

MF

Proline Latex Acrylic Paints



MF Paints Inc.

ENVIRONMENTAL PRODUCT DECLARATION

ISO 14025:2006 and ISO 21930:2017



ASTM INTERNATIONAL



MF Paints Inc. is pleased to present this Environmental Product Declaration (EPD) for Proline Latex Acrylic Paints. This EPD was developed in compliance with ISO 14025 and has been verified by Lindita Bushi from Athena Sustainable Materials Institute.

The LCA and the EPD were prepared by Vertima Inc. The EPD includes cradle-to-grave life cycle assessment (LCA) results.

For more information about MF Paints Inc., visit <https://www.peinturesmf.com/en/about/>.

For any explanatory material regarding this EPD, please contact the program operator.

1. GENERAL INFORMATION

PCR GENERAL INFORMATION			
Reference PCR	Product Category Rule for Environmental Product Declarations for Architectural Coatings. NSF International, PCR extended through June 30, 2024.		
The PCR review was conducted by:	<i>Dr. Thomas Gloria (chair)</i> Industrial Ecology Consultants t.gloria@industrial-ecology.com	<i>Mr. Bill Stough</i> Sustainable Research Group bstough@sustainableresearchgroup.com	<i>Dr. Michael Overcash</i> Environmental Clarity mrovercash@earthlink.net
EPD GENERAL INFORMATION			
Program Operator	ASTM Program Operator 100 Barr Harbor Drive West Conshohocken (PA) 19428-2959 USA www.astm.org		
Declared Product	Proline Latex Acrylic Paints		
EPD Registration Number	EPD Date of Issue June 2024	EPD Period of Validity June 2024 - June 2029	
EPD Recipient Organization	MF Paints Inc. 1605, Dagenais West Blvd. Laval (Quebec) H7L 5A3 Canada www.peinturesmf.com		
EPD Type/Scope and Functional Unit Product-specific cradle-to-grave EPD with functional unit of 1 m ² of covered and protected substrate for a period of 60 years.			Year of Reported Manufacturer Primary Data 2022
Geographical Scope North America	LCA Software Open LCA version 1.11.0	LCI Databases Ecoinvent 3.9.1 and US LCI	LCIA Methodology TRACI v2
This LCA and EPD were prepared by:		Gatien Geraud Essoua Essoua, Ph.D., Eng. Forestry. Vertima Inc. www.vertima.ca	
This EPD and LCA were independently verified in accordance with ISO 14025:2006, ISO 14040:2006 and ISO 14044:2006, as well as the NSF International PCR for Architectural Coatings, which is based on ISO 21930. <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External		 Lindita Bushi Athena Sustainable Materials Institute	





LIMITATIONS

Environmental declarations from different programs (ISO 14025) may not be comparable. In order to support comparative assertions, this EPD meets all comparability requirements stated in ISO 14025:2006. However, differences in certain assumptions, data quality, and variability between LCA data sets may still exist. As such, caution should be exercised when evaluating EPDs from different manufacturers, as the EPD results may not be entirely comparable. Any EPD comparison must be carried out at the building level per ISO 21930 guidelines. The results of this EPD reflect an average performance by the product and its actual impacts may vary on a case-by-case basis.



2 PRODUCT DEFINITION AND INFORMATION

2.1 DESCRIPTION OF THE COMPANY

At MF Paints, we work together to formulate paints and stains that are adapted to the Canadian climate. For more than 50 years, we have distinguished ourselves by offering premium quality and environmentally friendly products. It is thanks to our vision, values, and attention to quality that MF Paints has risen to the top of the paint and stain industry in Quebec and Canada over the last 50 years. Focused on research, development, and personalized customer service, MF Paints has succeeded in formulating premium products adapted to the needs both residential, commercial and industrial projects.

2.2 PRODUCT DESCRIPTION

Proline Latex Acrylic Series paints are a professional paint. The Proline Series is designed for new or existing buildings. These paints fall under the interior subcategory, recommended for drywall, concrete, galvanized metal, aluminum, masonry, cement and wood. Our professional paints and coatings meet the needs of painters, designers, and architects. The Proline series can be used for commercial, industrial and residential projects.

Table 1 presents each paint included in the Proline Latex Acrylic Series.

Product Series	Code number	Description	Gloss finish
Proline	6040	Self-priming	Velvet
Proline	6044	Self-priming	Satin
Proline	6046	Self-priming	Satin
Proline	6049	Self-priming	Satin/Eggshell
Proline	6059	Self-priming	Satin/Eggshell
Proline	7046	Self-priming	Velvet
Proline	7242	Self-priming	Velvet
Proline	207	Concrete ceiling sealer	Flat
Proline	757	Dry fall paint	Flat
Proline	6031	Self-priming	Satin/Flat
Proline	6032	Self-priming	Satin/Flat
Proline	6034	Self-priming	Satin/Velvet
Proline	6052	Self-priming	Satin
Proline	6055	Self-priming	Satin
Proline	6581	Self-priming	Eggshell
Proline	7052	Self-priming	Eggshell





Environmental Product Declaration (EPD) # 675

Product Series	Code number	Description	Gloss finish
Proline	7055	Self-priming	Satin
Proline	6025	Interior wall paint	Pearl
Proline	6030	Ceiling painting	Flat
Proline	6036	Ceiling painting	Flat
Proline	6038	Ceiling painting	Ultra Flat
Proline	7035	Ceiling painting	Ultra Flat
Proline	7050	Ceiling painting	Flat
Proline	6006	High build block filler	Flat
Proline	6065	Primer sealer	Flat
Proline	6066	Primer sealer	Flat
Proline	6070	Primer sealer	Flat
Proline	7065	Primer sealer	Flat
Proline	7070	Primer sealer	Flat
Proline	752	Dry fall paint	Semi-gloss
Proline	6008	Block filler	Semi-gloss
Proline	6020	Interior paint	Semi-gloss

Table 1: Paints include in a Proline Latex Acrylic Series.



Semi-Gloss Pearl Satin Velvet Satin/Eggshell Ceiling Flat Primer Sealer

Sold in gallons or liters, MF Paints' products come in wide range of colors. The primary United Nations Standard Products and Services Code (UNSPSC) code for paint products is 3511 and the Construction Specifications Institute (CSI) code is 09 96 00.





Figure 1: Representation of MF Paints room scene.

2.2.1 Product Average

The weighted average profile of each paint is calculated based on 2022 annual production data (on mass).

2.2.1.1 *Product-Specific EPD*

In the context of the growing popularity of sustainable building and LEED v4 and v4.1 Rating Systems, developing Type III Environmental Product Declarations (EPDs) would allow MF Paints to increase visibility for its Proline Latex Acrylic Series. The EPD for the Proline Latex Acrylic series has been developed according to the PCR for Architectural Coating from NSF International developed in accordance with ISO 14025, ISO 21930 – 2017 and ISO 14044 [1, 2, 3, 4].



Environmental Product Declaration (EPD) # 675

2.3 APPLICATION

MF Paints products' ease of use makes it the ideal material for commercial, hospitality and institutional projects. MF Paints products have good chemical resistance, abrasion resistance, and substrate penetration in addition to their easy application to concrete, wood, masonry, steel, aluminum substrates. The Proline latex acrylic paints presented in this EPD are for interior use.

2.4 DECLARATION OF METHODOLOGICAL FRAMEWORK

This LCA is a cradle-to-grave study. For this analysis, the attributional approach was followed and impacts of infrastructure have been excluded.

Life cycle stages included in the analysis are production, construction, use and end-of-life. According to the NSF International PCR [1] for architectural coatings (Table 1 and Table 2), there are two (2) lifetime scenarios for paint products. The first scenario is a market-based lifetime and the second scenario is design life. The Proline Latex Acrylic series had different levels of quality (Low, Mid and High). For scenario 1, the RSL are 3, 7 and 15 for the low, mid and high quality, respectively. For scenario 2, the RSL is 5 years for all paint products. For more information, please see Table 7 below.

According to the PCR allocation procedure, mass should be used as the primary basis for co-product allocation. OpenLCA software v1.11 [5], an open-source software, was used to calculate the inventory and to assess potential environmental impacts associated with the inventoried emissions.

2.5 TECHNICAL DATA

For specific properties and performance data for MF Paints, please consult the following link: <https://www.peinturesmf.com/en/product-categories/>. Table 2 presents the technical data for the products under study.

Table 2: Technical Details

Proline Latex Acrylic Finish	Surface covered (m ²)	Amounts (kg)
Satin Velvet	1	1.18E-01
Satin/Eggshell	1	1.18E-01
Pearl	1	1.18E-01
Ceiling Flat	1	1.18E-01
Primer Sealer	1	1.18E-01
Semi-Gloss	1	1.18E-01

2.6 PRODUCT COMPOSITION

The composition of each paint included in the Proline Latex Acrylic series is presented in Table 3. The composition is similar but the rates are different based on each paint.





Table 3: Material Composition for each paint in the Proline Latex Acrylic series

Paint series	Paint product	Components	Rate (%)
Proline Latex Acrylic Series	Satin Velvet	Additives	4.80%
		Glycol, esters and ethers	3.08%
		Fillers	35.13%
		Pigment	6.81%
		Binders	22.46%
		Titanium dioxide	6.17%
		Preservative	0.09%
		Water	21.47%
	Satin/Eggshell	Additives	4.87%
		Glycol, esters and ethers	4.03%
		Fillers	32.04%
		Pigment	5.06%
		Binders	22.39%
		Titanium dioxide	7.77%
		Preservative	0.11%
		Water	23.73%
	Pearl	Additives	4.54%
		Glycol, esters and ethers	4.93%
		Fillers	9.32%
		Binders	37.81%
		Titanium dioxide	20.55%
		Preservative	0.16%
		Water	22.69%
	Ceiling Flat	Additives	5.26%
		Glycol, esters and ethers	4.30%
		Fillers	21.13%
		Binders	16.76%
		Titanium dioxide	15.51%
		Preservative	0.20%
		Water	36.85%
	Primer Sealer	Additives	1.78%
		Glycol, esters and ethers	1.70%
Fillers		56.66%	
Pigment		5.22%	
Binders		11.45%	
Titanium dioxide		5.32%	
Preservative		0.10%	
Water		17.78%	



Paint series	Paint product	Components	Rate (%)
	Semi-Gloss	Additive	3.34%
		Glycol, esters and ethers	4.82%
		Fillers	5.64%
		Pigment	5.88%
		Binders	45.69%
		Titanium dioxide	17.93%
		Preservative	0.17%
		Water	16.54%

2.7 MANUFACTURING

Overall, the paint manufacturing process involves several critical steps to produce premium quality paint products that meet various specifications and requirements. Quality control at each step of the process is critical to ensuring that the final product meets customer expectations. Figure 2 shows the flow diagram for the manufacturing stage.

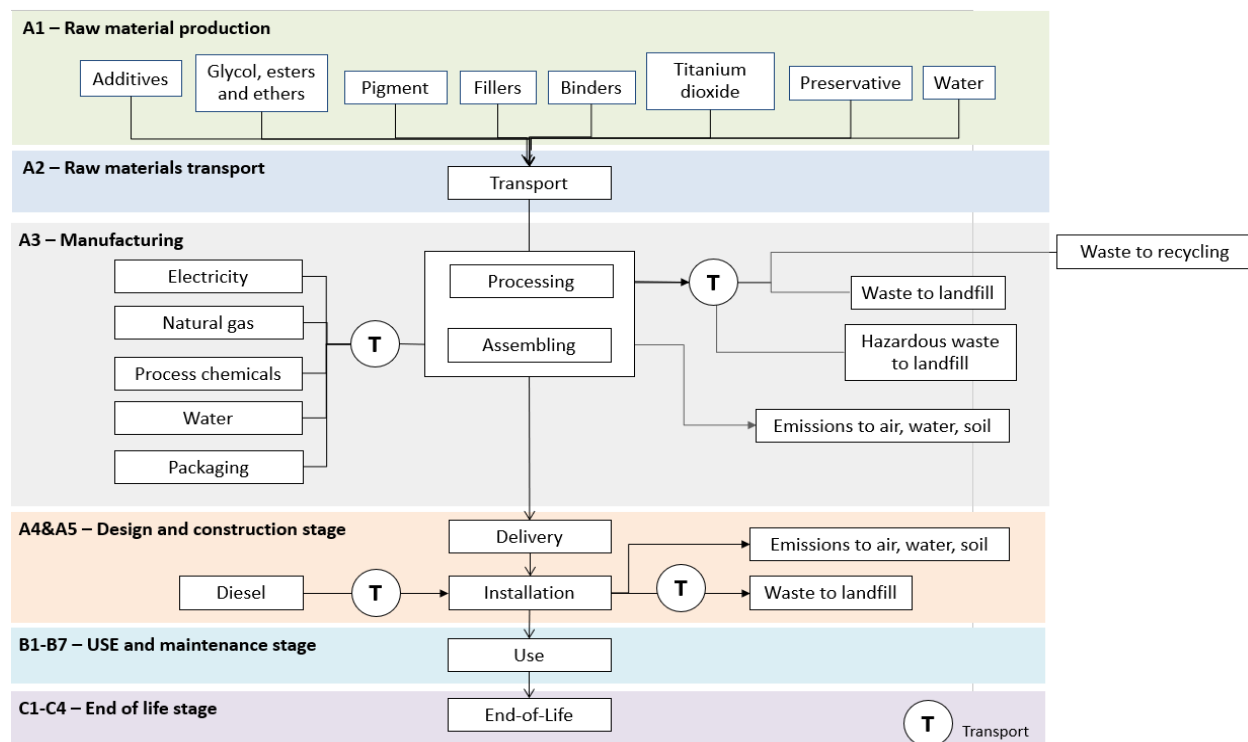


Figure 2: Flow Diagram for MF Paints manufacturing process.



2.8 PACKAGING

The paint products are packaged in steel or plastic gallon or liter containers. Containers are placed in corrugated cardboard and then placed on wood pallets, wrapped with low-density polyethylene (LDPE) and tied with polyethylene strapping. The materials used are presented in Table 4.

Table 4: Packaging materials used per each FU per Proline Latex Acrylic finish.

Materials	Proline Latex Acrylic gloss finish						Units
	Satin Velvet	Satin/Eggshell	Pearl	Ceiling Flat	Primer Sealer	Semi-Gloss	
Pallet	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	pallet
Cardboard	8.13E-07	8.13E-07	8.13E-07	8.13E-07	8.13E-07	8.13E-07	ton
Plastic	5.80E-06	5.80E-06	5.80E-06	5.80E-06	5.80E-06	5.80E-06	ton
Metal	8.26E-07	8.26E-07	8.26E-07	8.26E-07	8.26E-07	8.26E-07	ton
Polyethylene	2.21E-07	2.21E-07	2.21E-07	2.21E-07	2.21E-07	2.21E-07	ton

2.9 DISTRIBUTION OF THE PRODUCT

The distribution of MF Paint products is 85% in Quebec, 4% in Ontario, 4% in the western Canadian provinces, 4% in the Maritime provinces and the remaining 3% in the USA and the rest of the world.

2.10 PRODUCT APPLICATION

According to information received from MF Paints, no energy is needed to apply the paint product on the substrate. The percentage of un-used paints is 10%. The environmental impacts of the production stage and design and construction stage are accounted in this module. The environmental impacts of carbon black chemicals used as colorant is accounted for in this module. The drying VOC emissions were also accounted for. The manufacturer's installation instructions should be followed [6].

Table 5: Installation inputs per FU

Items	Proline Latex Acrylic Series	Units	Datasets
Carbon black	9.47E-06	kg	market for carbon black carbon black Cutoff, U - GLO
VOC emissions	4.55E-03	gr COV/m2	-
10% of un-used paint	(A1 to A5)*10%	-	-

2.11 USE CONDITIONS

After paint application on a substrate, the manufacturer does not have specific recommendations on use conditions except those indicated on the TDS sheet. As paint is washable, it is possible to clean and to remove any dust that may settle on any surface.



Environmental Product Declaration (EPD) # 675

2.12 REFERENCE SERVICE LIFE AND ESTIMATED BUILDING SERVICE LIFE

According to the NSF International PCR, the estimated service life (ESL) is 60 years. [1]

2.13 REUSE, RECYCLING, AND ENERGY RECOVERY

There is no re-use and energy recovery but waste paint is recycled.

2.14 DISPOSAL

This LCA study assumes that packaging materials such as cardboard and plastic are 100% landfilled. For metal packaging material, 100% is recycled. In landfills, based on a conservative timeline of 100 years and on the ecoinvent dataset “treatment of waste paperboard, sanitary landfill | waste paperboard | Cutoff, U – RoW” and “treatment of waste plastic, mixture, sanitary landfill | waste plastic, mixture | Cutoff, U – RoW,” the degradation of paperboard is 32% over 100 years. Waste plastic degradation represents less than 1% (negligible). In this LCA, a rate of zero degradation was considered at landfill sites.

2.15 FURTHER INFORMATION

Further information about MF Paint products is available at <https://www.peinturesmf.com/en/data-sheets/>

MF Paints is committed to making products that contribute to a healthy living environment. This is evidenced by the fact that the Proline Latex Acrylic series is tested for VOC and formaldehyde emissions by a third-party laboratory (less than 50 g/l). MF Paints also have Health Product Declarations (HPD), in the process of being certified by a third party (Green Seal company).



3 LIFE CYCLE ASSESSMENT CALCULATION RULES

3.1 FUNCTIONAL UNIT

The functional unit (FU) analyzed is 1 m² of covered and protected substrate for a period of 60 years (the assumed average lifetime of a building) with opacity of 97% after drying. Table 6 presents all products covered by this report and their respective functional unit (FU).

Table 6: Functional unit of assessed products.

Items	Proline Latex Acrylic series	Units
Functional Unit (FU)	1	m ²
Weight	1.18E-01	kg

3.2 SYSTEM BOUNDARIES

According to the NSF International PCR, the LCA is cradle-to-grave (A + B + C). All life cycle stages are included in the analysis: Production, Construction, Use and End-of-life (**Figure 3**). The production stage includes the following modules: A1) Extraction and upstream production; A2) Raw materials transportation to the manufacturing site; and A3) Manufacturing. The Construction stage includes the following modules: A4 and A5) Transportation of MF Paint products from the manufacturing site to the wholesaler in North America. The Use stage includes modules B1 to B7. The End-of-Life (EoL) stage includes modules C1 to C4.

Module B1 corresponds to the application of the paint product on the substrate. Paint is applied manually with no energy consumption. During the use stage, the resources used on rare occasions, if necessary, are negligible for module B3. For cleaning purposes, based on manufacturer recommendations, there are no resources needed for maintenance (module B2). Based on the PCR, two scenarios were analyzed: design life and market-based lifetime. During the ESL of the building (60 years), the replacement (module B4) of each paint is analyzed based on both scenarios (**Figure 3**).

Table 7 below presents both scenarios. There is no refurbishment (B5) during the estimated service life of the building. During the ESL of the building, the product does not require operational energy (B6) or water use (B7). In this analysis, the environmental impacts of these modules (B2, B3, B5, B6 and B7) are therefore considered nil.

For the end of the life (EoL) stage, there is no energy consumption for the deconstruction module (C1) because, in the building demolition activities, there is no demolition of the paint layer. For module C3, the waste goes directly from the building site to the landfill site without any energy consumption at a sorting plant. The EoL modules included in this analysis are the C2 and C4 modules for transportation from building sites to the landfill site and landfill, respectively. The distance for module C2 was assumed to be 11.27 km.

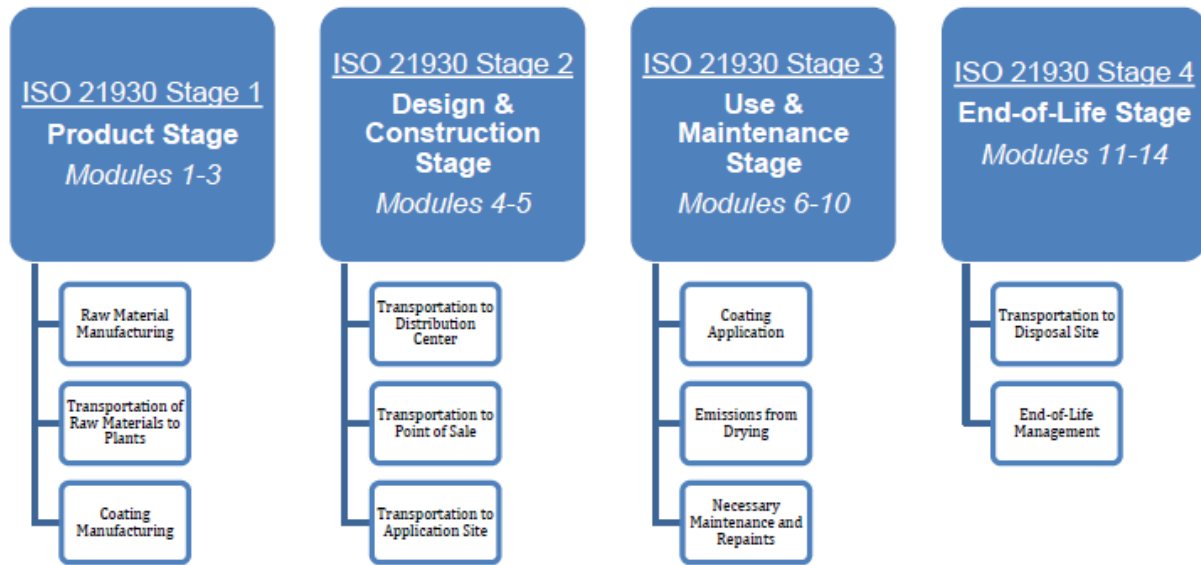


Figure 3: presents the life cycle stages, and their modules, included in the system boundaries [1]

Table 7: Lifetime scenario of paint products studied.

Proline Latex Acrylic Series Interior subcategory	Quality Level	Design life (scenario 1)	No. of replacements for scenario 1 based on building ESL	Market-based lifetime (scenario 2)	No. of replacements for scenario 2 based on building ESL
Satin/ Velvet	Mid-Level	7	8	5	11
Satin / Eggshell	Low Level	3	19	5	11
Pearl	Mid-Level	7	8	5	11
Ceiling Flat	Low Level	3	19	5	11
Primer Sealer	Low Level	3	19	5	11
Semi-Gloss	High Level	15	3	5	11

Extraction and upstream production (module A1): This stage includes the extraction and manufacturing of raw materials needed to produce the paint products.

Raw materials transportation to manufacturing site (module A2): This stage includes the transportation of raw materials from suppliers to the MF Paints manufacturing site at 1605 Dagenais Boulevard West, Laval (Quebec).

Manufacturing (module A3): This stage includes water and energy (electricity, diesel and propane) consumption for the manufacturing process, chemicals used in the process as well as their transport to the site. Hazardous waste treatment has been counted as well. Finally, packaging materials to make products ready for shipment are covered by this stage.



Environmental Product Declaration (EPD) # 675

Design and construction stage (modules A4 - A5): The design and construction process start with the packaged and finished coating leaving the production site and ends with the finished coating being delivered to the application site. Products are transported and distributed by truck in Canada (97%), mainly in the province of Quebec (85%).

Use and maintenance stage (B1 to B7): As mentioned in the PCR “The use stage begins when the user applies the product to a substrate and ends with any leftover coating and discarded packaging entering the end-of-life stage.” It was assumed that 10% of the wet paint is unused and it was also assumed it was 100% landfilled. No energy for paint application and VOC emissions from the drying of paint were accounted for. The replacement module (B4) includes the modules A1 to A5, and modules B1, C2 and C4.

End-of-life stage (C1 to C4) Transport to waste processing and/or disposal (module C2): As mentioned in the PCR “The end-of-life stage begins when any applied or unused coating and primary packaging is ready for disposal, recycling, reuse, etc. and ends when these products are landfilled, returned to nature (deterioration), or transformed to be recycled or reused” [1]. Based on the PCR, section 4.4, it was assumed that the distance to the landfill site was seven miles (11.27 Km) and 100% of the water-based paint was landfilled [1].



3.3 CUT-OFF CRITERIA

According to section 6.3.3 of ISO 21930 [3], if a mass flow or energy flow represents less than 1% of the cumulative mass or energy flows of the system, it may be excluded from the system boundaries. However, these flows should not have a relevant environmental contribution. Moreover, at least 95% of the total energy and mass flows shall be included, and the cumulative mass or environmental impacts of the excluded flows shall not exceed 5% of the total mass and energy flows or potential environmental impacts.

In this study, no primary data (input material, energy consumption) was excluded from the system boundaries. Water consumption was assumed to be 100% dedicated to employees. Therefore, this water consumption was estimated negligible by the manufacturer. No primary data on the construction, maintenance or dismantling of the company’s capital assets was included in the model. In addition, primary data on the daily transport of employees, office work, business trips and other activities from the manufacturer’s employees was not included in the model.

3.4 DATA SOURCES

Inventory data was collected from the manufacturing site located in 1605 Dagenais Boulevard West, Laval (Quebec) using a life cycle inventory (LCI) questionnaire. Data was collected via the Technical Manager and the manufacturing team. The Technical Manager and Production Manager were responsible for filling out the questionnaire. Further telephone, email and meeting discussions took place to determine certain aspects of the questionnaire, to collect additional information or to seek clarifications.

When primary data was not available, unit processes were selected from the ecoinvent database v3.9.1 or from the US LCI database, the most comprehensive LCI databases currently available. [7, 8]

3.5 DATA QUALITY

Data Quality Parameter	Data Quality Discussion
<p>Source of manufacturing data: Description sources of data</p>	<p>Manufacturing data was collected from the MF Paints manufacturing site located at 1605 Dagenais Boulevard West, Laval (Quebec) for the 2022 production year.</p> <p>Data included the total production mass of products produced at the manufacturing plant, as well as the total annual units in kg and total production mass of products under study; raw materials entering the production of the products under study; losses of materials; transport modes and distance of materials; energy consumption; water consumption; emissions to the environment at the manufacturing plant; waste treatment; packaging material and paint products distribution.</p>
<p>Source of secondary data: Description sources of raw material, energy source, transport, waste and packaging data</p>	<p>When appropriate, the grid mix was changed for the grid mix of the province or country where the process takes place. Otherwise, ecoinvent datasets representative of the global market or “rest-of-the-world” were mainly selected as proxies.</p>



Data Quality Parameter	Data Quality Discussion
Geographical representativeness	Manufacturing site is located 1605 Dagenais Boulevard West, Laval (Quebec); hence, electricity consumption is based on the Quebec grid mix. Geographical correlation of the material supply and the selected datasets are representative of each specific area or a larger area.
Temporal representativeness	Primary data were collected to be representative of the full year 2022, while this was not always the case for ecoinvent and US LCI datasets. Nevertheless, ecoinvent and US LCI remain reference LCI databases used in this study.
Technological representativeness	Primary data, obtained from the manufacturer, are representative of the current technologies and materials used by the company.
Completeness	All relevant process steps were considered and modelled to satisfy the goal and scope. Cut-off criteria were respected.

3.6 PERIOD UNDER REVIEW

The period under review is the year 2022.

3.7 ALLOCATION

According to the PCR [1], the allocation approach used as the primary basis for co-product allocation is mass allocation. In this study, mass allocation was used for the manufacturing input and output flow and the yearly production mass of each product under study was used as a basis. Data relative to material and energy consumption were provided for all co-products by the manufacturer.

Materials undergoing recycling/reuse processes are excluded from the system boundary. A cut-off approach was used because recycled/reused material is part of raw material preparation for another product system.



4 LIFE CYCLE ASSESSMENT RESULTS

4.1 RESULTS TABLES

The life cycle assessment results are presented per FU. According to the PCR requirements, the results presented derive from the life cycle impact assessment (LCIA) and the life cycle inventory (LCI). LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

According to the NSF International PCR standard, Table 3, the life cycle impact assessment shall, at a minimum, report the set of impact categories. These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development. However, EPD users shall not use additional measures for comparative purposes.

The LCA results are presented from Table 8 to Table 19 for the MF Paints Proline Latex Acrylic series of products.



Environmental Product Declaration (EPD) # 675

Table 8: Scenario 1: Satin Velvet paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	2.05E-03	3.45E-05	8.40E-05	1.70E-04	2.34E-04	0.00E+00	0.00E+00	2.06E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	1.17E-03	2.52E-06	4.67E-05	1.22E-05	1.23E-04	0.00E+00	0.00E+00	1.61E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	2.83E-01	3.20E-03	2.22E-02	1.39E-02	3.23E-02	0.00E+00	0.00E+00	2.95E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	4.48E-08	1.11E-11	7.84E-08	4.80E-11	1.23E-08	0.00E+00	0.00E+00	1.08E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.80E-02	9.37E-04	1.20E-03	4.66E-03	2.48E-03	0.00E+00	0.00E+00	2.20E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	2.61E-01	6.31E-03	3.19E-02	2.73E-02	3.27E-02	0.00E+00	0.00E+00	2.89E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03

Table 9: Scenario 2: Satin Velvet paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	2.05E-03	3.45E-05	8.40E-05	1.70E-04	2.34E-04	0.00E+00	0.00E+00	2.84E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	1.17E-03	2.52E-06	4.67E-05	1.22E-05	1.23E-04	0.00E+00	0.00E+00	2.22E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	2.83E-01	3.20E-03	2.22E-02	1.39E-02	3.23E-02	0.00E+00	0.00E+00	4.06E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	4.48E-08	1.11E-11	7.84E-08	4.80E-11	1.23E-08	0.00E+00	0.00E+00	1.49E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.80E-02	9.37E-04	1.20E-03	4.66E-03	2.48E-03	0.00E+00	0.00E+00	3.02E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	2.61E-01	6.31E-03	3.19E-02	2.73E-02	3.27E-02	0.00E+00	0.00E+00	3.97E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03

Table 10: Scenario 1: Primer Sealer paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	1.36E-03	4.66E-05	8.40E-05	1.70E-04	1.66E-04	0.00E+00	0.00E+00	3.48E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	5.85E-04	3.40E-06	4.67E-05	1.22E-05	6.48E-05	0.00E+00	0.00E+00	2.61E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	1.58E-01	4.33E-03	2.22E-02	1.39E-02	1.99E-02	0.00E+00	0.00E+00	4.42E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	1.51E-08	1.50E-11	7.84E-08	4.80E-11	9.35E-09	0.00E+00	0.00E+00	1.95E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.01E-02	1.27E-03	1.20E-03	4.66E-03	1.73E-03	0.00E+00	0.00E+00	3.64E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	1.15E-01	8.53E-03	3.19E-02	2.73E-02	1.83E-02	0.00E+00	0.00E+00	3.85E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03





Table 11: Scenario 2: Primer Sealer paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	1.36E-03	4.66E-05	8.40E-05	1.70E-04	1.66E-04	0.00E+00	0.00E+00	2.02E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	5.85E-04	3.40E-06	4.67E-05	1.22E-05	6.48E-05	0.00E+00	0.00E+00	1.51E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	1.58E-01	4.33E-03	2.22E-02	1.39E-02	1.99E-02	0.00E+00	0.00E+00	2.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	1.51E-08	1.50E-11	7.84E-08	4.80E-11	9.35E-09	0.00E+00	0.00E+00	1.13E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.01E-02	1.27E-03	1.20E-03	4.66E-03	1.73E-03	0.00E+00	0.00E+00	2.11E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	1.15E-01	8.53E-03	3.19E-02	2.73E-02	1.83E-02	0.00E+00	0.00E+00	2.23E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03

Table 12: Scenario 1: Semi-Gloss paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	2.64E-03	2.39E-05	8.40E-05	1.70E-04	2.92E-04	0.00E+00	0.00E+00	9.65E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	8.65E-04	1.75E-06	4.67E-05	1.22E-05	9.26E-05	0.00E+00	0.00E+00	5.03E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	2.66E-01	2.22E-03	2.22E-02	1.39E-02	3.05E-02	0.00E+00	0.00E+00	1.05E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	6.56E-09	7.68E-12	7.84E-08	4.80E-11	8.50E-09	0.00E+00	0.00E+00	2.80E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.65E-02	6.50E-04	1.20E-03	4.66E-03	2.31E-03	0.00E+00	0.00E+00	7.65E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	2.18E-01	4.37E-03	3.19E-02	2.73E-02	2.83E-02	0.00E+00	0.00E+00	9.36E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03

Table 13: Scenario 2: Semi-Gloss paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	2.64E-03	2.39E-05	8.40E-05	1.70E-04	2.92E-04	0.00E+00	0.00E+00	3.54E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	8.65E-04	1.75E-06	4.67E-05	1.22E-05	9.26E-05	0.00E+00	0.00E+00	1.85E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	2.66E-01	2.22E-03	2.22E-02	1.39E-02	3.05E-02	0.00E+00	0.00E+00	3.84E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	6.56E-09	7.68E-12	7.84E-08	4.80E-11	8.50E-09	0.00E+00	0.00E+00	1.03E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.65E-02	6.50E-04	1.20E-03	4.66E-03	2.31E-03	0.00E+00	0.00E+00	2.80E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	2.18E-01	4.37E-03	3.19E-02	2.73E-02	2.83E-02	0.00E+00	0.00E+00	3.43E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03





Environmental Product Declaration (EPD) # 675

Table 14: Scenario 1: Pearl paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	2.34E-03	2.33E-05	8.40E-05	1.70E-04	2.63E-04	0.00E+00	0.00E+00	2.31E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	8.35E-04	1.70E-06	4.67E-05	1.22E-05	9.01E-05	0.00E+00	0.00E+00	1.32E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	2.46E-01	2.17E-03	2.22E-02	1.39E-02	2.86E-02	0.00E+00	0.00E+00	2.61E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	1.03E-08	7.48E-12	7.84E-08	4.80E-11	8.88E-09	0.00E+00	0.00E+00	7.81E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.52E-02	6.34E-04	1.20E-03	4.66E-03	2.18E-03	0.00E+00	0.00E+00	1.92E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	2.07E-01	4.26E-03	3.19E-02	2.73E-02	2.71E-02	0.00E+00	0.00E+00	2.39E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03

Table 15: Scenario 2: Pearl paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	2.34E-03	2.33E-05	8.40E-05	1.70E-04	2.63E-04	0.00E+00	0.00E+00	3.18E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	8.35E-04	1.70E-06	4.67E-05	1.22E-05	9.01E-05	0.00E+00	0.00E+00	1.81E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	2.46E-01	2.17E-03	2.22E-02	1.39E-02	2.86E-02	0.00E+00	0.00E+00	3.59E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	1.03E-08	7.48E-12	7.84E-08	4.80E-11	8.88E-09	0.00E+00	0.00E+00	1.07E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.52E-02	6.34E-04	1.20E-03	4.66E-03	2.18E-03	0.00E+00	0.00E+00	2.64E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	2.07E-01	4.26E-03	3.19E-02	2.73E-02	2.71E-02	0.00E+00	0.00E+00	3.29E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03

Table 16: Scenario 1: Satin/Eggshell paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	1.72E-03	2.26E-05	8.40E-05	1.70E-04	8.55E-04	0.00E+00	0.00E+00	4.18E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	6.73E-04	1.65E-06	4.67E-05	1.22E-05	2.47E-04	0.00E+00	0.00E+00	2.79E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	1.92E-01	2.10E-03	2.22E-02	1.39E-02	7.12E-02	0.00E+00	0.00E+00	5.08E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	1.10E-08	7.25E-12	7.84E-08	4.80E-11	1.01E-08	0.00E+00	0.00E+00	1.87E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.18E-02	6.14E-04	1.20E-03	4.66E-03	5.01E-03	0.00E+00	0.00E+00	3.85E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	1.55E-01	4.13E-03	3.19E-02	2.73E-02	4.27E-02	0.00E+00	0.00E+00	4.60E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03





Table 17: Scenario 2: Satin/Eggshell paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	1.72E-03	2.26E-05	8.40E-05	1.70E-04	8.55E-04	0.00E+00	0.00E+00	2.42E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	6.73E-04	1.65E-06	4.67E-05	1.22E-05	2.47E-04	0.00E+00	0.00E+00	1.61E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	1.92E-01	2.10E-03	2.22E-02	1.39E-02	7.12E-02	0.00E+00	0.00E+00	2.94E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	1.10E-08	7.25E-12	7.84E-08	4.80E-11	1.01E-08	0.00E+00	0.00E+00	1.08E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.18E-02	6.14E-04	1.20E-03	4.66E-03	5.01E-03	0.00E+00	0.00E+00	2.23E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	1.55E-01	4.13E-03	3.19E-02	2.73E-02	4.27E-02	0.00E+00	0.00E+00	2.66E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03

Table 18: Scenario 1: Ceiling Flat from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	2.02E-03	3.10E-05	8.40E-05	1.70E-04	2.30E-04	0.00E+00	0.00E+00	4.83E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	8.18E-04	2.26E-06	4.67E-05	1.22E-05	8.79E-05	0.00E+00	0.00E+00	3.09E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	2.21E-01	2.88E-03	2.22E-02	1.39E-02	2.60E-02	0.00E+00	0.00E+00	5.70E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	1.79E-08	9.95E-12	7.84E-08	4.80E-11	9.63E-09	0.00E+00	0.00E+00	2.01E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.38E-02	8.43E-04	1.20E-03	4.66E-03	2.05E-03	0.00E+00	0.00E+00	4.31E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	1.69E-01	5.67E-03	3.19E-02	2.73E-02	2.35E-02	0.00E+00	0.00E+00	4.92E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03

Table 19: Scenario 2: Ceiling Flat paint from the Proline Latex Acrylic series, Life Cycle Impact Assessment Results

Impacts Categories	Units	A1	A2	A3	A4-A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4
Acidification ⁽¹⁾	kg SO2 eq	2.02E-03	3.10E-05	8.40E-05	1.70E-04	2.30E-04	0.00E+00	0.00E+00	2.80E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.77E-07	0.00E+00	7.65E-06
Eutrophication ⁽¹⁾	kg N eq	8.18E-04	2.26E-06	4.67E-05	1.22E-05	8.79E-05	0.00E+00	0.00E+00	1.79E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.03E-08	0.00E+00	6.60E-04
Global Warming ^(2,3)	kg CO2 eq	2.21E-01	2.88E-03	2.22E-02	1.39E-02	2.60E-02	0.00E+00	0.00E+00	3.30E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	2.58E-05	0.00E+00	1.40E-02
Ozone Depletion ⁽¹⁾	kg CFC-11 eq	1.79E-08	9.95E-12	7.84E-08	4.80E-11	9.63E-09	0.00E+00	0.00E+00	1.17E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.91E-14	0.00E+00	1.94E-11
Photochemical ozone formation ⁽¹⁾	kg O3 eq	1.38E-02	8.43E-04	1.20E-03	4.66E-03	2.05E-03	0.00E+00	0.00E+00	2.50E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	7.54E-06	0.00E+00	1.32E-04
Resource depletion - fossil fuels ⁽¹⁾	MJ surplus	1.69E-01	5.67E-03	3.19E-02	2.73E-02	2.35E-02	0.00E+00	0.00E+00	2.85E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	5.08E-05	0.00E+00	1.79E-03





Environmental Product Declaration (EPD) # 675

According to the PCR, the life cycle inventory (LCI) shall be presented for resources used and output flows, waste categories and carbon removals and emissions.[1] The environmental parameters used for inventory analysis describe the use of renewable and non-renewable material resources, and renewable and non-renewable primary energy and water.

The LCI results are presented from Figure 20 to Figure 31 for the MF Paints Proline Latex Acrylic series of products.

Table 20: Scenario 1: Satin Velvet paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 17 columns: Parameter, Unit, Production stage (A1-A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPR, RPRM, PERT, NRPR, NRPRM, PENRT, SM, RSF, NRSF, FW, HWD, NHWD, HLRW, ILLRW, CRU, MR, MER, and EE.

Table 21: Scenario 2: Satin Velvet paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 17 columns: Parameter, Unit, Production stage (A1-A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPRE, RPRM, PERT, NRPRE, NRPRM, PENRT, SM, RSF, NRSF, FW, HWD, NHWD, HLRW, ILLRW, CRU, MR, MER, and EE.

Table 22: Scenario 1: Primer Sealer paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 17 columns: Parameter, Unit, Production stage (A1-A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPR, RPRM, PERT, NRPR, NRPRM, PENRT, SM, RSF, NRSF, FW, HWD, NHWD, HLRW, ILLRW, CRU, MR, MER, and EE.





Environmental Product Declaration (EPD) # 675

Table 23: Scenario 2: Primer Sealer paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 17 columns: Parameter, Unit, Production stage (A1-A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPPE(4), RPRM(5), PERT(6), NRPRE(7), NRPRM(8), PENRT(9), SM(10), RSF(11), NRSF(12), FW(13), HWD(14), NHWD(15), HLRW(16), ILLRW(17), CRU(18), MR(18), MER(18), and EE, (18).

Table 24: Scenario 1: Semi-Gloss paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 17 columns: Parameter, Unit, Production stage (A1-A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPR(4), RPRM(5), PERT(6), NRPRE(7), NRPRM(8), PENRT(9), SM(10), RSF(11), NRSF(12), FW(13), HWD(14), NHWD(15), HLRW(16), ILLRW(17), CRU(18), MR(18), MER(18), and EE, (18).

Table 25: Scenario 2: Semi-Gloss paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 17 columns: Parameter, Unit, Production stage (A1-A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPPE(4), RPRM(5), PERT(6), NRPRE(7), NRPRM(8), PENRT(9), SM(10), RSF(11), NRSF(12), FW(13), HWD(14), NHWD(15), HLRW(16), ILLRW(17), CRU(18), MR(18), MER(18), and EE, (18).





Environmental Product Declaration (EPD) # 675

Table 26: Scenario 1: Pearl paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 18 columns: Parameter, Unit, Production stage (A1, A2, A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPR, RPRM, PERT, NRPR, NRPRM, PENR, SM, RSF, NRSF, FW, HWD, NHWD, HLRW, ILLRW, CRU, MR, MER, and EE.

Table 27: Scenario 2: Pearl paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 18 columns: Parameter, Unit, Production stage (A1, A2, A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPRE, RPRM, PERT, NRPRE, NRPRM, PENR, SM, RSF, NRSF, FW, HWD, NHWD, HLRW, ILLRW, CRU, MR, MER, and EE.

Table 28: Scenario 1: Satin/Eggshell paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 18 columns: Parameter, Unit, Production stage (A1, A2, A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPR, RPRM, PERT, NRPR, NRPRM, PENR, SM, RSF, NRSF, FW, HWD, NHWD, HLRW, ILLRW, CRU, MR, MER, and EE.





Environmental Product Declaration (EPD) # 675

Table 29: Scenario 2: Satin/Eggshell paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 18 columns: Parameter, Unit, Production stage (A1-A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPRE(4), RPRM(5), PERT(6), NRPRE(7), NRPRM(8), PENRT(9), SM(10), RSF(11), NRSF(12), FW(13), HW(14), NHRW(15), HLRW(16), ILLRW(17), CRU(18), MR(18), MER(18), and EE(18).

Table 30: Scenario 1: Ceiling Flat from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 18 columns: Parameter, Unit, Production stage (A1-A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPR(4), RPRM(5), PERT(6), NRPR(7), NRPRM(8), PENRT(9), SM(10), RSF(11), NRSF(12), FW(13), HW(14), NHRW(15), HLRW(16), ILLRW(17), CRU(18), MR(18), MER(18), and EE(18).

Table 31: Scenario 2: Ceiling Flat paint from the Proline Latex Acrylic series, Life Cycle Inventory Impact Results

Table with 18 columns: Parameter, Unit, Production stage (A1-A3), Design and construction stage (A4-A5), Use and maintenance stage (B1-B7), and End-of-Life stage (C1-C4). Rows include RPRE(4), RPRM(5), PERT(6), NRPRE(7), NRPRM(8), PENRT(9), SM(10), RSF(11), NRSF(12), FW(13), HW(14), NHRW(15), HLRW(16), ILLRW(17), CRU(18), MR(18), MER(18), and EE(18).

- (1): Calculated as per Traci v.2 methodology and OpenLCA v 1.11.
(2): GWP 100a, excludes biogenic CO2 removals and emissions associated with biobased products and packaging; 100-year time horizon GWP factors are provided by the IPCC 2013 Fifth Assessment Report (AR5). Results of biogenic carbon are presented in a separate line.
(3): Global warming potential without biogenic carbon.
(4): RPR_e = RPR_T - RPR_M, where RPR_T(9) is equal to the value for renewable energy obtained using the CED LHV.
(5): RPR_M is calculated by multiplying the mass (kg) of the material input (or its components) by the net calorific value (lower heating value) (MJ/kg) of this input as per ACLCA ISO 21930 Guidance [9]. In the calculation of RPR_M, packaging materials were included.
(7): NRPR_e = NRPR_T - NRPR_M, where NRPR_T(9) is equal to the value for non-renewable energy obtained using the CED LHV methodology.
(8): NRPR_M is calculated by multiplying the mass (kg) of the material input (or its components) by the net calorific value (lower heating value) (MJ/kg) of this input as per ACLCA ISO 21930 Guidance [9]. In the calculation of NRPR_M, packaging materials were included.
(10): Calculated as per ACLCA ISO 21930 Guidance [9], 6.5 Secondary material, SM: There is SM involved in the MF Paints manufacturing process.
(11): Calculated as per ACLCA ISO 21930 Guidance [9], 6.6 Renewable secondary fuels, RSF: There is no RSF involved in the MF Paints manufacturing process.
(12): Calculated as per ACLCA ISO 21930 Guidance [9], 6.7 Non-renewable secondary fuels, NRSF: There is no NRSF involved in the MF Paints manufacturing process.
(13): There is no water used in the MF Paints manufacturing process. Water mentioned comes from the upstream process.
(14): Calculated from life cycle inventory results, based on datasets marked as "hazardous."
(15): Calculated from life cycle inventory results, based on waste "non-hazardous."





Environmental Product Declaration (EPD) # 675

- (16): Calculated as per ACLCA ISO 21930 Guidance [9], 10.3 High-level radioactive waste, conditioned, to final repository. It should be noted that the MF Paints manufacturing process does not generate any HLRW (High-level radioactive waste), e.g., when generated by electricity production, consists mostly of spent fuel from reactors." (ISO 21930:2017, clause 7.2.14).
- (17): Calculated as per ACLCA ISO 21930 Guidance [9], 10.4 Intermediate- and low-level radioactive waste, conditioned, to final repository. It should be noted that the MF Paints manufacturing process does not generate any ILLRW (Low- and intermediate-level radioactive waste), e.g., when generated by electricity production, arise mainly from routine facility maintenance and operations (ISO 21930:2017, clause 7.2.14).
- (18): Reused components (CRU), materials for energy recovery (MER), exported energy (EE) are nil in this analysis. Materials for recycling (MR) was accounted for.





5 LCA: INTERPRETATION

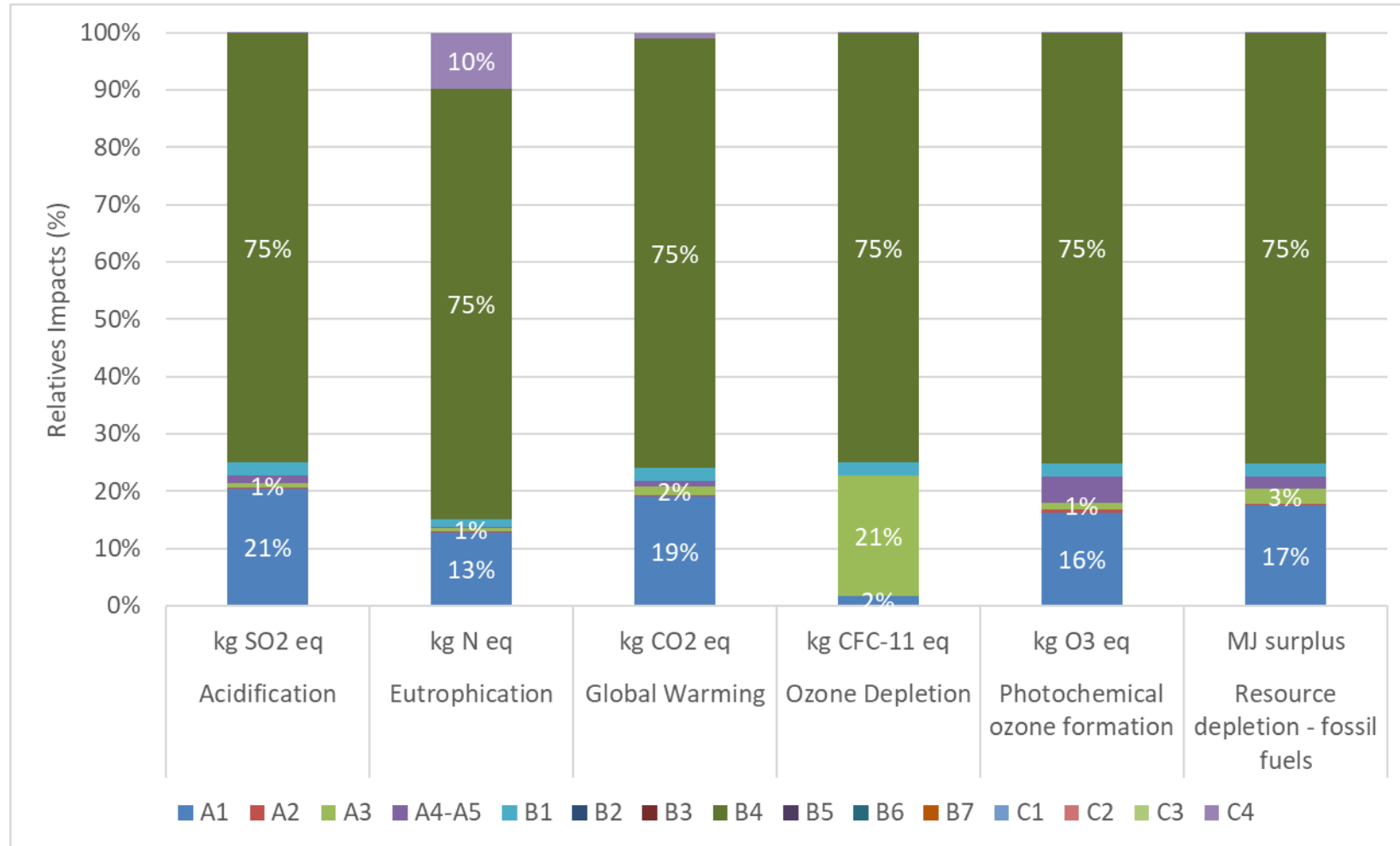
The aim of this section is to present more details on the contribution to the impacts and resource use of the different life cycle modules of the MF Paints Proline Latex Acrylic series of products studied.

For the Proline latex acrylic series, the extraction of raw materials and upstream production module (A1) and replacement module (B4) are the major contributors of the environmental impacts for all impact categories. For scenario 1 of the Proline Latex acrylic series, the impacts of module A1 are between 1% to 21% of the total impacts while the impacts of the replacement module represent 75% to 95% of the total impacts for all impact categories. This variation represents the variation of the number of replacements during the building ESL. Figure 4, Figure 5 and Figure 6 present Proline 100% acrylic series with 3, 8 and 19 replacements as high, mid and low-quality paints, respectively. In the case of scenario 2, the impact of module A1 is between 1% to 7% of the total impacts while the impact of the replacement module (B4) represents 92% of the total impacts for all impact categories as all paint products were replaced 11 times in 60 years (Figure 7).



Environmental Product Declaration (EPD) # 675

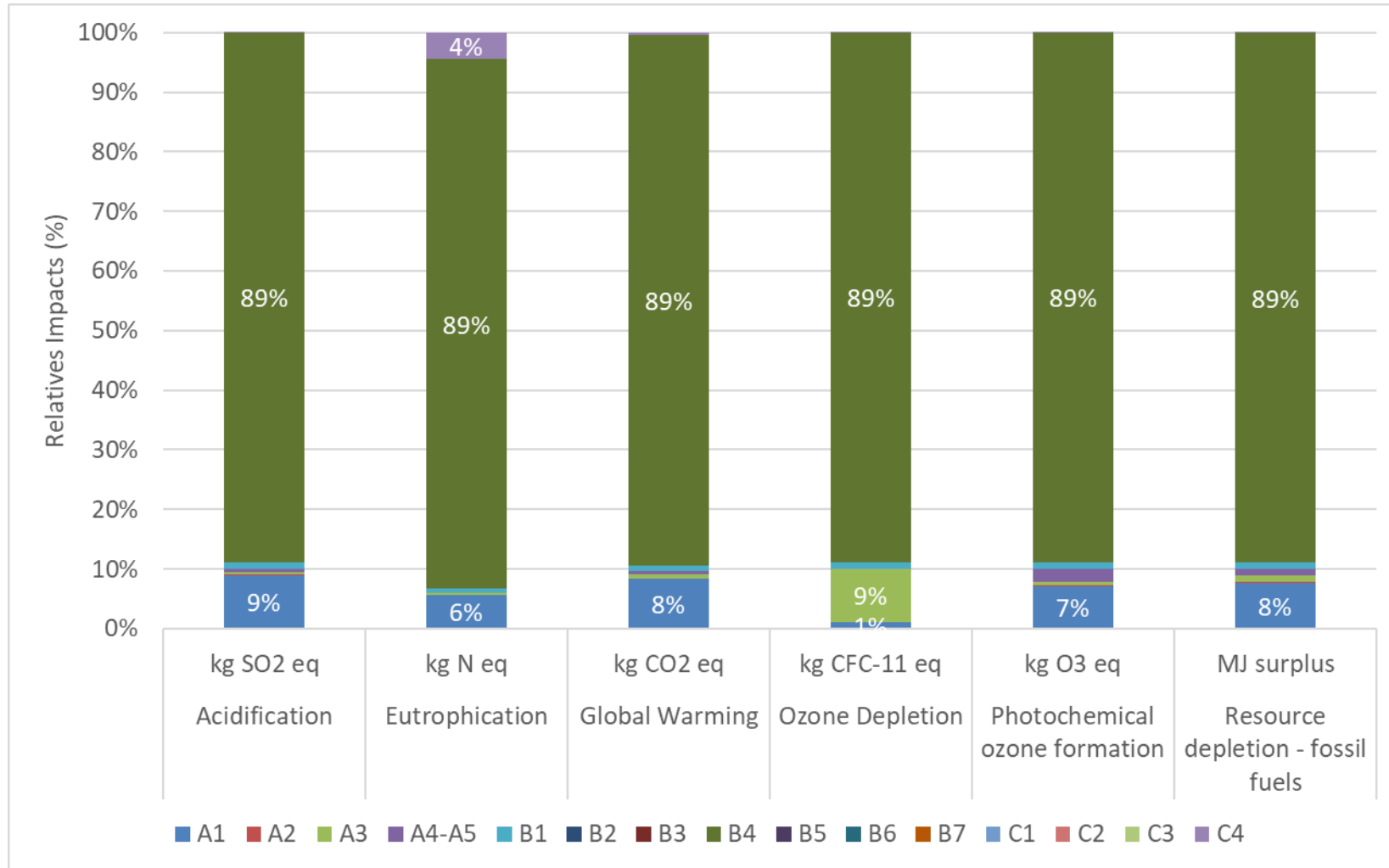
Figure 4: Scenario 1: Contribution of each life cycle stage of the Semi-Gloss paint product from the Proline latex acrylic series.





Environmental Product Declaration (EPD) # 675

Figure 5: Scenario 1: Contribution of each life cycle stage of the Pearl paint product from the Proline latex acrylic series.





Environmental Product Declaration (EPD) # 675

Figure 6: Scenario 1: Contribution of each life cycle stage of the Satin/Eggshell paint product from the Proline latex acrylic series.

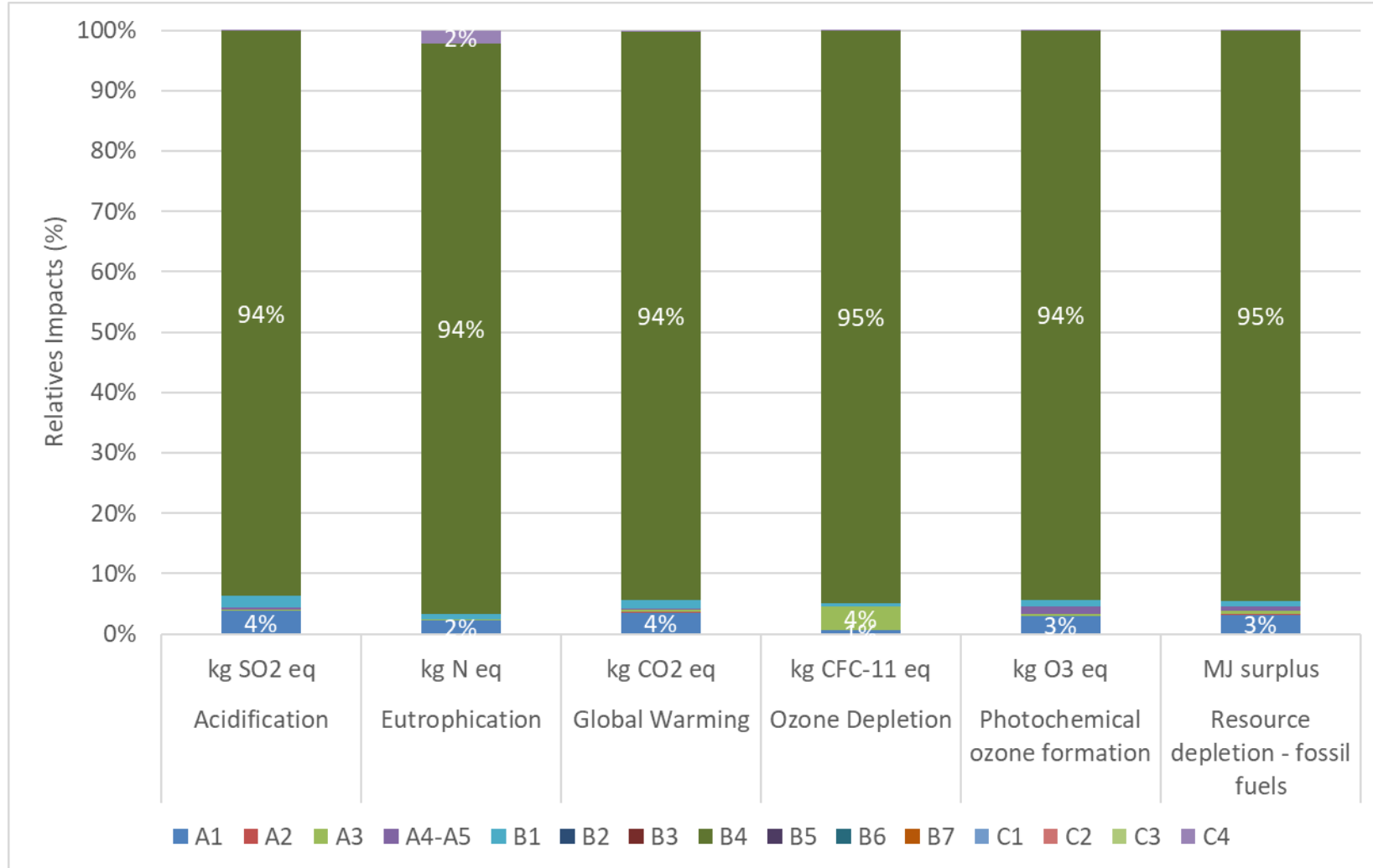
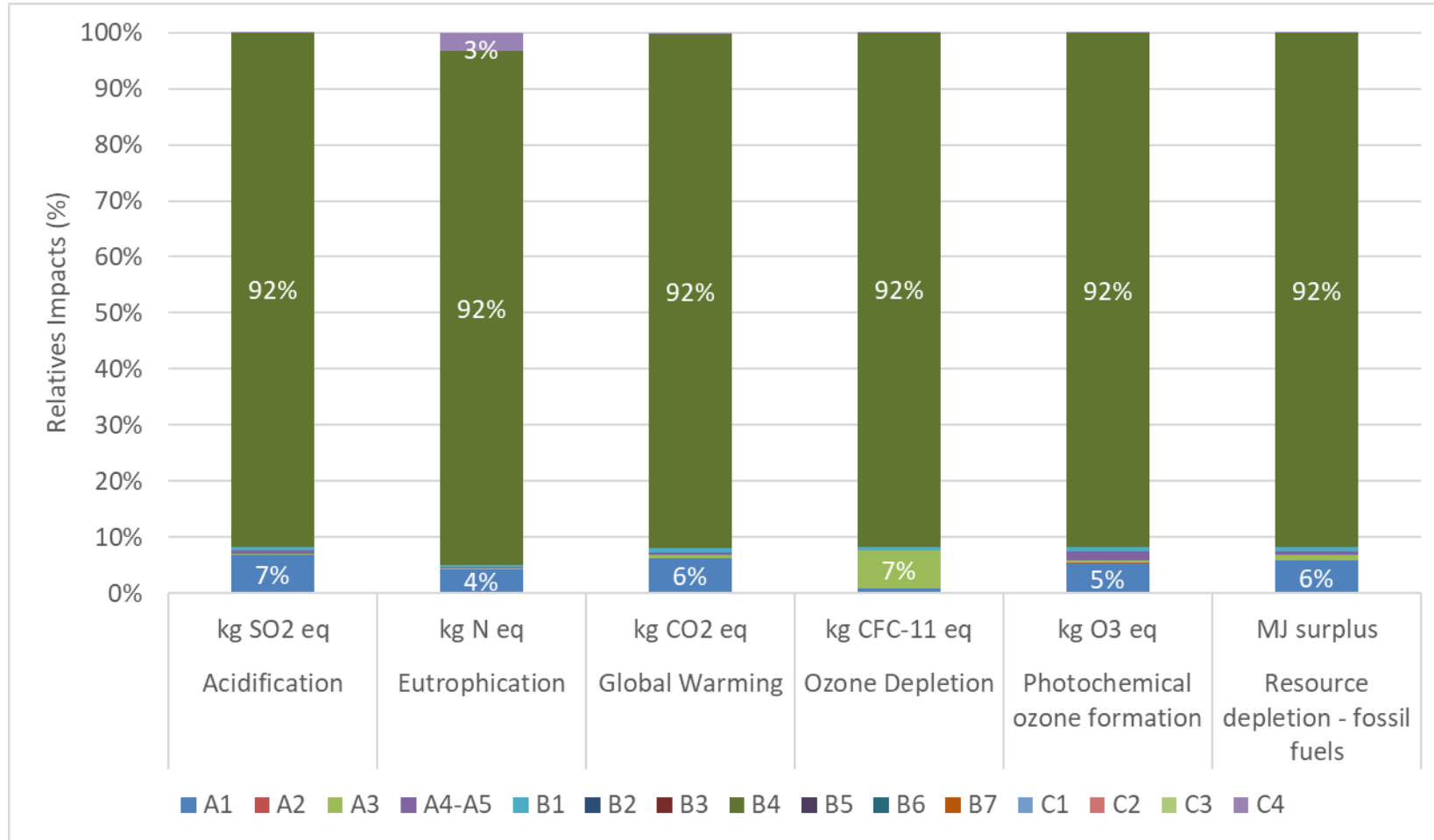




Figure 7: Scenario 2: Contribution of each life cycle stage of the Pearl paint product from the Proline latex acrylic series.





6 ADDITIONAL ENVIRONMENTAL INFORMATION

6.1 ENVIRONMENTAL ACTIVITIES AND CERTIFICATION

In addition, MF Paints has engaged a third-party preparer (Green Seal company) to prepare the Health Product Declaration (HPD) for their paint products.

6.2 EXTRAORDINARY EFFECTS

There are no extraordinary effects for MF Paints products.

7 REFERENCES

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