation procedures are described in the Allocation section. No known flows are deliberately excluded from this EPD. Third party verified ISO 14040/44 secondary LCI data sets contribute more than 67% of total impacts in all impact categories required by the PCR.



ENVIRONMENTAL PRODUCT DECLARATION



Allegion plc
Republic DF Series Flush Door and Frame Assembly

According to ISO 14025,
EN 15804 and ISO 21930:2017

1.5. Material Composition

The materials that make up the Republic DF Series Flush Door and Frame Assembly are indicated in Table 2..

Table 2: Material Composition

MATERIAL	REPUBLIC DF SERIES FLUSH DOOR AND FRAME ASSEMBLY
Galvannealed Steel	94.6%
Steel	4.5%
Paint	0.5%
Chloroprene	0.4%
Polystyrene	0.1%
Epoxy	0.1%

1.6. Properties of Declared Product as Delivered

Republic DF Series door and frame assemblies are typically packaged and shipped at different times based on the construction schedule of the building.

The Republic DF Series frames are packaged with a variety of packaging materials including cardboard, paper (for labels and instructions), and polyethylene film. Exact weight and type of packaging per product are provided by the product engineering team. In order to have full truck loads, DF frames can be mixed with other frame products from Republic and is shipped via a common carrier.

The Republic DF Series doors are stacked on a cardbaord skid, bound by plastic bands and protected by full height door edge cuffs. Bound products are then staged for loading onto trucks for shipping. The dimensions of the final packaged product vary by customer order. Under typical shipping situations pallets are stacked 10-20 doors high. At max (20 doors) the pallet is roughly 80" tall. DF Series doors can be mixed with other door products from Republic and is shipped via a common carrier.

1.7. Manufacturing

DF Series door and frame assemblies are manufactured at Allegion’s factory in Blue Ash, OH. Manufacturing begins at receiving bays where the steel is delivered. Steel is supplied in sheet and coil form. The steel is the sheared and punched in preparation for the forming stage. In the forming stage a pair of sheard and punched sheets are formed with a hook and seam pattern. Reinforcement are then welded onto the formed sheets. All parts then move through a stage wash process to remove oils and other contaminants in preparation for prime painting. The front and back panels are bonded together. Lastly, door end channels are inserted and welded to each door panel before going through a series of paint booths, curing ovens, and finally to the shipping area.

Natural Resources used in the manufacturing process include electricity, natural gas, and water. Steel waste is also generated throughout each step as the product is formed and assembled. All Steel waste is collected and recycled offsite.

1.8. Packaging



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According to ISO 14025,
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Packaging utilized in the shipment of the product is described in Table 2.

Table 3: Packaging

MATERIAL	DF SERIES DOOR AND FRAME	UNIT	DISPOSAL PATHWAY
Cardboard	1.63E+00	kg	Landfilled (20%), Incinerated (5%), Recycled (75%)
Paper	2.72E-03	kg	Landfilled (20%), Incinerated (5%), Recycled (75%)

1.9. Transportation

It is assumed that all raw materials are distributed by truck and ship, based on global region. An average distance using this information was calculated and used in the model.

The transport distance to the end customers was calculated based on sales data for the year 2019. The transportation distance for all waste flows is assumed to be 200 km. Both distances are provided in the sub-category PCR in Section 3.12.

1.10. Product Installation

Detailed installation instructions are provided online at Allegion.com. Installation equipment is required though not included in the study as these are multi-use tools and the impacts per declared unit is considered negligible. Packaging waste is generated and disposed of in this stage. Packaging and installation waste disposal have been modeled as per guidelines in section 2.8.5 of *Part A: Life Cycle Assessment Calculation Rules and Report Requirements* from UL Environment. Packaging installation waste are either landfilled, incinerated or recycled.

Product should be installed by a professional and is subject to commercial building codes. Proper equipment, including protective equipment, should be used. Allegion products must be installed in full compliance with manufacturer’s written instructions, which are included with each product.

1.11. Reuse, Recycling, and Energy Recovery

DF Series doors may be recycled or resued at the end of life. The LCA that this EPD is created from takes the conservative approach by assuming that all products are disposed of within the system boundary.

1.12. Disposal

Disposal pathways in the EPD are modeled in accordance with disposal routes and waste classification referenced in Sections 2.8.5 and 2.8.6 of *Part A: Life Cycle Assessment Calculation Rules and Report Requirements* from UL Environment. This indicates an end-of-life split amongst landfill, recycling, and incineration pathways. For metals disposed in the United States, 85% is recycled and 15% is landfilled. All plastics are landfilled in the United States.

2. Life Cycle Assessment Background Information

2.1. Functional Unit

The functional unit for doors is a standard 3-feet x 7-feet single-leaf door, installed in a North American standard building with an Estimated Service Life of 75 years, as indicated in Table 3.



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Table 4: Functional Unit Details

NAME	REPUBLIC DF SERIES FLUSH DOOR AND FRAME ASSEMBLY	UNIT
Functional Unit	One unit of product for 75 years	
Mass per functional unit, including fasteners	5.54 E+02	kg
Reference Service Life (RSL)	25	years

The fasteners needed for installation are supplied by the manufacturer with the product and therefore are accounted for together with the product.

2.2. System Boundary

The type of EPD is cradle-to-grave. All LCA modules are included and are summarized in Table 4.

Table 5: Summary of Included Life Cycle Stages

MODULE NAME	DESCRIPTION	ANALYSIS PERIOD	SUMMARY OF INCLUDED ELEMENTS
A1	Product Stage: Raw Material Supply	2019	Raw Material sourcing and processing as defined by secondary data.
A2	Product Stage: Transport	2019	Shipping from supplier to manufacturing site. Fuel use requirements estimated based on product weights and estimated distance.
A3	Product Stage: Manufacturing	2019	Energy, water and material inputs required for manufacturing products from raw materials. Packaging materials and manufacturing waste are included as well.
A4	Construction Process Stage: Transport	2019	Shipping from manufacturing site to project site. Fuel use requirements estimated based on product weights and mapped distances.
A5	Construction Process Stage: Installation	2019	Installation materials, installation waste and packaging material waste.
B1	Use Stage: Use	2019	The usage of this product does not result in direct material impacts or emissions.
B2	Use Stage: Maintenance	2019	The maintenance of the products does not involve any consumption of energy or resources.
B3	Use Stage: Repair	2019	The product does not require repairing once installed.
B4	Use Stage: Replacement	2019	Total materials and energy required to manufacture the replacements needed to meet the functional unit.
B5	Use Stage: Refurbishment	2019	The products do not require refurbishment once installed.
B6	Operational Energy Use	2019	Operational energy consumption for door products are assumed per Part B Steel doors PCR.
B7	Operational Water Use	2019	The use of the products does not impact the operational water use of the building.
C1	EOL: Deconstruction	2019	No inputs required for deconstruction.
C2	EOL: Transport	2019	Shipping from project site to landfill. Distance assumed to be 200 km from installation site to landfill.
C3	EOL: Waste Processing	2019	Waste processing not required. All waste can be processed as is.
C4	EOL: Disposal	2019	The disposal process of the product varies with the material type as per Part A Section 2.8.5. The impacts from landfilling and recycling are modeled based on secondary data.
D	Benefits beyond system	N/A	Module not declared



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According to ISO 14025,
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2.3. Estimates and Assumptions

All estimates and assumptions are within the requirements of ISO 14040/44. The majority of the estimations are within the primary data. The primary data was collected as annual totals including all utility usage and production information. For the LCA, the usage information was divided by the production in pieces to create an energy and water use per declared unit, i.e., one unit of product. Other assumptions are listed below:

- It is assumed that there is a 10% scrap loss rate of the input raw material while manufacturing all of Allegion's products.
- The utility inputs are allocated to all products equally.
- Stamping was the assumed manufacturing process of the upstream metal part when either the appropriate process wasn't available or was unknown.
- An average US Electricity grid mix is adopted in the model to calculate the impact from the Use Stage (B6).
- The installation tools are used enough times that the per unit of product impacts are negligible.

2.4. Cut-off Criteria

All inputs in which data was available were included. Material inputs greater than 1% (based on total mass of the final product) were included within the scope of analysis. Material inputs less than 1% were included if sufficient data was available to warrant inclusion and/or the material input was thought to have significant environmental impact. Cumulative excluded material inputs and environmental impacts are less than 5% based on total weight of the functional unit.

There is no excluded material or energy input or output, except as noted below:

- As the tools used during the installation of the product are multi-use tools and can be reused after each installation, the per-functional unit impacts are considered negligible and therefore are not included. However, the electricity used to drill holes for installation has been included.
- Some material inputs may have been excluded within the secondary MLC datasets used for this project. All MLC datasets have been critically reviewed and conform to the exclusion requirements of the PCR.

2.5. Data Sources

Primary data were collected by facility personnel and from utility bills and was used for all manufacturing processes. Whenever available, supplier data was used for raw materials used in the production process. When primary data did not exist, secondary data for raw material production was utilized from LCA FE (formerly GaBi) 10.7, MLC (formerly GaBi) Database Version 2020.2.

2.6. Data Quality

Geographical Coverage

The geographical scope of the manufacturing portion of the life cycle is Blue Ash, Ohio. This LCA uses country specific energy datasets that take into account US eGrid specific energy and transportation mixes. Overall geographic data quality is considered good.



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Time Coverage

Primary data were provided by Allegion associates and represent calendar year 2019. Using 2019 data meets the PCR requirement that manufacturer specific data be within the last 5 years. Time coverage of this data is considered good. Data necessary to model cradle-to-gate unit processes was sourced from Sphera LCI datasets. Time coverage of the MLC datasets varies from approximately 2015 to present. All datasets rely on at least one 1-year average data. Overall time coverage of the datasets is considered good and meets the requirement of the PCR that all data be updated within a 5-year period. The specific time coverage of secondary datasets can be referenced in the dataset references table in each supplemental LCA report.

Technological Coverage

Primary data provided by Allegion are specific to the technology that the company uses in manufacturing their product. It is site specific and considered of good quality. It is worth noting that the energy and water used in manufacturing the product includes overhead energy such as lighting, heating and sanitary use of water. Sub-metering was not available to extract process only energy and water use from the total energy use. Sub-metering would improve the technological coverage of data quality. Data necessary to model cradle-to-gate unit processes was sourced from Sphera LCI datasets. Technological coverage of the datasets is considered good relative to the actual supply chain of Allegion. While improved life cycle data from suppliers would improve technological coverage, the use of lower quality generic datasets does meet the goal of this EPD.

Completeness

The data included is consider complete. The LCA model included all known material and energy flows, with the exception of what is listed in Section 2.4. As pointed out in that section, no known flows above 1% were excluded and the sum of all excluded flows totals less than 5%.

2.7. Period under Review

The period under review is calendar year 2019.

2.8. Allocation

General principles of allocation were based on ISO 14040/44. Where possible, allocation was avoided. To derive a per-unit value for manufacturing inputs such as electricity, thermal energy, and water, allocation based on total production in pieces was adopted. Discussions with Allegion staff divulged this was a more representative way to allocate the manufacturing inputs based on the manufacturing processes used and the types of products created. There are several other products that are assembled and packaged within the same facility. It is assumed that energy used for these purposes are the same across different products. Regarding secondary datasets, as a default, MLC datasets use a physical mass basis for allocation.

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According to ISO 14025,
EN 15804 and ISO 21930:2017

3. Life Cycle Assessment Scenarios¹

Table 6: Transport to the building site (A4)

NAME	REPUBLIC DF SERIES FLUSH DOOR AND FRAME ASSEMBLY	UNIT
Fuel type	Diesel	-
Liters of fuel	38.4	l/100km
Vehicle type	Truck – Trailer, basic enclosed/ 50,000 lb. payload	-
Transport distance	5.05E+02	km
Capacity utilization	65	%
Weight of products transported	1.85E+02	kg
Volume of products transported	113.56	m ³
Capacity utilization volume factor	1	-

Table 7: Installation into the building (A5)

NAME	REPUBLIC DF SERIES FLUSH DOOR AND FRAME ASSEMBLY	UNIT
Fasteners	The fasteners for installation are accounted for in A1-A3.	
Waste material at the construction site before waste processing, generated by production installation	1.63E+00	kg
Pulp Recycling (75%)	1.22E+00	kg
Pulp Landfilling (20%)	3.26E-01	kg
Pulp Incineration (5%)	8.14E-02	kg
Total Pulp Packaging Waste	1.63E+00	kg
Biogenic carbon contained in packaging	2.65E+00	kg CO ₂
VOC emission	N/A	µg/m ³

Table 8: Reference Service Life

NAME	REPUBLIC DF SERIES FLUSH DOOR AND FRAME ASSEMBLY	UNIT
RSL	25 years	years
Declared product properties	ANSI Compliant	-
Design application parameters	Installation per recommendation by manufacturer	-
An assumed quality of work	Accepted industry standard	-
Indoor environment	Normal building operating conditions	-
Use conditions	Normal use conditions	-
Maintenance	None required	-

¹ The tables for B1, B2, B3, and B5 are not included as these stages do not involve any flow input or output.



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According to ISO 14025,
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Table 9: Replacement (B4)

NAME	REPUBLIC DF SERIES FLUSH DOOR AND FRAME ASSEMBLY	UNIT
Reference Service Life	25	Years
Replacement cycles ((ESL/RSL)-1)	2	#
Replacement of worn parts	N/A	kg
Further assumptions for scenario development	N/A	-

Table 10: Operational Energy Use (B6) and Operational Water Use (B7)

NAME	REPUBLIC DF SERIES FLUSH DOOR AND FRAME ASSEMBLY	UNIT
Net freshwater consumption	0	m3
Ancillary materials	0	kg
Electricity input	2,090	kWh
Thermal energy input	155,526	MJ
Equipment power output	0	kW
Characteristic performance	R-value = 1.89*	hr-ft2-°F/BTU
Direct emission to ambient air, soil and water	0	kg
Further assumptions for scenario development	Use scenario is dictated by the PCR Part B for Commercial Steel Doors	
*R-value is not available for DF Series Flush Doors and a proxy value was used for a similar door manufactured by Allegion.		

Table 11: End of life (C1-C4)

NAME		REPUBLIC DF SERIES FLUSH DOOR AND FRAME ASSEMBLY	UNIT
Collection process	Collected with mixed construction waste	1.83E+02	kg
Recovery	Non-metal Landfilling (100%)	3.87E+00	kg
	Metal Waste Recycling (85%)	1.52E+02	kg
	Metal Waste Landfilling (15%)	2.69E+01	kg
Disposal	Product or material for final deposition	1.83E+02	kg



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Republic DF Series Flush Door and Frame Assembly



According to ISO 14025,
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4. Life Cycle Assessment Results

Table 12: Description of the system boundary modules

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY	
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
	Raw material supply	Transport	Manufacturing	Transport from gate to site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential	
Cradle to Grave	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X	MND
X = Included MND = Module not Declared																		



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According to ISO 14025,
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4.1. Republic DF Series Flush Door and Frame Assembly Results

Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
CML Impacts (Europe, Rest of World)															
GWP [kg CO2 eq]	5.34E+02	1.25E+01	3.87E-01	0.00E+00	0.00E+00	0.00E+00	1.12E+03	0.00E+00	1.25E+04	0.00E+00	0.00E+00	2.30E+00	0.00E+00	1.19E+00	MND
ODP [kg CFC 11 eq]	1.94E-08	1.61E-15	5.57E-17	0.00E+00	0.00E+00	0.00E+00	3.87E-08	0.00E+00	6.01E-12	0.00E+00	0.00E+00	2.97E-16	0.00E+00	4.06E-15	MND
AP [kg SO2 eq]	1.10E+00	1.80E-02	4.30E-04	0.00E+00	0.00E+00	0.00E+00	2.28E+00	0.00E+00	9.36E+00	0.00E+00	0.00E+00	5.08E-03	0.00E+00	5.02E-03	MND
EP [kg Phosphate eq]	1.10E-01	4.85E-03	2.45E-04	0.00E+00	0.00E+00	0.00E+00	2.41E-01	0.00E+00	1.79E+00	0.00E+00	0.00E+00	1.36E-03	0.00E+00	1.56E-03	MND
POCP [kg Ethene eq]	1.33E-01	-4.23E-03	1.24E-04	0.00E+00	0.00E+00	0.00E+00	2.50E-01	0.00E+00	1.22E+00	0.00E+00	0.00E+00	-1.67E-03	0.00E+00	5.28E-04	MND
ADP-elements [kg Sb eq]	9.42E-03	2.14E-06	7.02E-09	0.00E+00	0.00E+00	0.00E+00	1.88E-02	0.00E+00	4.95E-03	0.00E+00	0.00E+00	3.94E-07	0.00E+00	2.53E-07	MND
ADP-fossil fuel [MJ]	5.00E+03	1.61E+02	4.34E-01	0.00E+00	0.00E+00	0.00E+00	1.06E+04	0.00E+00	5.18E+04	0.00E+00	0.00E+00	2.97E+01	0.00E+00	1.48E+01	MND
TRACI Impacts (North America)															
AP [kg SO2 eq]	1.17E+00	2.36E-02	9.42E-04	0.00E+00	0.00E+00	0.00E+00	2.44E+00	0.00E+00	1.17E+01	0.00E+00	0.00E+00	6.83E-03	0.00E+00	7.53E-03	MND
EP [kg N eq]	5.64E-02	3.46E-03	1.85E-04	0.00E+00	0.00E+00	0.00E+00	1.29E-01	0.00E+00	7.32E-01	0.00E+00	0.00E+00	7.97E-04	0.00E+00	1.22E-03	MND
GWP [kg CO2 eq]	5.34E+02	1.25E+01	3.87E-01	0.00E+00	0.00E+00	0.00E+00	1.12E+03	0.00E+00	1.25E+04	0.00E+00	0.00E+00	2.30E+00	0.00E+00	1.19E+00	MND
ODP [kg CFC 11 eq]	2.17E-08	1.61E-15	5.57E-17	0.00E+00	0.00E+00	0.00E+00	4.35E-08	0.00E+00	6.01E-12	0.00E+00	0.00E+00	2.97E-16	0.00E+00	4.06E-15	MND
Resources [MJ]	2.58E+02	2.37E+01	6.97E-02	0.00E+00	0.00E+00	0.00E+00	6.07E+02	0.00E+00	3.09E+04	0.00E+00	0.00E+00	4.37E+00	0.00E+00	2.46E+00	MND
POCP [kg O3 eq]	1.90E+01	5.20E-01	5.38E-03	0.00E+00	0.00E+00	0.00E+00	4.02E+01	0.00E+00	3.26E+02	0.00E+00	0.00E+00	1.53E-01	0.00E+00	1.00E-01	MND
Carbon Emissions and Uptake															
BCRP [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
BCEP [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
BCRK [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
BCEK [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
BCEW [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
CCE [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
CCR [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
CWNR [kg CO2]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND

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According to ISO 14025,
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Impact Category	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Resource Use Indicators															
RPRE [MJ]	3.99E+02	7.53E+00	3.23E-02	0.00E+00	0.00E+00	0.00E+00	8.29E+02	0.00E+00	3.20E+03	0.00E+00	0.00E+00	1.39E+00	0.00E+00	1.57E+00	MND
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RPRT [MJ]	3.99E+02	7.53E+00	3.23E-02	0.00E+00	0.00E+00	0.00E+00	8.29E+02	0.00E+00	3.20E+03	0.00E+00	0.00E+00	1.39E+00	0.00E+00	1.57E+00	MND
NRPRE [MJ]	5.58E+03	1.78E+02	5.42E-01	0.00E+00	0.00E+00	0.00E+00	1.19E+04	0.00E+00	2.18E+05	0.00E+00	0.00E+00	3.29E+01	0.00E+00	1.94E+01	MND
NRPRM [MJ]	5.62E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.12E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRPRT [MJ]	5.59E+03	1.78E+02	5.42E-01	0.00E+00	0.00E+00	0.00E+00	1.19E+04	0.00E+00	2.18E+05	0.00E+00	0.00E+00	3.29E+01	0.00E+00	1.94E+01	MND
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
NRSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
FW [m3]	6.17E-01	3.35E-02	3.54E-04	0.00E+00	0.00E+00	0.00E+00	1.36E+00	0.00E+00	8.58E+00	0.00E+00	0.00E+00	6.17E-03	0.00E+00	2.75E-03	MND
Output Flows and Waste Categories															
HWD [kg]	3.04E-02	3.05E-06	6.22E-09	0.00E+00	0.00E+00	0.00E+00	6.08E-02	0.00E+00	7.76E-05	0.00E+00	0.00E+00	5.62E-07	0.00E+00	1.29E-07	MND
NHWD [kg]	1.10E+01	1.28E-02	2.57E-01	0.00E+00	0.00E+00	0.00E+00	8.04E+01	0.00E+00	4.97E+01	0.00E+00	0.00E+00	2.35E-03	0.00E+00	2.90E+01	MND
HLRW [kg]	1.20E-04	4.85E-07	4.64E-09	0.00E+00	0.00E+00	0.00E+00	2.42E-04	0.00E+00	2.07E-03	0.00E+00	0.00E+00	8.93E-08	0.00E+00	1.91E-07	MND
ILLRW [kg]	1.01E-01	4.02E-04	3.93E-06	0.00E+00	0.00E+00	0.00E+00	2.03E-01	0.00E+00	1.72E+00	0.00E+00	0.00E+00	7.39E-05	0.00E+00	1.64E-04	MND
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
MR [kg]	2.33E-01	0.00E+00	1.22E+00	0.00E+00	0.00E+00	0.00E+00	3.11E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	1.54E+02	0.00E+00	MND
MER [kg]	1.06E-01	0.00E+00	8.14E-02	0.00E+00	0.00E+00	0.00E+00	3.76E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EEE [MJ]	5.64E-01	0.00E+00	2.62E-01	0.00E+00	0.00E+00	0.00E+00	1.65E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND
EET [MJ]	2.27E-01	0.00E+00	8.37E-02	0.00E+00	0.00E+00	0.00E+00	6.21E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	MND

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5. LCA Interpretation

Overall, the vast majority of the door's impacts are found in B6, specifically due to the heat transfer through the door. This causes the building HVAC system to compensate for the energy loss and thus leads to a higher energy consumption to maintain thermal comfort. If the impacts from B6 are set aside to observe impacts from other phases, B4 emerges as a major contributor. This follows the fact that with an RSL of 25 years, there are 2 replacements that need to occur during the 75 years of building operation. This includes raw material extraction, manufacturing, distribution, install and end of life (for replaced product) for every replacement.

6. Additional Environmental Information

6.1. Environment and Health During Manufacturing

Allegion meets all federal and state standards related to the Environment and Health during manufacturing. Beyond what is regulated, there are no additional environment and health considerations during the production of goods.

6.2. Environment and Health During Installation

The installation instruction that can be found on Allegion's website should be referred to and followed to have proper and safe installation.

6.3. Environment and Health During Use

There are no environmental or health considerations during the use of the product.

6.4. Extraordinary Effects

Fire

Republic DF Series door and frame assemblies can be UL10C labeled for fire door applications.

Windstorm

Republic DF Series door and frame assemblies are ICC500-2020 listed and labeled for windstorm applications.

Water

Should the product become flooded, the water should be removed by means of extraction and drying and the product should behave as originally intended. There are no environmental impacts associated with the product being flooded.

Mechanical Destruction

If the product is mechanically destroyed, it should be disposed of using standard procedures and replaced in a timely manner.





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EN 15804 and ISO 21930:2017

7. Supporting Documentation

The full text of the acronyms found in Section 4 are found in Table 12.

Table 13: Acronym Key

ACRONYM	TEXT	ACRONYM	TEXT
LCA Indicators			
ADP-elements	Abiotic depletion potential for non-fossil resources	GWP	Global warming potential
ADP-fossil	Abiotic depletion potential for fossil resources	OPD	Depletion of stratospheric ozone layer
AP	Acidification potential of soil and water	POCP	Photochemical ozone creation potential
EP	Eutrophication potential	Resources	Depletion of non-renewable fossil fuels
LCI Indicators			
PERE	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PENRT	Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)
PERM	Use of renewable primary energy resources used as raw materials	SM	Use of secondary materials
PERT	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	RSF	Use of renewable secondary fuels
PENRE	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	NRSF	Use of non-renewable secondary fuels
PENRM	Use of non-renewable primary energy resources used as raw materials	FW	Net use of fresh water
HWD	Disposed-of-hazardous waste	MFR	Materials for recycling
NHWD	Disposed-of non-hazardous waste	MET	Materials for energy recovery
HLRW	High-level radioactive waste	EEE	Exported electrical energy
ILLRW	Intermediate- and low-level radioactive waste	EET	Exported thermal energy
CRU	Components for reuse	RE	Recovered energy



ENVIRONMENTAL PRODUCT DECLARATION



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Republic DF Series Flush Door and Frame Assembly



According to ISO 14025,
EN 15804 and ISO 21930:2017

8. References

1. Life Cycle Assessment, Allegion, LCA for EPD Generation Tool Report for Allegion Doors. WAP Sustainability Consulting. March 2021.
2. Product Category Rules for Building-Related Products and Services Part A: Life Cycle Assessment Calculation Rules and Report Requirements UL – 10010 Version 3.2. UL Environment. 2019.
3. PCR for Building-related Products and Services Part B: Commercial Steel Doors and Steel Frames EPD Requirements. UL Environment. Version 2.0. 2020.
4. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.
5. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
6. ISO 14044: 2006/ Amd 1:2017 Environmental Management – Life cycle assessment – Requirements and Guidelines – Amendment 1.
7. ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.
8. EN 15804: 2012 + A1: 2013 – Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction product.
9. UL Environment General Program Instructions, March 2020, version 2.5.

