ENVIRONMENTAL PRODUCT DECLARATION

INTERIOR PAINT

NIPPON PAINT SINGAPORE
DECLARATION NUMBER: 4791753641.101.2
DATE OF ISSUE: OCTOBER 31, 2025
VALIDITY: 5 YEARS

CERTIFIED
ENVIRONMENTAL PRODUCT DECLARATION
UL.COM/EPD

NIPPON PAINT (SINGAPORE)

About Nippon Paint

Nippon Paint is a leading innovator in the global paint and coatings industry. Originating from Japan, the Nippon Paint Group has expanded its presence to 48 countries and territories, and is currently the No. 1 paint and coatings manufacturer in the Asia-Pacific region in terms of both production volume and sales revenue.

With over 144 years of heritage, Nippon Paint employs more than 38,500 people worldwide, who are dedicated to delivering excellence across the entire value chain – from research and development to manufacturing, and ultimately, customer satisfaction. Our mission is to continuously create value for our partners and customers by delivering high-performance, reliable, and sustainable solutions. We remain committed to customer-centric innovation that enhances both quality of life, environmental performance, and sustainability growth.

For Singapore market visit: **https://www.nipponpaint.com.sg**

Our commitment to a more sustainable future

To ensure alignment with the strategy of our parent company, Nippon Paint Holdings Co., Ltd. ("NPHD"), our approach to corporate sustainability is rooted in the philosophy of "Mutual Prosperity". This commitment extends beyond mere compliance, prioritising not only consistent financial performance but also environmental and social responsibility. By integrating ESG considerations into our operations, we ensure long term viability for both the company and the environment we operate within.

NIPSEA Group's Sustainability Steering Committee, led by the Group Chief Executive Officer, oversees group-wide initiatives. This cross-functional team comprises experts from various departments, ensuring a holistic approach to sustainability.

To further strengthen our sustainability efforts, we have identified five key pillars: Environment & Safety, People & Community, Innovation & Product Stewardship, Governance, and Sustainable Procurement.

ENVIRONMENTAL PRODUCT DECLARATION

EPD PROGRAM AND PROGRAM OPERATOR NAME, ADDRESS, LOGO, AND WEBSITE	UL ENVIRONMENT 333 PFINGSTEN ROAD NORTHBROOK, IL 60611	HTTPS://WWW.UL.COM/ HTTPS://SPOT.UL.COM/
GENERAL PROGRAM INSTRUCTIONS AND VERSION NUMBER	PROGRAM OPERATOR RULES V2.7 2022	
MANUFACTURER NAME AND ADDRESS	Nippon Paint (Singapore) Co. Pte. Ltd. 1, First Lok Yang Road Jurong Singapore 629728	
DECLARATION NUMBER	4791753641.101.2	
DECLARED PRODUCT & FUNCTIONAL UNIT OR DECLARED UNIT	Nippon Interior Paint 1 kg of paint product; including its packaging (the weight of the packaging is not included in this 1 kg).	
REFERENCE PCR AND VERSION NUMBER	EN 15804:2012+A2:2019+AC: 2021, Sustainability of construction works – Environmental product declarations - Core rules for the product category of construction products; Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report according to EN 15804+A2:2019, Version 1.4. Part B: Requirements on the EPD for Coatings with organic binders, Version 11.	
DESCRIPTION OF PRODUCT APPLICATION/USE	Nippon interior paint products are professional architectural decoration coatings	
PRODUCT RSL DESCRIPTION (IF APPL.)	3 – 15 Years	
MARKETS OF APPLICABILITY	South East & South Asia	
DATE OF ISSUE	October 31, 2025	
PERIOD OF VALIDITY	5 Years	
EPD TYPE	Product-specific	
YEAR(S) OF REPORTED PRIMARY DATA	2024	
LCA SOFTWARE & VERSION NUMBER	open LCA 2.4.1	
LCI DATABASE(S) & VERSION NUMBER	Ecoinvent 3.11	
LCIA METHODOLOGY & VERSION NUMBER	EF v3.1	
The PCR review was conducted by:		IBU PCR Review Panel info@ibu-epd.com
This declaration was independently verified in accordance with ISO 14025: 2006, EN 15804+A2, UL Part A. ☐ INTERNAL ■ EXTERNAL		Skye Tang, UL Solutions
This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:		Kang An, UL Solutions
This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:		Ik-Kim, Smart-Eco

LIMITATIONS

Exclusions: EPDs do not indicate that any environmental or social performance benchmarks are met, and there may be impacts that they do not encompass. LCAs do not typically address the site-specific environmental impacts of raw material extraction, nor are they meant to assess human health toxicity. EPDs can complement but cannot replace tools and certifications that are designed to address these impacts and/or set performance thresholds – e.g. Type 1 certifications, health assessments and declarations, environmental impact assessments, etc.

Accuracy of Results: EPDs regularly rely on estimations of impacts; the level of accuracy in estimation of effect differs for any particular product line and reported impact.

Comparability: Comparison of the environmental performance of Flooring Products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR. EPDs from different programs may not be comparable. Full conformance with the PCR for flooring allows EPD comparability only when all stages of a life cycle have been considered, when they comply with all referenced standards, use the same sub-category PCR, and use equivalent scenarios with respect to construction works. However, variations and deviations are possible. Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.

PRODUCT DEFINITION AND INFORMATION

Product Definition

Nippon Paint's interior paint products are professional architectural coatings specifically designed for indoor applications. These water-based coatings are formulated with synthetic resin emulsions, pigments, extenders, and various functional additives to ensure durability and protection against external elements.

Interior emulsion paints are widely used in residential and commercial construction due to their rapid drying time, ease of application, cost efficiency, excellent weather resistance, durability, anti-algae and anti-fungus properties, and low VOC emissions. They provide long-lasting protection and aesthetic appeal for external wall surfaces, even under harsh environmental conditions.

Product Specification

Within this report, a total of 9 types of interior paint are analysed. The interior paint products included in this LCA study are produced in Singapore (SG). The full list of products under analysis is shown below.

Table 1. Interior Paint Product Specification

No	Product Name / Descriptor	No	Product Name / Descriptor
1	Nippon Paint Aqua PU	6	Nippon Paint Odour-Less Anti-Mould Ceiling White
2	Nippon Paint EvoMEDICO Interior Sheen	7	Nippon Paint Odour-Less Ultra Fresh Air
3	Nippon Paint EvoMEDICO Interior Matt	8	Nippon Paint Vinilex 5000
4	Nippon Paint MAX	9	Nippon Paint VirusGuard
5	Nippon Paint MozzieGuard		

Application

Nippon Paint's interior emulsion paints are widely used in both new construction and renovation projects. Their key advantages – such as high coverage and opacity, excellent anti-stain properties, washability, anti-bacteria, anti-virus anti-fungus properties, and low VOC emissions – enhance indoor air quality, provide long-lasting surface protection, and contribute to greater user comfort in interior environments.

Declaration of Methodological Framework

The EPD analysis uses a cradle-to-gate (A1-A3) system boundary, due to the fact that the product is physically integrated with other products during installation so they cannot be physically separated from them at end of life, and the product is no longer identifiable at end of life as a result of a physical or chemical transformation process, and the products do not contain biogenic carbon. Additional details on cut-off and allocation procedures are found in sections 2.5 and 2.8, respectively. No known flows are deliberately excluded from this EPD.

Technical Requirements

The technical specifications of the interior paint products are listed in the tables below.

Table 2. Constructional Data of Interior Paint Products

Product (Unit)	Density (g/cm^3)	Gloss Level	Theoretical Coverage (m^2/L)	Number of Coats	Overcoating Time (Hrs)
Nippon Paint Aqua PU	1.24±0.03	Gloss	8 – 10	2	2
Nippon Paint EvoMEDICO Interior Sheen	1.31±0.03	Sheen	8 – 10	2	2
Nippon Paint EvoMEDICO Interior Matt	1.40±0.03	Matt	10 – 12	2	2
Nippon Paint Max	1.42±0.03	Matt	10 – 12	2	2
Nippon Paint MozzieGuard	1.35±0.03	Soft Sheen	10 – 12	2	2
Nippon Paint Odour-less Anti-Mould Ceiling White	1.41±0.03	Matt	10 – 12	2	2
Nippon Paint Odour-less Ultra Fresh Air	1.37±0.03	Soft Matt	10 – 12	2	2
Nippon Paint Vinilex 5000	1.43±0.03	Matt	10 – 12	2	2
Nippon Paint VirusGuard	1.35±0.03	Soft Sheen	10 – 12	2	2

Values are guidance values and do not reflect a statistical evaluation or guaranteed value.

Performance data of the product with respect to its characteristics in accordance with the relevant technical provision (no-CE marking).

Delivery Status

The Delivery Status of the interior wall paint products is listed in the table below.

Table 3. Delivery Status of Interior Wall Paint Products

No	Product Name / Descriptor	Delivery Status	No	Product Name / Descriptor	Delivery Status
1	Nippon Paint Aqua PU	20L	6	Nippon Paint Odour-less Anti-Mould Ceiling White	1L, 5L, 20L
2	Nippon Paint EvoMEDICO Interior Sheen	20L	7	Nippon Paint Odour-less Ultra Fresh Air	1L, 5L, 20L
3	Nippon Paint EvoMEDICO Interior Matt	20L	8	Nippon Paint Vinilex 5000	1L, 5L, 20L
4	Nippon Paint Max	20L	9	Nippon Paint VirusGuard	5L
5	Nippon Paint MozzieGuard	5L, 20L			

Base Materials / Ancillary Materials

The main constituents of the product are shown in Table 4 below.

Table 4. Constituents of Interior Paint Products

Constituent	Unit	WB Topcoat
Polymer Dispersion	% w/w	10-55
Pigment & Minerals	% w/w	20-50
Additive	% w/w	2-10
Water	% w/w	10-40

This product/article (or at least one partial article) contains POPs substances in the candidate list of 08/2022/NĐ-CP (as of 10.01.2022) exceeding 0.1% by mass: No.

Biocide products have been added to our Nippon Paint product, or it has been treated with biocide products (regulated under EU Biocidal Products Regulation No. 528/2012). Please refer to the following list.

CAS Number	Chemical Formula	Ingredient Name
330-54-1	C9-H10-Cl2-N2-O	diuron (ISO)
26530-20-1	C11-H19-N-O-S	OIT
55406-53-6	C8-H12-I-N-O2	IPBC
2682-20-4	C4-H5-N-O-S	methylisothiazolinone

Manufacturing

The process begins with the input of raw materials, which are transported to the factory. These materials undergo a pre-mixing stage before entering the high-speed dispersion (HSD) process. After dispersion, the materials are filtered and packaged to form the final interior and exterior paint products.

The logistics system then manages the distribution of the paints. Any waste generated during the production process, such as incineration waste, landfill waste, and wastewater, is properly managed through end-of-life treatment methods, including wastewater treatment, landfilling, and incineration, specific production flow diagram shown in Figure 1.

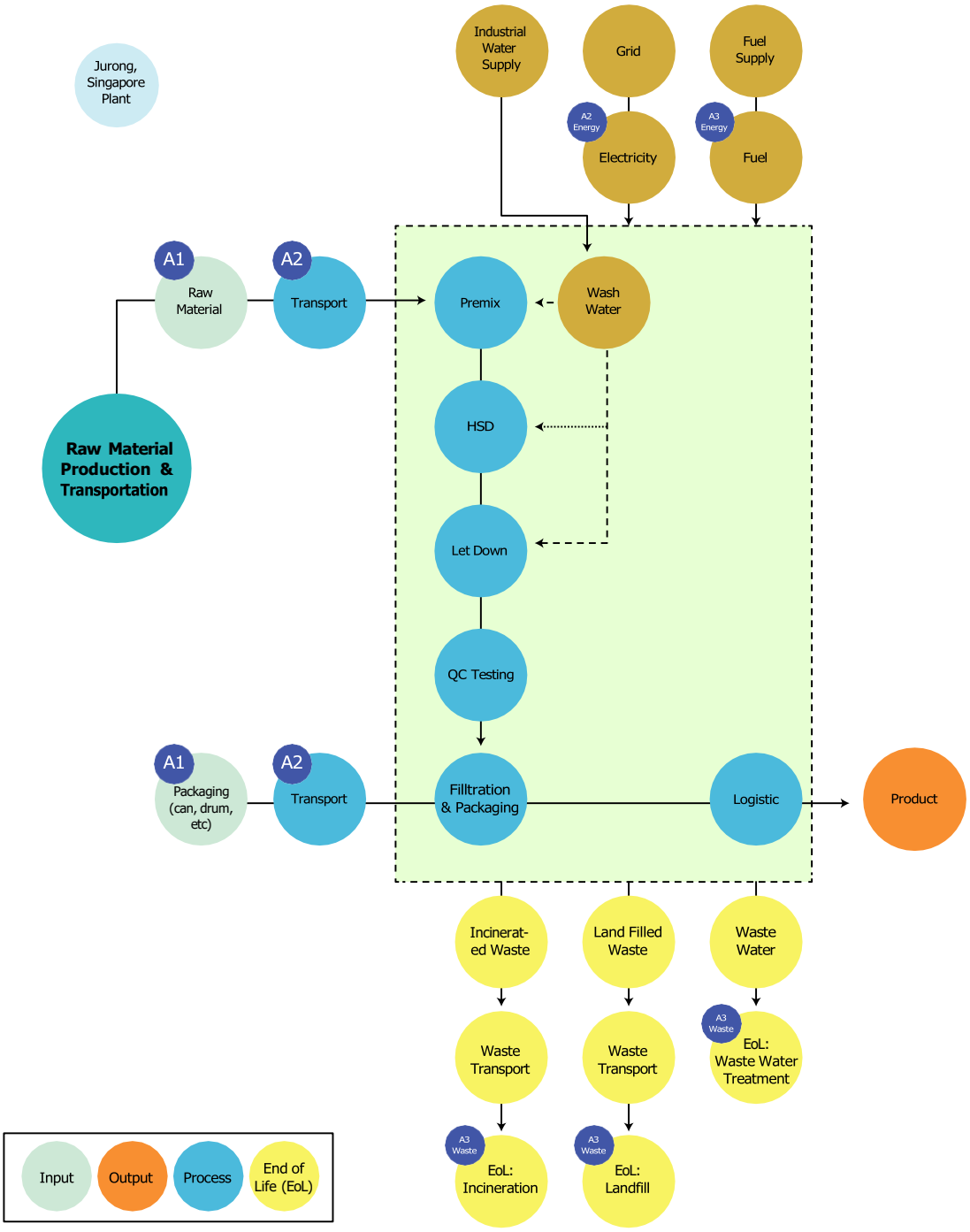

Figure 1: Diagram of Production Process

Environment and Health During Manufacturing

The manufacturing process is designed with consideration for both environmental impact and worker health and safety. The following measures are implemented:

- A dust extraction system is installed to minimise airborne particles and ensure good air quality during the production process.
- Annual workplace environment inspections are conducted by a third-party in accordance with state regulations, along with regular environmental monitoring as prescribed.
- Workers undergo annual general health check-up.
- Production workers are entitled to a 15-minute morning break, a 15-minute afternoon break, and a 45-minute lunch break.
- In terms of occupational safety, workers are fully equipped with personal protective equipment (PPE), clear safety signage is provided, and regular safety training is carried out.

Packaging

Tin Can and cap (Tin plated steel) and PP (polypropylene) container and cap is used for product packaging. Weight of product packaging is allocated to individual products according to the number of packaged items. The Tin and PP packaging materials may be recycled.

Conditions of Use

Surface must be clean, dry, and stable. Suggested Treatment:

- Dirt / Powder: Clean with damp cloth and remove loose powder. Mild detergent may be used.
- Old Paint / Plaster / Skimcoat / Putty: Unstable old film/substrate should be removed by chisel, scraper, power grinder whichever is appropriate. Uneven substrates must be re-plastered with an approved Skimcoat / Putty.
- Moisture: High moisture will cause paint defect. Observe the following level prior to painting: Masonry: below 6% by Sovereign 1150 Moisture meter; below 16% by Protimeter Mini BLD 2000 Moisture meter; below 60% by Lutron MS-7003 Moisture meter. All water seepage must be checked and repaired.
- Algae / Fungus: Remove by chisel or scraper and treat with NIPPON ANTI-FUNGUS SOLUTION. Rinse again with clean water and dry.
- Oil / Grease: Clean off with mild detergent and a little solvent if necessary. Wash thoroughly to remove all traces.

Environment and Health During Use

Products are water-based coatings with low odour and low VOC. The products contain no added lead or mercury.

LIFE CYCLE ASSESSMENT BACKGROUND INFORMATION

A full life cycle assessment has been carried out according to ISO 14040 (ISO, 2009) and 14044 (ISO, 2006), EN15804 per the product category rules (PCR) for Coatings with organic binders as published by IBU.

Declared Unit

In this study, a declared unit is defined as 1 kg of paint product; including its packaging (the weight of the packaging is not included in this 1 kg).

Table 5. Declared Unit and Mass Reference

Name	Declared Unit (kg)	Grammage (kg/m^2)	Dry Film Thickness (mm)	Density (g/m^3)
Nippon Paint Aqua PU	1	0.124	40	1.24
Nippon Paint EvoMEDICO Interior Sheen	1	0.164	45	1.31
Nippon Paint EvoMEDICO Interior Matt	1	0.127	30	1.40
Nippon Paint Max	1	0.129	30	1.42
Nippon Paint MozzieGuard	1	0.123	35	1.35
Nippon Paint Odour-less Anti-Mould Ceiling White	1	0.142	30	1.41
Nippon Paint Odour-less Ultra Fresh Air	1	0.125	35	1.37
Nippon Paint Vinilex 5000	1	0.11	30	1.43
Nippon Paint VirusGuard	1	0.123	35	1.35

System Boundary

The life cycle stages considered in this LCA study are from cradle to gate. Figure 2 below illustrates the system boundaries for the paint product. The terms of defining life cycle stages in PCR from EN 15804 are adopted. Modules C1-C4 and module D are not declared in this LCA study, as the products fulfil the conditions in Declaration of Methodological Framework.

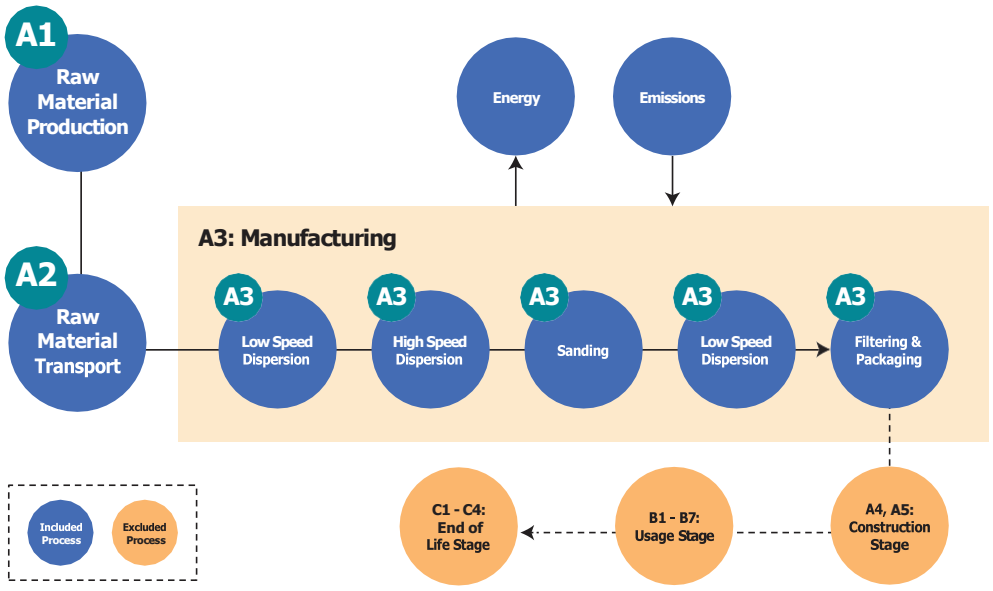

Figure 2: System Boundary

The production stage for paint products includes extraction and processing of raw materials, transportation to the factory, and manufacturing processes with packaging, etc. Throughout the production stages of products, resources of energy and materials used together with emissions to soil, water, and air are accounted for in the calculations of the impact assessment.

Estimates and Assumptions

Materials for which there are no inventories available are approximated with datasets of similar chemicals or estimated by merging available datasets.

The data for the generation of electricity applied in A3 is electricity mixes on the market, namely the Singapore market for electricity, medium voltage in the Ecoinvent 3.11 (cut-off) database. Its GWP-GHG impact is 0.5458 kg CO_2eq/kWh. The reference year of electricity dataset is 2021-2024.

In addition, the factory also has photovoltaic power generation, and the corresponding background dataset is electricity production, photovoltaic, 3kWp flat-roof installation, single-Si results in a GWP-GHG impact is 0.0841 kg CO_2eq/kWh.

Cut-off Criteria

Cut-off rules are consistent with PCR Part A and Part B. No known flows were deliberately excluded. In this study, the neglected flow is demonstrated in the table below. Machinery, plants, and infrastructure required in the manufacturing process were not considered.

Table 6. Cut-off Flows

Flow Name	Process Stage	Mass %	Reason to Cut-Off
Machinery, plants, and infrastructure	A3	N/A	Machinery, plants, and infrastructure spread on each unit of product can be ignored
Total cut-off mass % estimated		< 1%	< 1%

Data Sources

Primary data were collected as far as possible for the manufacturing stage, including the amount of raw materials, material information, transportation distance, etc. The key parameters for producer-specific foreground data were based on annualised production for 2024 of averaged data from Nippon Paint Singapore. The relevant background datasets were taken from the Ecoinvent 3.11, taking into consideration the degree to which it was technologically, temporally, and geographically representative.

Data Quality

A variety of tests and checks were performed throughout the project to ensure high quality of the completed LCA. Checks included an extensive review of project-specific LCA models as well as the background data used.

Temporal Coverage

Foreground data represent a continuous 12-month period over the 2024 calendar year. Background datasets are all based on data from the latest year, with the majority of datasets based on data from 2024, which were obtained from the Ecoinvent 3.11 databases.

Geographical Coverage

To satisfy cut-off criteria, proxy datasets were used as needed for raw material inputs to address lack of data for a specific material or for a specific geographical region. These proxy datasets were chosen for their representativeness of the actual product. Additionally, global data or rest of world data were used when Singapore data (for raw materials sourced in Singapore) were not available.

Technological Coverage

The primary data represent production of the product under evaluation. Secondary data were chosen to be specific to the technologies in question (or appropriate proxy data used where necessary).

Period Under Review

Manufacturer-supplied data (primary data) are based on annualised production for 2024. This analysis is intended to represent production in 2024.

Allocation

In this LCA study allocation is based on physical properties and is based on weight. For example, a variety of products flooring products are produced in one factory. The consumption of the target products is obtained by dividing the total annual production weight of each product by the total weight of all the products produced in the factory, obtaining the weight ratio of target product, and then multiplying by the total data.

Comparability and Benchmarking

No comparisons or benchmarking are included in this EPD. LCA results across EPDs can be calculated with different background databases, modelling assumptions, geographic scope, and time periods, all of which are valid and acceptable according to the Product Category Rules (PCR) and ISO standards. The user of the EPD should take care when comparing EPDs from different companies. Assumptions, data sources, and assessment tools may all impact the uncertainty of the final results and make comparisons misleading.

LIFE CYCLE ASSESSMENT RESULTS

Table 7. Description of the System Boundary Modules

	PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
	Raw material	Transport	Manufacturing	Transport from GATE TO SU=ITE	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Building Operational Energy Use During Product Use	Building Operational Water Use During Product Use	Deconstruction	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling Potential
EPD Type: Cradle to Gate	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X = Module Declared, MND = Module Not Declared (such a declaration shall not be regard as an indicator result of zero)

Environmental Impact Indicators

Based on the model of NPSG's paint products, the LCIA result is calculated based on EN15804+A2 (EF version 3.1) method, an optional additional impact assessment using the characterisation factors in accordance with TRACI (version 2.1) are declared. And the tables below show the results. And the tables below show the results.

Note: The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Table 8. Core Environmental Impact Category Indicators Assessment Results-EF v3.1

Product	Unit	Nippon Paint Aqua PU	Nippon Paint EvoMEDICO Interior Matt	Nippon Paint EvoMEDICO Interior Sheen	Nippon Paint MAX	Nippon Paint MozzieGuard	Nippon Paint Odour-Less Anti-Mould Ceiling White	Nippon Paint Odour-Less Ultra Fresh Air	Nippon Paint Vinilex 5000	Nippon Paint VirusGuard
GWP-total	kg CO_2 eq	3.59E+00	2.75E+00	3.11E+00	1.19E+00	2.62E+00	1.35E+00	2.86E+00	2.09E+00	3.07E+00
GWP-luluc	kg CO_2 eq	2.52E-03	1.86E-03	1.98E-03	8.09E-04	1.88E-03	1.14E-03	1.93E-03	1.76E-03	2.10E-03
GWP-biogenic	kg CO_2 eq	2.11E-02	1.69E-02	1.66E-02	6.60E-03	1.90E-02	1.14E-02	2.08E-02	1.82E-02	2.14E-02
GWP-fossil	kg CO_2 eq	3.57E+00	2.73E+00	3.09E+00	1.18E+00	2.60E+00	1.33E+00	2.83E+00	2.08E+00	3.04E+00
ADP-fossil[2]	MJ, net calorific value	5.23E+01	3.75E+01	4.36E+01	1.90E+01	4.02E+01	1.91E+01	3.86E+01	3.07E+01	4.26E+01
ADP-minerals & metals[2]	kg Sb eq	3.77E-05	3.27E-05	3.55E-05	1.45E-05	2.69E-05	1.90E-05	3.29E-05	2.57E-05	3.39E-05
EP-freshwater	kg P eq	1.12E-03	9.03E-04	9.74E-04	4.34E-04	8.70E-04	5.54E-04	9.41E-04	7.87E-04	1.01E-03
POCP	kg NMVOC eq	1.55E-02	1.08E-02	1.18E-02	4.58E-03	1.18E-02	5.81E-03	1.13E-02	9.06E-03	1.28E-02
AP	mol H+ eq	2.26E-02	1.72E-02	1.85E-02	6.08E-03	1.62E-02	8.60E-03	1.85E-02	1.39E-02	1.93E-02
EP-terrestrial	mol N eq	3.84E-02	2.79E-02	3.07E-02	1.11E-02	2.80E-02	1.47E-02	2.94E-02	2.19E-02	3.16E-02
EP-marine	kg N eq	4.05E-03	3.03E-03	3.38E-03	1.18E-03	2.80E-03	1.53E-03	3.19E-03	2.24E-03	3.34E-03
ODP	kg CFC 11 eq	6.16E-08	1.43E-06	1.95E-06	1.73E-08	4.63E-08	2.60E-08	3.94E-08	3.61E-08	2.41E-06
WDP[2]	m^3 world eq deprived	1.38E+00	1.16E+00	1.28E+00	4.84E-01	9.76E-01	5.78E-01	1.18E+00	9.57E-01	1.23E+00

Table 9. Core Environmental Impact Category Indicators Assessment Results-TRACI v2.1

Impact Category	Acidification	Eutrophication	Fossil Fuel Depletion	Global Warming	Ozone Depletion	Smog
Unit	kg SO_2 eq	kg N eq	MJ surplus	CO_2 eq	kg CFC 11 eq	kg O_3 eq
Nippon Paint Aqua PU	1.96E-02	3.88E-02	5.06E+01	3.52E+00	6.65E-08	2.33E-01
Nippon Paint EvoMEDICO Interior Sheen	1.60E-02	3.75E-02	4.21E+01	3.05E+00	2.08E-06	1.77E-01
Nippon Paint EvoMEDICO Interior Matt	1.48E-02	3.18E-02	3.61E+01	2.69E+00	1.52E-06	1.63E-01
Nippon Paint MAX	5.18E-03	8.08E-03	1.83E+01	1.16E+00	1.87E-08	6.87E-02
Nippon Paint MozzieGuard	1.39E-02	1.98E-02	3.89E+01	2.56E+00	4.97E-08	1.76E-01
Nippon Paint Odour-Less Anti-Mould Ceiling White	7.31E-03	1.15E-02	1.82E+01	1.32E+00	2.80E-08	9.11E-02
Nippon Paint Odour-Less Ultra Fresh Air	1.59E-02	3.18E-02	3.72E+01	2.80E+00	4.21E-08	1.72E-01
Nippon Paint Vinilex 5000	1.19E-02	2.06E-02	2.94E+01	2.05E+00	3.88E-08	1.36E-01
Nippon Paint VirusGuard	1.67E-02	3.18E-02	4.11E+01	3.00E+00	2.69E-06	1.92E-01

Acronyms: GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine =Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources ; ADP-fossil = Abiotic depletion potential for fossil resources; WDP = Water (user) deprivation potential, deprivation-weighted water consumption; LVH=Lower Heating value.

Additional Environmental Impact Category Indicators Assessment Results

Table 10: Additional Environmental Impact Category Indicators Assessment Results

Product	Unit	Nippon Paint Aqua PU	Nippon Paint EvoMEDICO Interior Matt	Nippon Paint EvoMEDICO Interior Sheen	Nippon Paint MAX	Nippon Paint MozzieGuard	Nippon Paint Odour-Less Anti-Mould Ceiling White	Nippon Paint Odour-Less Ultra Fresh Air	Nippon Paint Vinilex 5000	Nippon Paint VirusGuard
ETP-fw_2	CTUe	3.66E+02	3.59E+02	4.87E+02	9.56E+00	2.78E+01	1.97E+01	3.62E+02	2.49E+01	2.84E+02
HTP-c_2	CTUh	2.11E-09	1.56E-09	1.75E-09	6.97E-10	1.65E-09	1.15E-09	1.59E-09	1.27E-09	1.85E-09
HTP-nc_2	CTUh	1.57E-07	4.03E-08	4.67E-08	3.32E-08	6.87E-08	2.68E-08	4.35E-08	2.40E-08	1.31E-07
SQP_2	Dimensionless	1.44E+01	1.20E+01	1.26E+01	4.69E+00	1.35E+01	6.65E+00	1.25E+01	1.08E+01	1.34E+01
PM	Disease incidence	2.26E-07	1.86E-07	2.03E-07	7.31E-08	1.86E-07	9.42E-08	1.97E-07	1.47E-07	2.02E-07
IRP_1	kBq U235 eq	1.10E-01	8.55E-02	9.20E-02	4.16E-02	8.52E-02	5.54E-02	8.78E-02	8.04E-02	9.67E-02

Acronyms: PM = Potential incidence of disease due to PM emissions; IRP = Potential Human exposure efficiency relative to U235; Potential Comparative Toxic Unit for ecosystems; HTP-c = Potential Comparative Toxic Unit for humans; HTP-nc = Potential Comparative Toxic Unit for humans; SQP = Potential Soil quality index.

Disclaimer 1: This impact category deals mainly with the eventual impact of low dose ionising radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionising radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

Disclaimer 2: The results of this environmental impact indicator shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.

Life Cycle Inventory Results

Table 11. Resource Use

Product	Unit	Nippon Paint Aqua PU	Nippon Paint EvoMEDICO Interior Matt	Nippon Paint EvoMEDICO Interior Sheen	Nippon Paint MAX	Nippon Paint MozzieGuard	Nippon Paint Odour-Less Anti-Mould Ceiling White	Nippon Paint Odour-Less Ultra Fresh Air	Nippon Paint Vinilex 5000	Nippon Paint VirusGuard
PENRE	MJ, LHV	4.20E+01	3.07E+01	3.56E+01	1.30E+01	3.11E+01	1.42E+01	3.22E+01	2.31E+01	3.46E+01
PERE	MJ, LHV	2.65E+00	2.25E+00	2.39E+00	1.16E+00	2.14E+00	1.46E+00	2.24E+00	2.01E+00	2.45E+00
PENRM	MJ, LHV	1.03E+01	6.85E+00	8.02E+00	5.99E+00	9.14E+00	4.82E+00	6.47E+00	7.54E+00	7.97E+00
PERM	MJ, LHV	7.60E-02	1.05E-01	1.05E-01	1.33E-01	8.77E-02	9.46E-02	6.70E-02	6.70E-02	6.70E-02
PENRT	MJ, LHV	5.23E+01	3.75E+01	4.36E+01	1.90E+01	4.02E+01	1.91E+01	3.86E+01	3.07E+01	4.26E+01
PERT	MJ, LHV	2.72E+00	2.35E+00	2.49E+00	1.30E+00	2.23E+00	1.55E+00	2.31E+00	2.08E+00	2.51E+00
FW	m_3	3.62E-02	2.55E-02	2.82E-02	9.62E-03	2.31E-02	1.18E-02	2.62E-02	2.07E-02	3.11E-02
SM	kg	4.35E-02	4.04E-02	4.11E-02	2.64E-02	4.00E-02	3.00E-02	3.99E-02	3.69E-02	4.19E-02
RSF	MJ, LHV	5.15E-04	4.21E-04	4.18E-04	1.56E-04	4.56E-04	2.42E-04	4.67E-04	4.07E-04	4.84E-04
NRSF	MJ, LHV	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Acronyms: PENRE = Use of non-renewable primary energy excluding nonrenewable primary energy resources used as raw material; PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw material; PENRM = Use of non-renewable primary energy resources used as raw material; PERM = Use of renewable primary energy resources used as raw material; PENRT = Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials); PERT = Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials); FW = Net use of fresh water; SM = Use of secondary materials; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels=Recovered energy; LVH=Lower Heating value

Table 12. Output Flows and Waste Categories

Product	Unit	Nippon Paint Aqua PU	Nippon Paint EvoMEDICO Interior Matt	Nippon Paint EvoMEDICO Interior Sheen	Nippon Paint MAX	Nippon Paint MozzieGuard	Nippon Paint Odour-Less Anti-Mould Ceiling White	Nippon Paint Odour-Less Ultra Fresh Air	Nippon Paint Vinilex 5000	Nippon Paint VirusGuard
HWD	kg	6.92E-01	6.22E-01	6.56E-01	2.92E-01	5.83E-01	3.80E-01	6.33E-01	5.53E-01	6.61E-01
NHWD	kg	1.82E+01	1.55E+01	1.60E+01	6.72E+00	1.43E+01	9.22E+00	1.69E+01	1.39E+01	1.69E+01
RWD	kg	2.72E-05	2.19E-05	2.30E-05	1.12E-05	2.11E-05	1.47E-05	2.19E-05	2.02E-05	2.43E-05
MER	kg	2.40E-05	1.91E-05	1.88E-05	7.40E-06	2.14E-05	1.13E-05	2.15E-05	1.87E-05	2.24E-05
MFR	kg	2.40E-03	1.50E-03	1.62E-03	6.00E-04	1.37E-03	8.86E-04	1.57E-03	1.20E-03	1.76E-03
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ETE	kg	3.56E-02	2.04E-02	2.06E-02	1.62E-02	2.99E-02	1.68E-02	2.21E-02	2.07E-02	3.16E-02
EEE	MJ	1.46E-02	1.18E-02	1.24E-02	8.06E-03	1.22E-02	9.19E-03	1.21E-02	1.16E-02	1.31E-02

Acronyms: HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; MER = Materials for energy recovery; MFR = Material for recycling; CRU = Components for reuse; ETE = Exported thermal energy; EEE = Exported electricity energy.

LCA INTERPRETATION

The contribution analysis and process contribution analysis reveal that the environmental impact of NPSG's interior paint product is dominated by the upstream supply chain of the raw material in all declared indicators.

Sensitivity analysis shows that the changes in assumptions such as substituted raw materials background data can lead to certain fluctuation of the final LCA results, hence it is recommended to continuously update the model to get up-to-date results, in case the assumption or process parameters will be changed in the future or better data would be provided, especially regarding the substituted material where the background data for the raw material is not available.

The LCA study has been carried out based on available data, information, regional and global knowledge, and experience to achieve more possible accuracy, completeness, and representative of the results.

ADDITIONAL ENVIRONMENTAL INFORMATION

Extraordinary Effects

Fire
The interior paint products usually have no or only have a subordinate influence on the fire characteristics of the structure in which they have been used.

Mechanical destruction
The mechanical destruction of interior paint products does not have negative impact on the environment or health.

Re-use Phase

Material reuse of coatings is not possible. It may be possible to re-use the packaging.

Disposal

Possible disposal methods for powder coating waste are:

1. Material utilisation, e.g. in composite materials
2. Thermal utilisation in approved systems

The following waste codes according to the European List of Waste (2000/532/EC) can apply: European Waste Catalogue (EWC) code 08 01 12 (Paint and varnish waste with the exception of that covered by EWC 08 01 11); EWC code 08 04 10 (Adhesive and sealant compound waste with the exception of that covered by EWC 08 04 09).

Further Information

Additional information about Nippon Paint products can be found on the following website: **https://nipponpaint.com.sg**

REQUISITE EVIDENCE

Fire Gas Toxicity

Fire gas toxicity test is usually carried out for one of the building structures, such as substrate of the wall, and it is not carried out for the coatings individually. Hence there is no information on fire gas toxicity for the paint products.

REFERENCES

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5. ISO. (2006). ISO 14044: Environmental management – Life cycle assessment – Requirements and guidelines.
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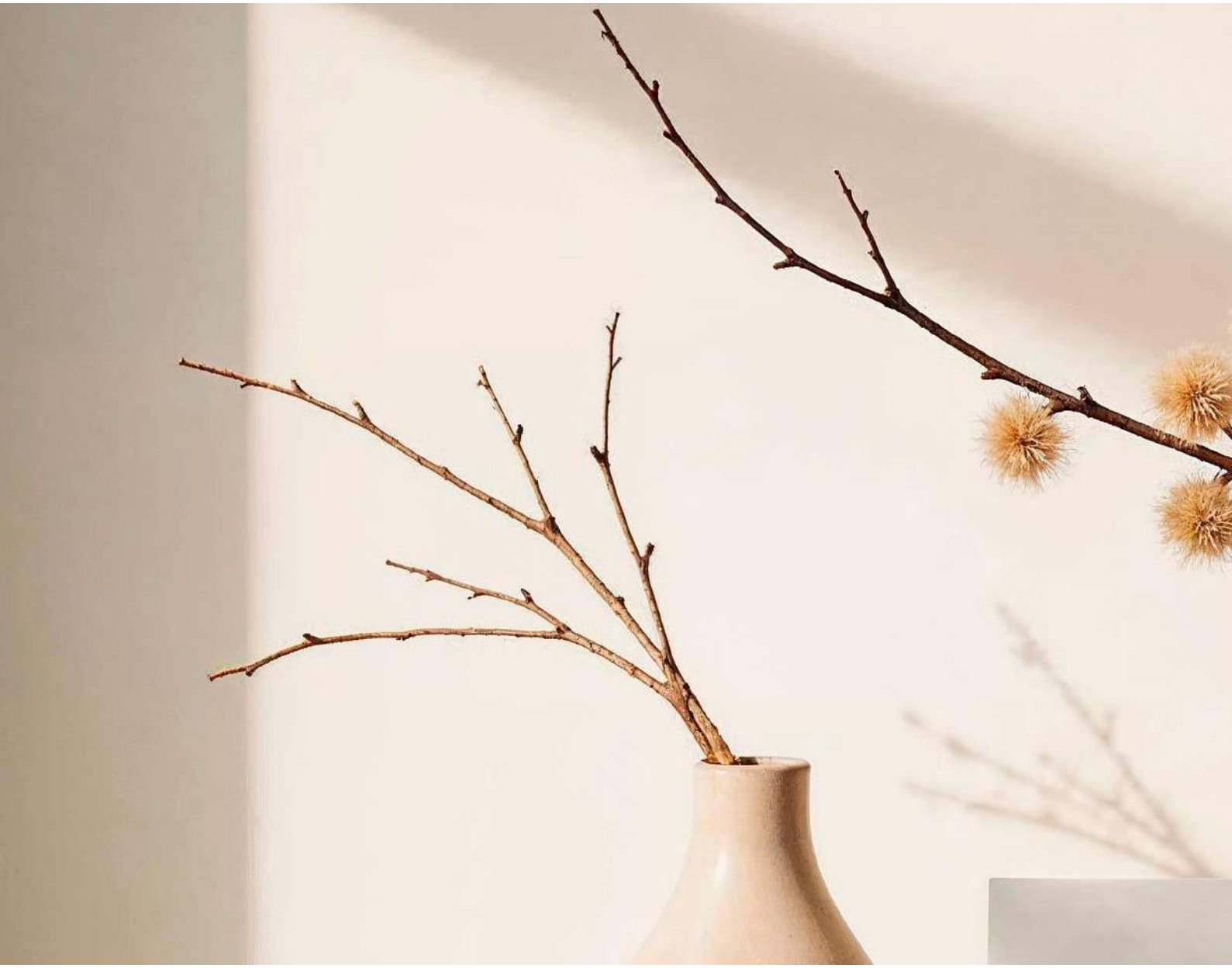

CONTACT INFORMATION

Study Commissioner

Nippon Paint Singapore
customer@nipponpaint.com.sg
https://nipponpaint.com.sg

Nippon Paint (Singapore) Co. Pte. Ltd.
1, First Lok Yang Road Jurong Singapore 629728
Tel: (65) 6265 5355
www.nipponpaint.com.sg/trade