KELLY-MOORE PAINTS

Environmental Product Declaration

Premium Professional

Interior Coatings

100 Barr Harbor Drive
PO Box C700
West Conshohocken, PA
19428-2959
United States.

ASTM INTERNATIONAL
Standards Worldwide

EPD IMPACT SUMMARY

Company name	Kelly-Moore Paint Co., Inc.
Product type	Interior Paints
Product name	**Premium Professional Interior Paints**
Product definition	Trusted Quality. Our Premium Professional Interior paint and enamels deliver a durable finish with outstanding touch-up qualities and are better professional grade paints. Premium Professional Interior line is available in flat, low sheen, eggshell, satin and semi-gloss sheens. Colors include white, off-whites and four tint bases for virtually unlimited color options.
Product Category Rule (PCR)	PCR for Architectural Coatings: NAICS 325510
Certification Period	January 10, 2017 – January 10, 2022
Functional Unit	1m^2 of covered and protected substrate for a period of 60 years (the assumed average lifetime of a building).
ASTM Declaration Number	056

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-to-case basis.

EPD Information	
Program Operator	ASTM International
Declaration Holder	Kelly-Moore Paint Co., Inc. 1011 Commercial Street, San Carlos, CA 94070 +1 650-610-4253 TAlvarez@kellymoore.com www.kellymoore.com
Product	Premium Professional Interior Paints
Date of Issue	January 10, 2017
Period of Validity	5 years
Declaration Number	056
Declaration Type	Cradle to grave EPD
Applicable Countries	North America
This EPD was independently verified by ASTM in accordance with ISO 14025: Internal External X	Signature of ASTM Representative 

	Name and contact information for representative Timothy S Brooke ASTM International 100 Barr Harbor Drive West Conshohocken, PA 19428 tbrooke@astm.org
This life cycle assessment was critically reviewed in accordance with ISO 14044 and the reference PCR	Signature of LCA Representative  Name and contact information for representative Thomas P. Gloria, Ph. D. Industrial Ecology Consultants 35 Bracebridge Rd. Newton, MA 02459-1728 t.gloria@industrial-ecology.com

LCA Information	
Basis LCA	Cradle to Grave of Latex Paints
LCA Preparer	thinkstep, Inc. 170 Milk Street, Boston, MA, Floor 3, 02109 +1 617-247-4477 info@thinkstep.com www.thinkstep.com
This life cycle assessment was critically reviewed in accordance with ISO 14044	Signature of LCA Representative  Name and contact information for representative Thomas P. Gloria, Ph. D. Industrial Ecology Consultants 35 Bracebridge Rd. Newton, MA 02459-1728 t.gloria@industrial-ecology.com

PCR Information	
Program operator	NSF International National Center for Sustainability Standards
Reference PCR	PCR for Architectural Coatings: NAICS 325510
Validity Date	June 18, 2020
PCR review was conducted by:	Thomas P. Gloria, Ph. D. Industrial Ecology Consultants 35 Bracebridge Rd. Newton, MA 02459-1728 t.gloria@industrial-ecology.com Mr. Bill Stough Sustainable Research Group PO Box 1684 Grand. Rapids, MI 49501-1684 bstough@sustainableresearchgroup.com Dr. Michael Overcash Environmental Clarity 2908 Chipmunk Lane. Raleigh, NC 27607-3117

	mrovercash@earthlink.net

Premium Professional Interior Paints EPD - Kelly-Moore

This document is a Type III environmental product declaration by Kelly-Moore that is certified by ASTM International (ASTM) as conforming to the requirements of ISO 14025. ASTM has assessed that the Life Cycle Assessment (LCA) information fulfills the requirements of ISO 14040 in accordance with the instructions listed in the product category rules cited above. The intent of this document is to further the development of environmentally compatible and sustainable construction methods by providing comprehensive environmental information related to potential impacts in accordance with international standards.

PRODUCT DEFINITION

Trusted Quality. Our Premium Professional Interior paint and enamels deliver a durable finish with outstanding touch-up qualities and are better professional grade paints. Premium Professional Interior line is available in flat, low sheen, eggshell, satin and semi-gloss sheens. Colors include white, off-whites and four tint bases for virtually unlimited color options.

Declared Product Description

The Premium Professional Interior Paints include the following sheens: 1005 Premium Professional Flat, 1007 Premium Professional Low Sheen, 1010 Premium Professional Eggshell, 1040 Premium Professional Satin and 1050 Premium Professional Semi-Gloss, available in quart, gallon and five gallon size containers. There are varying Tint bases offered for all sheens in the series, as follows: Light, Medium, Deep and Neutral Bases that allow custom tinting to any desired color. Premium Professional Interior paints are also available in returnable ready-mixed colors. The chart below outlines additional technical data.

Table 1. List of Premium Professional Interior Paints formulas Assessed by LCA Model and Report

	1005	1007	1010	1040	1050
Sheen	Flat	Low Sheen	Eggshell	Satin	Semi-Gloss
%@60°	<3	6-10	10-20	25-35	45-55
MPI Level	Level 1	Level 2	Level 3	Level 4	Level 5
MPI Category	Untested	#44/#44X Green	#52/#52X Green	#43	#52/#52X Green
MPI GPS	Untested	1 & 2	1 & 2	1 & 2	1 & 2
VOC	<2 g/L	<2 g/L	<2 g/L	<2 g/L	<2 g/L
Solids Weight	52%	50%	52%	53%	51%
Solids Volume	33%	35%	38%	40%	38%

Table 2. List of Premium Professional Interior Paints Base Types Assessed by LCA Model and Report

Premium Professional Latex Interior Product Series

		Base			
Product	**Sheen**	**Light & White**	**Medium**	**Deep**	**Neutral**
1005	Flat	122	122	333	555
1007	Low Sheen	121	222	333	555
1010	Eggshell	121	222	333	555
1040	Satin	121	222	333	
1050	Semi-Gloss	121	222	333	555

PERFORMANCE ATTRIBUTES

Ease of application, great flow and leveling, fantastic touch-up and excellent durability are features that put Premium Professional ahead of the competition. Premium Professional paints are available in white,

returnable ready-mixed colors and may be tinted to any custom color.

Performance Features

- Low Odor
- Self-Sealing
- USDA Acceptable
- Water Clean-up
- Good Uniformity & Touch-up

PRODUCT COMPONENTS RELATED TO LIFE CYCLE ASSESSMENT

The material composition of the paints are in the following range:

Table 3: Material Composition Range in % by Mass for Premium Professional Interior Paints Product Line

	Minimum [%]	Maximum [%]
Water	37	58
Acrylic resin	6.1	33
Titanium dioxide	0	20
Nepheline syenite	0	20
Kaolin clay	0	11
Limestone	0	14
Diatomaceous earth	0	5.3
Talc	0	5.3
Preservative	0.27	0.89
Rheology modifier	0.77	7.3
Coalescent	0.20	1.2
Surfactant	1.2	4.9

The functional unit for the study was covering and protecting 1m^2 of substrate for a period of 60 years (the assumed lifetime of a building). The functional unit and the reference flow required for the functional unit was calculated for both the design life and the market life as prescribed by the PCR. Market life for interior paints is 5 years and design life is based on quality determined by ASTM testing for scrubbability, burnish resistance, and washability and shown in the table below. If a product performs at different quality levels in the durability tests, then it should be classified using its lowest performance category. Results were calculated for all base and sheen formulations.

Table 4a: Design Life by Coating Type and Quality Designation

Test Type	Test	Substrate	Low Quality	Mid Quality	High Quality
Scrub Resistance	ASTM D2486-06 (2012)e1	Plastic	< 100 scrubs	100 – 400 scrubs	> 400 scrubs
Burnish – 20 cycle	ASTM D6736-08 (2013)	Plastic	Change in gloss	Change in gloss between 10 –	Change in gloss
Washability	ASTM D4828-94 (2012)e1	Plastic	Avg. score < 3	Avg. score between 3	Avg. score > 7

Table 4b: Design Life by Coating Type and Quality Designation

Coating Type	Low Quality	Mid Quality	High Quality
Interior Paint	3 years	7 years	15 years

Table 5: Design Life- Reference flow, quantity of colorant, and lifetime

	Lifetime (years)	Quantity needed during lifetime (kg/FU)	Tint needed during lifetime (g/FU)
1005-122	3	4.16	183
1005-333	3	3.64	429
1005-555	3	2.79	628
1007-121	7	1.68	78.1
1007-222	7	1.47	137
1007-333	7	1.55	198
1007-555	7	1.30	272
1010-121	7	1.74	78.1
1010-222	7	1.56	147
1010-333	7	1.44	183
1010-555	7	1.33	273
1040-121	7	1.62	77.9
1040-222	7	1.5	148
1040-333	7	1.35	181
1050-121	7	1.61	77.9
1050-222	7	1.49	148
1050-333	7	1.29	180
1050-555	15	0.588	84.1

Table 6: Market Life- Reference flow, quantity of colorant, and lifetime

	Lifetime (years)	Quantity needed during lifetime (kg/FU)	Tint needed during lifetime (g/FU)
1005-122	5	2.49	110
1005-333	5	2.19	257
1005-555	5	1.68	377
1007-121	5	2.36	109
1007-222	5	2.06	192
1007-333	5	2.17	278
1007-555	5	1.82	381
1010-121	5	2.44	109
1010-222	5	2.19	206
1010-333	5	2.02	256
1010-555	5	1.86	382
1040-121	5	2.27	109
1040-222	5	2.1	208
1040-333	5	1.9	253
1050-121	5	2.26	109
1050-222	5	2.09	208
1050-333	5	1.81	252
1050-555	5	1.76	252

SCOPE AND BOUNDARIES OF THE LIFE CYCLE ASSESMENT

System Boundaries

The LCA was performed according to ISO 14040 standards. The system is a cradle to grave LCA and includes the following modules as defined in the PCR. The declaration covers the full range of Premium Professional Interior Paints sold in the North American market for the reference year 2015.

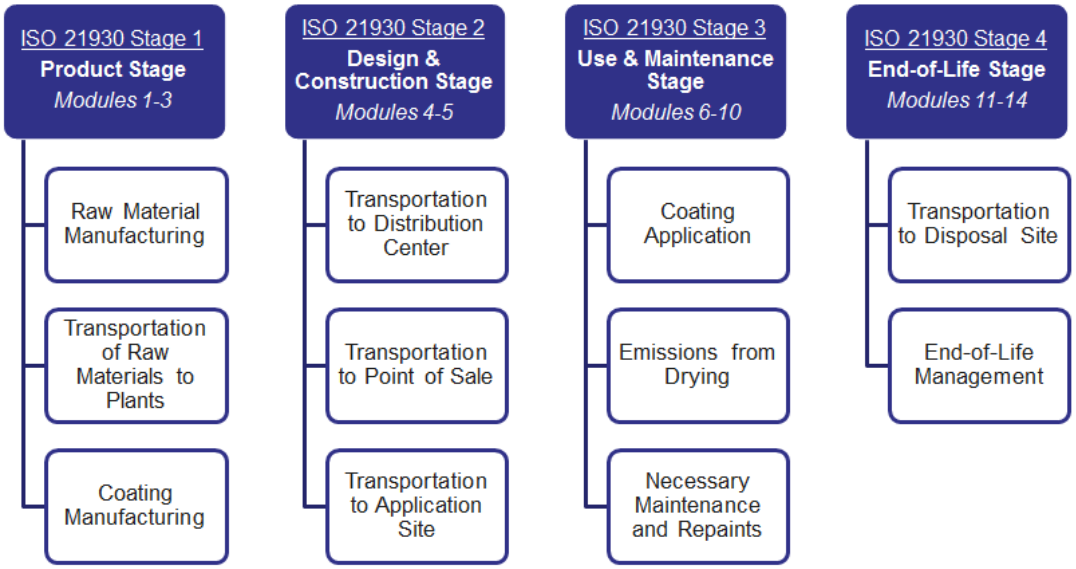

Figure 1: System Boundaries for Cradle to Grave LCA

Assumptions

The described modeling approach makes assumptions in order to represent cradle-to-grave environmental performance of Kelly-Moore latex paint products. These assumptions include those that are prescribed by the PCR, such as in packaging disposal and recovery treatment, as well as transport distances along the life cycle.

Cut-off Criteria

No cut-off criteria are defined by this study. For processes within the system boundary, all available energy and material flow data have been included in the model.

Data Quality

Primary data was obtained from Kelly-Moore's two facilities at Hurst, TX and San Carlos, CA facilities for the 2015 reference year. Background data was obtained from the GaBi 2016 database and are representative of the years 2010 – 2015. Overall, both primary and background data are representative of the product system and have been deemed high quality.

Allocation

Manufacturing inputs for the Hurst, TX and San Carlos, CA were allocated to each paint product by mass.

PRODUCT STAGE

Latex paints are produced at Kelly-Moore's Hurst, TX and San Carlos, CA production facilities according to the following processing steps.

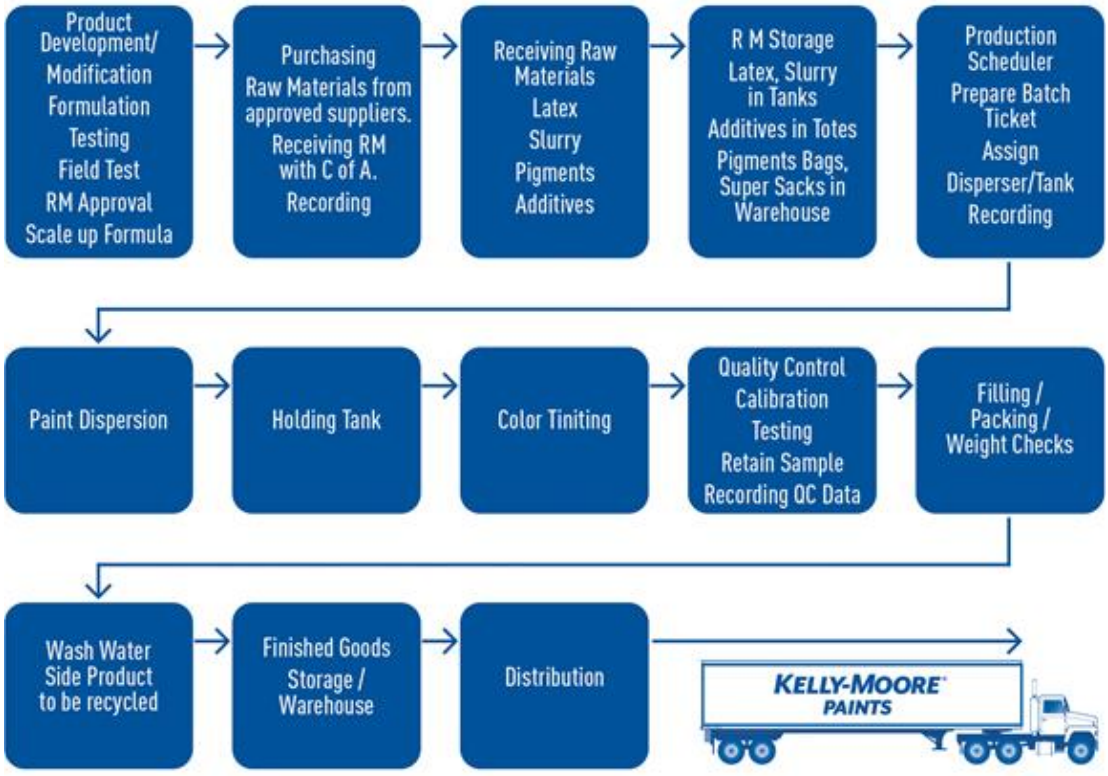

Figure 2: Kelly-Moore Process Flow Schematic

DESIGN AND CONSTRUCTION STAGE

The design and construction stage begins with the packaged paint product leaving the production site and ends with the coating being delivered to the point of application. Within this stage, the paint product is modeled as distributed to a warehouse and from there to point of sale. At point of sale, it is purchased and transported to the point of application. This stage also includes the addition of carbon black colorant at the point of sale, per the PCR.

USE AND MAINTENANCE STAGE

Application and Use

The use stage begins when the user applies the product to a substrate. This stage does not require any energy or additional cleaning inputs, but includes the VOCs emitted over the course of the paint's lifetime. VOC emissions were calculated in conformance to the California Department of Public Health/Environmental Health Laboratory CDPH/EHLB/Standard Method Version 1.1, 2010. Environmental burdens associated with repaints are attributed to the original stage in which they occurred (e.g. production of the coating for the repaint is attributed to Stage 1 - Product Stage).

Health, Safety and Environmental Aspects During Installation

Customers obtain material from a store or have the store deliver it. The customer or their contractor applies the coating to substrate(s) at customer site(s). The coating remains on the substrate material until the substrate is disposed of. This may include up to a 60 year life time, with additional /subsequent protective coatings. If the coating is handled and applied using the recommendations in the safety data sheet and

technical data sheet, minimal health and environmental impacts should occur, and maximum product and substrate life should be expected.

Waste

Disposal of any leftover coating and discarded packaging is categorized under the end-of-life stage. A 10% loss rate during application was included per the PCR.

Packaging

Quart and gallon cans are manufactured from metal and contain 65-70% recycled material. Kelly Moore's 5-gallon bucket requires 10% less resin by mass to produce than typical 5-gallon buckets on the market. This packaging is marked on the bottom for recycling.

END OF LIFE STAGE

Recycling or Reuse

Stores encourage customers to use PaintCare or local recycling programs, and 90 stores in California are PaintCare drop-off sites.

Unused Materials

The manufacturing facilities recycle off-spec products, materials and by-products for sale and use outside of Kelly-Moore's standard markets. The San Carlos factory and California stores send off-spec products to be recycled into e-Coat branded paint, which contains 50% pre-consumer and 50% post-consumer recycled paint.

Disposal

Product end-of-life occurs with the disposal of the substrate material. 100% of the waste is disposed of in a landfill at end of life, and cannot be separated from the substrate before disposal. Packaging is recovered at a rate of 1.4% for plastics and 70% for metals. Recovery rates represent the average fraction of generated packaging waste that is recovered in the US.

LIFE CYCLE IMPACT ASSESSMENT

Key Environmental Parameters

Table 7: LCIA Results for Design Lifetime

	GWP - excl biogenic carbon [kg CO2-Equiv.]	GWP - incl biogenic carbon [kg CO2-Equiv.]	Acidification [kg SO2-Equiv.]	Eutrophication [kg N-Equiv.]	Ozone Depletion Air [kg CFC 11-Equiv.]	Smog formation [kg O3-Equiv.]
1005-121	7.19E00	7.31E00	1.52E-01	1.59E-03	6.18E-09	3.72E-01
1005-333	4.59E00	4.63E00	3.47E-02	8.39E-04	5.79E-09	2.07E-01
1005-555	6.68E00	6.73E00	1.93E-02	1.15E-03	5.43E-09	2.66E-01
1007-121	3.21E00	3.27E00	3.90E-02	6.27E-04	2.80E-09	1.53E-01
1007-222	3.04E00	3.09E00	3.25E-02	5.69E-04	2.35E-09	1.39E-01
1007-333	2.90E00	2.95E00	1.55E-02	5.05E-04	2.54E-09	1.26E-01
1007-555	3.52E00	3.58E00	1.00E-02	5.90E-04	2.37E-09	1.37E-01
1010-121	3.37E00	3.44E00	4.45E-02	6.64E-04	2.21E-09	1.59E-01
1010-222	3.10E00	3.15E00	3.42E-02	5.83E-04	2.63E-09	1.41E-01
1010-333	2.69E00	2.72E00	1.50E-02	4.59E-04	2.40E-09	1.14E-01
1010-555	2.66E00	2.68E00	6.75E-03	4.11E-04	2.37E-09	1.07E-01
1040-121	3.37E00	3.44E00	4.17E-02	6.48E-04	2.81E-09	1.58E-01
1040-222	3.18E00	3.24E00	3.41E-02	5.88E-04	2.67E-09	1.44E-01
1040-333	2.62E00	2.67E00	1.49E-02	4.43E-04	2.11E-09	1.11E-01
1050-121	3.92E00	3.98E00	4.77E-02	7.61E-04	2.77E-09	1.75E-01
1050-222	3.58E00	3.63E00	3.89E-02	6.83E-04	2.63E-09	1.56E-01
1050-333	3.92E00	3.96E00	2.15E-02	6.90E-04	2.53E-09	1.55E-01
1050-555	1.66E00	1.67E00	4.73E-03	2.83E-04	1.16E-09	6.41E-02

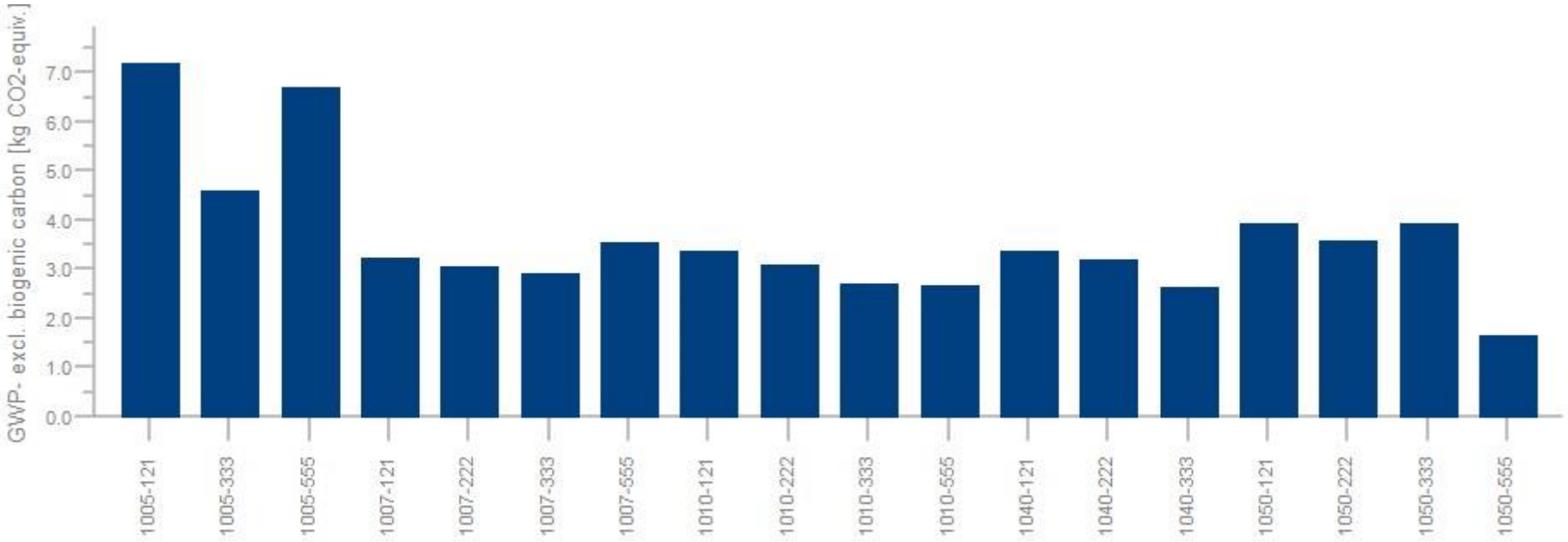

Figure 3: Global Warming Potential, Excluding Biogenic Carbon for Design Lifetime

Table 8: LCIA for Design Lifetime by PCR stages (Representative Product, 1005-122)

	Stage 1	Stage 2	Stage 3	Stage 4
GWP - excl biogenic carbon [kg CO2-Equiv.]	5.95E00	1.17E00		7.49E-02
GWP - incl biogenic carbon [kg CO2-Equiv.]	6.09E00	1.15E00		7.28E-02
Acidification [kg SO2-Equiv.]	1.48E-01	3.03E-03		7.06E-04
Eutrophication [kg N-Equiv.]	1.28E-03	2.56E-04		5.29E-05
Ozone Depletion Air [kg CFC 11-Equiv.]	4.08E-09	3.96E-11		2.06E-09
Smog formation [kg O3-Equiv.]	3.04E-01	5.30E-02	5.45E-09	1.46E-02

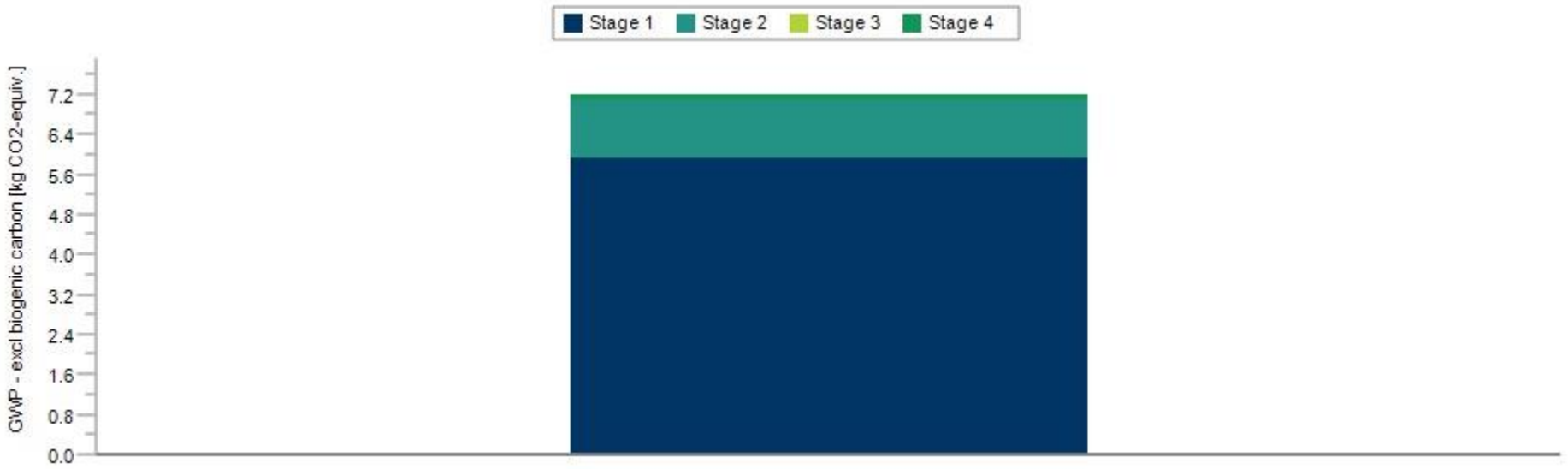

Figure 4: Global Warming Potential, Excluding Biogenic Carbon for Design Lifetime, (Representative Product, 1050-121)

Table 9: LCIA Results for Market Lifetime

	GWP - excl biogenic carbon [kg CO2-Equiv.]	GWP - incl biogenic carbon [kg CO2-Equiv.]	Acidification [kg SO2-Equiv.]	Eutrophication [kg N-Equiv.]	Ozone Depletion Air [kg CFC 11-Equiv.]	Smog formation [kg O3-Equiv.]
1005-122	4.31E00	4.39E00	9.11E-02	9.52E-04	3.71E-09	2.23E-01
1005-333	2.75E00	2.78E00	2.08E-02	5.03E-04	3.47E-09	1.24E-01
1005-555	4.01E00	4.04E00	1.16E-02	6.92E-04	3.26E-09	1.59E-01
1007-121	4.50E00	4.58E00	5.45E-02	8.78E-04	3.92E-09	2.14E-01
1007-222	4.25E00	4.33E00	4.54E-02	7.97E-04	3.29E-09	1.95E-01
1007-333	4.06E00	4.13E00	2.16E-02	7.07E-04	3.55E-09	1.76E-01
1007-555	4.93E00	5.01E00	1.41E-02	8.26E-04	3.32E-09	1.92E-01
1010-121	4.72E00	4.82E00	6.23E-02	9.29E-04	3.10E-09	2.22E-01
1010-222	4.34E00	4.41E00	4.79E-02	8.17E-04	3.68E-09	1.98E-01
1010-333	3.76E00	3.81E00	2.11E-02	6.43E-04	3.36E-09	1.60E-01
1010-555	3.72E00	3.76E00	9.45E-03	5.75E-04	3.32E-09	1.49E-01
1040-121	4.72E00	4.82E00	5.84E-02	9.08E-04	3.93E-09	2.21E-01
1040-222	4.45E00	4.53E00	4.78E-02	8.24E-04	3.74E-09	2.01E-01
1040-333	3.67E00	3.73E00	2.09E-02	6.20E-04	2.96E-09	1.55E-01
1050-121	5.49E00	5.57E00	6.68E-02	1.07E-03	3.87E-09	2.45E-01
1050-222	5.02E00	5.09E00	5.44E-02	9.56E-04	3.68E-09	2.19E-01
1050-333	5.49E00	5.55E00	3.01E-02	9.66E-04	3.55E-09	2.17E-01
1050-555	4.97E00	5.01E00	1.42E-02	8.48E-04	3.49E-09	1.92E-01

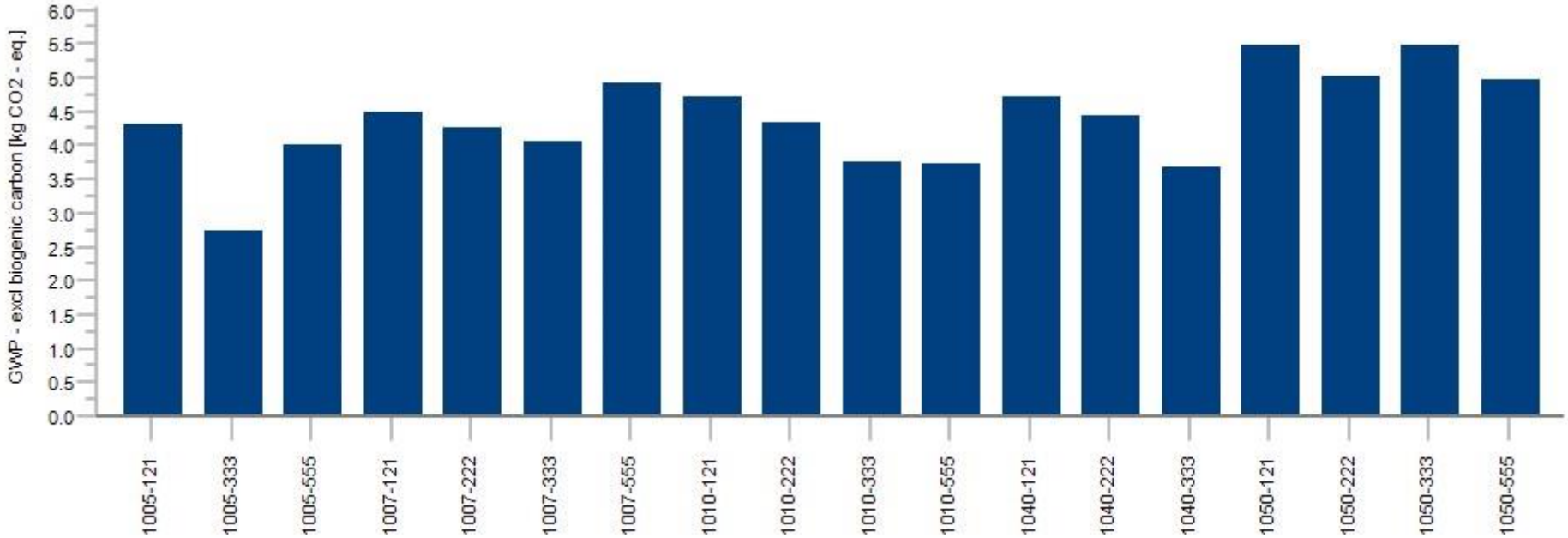

Figure 5: Global Warming Potential, Excluding Biogenic Carbon for Market Lifetime

Table 10: Life Cycle Inventory Data for Market Lifetime (Representative Product, 1005-122).

	Stage 1	Stage 2	Stage 3	Stage 4
GWP - excl biogenic carbon [kg CO2-Equiv.]	3.57E00	7.00E-01		4.50E-02
GWP - incl biogenic carbon [kg CO2-Equiv.]	3.65E00	6.87E-01		4.37E-02
Acidification [kg SO2-Equiv.]	8.88E-02	1.82E-03		4.24E-04
Eutrophication [kg N-Equiv.]	7.66E-04	1.53E-04		3.18E-05
Ozone Depletion Air [kg CFC 11-Equiv.]	2.45E-09	2.37E-11		1.23E-09
Smog formation [kg O3-Equiv.]	1.82E-01	3.18E-02	3.27E-09	8.77E-03

Material and Energy Resources, Emissions, and Wastes

The additional inventory results required by the PCR for each product are shown in the tables below.

Table 11: Energy Resources for Design Lifetime, (Representative_ Product, 1005-122) [MJ, net heating value]

	[MJ]
Hydro/wind power	3.46E+00
Fossil energy	1.16E+02
Nuclear energy	7.47E+00
Other energy	4.68E+00

Table 12: Other Environmental Information for Design Lifetime, (Representative Product, 1005-122)

	Stage 1	Stage 2	Stage 3	Stage 4
Consumption of fresh water [m^3]	3.69E-02	5.58E-03		2.96E-06
Hazardous waste (deposited) [kg]	9.46E-08	3.78E-06		4.64E-09
Non-hazardous waste (deposited) [kg]	1.52E-01	2.08E-03		4.49E00
Recycled materials [kg]				3.89E-02
Secondary raw material [kg]	1.79E-03			
Use of non-renewable energy resources [MJ]				
Use of renewable material resources [kg]	2.09E-04			

Table 13: Energy Resources for Market Lifetime, (Representative Product, 1005-122) [MJ, net heating value]

	[MJ]
Hydro/wind power	2.07E+00
Fossil energy	6.98E+01
Nuclear energy	4.48E+00
Other energy	2.81E+00

Table 14: Other Environmental Information for Market Lifetime, (Representative Product, 1005-122)

	Stage 1	Stage 2	Stage 3	Stage 4
Consumption of fresh water [m^3]	2.22E-02	3.35E-03		1.77E-06
Hazardous waste (deposited) [kg]	5.67E-08	2.27E-06		2.78E-09
Non-hazardous waste (deposited) [kg]	9.09E-02	1.25E-03		2.69E00
Recycled materials [kg]				2.34E-02
Secondary raw material [kg]	1.07E-03			
Use of non-renewable energy resources [MJ]				
Use of renewable material resources [kg]	1.25E-04			

LCIA Interpretation

For the Premium Professional Interior Paints products, raw materials and manufacturing (Stage 1) are the highest contributors to all impact categories. The impact from the design and construction stage is small but not insignificant and can be mostly attributed to transportation. Since the amount of repaints and the quality and lifetime of the paints has such a direct impact on the results, any work towards improving the quality of the products would significantly reduce the impacts.

ADDITIONAL ENVIRONMENTAL INFORMATION

Certifications

This product meets all of the necessary qualifications to be certified for Indoor Advantage™ Gold. Indoor Air Quality Certified to SCS-EC10.3-2014 v3.0. Conforms to the CDPH/EHLB Standard Method v1.1-2010 for the school classroom, private office, and single family residence parameters when modeld as Wall Paint/Wallcoverings and Walls/Wallcoverings. Also conforms to the SCAQMD Rule 113 – Architectural Coatings.

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