

**Von Duprin®
M996
Motor driven
electrified trim**


**EPD Optimization
Assessment**

Creation Date: 11/13/2023
Date of Expiration: 7/1/2026

VON DUPRIN®



EPD Optimization Assessment
M996 Motor Driven Electrified Trim

Product Information		
Manufacturer Name	Allegion Plc 2720 Tobey Dr, Indianapolis, IN 46219	
Product Name and Type	Von Duprin M996 Motor Driven Electrified Trim	
Optimization Assessment ID Number	AGIN04	
Impact Comparison Parameters		
Type of Comparison	EPD of product (M996) vs LCA impact results of legacy product (E996)	
Current EPD	Von Duprin M996, 4789828313.106.1, UL https://spot.ul.com/main-app/products/detail/6140e333cb68c6ac4e21e673?page_type=Products Catalog	
Program Operator	UL Environment, 333 Pfingsten Road, Northbrook, IL, 60611 https://www.ul.com	
Baseline Product Specific LCA	Von Duprin E996, AGIN06 https://us.allegion.com/content/dam/allegion-us-2/web-files/von-duprin-technical-documents/VON_E996_Product_Specific_LCA_115818.pdf	
Life Cycle Stages Reviewed	Cradle-to-Grave	
Functional Unit	1 unit of product used for a standard 3' x 7' single-leaf door for 75 years	
Impact Assessment (TRACI)		
	M996	E996
GWP [kg CO ₂ eq]	7.26E+1	1.10E+03
AP [kg SO ₂ eq]	1.91E-01	1.77E+00
EP [kg N eq]	1.43E-02	1.33E-01
Impact Comparison Results		
Comparison Summary	The current Allegion product has greater than 20% GWP impact reduction, and more than 5% Resources and POCP impact reduction than the historical product.	
LEED Credit Achieved	<input checked="" type="checkbox"/> LEED v4.0 @ 100% cost <input type="checkbox"/> LEED v4.1 @ 100% cost/1 product	<input type="checkbox"/> LEED v4.1 @ 150% cost/1.5 products <input checked="" type="checkbox"/> LEED v4.1 @ 200% cost/2 products
Verifier	Matt Van Duinen, LCACP Sustainability Director, WAP Sustainability 	
Creation Date	11/13/2023	
Expiration Date	7/1/2026	

Third Party LEED Verification Statement

It is WAP Sustainability’s professional opinion that the product(s) in question meets the following LEED Materials and Resource Credit, Environmental Product Declaration, Option 2 criteria:

<input type="checkbox"/> Product Does Not Meet LEED Option 2 Criteria
<input checked="" type="checkbox"/> Impact Reduction in 3+ Categories (value at 100% by cost for LEED v4.0)
<input type="checkbox"/> GWP Reduction >0% (value at 100% by cost or 1 product for LEED v4.1)
<input type="checkbox"/> GWP Reduction 10+% (value at 150% by cost or 1.5 products for LEED v4.1)
<input checked="" type="checkbox"/> GWP Reduction 20+% and Impact Reduction 5+% in 2+ Additional Categories (value at 200% by cost or 2 products for LEED v4.1)

This determination was made for the following reasons:

- The comparability assessment initially reviewed the EPDs and the LCA report behind the results. Sufficient information is provided for us to come to the conclusion that comparability was achieved.
- GWP reductions of at least 20%, and more than 5% AP and EP reductions were shown.
- The narrative provided by Allegion was found to adequately address the source of the reductions found in the comparison. The narrative is attached as an appendix to this report.
- Allegion has provided a timeline for publishing this report publicly and given direction as to the location that this report will be published.



Matt Van Duinen, LCACP
Sustainability Director
WAP Sustainability Consulting, LLC

Assessment of Impact Results

Life Cycle Stages Under Review

Sourcing and Manufacturing	Transportation and Installation	Use Phase	End of Life	Other
<input checked="" type="checkbox"/> A1 <input checked="" type="checkbox"/> A2 <input checked="" type="checkbox"/> A3	<input checked="" type="checkbox"/> A4 <input checked="" type="checkbox"/> A5	<input checked="" type="checkbox"/> B1 <input checked="" type="checkbox"/> B5 <input checked="" type="checkbox"/> B2 <input checked="" type="checkbox"/> B6 <input checked="" type="checkbox"/> B3 <input checked="" type="checkbox"/> B7 <input checked="" type="checkbox"/> B4	<input checked="" type="checkbox"/> C1 <input checked="" type="checkbox"/> C2 <input checked="" type="checkbox"/> C3 <input checked="" type="checkbox"/> C4	<input type="checkbox"/> D

Functional/Declared Unit

As this comparison reviewed A1-A3 impacts only, a Declared unit is provided rather than a functional unit.

	Functional Unit	Product Reference Service Life
M996 LCA/EPD	1 unit of product used for a standard 3' x 7' single-leaf door for 75 years	20
E996 LCA	1 unit of product used for a standard 3' x 7' single-leaf door for 75 years	20

Assessment Results

As the original life cycle assessments for the products in question were not performed in a similar manner, the results were not directly comparable. An additional LCA-based analysis was necessary to generate the comparison table below, and as such, the results are now directly comparable.

	AP [kg SO ₂ eq]	EP [kg N eq]	GWP [kg CO ₂ eq]	ODP [kg CFC 11 ¹]	Resources [MJ]	POCP [kg O ₃ eq]
M996	1.91E-01	1.43E-02	7.26E+01	6.50E-10	7.98E+01	2.18E+00
E996	9.27E-01	6.93E-02	5.46E+02	5.93E-10	5.69E+02	1.27E_01

¹ ODP has high levels of uncertainty within secondary background datasets and comparisons using ODP as a reference should not be performed.

EPD Optimization Assessment
M996 Motor Driven Electrified Trim

Impact Change	-79%	-79%	-87%	10%	-86%	-83%
---------------	------	------	------	-----	------	------

WAP Sustainability’s Criteria for Comparability

Per ISO14025, “Type III environmental declarations are intended to allow a purchaser or user to compare the environmental performance of products on a life cycle basis. Therefore, comparability of Type III environmental declarations is critical. The information provided for this comparison shall be transparent in order to allow the purchaser or user to understand the limitations of comparability inherent in the Type III environmental declarations.”

WAP Sustainability takes this requirement very seriously. No EPD is an exact replica of another. Due to the human element and the embodied uncertainty in complex supply chain, there are nearly always limitations to comparability. The goal is to limit those limitations. It is important for the user of an EPD to understand that the environmental impact values presented are ballpark figures based on the best available science, expert decisions and available budgets. At WAP Sustainability, we agree with the above statement taken from ISO14025 and believe that “comparability of Type III environmental declarations is critical”. Without comparability, the power of LCAs and EPDs to help facilitate a transition to an environmentally sustainable economy will always be limited. The key is for the comparison to be done in a manner that is critically reviewed and open.

To facilitate transparency, we have presented our entire criteria for the assessment of comparability in the table below.

	Data is not at all comparable	Data is significantly not comparable. Modification may need to be made.	Data is comparable but opportunities for improvement exist.	Data is highly comparable.
Score Category	Score = 0	Score = 1	Score = 2	Score = 3
Count	0	0	3	24
<p>Note: A single score of 0 will result in LCA/EPD not being able to be compared. Additionally, multiple scores of 1 will result in LCA/EPD not being able to be compared.</p>				

Comparability Findings

- Comparable for the Purposes of LEED Credit Achievement
- Not Comparable for the Purposes of LEED Credit Achievement

The products in question are similar in application, size, and use scenarios. The production method in manufacturing is similar. The boundary conditions are the same between the studies. Additionally, further LCA modeling and expert analysis was conducted to account for the difference in PCRs. It is because of these facts that the EPDs are comparable.

	Current EPD	Previous LCA	Comparability
General			
Program Operator	UL Environment	UL Environment	3
PCR	UL PCR Part A V3.2 UL PCR Part B: Builders Hardware EPD Requirements	UL PCR Part A V3.2* UL PCR Part B: Builders Hardware EPD Requirements*	3
Product Category Definition			
Product Type	Electrified Trim	Electrified Trim	3
Manufacturing Description	Metal fabrication, Component Assembly	Metal fabrication, Component Assembly	3
Functional Unit	1 unit of product used for a standard 3' x 7' single-leaf door for 75 years	1 unit of product used for a standard 3' x 7' single-leaf door for 75 years	3
Weight Per Functional Unit	9.11 kg	10.00 kg	3
Reference Service Life (Product)	20	20	3
Estimated Service Life (Building)	75	75	3
Materials and Substances			
Raw Materials and Percent Listed in LCA or EPD	-	-	2

EPD Optimization Assessment
M996 Motor Driven Electrified Trim

	Current EPD	Previous LCA	Comparability
Brass	69.0%	46.9%	-
Stainless Steel	0.40%	15.3%	-
Steel	26.0%	33.0%	-
NBR	0.17%	0.15%	-
Nylon 66	0.27%	0.24%	-
Power Cable	2.65%	2.35%	-
ABS	0.17%	-	-
Motor/Solenoid	0.75%	2.14%	-
Electronic Components	0.54%	-	
Goal and Scope			
Stated Goal of LCA or EPD	Create an LCA for door hardware to understand impacts and create EPDs	Create an LCA for door hardware to understand impacts and create EPDs	3
Stated Scope of LCA or EPD	Cradle-to-Grave	Cradle-to-Grave	3
Format for Declaration			
LCA or EPD	EPD	LCA	2
ISO 14025 Series Compliance	Yes	Yes*	3
ISO 21930 Compliance	Yes	Yes*	3
EN 15804 Compliance	Yes	Yes*	3
Data Collection			
Assessed Data Quality	Data within 10 years, US datasets when possible, appropriate technologies used	Data within 10 years, US datasets when possible, appropriate technologies used	3

EPD Optimization Assessment
M996 Motor Driven Electrified Trim

	Current EPD	Previous LCA	Comparability
Vintage of Primary Data	2019	2019	3
Key Assumptions, Overall	Allocation based on production volume at plants	Allocation based on production volume at plants	3
Key Assumptions, Use Phase	90% AC to DC conversion efficiency 8 hours per work day with latch held retracted 20 additional actuations per work day 261 work days per year Fail Mode: 50% Fail safe + 50% Fail secure US Average Electricity Mix	90% AC to DC conversion efficiency 8 hours per work day with latch held retracted 20 additional actuations per work day 261 work days per year Fail Mode: 50% Fail safe + 50% Fail secure US Average Electricity Mix	3
Key Assumptions, EOL	According to PCR Part A	According to PCR Part A	3
Defined Cut Off Rule	<1% mass <1% energy <5% total	<1% mass <1% energy <5% total	3
Percent of Materials Left Out of Study	0%	0%	3
LCA Software Used	GaBi 10.5.1.124	GaBi 10.7.1.28	2
Source of Secondary Datasets	sphera	sphera	3
Vintage of Secondary Datasets	2020.2	2020.2	3
Reporting Categories			
LCIA Impacts Assessment Methodology	TRACI 2.1	TRACI 2.1	3
Description of Any Modifications Made to	None	None	3

	Current EPD	Previous LCA	Comparability
Reporting Categories That Were Necessary to Facilitate Comparison			
Equivalency of Stages			
Description of Any Modifications Made to Life Cycle Stages That Were Necessary to Facilitate Comparison	None	None	3
*While the baseline life cycle assessment methodology followed the standards specified, an environmental product declaration was not published, and compliance with these standards has not been externally verified.			

Manufacturer Narrative of Impact Reductions

The reductions in the impacts between M996 vs its legacy product E996 were mainly derived from one factor:

- The motors used on M996 are more energy-efficient when holding than the solenoid used on E996. In fail secure mode, the power demand of M996 for holding is less than 0.9% that of E996 in holding. In fail safe mode, the power ratio between M996 and E996 for holding is 1:22. Along the service life of the products, the impact reductions derived from the energy saving exceeds the impacts generated from all the other life stages including raw material extraction, transportation, manufacturing, distribution and end-of-life disposal.