Benjamin Moore & Co.
101 Paragon Drive,
Montvale, NJ 07645

Environmental Product Declaration – Ultra Spec® 500

Ultra Spec ® 500 is a professional-quality paint line ideal for residential and commercial projects. Available in a wide range of sheens and unlimited colors, professionals will appreciate its excellent hiding and touch up properties, good flow and leveling, easy-application and soap and water cleanup. Tinted with Benjamin Moore's patented waterborne Gennex® colorants, all of the finishes in the Ultra Spec® 500 line are Zero VOCs* even after tinting in both the base and the colorant. Visit www.benjaminmoore.com for more information.

The product image to the right is an example of one of the formulas covered by the EPD. A list of all relevant formulas is shown in Table 2 in this EPD.

**Zero VOC according to EPA Method 24*

Declaration Holder	Benjamin Moore & Co. (email: info@benjaminmoore.com); website: www.benjaminmoore.com for additional information)
Declaration Number	EPD10100
Declared Product	Ultra Spec® 500
Product Category and Subcategory	Architectural Coatings – Interior Architectural Coatings
Program Operator	NSF International (ncss@nsf.org)
PCR	PCR for Architectural Coatings – 7-18-2015
Date of Issue	August 31, 2017
Period of Validity	5 years from date of issue
Product Contents	See Table 2

The PCR review was conducted by	Thomas P. Gloria, PhD – Industrial Ecology Consultants (t.gloria@industrial-ecology.com)	
This EPD was independently verified by NSF International in accordance with ISO 21930 and ISO 14025. ☐ Internal ☒ External	Jenny Oorbeck joorbeck@nsf.org	
This life cycle assessment was independently verified in accordance with ISO 14044 and the PCR by ☐ Internal ☒ External	Jack Geibig - EcoForm jgeibig@ecoform.com	

Functional Unit	1m² of covered and protected substrate for a period of 60 years (the assumed average lifetime of a building)
Market-Based Lifetime Used in Assessment	5 years
Design Lifetime Used in Assessment	15 years (see Table 4)
Test Methods Used to Calculate Design Life	MPI 114, MPI 141, MPI 153, MPI 154, and MPI 164
Estimated Amount of Colorant	Varies (see Table 3)
Data Quality Assessment Score	Very good
Manufacturing Location(s)	All Benjamin Moore manufacturing locations in the United States producing the products listed in this EPD.

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.

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Product Definition, Characteristics, and Specifications

Ultra Spec® 500 uses Benjamin Moore's patent-pending cross-linking resin technology that delivers increased durability of the dry paint film and significantly extends the life of the coating. As a result, Ultra Spec® 500 withstands repeated washing without damaging the finish. Ultra Spec® 500 is ideal for both residential and commercial use, has officially received MPI's High Performance ranking, categorizing it as a paint that has a "significantly higher level of performance than conventional latex paints", especially with regard to scrubbability, stain removal and resistance to burnishing. Ultra Spec® 500 is an environmentally friendly coating that meets or exceeds the strictest industry standards, while also delivering the premium levels of performance expected from Benjamin Moore in the low sheen, eggshell, semi-gloss and gloss finishes.

The Benjamin Moore® Advantage

Over 5,000 independent retailers and 200+ field and architectural representatives ready to help you. We provide a full selection of premium and commercial products for every job as well as an architectural support program to help you specify the right products for any job. To find a Benjamin Moore representative in your area, visit www.benjaminmoore.com or call 866-708-9180.

Product Classification and Description

The products listed in Table 1 are included within this assessment. The primary differences between these products are gloss levels (sheen) and base types. For additional information on each of the specific products, please visit www.benjaminmoore.com.

Table 1: List of Ultra Spec® 500 formulas assessed by LCA model and report

EPD Product Name	Product Number	Sheen	PCR Base Type
Ultra Spec® 500- Primer Finish and White Base	N53400	Primer	None
Ultra Spec® 500- Flat Finish and White Base	N53601	Flat	None
Ultra Spec® 500- Flat Finish and 1X Base	N5361X	Flat	Light Base
Ultra Spec® 500- Flat Finish and 2X Base	N5362X	Flat	Pastel Base
Ultra Spec® 500- Flat Finish and 3X Base	N5363X	Flat	Deep Base
Ultra Spec® 500- Flat Finish and 4X Base	N5364X	Flat	Accent Base
Ultra Spec® 500- Flat Finish and Ready-mix Base	N53614	Flat	None
Ultra Spec® 500- Flat Finish and Ready-Mix Base	N53615	Flat	None
Ultra Spec® 500- Low Sheen Finish and White Base	N53701	Low Sheen	None
Ultra Spec® 500- Low Sheen Finish and 0X Base	N5370X	Low Sheen	Tintable Base
Ultra Spec® 500- Low Sheen Finish and 1X Base	N5371X	Low Sheen	Light Base
Ultra Spec® 500- Low Sheen Finish and 2X Base	N5372X	Low Sheen	Pastel Base
Ultra Spec® 500- Low Sheen Finish and 3X Base	N5373X	Low Sheen	Deep Base
Ultra Spec® 500- Low Sheen Finish and 4X Base	N5374X	Low Sheen	Accent Base
Ultra Spec® 500- Eggshell Finish and White Base	N53801	Eggshell	None
Ultra Spec® 500- Eggshell Finish and 0X Base	N5380X	Eggshell	Tintable Base

Ultra Spec® 500- Eggshell Finish and 1X Base	N5381X	Eggshell	Light Base
Ultra Spec® 500- Eggshell Finish and 2X Base	N5382X	Eggshell	Pastel Base
Ultra Spec® 500- Eggshell Finish and 3X Base	N5383X	Eggshell	Deep Base
Ultra Spec® 500- Eggshell Finish and 4X Base	N5384X	Eggshell	Accent Base
Ultra Spec® 500- Semi-gloss Finish and White Base	N53901	Semi-gloss	None
Ultra Spec® 500- Semi-gloss Finish and 1X Base	N5391X	Semi-gloss	Light Base
Ultra Spec® 500- Semi-gloss Finish and 2X Base	N5392X	Semi-gloss	Pastel Base
Ultra Spec® 500- Semi-gloss Finish and 3X Base	N5393X	Semi-gloss	Deep Base
Ultra Spec® 500- Semi-gloss Finish and 4X Base	N5394X	Semi-gloss	Accent Base
Ultra Spec® 500- Gloss Finish and White Base	N54001	Gloss	None
Ultra Spec® 500- Gloss Finish and 1X Base	N5401X	Gloss	Light Base
Ultra Spec® 500- Gloss Finish and 2X Base	N5402X	Gloss	Pastel Base
Ultra Spec® 500- Gloss Finish and 3X Base	N5403X	Gloss	Deep Base
Ultra Spec® 500- Gloss Finish and 4X Base	N5404X	Gloss	Accent Base

Under the Product Category Rule (PCR) for Architectural Coatings, all of the Ultra Spec® 500 products fall under the General exterior and interior coatings category. All Ultra Spec® 500 products described in this EPD are considered to be Interior Architectural Coatings.

In the paint manufacturing process, pigments, resin, water, and additives are mixed together to form a paste. This pigment-based paste is then processed to disperse the pigment into additional solvent. Finally, this paste is thinned with the proper amount of solvent to form the final product. In addition to the materials associated with paint production, other inputs to the production process include electrical energy, process water, and metal, plastic, and paper packaging materials. The outputs of this manufacturing stage include packaged paint products, waste for disposal, waste water for treatment, and manufacturing emissions.

Material composition

The typical composition of an Ultra Spec® 500 coating is shown by % mass in Table 2.

Table 2: Typical composition of Ultra Spec® 500 by % mass

Ingredient category	% of product by mass
Additive	1.4 – 13%
Antifoamer	0 – 0.61%
Biocide	0 – 0.38%
Calcium carbonate	0 – 48%
Nepheline	0 – 23%
Resin	11 – 57%
Silica	0 – 5.3%

Surfactant	0 – 1.8%
Thickener	0 – 2.0%
Titanium dioxide	0 – 51%
Water	9.0 – 24%

Life Cycle Assessment Methodology

Functional unit

Per PCR requirements, this EPD is based on a cradle-to-grave LCA, and the functional unit for the study is defined as 1 m^2 of covered and protected substrate for a period of 60 years. The PCR requires results to be calculated for a market-based lifetime and a design lifetime for the coating product.

Market-based life used in assessment

The market-based lifetime for interior coatings is 5 years.

Design-based life used in assessment

The design-based lifetime is determined by durability testing, as show in Table 3. Paint is either low quality (3 year lifetime), medium quality (7 year lifetime) or high quality (15 year lifetime) based on these test results. The requirements for the durability testing were met through the testing for high performance MPI standards. The MPI scrubbabilty and burnish resistance tests are based on the ASTM D2486 and ASTM D6736 standards, respectively, and follow methods of this standard that are more stringent than the ones specified by the PCR. The cleansabilty test is based on a more rigorous ASTM standard than the test specified by the PCR. If a test is not included in the MPI standard, it is because the test was not deemed relevant for that paint type, and does not need to be considered. Therefore, high performance MPI certifications can be considered high quality. Each Ultra Spec® 500 product was subjected to these tests, or the relevant MPI testing. The corresponding quality levels and coating quantities were calculated for each product and can be found in

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Table 4.

Table 3: Required testing for design lifetime of interior coatings

Test Type	Test	Substrate	Low Quality	Mid Quality	High Quality	MPI Test
Scrub Resistance	ASTM D2486-06 (2012)e1	Plastic	< 100 scrubs	100 – 400 scrubs	> 400 scrubs	>4000 scrubs
Burnish – 20 cycle	ASTM D6736-08 (2013)	Plastic	Change in gloss > 20	Change in gloss between 10 – 20	Change in gloss < 10	Change in gloss <2
Washability	ASTM D4828-94 (2012)e1	Plastic	Avg. score < 3	Avg. score between 3 – 7	Avg. score > 7	

Table 4: Lifetime, reference flow, and quantity of colorant required

Product Number	Quality level	Design lifetime (years)	Market lifetime (years)	Design lifetime quantity (kg)	Market lifetime quantity (kg)	Colorant - Design lifetime (g)	Colorant - Market lifetime (g)
N53601	**High**	**15**	**5**	**0.423**	**1.27**	**19.9**	**59.8**
N5361X	High	15	5	0.297	0.890	-	-
N5362X	**High**	**15**	**5**	**0.283**	**0.849**	**9.94**	**29.8**
N5363X	High	15	5	0.274	0.821	13.3	39.8
N5364X	High	15	5	0.254	0.761	19.1	57.4
N53614	High	15	5	0.278	0.834	9.93	29.8
N53615	High	15	5	0.270	0.809	13.2	39.7
N53701	High	15	5	0.261	0.783	19.2	57.5
N5370X	High	15	5	0.239	0.716	30.9	92.7
N5371X	High	15	5	0.435	1.31	27.6	82.7
N5372X	High	15	5	0.396	1.19	47.4	142
N5373X	High	15	5	0.425	1.28	61.8	185
N5374X	High	15	5	0.296	0.887	-	-
N53801	High	15	5	0.494	1.48	78.0	234
N5380X	High	15	5	0.282	0.845	13.9	41.6
N5381X	High	15	5	0.293	0.879	-	-
N5382X	High	15	5	0.867	2.60	-	-
N5383X	High	15	5	0.263	0.788	-	-
N5384X	High	15	5	0.511	1.53	-	-
N53901	High	15	5	0.255	0.765	19.43	58.29
N5391X	High	15	5	0.242	0.725	32.91	99
N5392X	High	15	5	0.224	0.673	37.27	112
N5393X	High	15	5	0.252	0.756	-	-
N5394X	High	15	5	0.468	1.40	23.6	70.9
N53400	High	15	5	0.463	1.39	-	-
N54001	High	15	5	0.405	1.21	31.2	93.7
N5401X	High	15	5	0.389	1.17	54.2	163
N5402X	High	15	5	0.242	0.725	41.2	124
N5403X	High	15	5	0.245	0.734	30.9	92.6
N5404X	High	15	5	0.471	1.41	72.1	216

Amount of colorant needed

Following the PCR, for any coating that can accept colorant, it was assumed that the full allowable amount of colorant is added to the paint either at the point of sale or application site. The tint/colorant inventory was taken from the GaBi carbon black pigment data in the appropriate quantity specified for the type of coating base for the respective Ultra Spec® 500 product. The amount of colorant needed for each formula is shown in

Table 4 and its impact is included in the overall LCA results.

Data Quality Assessment

Precision and Completeness

The majority of the relevant foreground data are measured or calculated based on primary data from the owner of the technology, so precision is considered high. Completeness of each foreground process is considered high as each process was checked for mass balance and completeness of the emission inventory. All background data are sourced from the GaBi 2016 databases with the documented precision and completeness.

Consistency and Reproducibility

To ensure data consistency, all primary data were collected with the same level of detail, while all background data were sourced from the GaBi 2016 databases. Reproducibility is supported as much as possible through the disclosure of input-output data, dataset choices, and modeling.

Temporal Coverage

All primary data were collected for the fiscal year 2015. All secondary data come from the GaBi 2016 databases and are representative of the years 2010-2015. As the study intended to compare the product systems for the reference year 2015, temporal representativeness is considered to be high.

Geographic Coverage

All primary and secondary data were collected specific to the countries or regions under study. Where country-specific or region-specific data were unavailable, proxy data were used. Geographical representativeness is considered to be high.

Allocation

As stated in the reference PCR, allocation was avoided whenever possible. The only allocation used in the LCA model was volume-based allocation during the manufacturing process, to assign Benjamin Moore manufacturing plant inputs and outputs across multiple products produced at the same plant.

System Boundary

As shown in Figure 1, the system boundary includes all life cycle stages as defined by ISO 21930, from raw material extraction and processing, coating manufacture, application and end-of-life treatment, with transportation included in all stages.

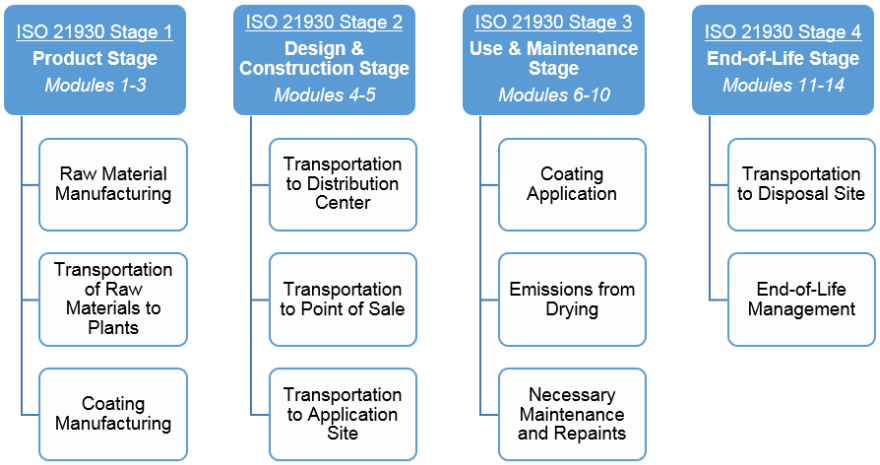

Figure 1: Life cycle stages included in system boundary

Cut-off criteria

No cut-off criteria were defined for this study. All relevant inputs were included in LCA models with the

exception of:

- Personnel impacts;
- Research and development activities;
- Business travel;
- Any secondary or tertiary packaging (e.g., pallets);
- All point of sale infrastructure; and,
- The coating applicator.

Life Cycle Impact Assessment

Impact Assessment Categories

The Life Cycle Impact Assessment (LCIA) relates the life cycle inventory to the potential environmental impacts. The PCR requires that the following key parameters of environmental impact assessment be declared based on the EPA's TRACI methodology (v2.1), except in the case of global warming potential which must be declared based on the IPPC (AR5) methodology:

- Global warming potential (GWP) – 100 year (used in place of climate change)
- Acidification potential (AP)
- Ozone depletion potential (ODP)
- Smog formation potential (SFP) (used in place of photochemical ozone creation potential)
- Eutrophication (EP)

The PCR also requires that the following material and energy emissions and waste shall be calculated and declared:

- Depletion of non-renewable energy resources
- Depletion of non-renewable material resources
- Use of renewable primary energy
- Use of renewable material resources
- Consumption of freshwater
- Hazardous waste disposed
- Non-hazardous waste disposed
- Secondary fuels
- Non-renewable resources
- Renewable resources
- Recycled materials
- Secondary raw materials
- Water

Key Environmental Parameters

The LCIA results for the design lifetime and the market lifetime are shown in Table 5 and Table 6, respectively. A representative product was chosen based on the median of the five impact categories. Results for global warming potential for the entire product line and the representative product are shown in Figure 2. Results for the representative product grouped by life cycle stages prescribed by the PCR are presented in Figure 3. Results in Figure 3 are shown for market life, but the percent contribution for each stage for design life are essentially identical.

Table 5: LCIA results for design lifetime

Impact category	Global warming potential 100, excl biogenic carbon [kg CO_2-equiv.]	Acidification [kg SO_2-equiv.]	Eutrophication [kg N-equiv.]	Ozone depletion air [kg CFC 11-equiv.]	Smog air [kg O_3-equiv.]
N53601	1.40E+00	4.17E-02	3.46E-04	2.16E-09	7.77E-02
N5361X	9.66E-01	1.88E-02	2.37E-04	1.48E-09	5.63E-02
N53701	7.70E-01	2.13E-02	1.86E-04	1.61E-09	4.18E-02
N5370X	8.13E-01	2.26E-02	1.93E-04	1.56E-09	4.31E-02
N5371X	7.73E-01	2.00E-02	1.82E-04	1.37E-09	4.16E-02
N5372X	5.71E-01	1.20E-02	1.30E-04	1.47E-09	2.98E-02
N5380X	7.18E-01	1.36E-02	1.59E-04	1.54E-09	3.59E-02
N5381X	7.36E-01	1.34E-02	1.68E-04	1.05E-09	3.96E-02
N5382X	6.38E-01	1.17E-02	1.43E-04	1.32E-09	3.33E-02
N5383X	4.92E-01	6.18E-03	1.05E-04	1.23E-09	2.54E-02
N5362X	8.31E-01	1.55E-02	2.07E-04	1.38E-09	5.03E-02
N5363X	8.56E-01	1.44E-02	2.01E-04	1.40E-09	4.87E-02
N5364X	1.01E+00	1.55E-02	2.28E-04	1.53E-09	5.54E-02
N53801	7.89E-01	1.51E-02	1.89E-04	1.04E-09	4.37E-02
N5384X	1.41E+00	2.12E-02	3.07E-04	1.93E-09	7.35E-02
N5391X	7.25E-01	1.40E-02	1.63E-04	1.09E-09	3.72E-02
N53400	5.21E-01	1.16E-02	1.32E-04	1.13E-09	3.12E-02
N53614	1.40E+00	3.46E-02	3.39E-04	3.25E-09	7.50E-02
N53615	4.23E-01	1.04E-02	1.02E-04	9.87E-10	2.26E-02
N53901	1.16E+00	2.46E-02	2.59E-04	2.01E-09	5.69E-02
N5392X	5.69E-01	1.12E-02	1.22E-04	1.06E-09	2.72E-02
N5393X	5.86E-01	1.05E-02	1.20E-04	1.06E-09	2.71E-02
N5394X	5.56E-01	9.26E-03	1.12E-04	1.00E-09	2.53E-02
N54001	6.17E-01	1.30E-02	1.36E-04	1.03E-09	2.97E-02
N5401X	1.16E+00	2.38E-02	2.49E-04	1.92E-09	5.53E-02
N5402X	9.64E-01	1.85E-02	2.05E-04	1.70E-09	4.56E-02
N5403X	9.89E-01	1.75E-02	2.02E-04	1.74E-09	4.53E-02
N5404X	6.36E-01	1.04E-02	1.26E-04	1.11E-09	2.86E-02
N5373X	5.76E-01	6.43E-03	1.20E-04	9.96E-10	2.90E-02
N5374X	9.85E-01	2.76E-03	1.88E-04	1.93E-09	4.72E-02

Table 6: LCIA results for market lifetime

Impact category	Global warming potential 100, excl biogenic carbon [kg CO_2-equiv.]	Acidification [kg SO_2-equiv.]	Eutrophication [kg N-equiv.]	Ozone depletion air [kg CFC 11-equiv.]	Smog air [kg O_3-equiv.]
N53601	4.20E+00	1.25E-01	1.04E-03	6.48E-09	2.33E-01
N5361X	2.90E+00	5.65E-02	7.10E-04	4.44E-09	1.69E-01
N53701	2.31E+00	6.39E-02	5.58E-04	4.82E-09	1.25E-01
N5370X	2.44E+00	6.78E-02	5.78E-04	4.68E-09	1.29E-01
N5371X	2.32E+00	6.00E-02	5.46E-04	4.11E-09	1.25E-01
N5372X	1.71E+00	3.60E-02	3.89E-04	4.42E-09	8.94E-02
N5380X	2.15E+00	4.09E-02	4.76E-04	4.62E-09	1.08E-01
N5381X	2.21E+00	4.01E-02	5.04E-04	3.15E-09	1.19E-01
N5382X	1.91E+00	3.51E-02	4.29E-04	3.97E-09	1.00E-01
N5383X	1.48E+00	1.85E-02	3.15E-04	3.70E-09	7.62E-02
N5362X	2.49E+00	4.65E-02	6.20E-04	4.13E-09	1.51E-01
N5363X	2.57E+00	4.33E-02	6.02E-04	4.19E-09	1.46E-01
N5364X	3.03E+00	4.65E-02	6.84E-04	4.59E-09	1.66E-01
N53801	2.37E+00	4.54E-02	5.66E-04	3.11E-09	1.31E-01
N5384X	4.22E+00	6.36E-02	9.22E-04	5.80E-09	2.21E-01
N5391X	2.18E+00	4.21E-02	4.89E-04	3.26E-09	1.12E-01
N53400	1.56E+00	3.49E-02	3.96E-04	3.40E-09	9.36E-02
N53614	4.21E+00	1.04E-01	1.02E-03	9.74E-09	2.25E-01
N53615	1.27E+00	3.12E-02	3.07E-04	2.96E-09	6.79E-02
N53901	3.48E+00	7.39E-02	7.76E-04	6.04E-09	1.71E-01
N5392X	1.71E+00	3.37E-02	3.67E-04	3.17E-09	8.17E-02
N5393X	1.76E+00	3.14E-02	3.61E-04	3.17E-09	8.12E-02
N5394X	1.67E+00	2.78E-02	3.35E-04	3.01E-09	7.58E-02
N54001	1.85E+00	3.90E-02	4.07E-04	3.08E-09	8.91E-02
N5401X	3.47E+00	7.14E-02	7.48E-04	5.76E-09	1.66E-01
N5402X	2.89E+00	5.55E-02	6.14E-04	5.11E-09	1.37E-01
N5403X	2.97E+00	5.26E-02	6.05E-04	5.22E-09	1.36E-01
N5404X	1.91E+00	3.13E-02	3.79E-04	3.33E-09	8.57E-02
N5373X	1.73E+00	1.93E-02	3.59E-04	2.99E-09	8.69E-02
N5374X	2.96E+00	8.28E-03	5.65E-04	5.79E-09	1.42E-01

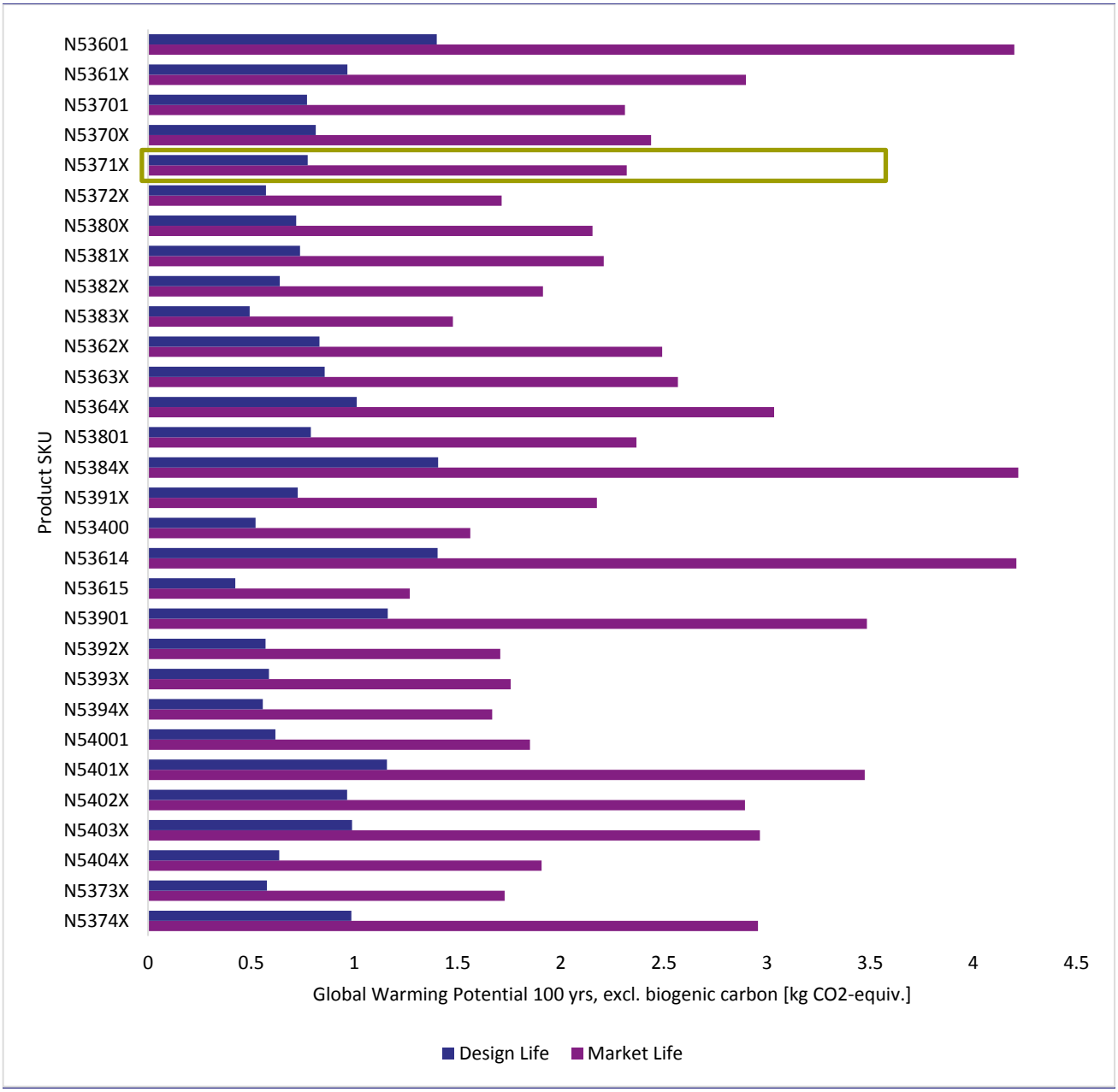

Figure 2: Global Warming Potential 100 yrs., excl. biogenic carbon for product line, design and market life

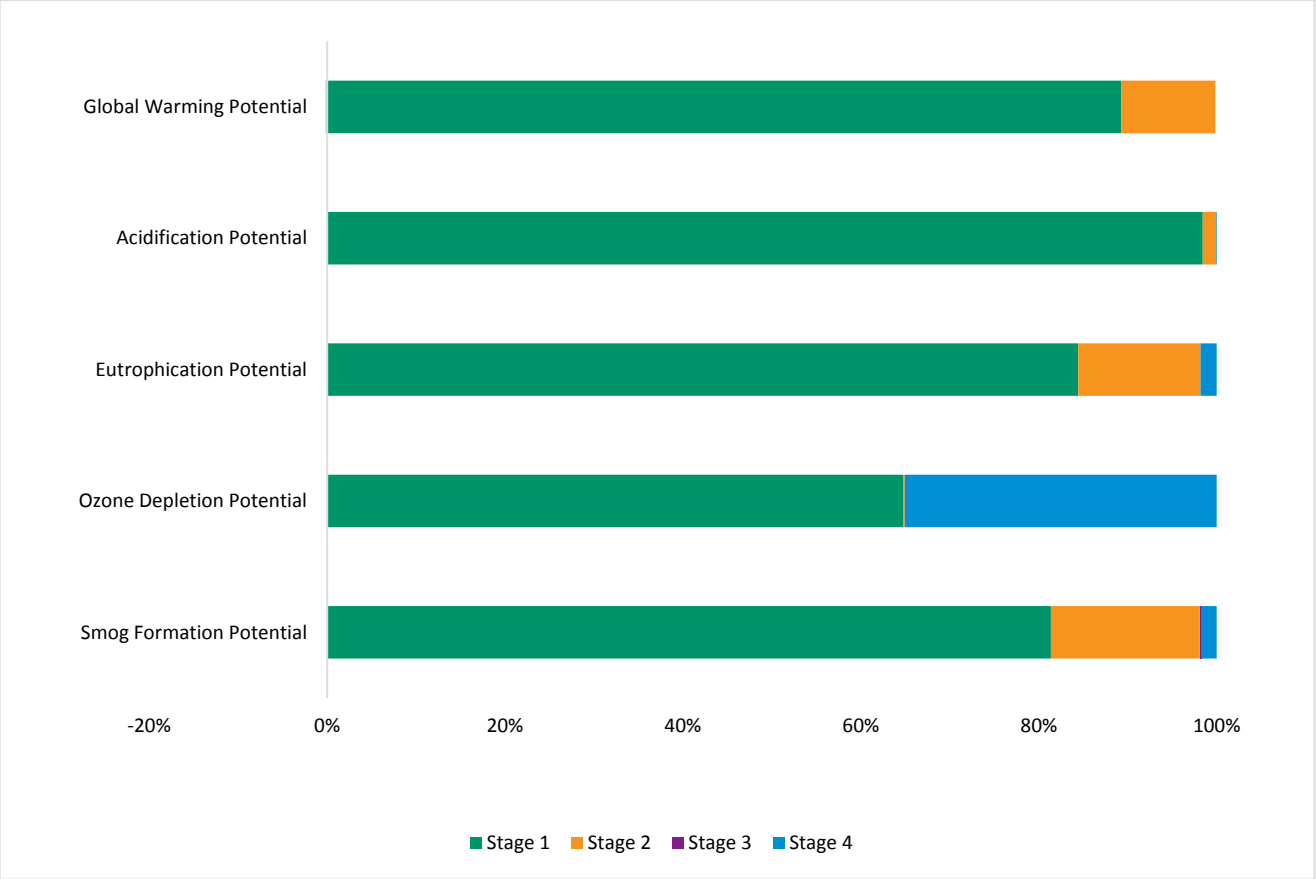

Figure 3: LCIA results by product stage for representative product, N5371X (market life)

Additional Life Cycle Inventory Results

The additional inventory results required by the PCR for a representative product are shown in Table 7 and Table 8.

Table 7: Additional LCI categories for the design life of N5371X

Additional LCI category	Total	Stage 1	Stage 2	Stage 3	Stage 4
Primary energy, non-renewable [MJ]	***1.26E+01***	***1.05E+01***	***2.10E+00***	***0.00E+00***	***9.42E-02***
Crude oil [MJ]	**4.52E+00**	2.49E+00	1.92E+00	0.00E+00	1.03E-01
Hard coal [MJ]	**2.85E+00**	2.96E+00	5.51E-02	0.00E+00	-8.72E-02
Natural gas [MJ]	**6.53E-01**	6.37E-01	6.15E-03	0.00E+00	1.10E-02
Lignite [MJ]	**3.74E+00**	3.61E+00	8.41E-02	0.00E+00	4.62E-02
Uranium [MJ]	**8.12E-01**	7.63E-01	2.81E-02	0.00E+00	2.15E-02
Primary energy, renewable [MJ]	***7.71E-01***	***6.88E-01***	***6.23E-02***	***0.00E+00***	***2.08E-02***
Geothermal [MJ]	**1.84E-02**	1.74E-02	9.46E-04	0.00E+00	7.96E-05
Hydro [MJ]	**1.74E-01**	1.59E-01	6.44E-03	0.00E+00	8.65E-03
Solar [MJ]	**3.91E-01**	3.32E-01	5.01E-02	0.00E+00	9.21E-03
Wind [MJ]	**1.64E-08**	2.88E-08	2.59E-15	0.00E+00	-1.24E-08
Depletion of non-renewable material resources [kg]	***1.88E+00***	*1.84E+00*	*1.88E-02*	*0.00E+00*	*3.18E-02*
Use of renewable resources [kg]	***5.96E+00***	*5.64E+00*	*2.71E-01*	*0.00E+00*	*4.37E-02*
Air [kg]	**5.92E+00**	5.62E+00	2.60E-01	0.00E+00	4.02E-02
Carbon dioxide [kg]	**2.63E-02**	2.26E-02	2.93E-03	0.00E+00	7.29E-04
Nitrogen [kg]	**0.00E+00**	0.00E+00	3.89E-14	0.00E+00	-4.15E-09
Oxygen [kg]	**1.43E-02**	4.31E-03	7.24E-03	0.00E+00	2.76E-03
Primary forest [kg]	**9.16E-08**	8.82E-08	1.49E-14	0.00E+00	3.47E-09
Renewable fuels [kg]	**4.14E-08**	4.79E-07	0.00E+00	0.00E+00	0.00E+00
Recycled materials (kg)	**9.24E-03**	0.00E+00	0.00E+00	0.00E+00	9.24E-03
Secondary raw materials (kg)	**4.24E-04**	4.24E-04	0.00E+00	0.00E+00	0.00E+00
Hazardous waste [%]	**0.272%**	0.272%	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste [%]	**0.536%**	0.536%	0.00E+00	0.00E+00	0.00E+00
Blue water consumption [m^3]	**4.79E-03**	4.29E-03	5.03E-04	0.00E+00	-5.21E-06

Table 8: Additional LCI categories for the market life of N5371X

Additional LCI category	Total	Stage 1	Stage 2	Stage 3	Stage 4
Primary energy, non-renewable [MJ]	***3.77E+01***	***3.14E+01***	***6.29E+00***	***0.00E+00***	***2.83E-01***
Crude oil [MJ]	**1.36E+01**	7.48E+00	5.77E+00	0.00E+00	3.08E-01
Hard coal [MJ]	**8.55E+00**	8.87E+00	1.65E-01	0.00E+00	-2.62E-01
Natural gas [MJ]	**1.96E+00**	1.91E+00	1.84E-02	0.00E+00	3.30E-02
Lignite [MJ]	**1.12E+01**	1.08E+01	2.52E-01	0.00E+00	1.39E-01
Uranium [MJ]	**2.44E+00**	2.29E+00	8.44E-02	0.00E+00	6.45E-02

Primary energy, renewable [MJ]	***2.31E+00***	***2.06E+00***	***1.87E-01***	***0.00E+00***	***6.24E-02***
Geothermal [MJ]	**5.51E-02**	5.21E-02	2.84E-03	0.00E+00	2.39E-04
Hydro [MJ]	**5.23E-01**	4.78E-01	1.93E-02	0.00E+00	2.60E-02
Solar [MJ]	**1.17E+00**	9.96E-01	1.50E-01	0.00E+00	2.76E-02
Wind [MJ]	**4.92E-08**	8.65E-08	7.78E-15	0.00E+00	-3.73E-08
Depletion of non-renewable material resources [kg]	**5.65E+00**	***5.53E+00***	***5.65E-02***	***0.00E+00***	***9.54E-02***
Use of renewable resources [kg]	**1.79E+01**	***1.69E+01***	***8.12E-01***	***0.00E+00***	***1.31E-01***
Air [kg]	**1.78E+01**	1.69E+01	7.81E-01	0.00E+00	1.21E-01
Carbon dioxide [kg]	**7.89E-02**	6.79E-02	8.80E-03	0.00E+00	2.19E-03
Nitrogen [kg]	**0.00E+00**	0.00E+00	1.17E-13	0.00E+00	-1.25E-08
Oxygen [kg]	**4.30E-02**	1.29E-02	2.17E-02	0.00E+00	8.29E-03
Primary forest [kg]	**2.75E-07**	2.65E-07	4.48E-14	0.00E+00	1.04E-08
Renewable fuels [kg]	**1.24E-07**	1.44E-06	0.00E+00	0.00E+00	0.00E+00
Recycled materials (kg)	**2.77E-02**	0.00E+00	0.00E+00	0.00E+00	2.77E-02
Secondary raw materials (kg)	**1.27E-03**	1.27E-03	0.00E+00	0.00E+00	0.00E+00
Hazardous waste [%]	**0.272%**	0.272%	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste [%]	**0.536%**	0.536%	0.00E+00	0.00E+00	0.00E+00
Blue water consumption [m^3]	**1.44E-02**	1.29E-02	1.51E-03	0.00E+00	-1.56E-05

Emissions to Water, Soil, and to Indoor Air

Because coatings are a passive product during use, the only impacts occurring during this phase are generally due to the off-gassing of material components in the paint. The quantity of VOC emissions during the use phase for Ultra Spec® 500 products are assumed to equal the EPA Method 24 listed VOC contents on the label.

LCA Interpretation

The LCA results show that the raw materials production and paint manufacturing are key contributors to many impact indicators. The majority of the impact of the raw materials comes from the pigments and the acrylic resin, as these components are often the highest percent by weight in the paint composition. Additionally, the energy demand for producing titanium dioxide (a pigment) is relatively high. Acidification potential is largely due to the titanium dioxide production. The relatively high ozone depletion potentials in the end-of-life are due to the energy required to recycle packaging materials. Transportation is small but significant for global warming, eutrophication, and smog formation potentials within the stages.

Benjamin Moore & Co.
101 Paragon Drive,
Montvale, NJ 07645

Additional Environmental Information

Environmental Certifications

Certified (low emitting materials category)

Ultra Spec® 500 paints meet stringent VOC standards, and are Master Painters Institute approved under their standard as well as their high performance categories. They are Cradle to Cradle Certified™ Silver, and are Collaborative for High Performance Schools (CHPS) and California Department of Health Environmental Health Laboratory (CDPH/EHLB) standard method V1.1 emission certified. Ultra Spec® 500 carries Benjamin Moore's Green Promise® designation. LEED® v4 Low Emitting Product Credit - Building Product Disclosure Credit.

Preferred End-of Life Options

Please visit www.paintcare.org for information about disposing unused latex paint. If possible, unused paint should be taken to an appropriate recycling/take-back center or disposed of in accordance with local environmental regulatory agency guidance.

References

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EPA VOC Calculation Rules. http://www3.epa.gov/ttn/atw/183e/aim/fr1191.pdf

ISO 14025:2006 *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*.

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