PROGRAMME OPERATOR

Stichting MRPI®
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COMPANY INFORMATION

AkzoNobel Decorative Paints
The AkzoNobel Building
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PRODUCT

Dulux Trade Vinyl Matt

MRPI®-REGISTRATION

1.1.00051.2019

EPD-REGISTRATION

00000844

DATE OF ISSUE

1-3-2019

DATE OF EXPIRY

1-3-2024

DECLARED UNIT/FUNCTIONAL UNIT

All impacts are calculated using the declared unit "decoration of 1 m^2 of surface"

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by NIBE.
The LCA study has been done by Ecomatters.
The certificate is based on an LCA-dossier according to ISO14025 and NEN-EN15804+A1.
It is verified according to the EPD-MRPI® verification protocol May 2017.
EPD of construction products may not be comparable if they do not comply with NEN-EN15804+A1.
Declaration of SVHC that are listed on the "Candidate List of Substances of Very High Concern for authorization" when content exceeds the limits for registration with ECHA.

VISUAL PRODUCT

DESCRIPTION OF PRODUCT

Emulsion suitable for interior use on all normal interior wall and ceiling surfaces

MORE INFORMATION:

https://www.duluxtradepaintexpert.co.uk/products/dulux-trade/vinyl-matt

DEMONSTRATION OF VERIFICATION

CEN standard EN15804 serves as the core PCR[a]
independent verification of the declaration and data, according to EN ISO 14025:2010 ☐internal ☑external
(where appropriate[b]) Third party verifier: NIBE, ing. Kamiel Jansen
a Product Category Rules b Optional for B-to-B communication; mandatory for B-to-C communication (see EN ISO 14025:2010,9.4).

DETAILED PRODUCT DESCRIPTION

This EPD is representative for the 17 product paints belonging to the Dulux Trade Vinyl Matt Range:

1. Dulux Trade Vinyl Matt White
2. Dulux Trade Vinyl Matt Magnolia
3. Dulux Trade Vinyl Matt Pure Brilliant White
4. Dulux Trade Vinyl Matt Light Base
5. Dulux Trade Vinyl Matt Medium Base
6. Dulux Trade Vinyl Matt Extra Deep Base
7. Dulux Trade Vinyl Matt Light & Space Absolute White
8. Dulux Trade Vinyl Matt Light & Space Lumitec Tinted Colour
9. Dulux Trade Vinyl Matt Black
10. Dulux Trade Vinyl Matt Gardenia
11. Dulux Trade Vinyl Matt Jasmine White
12. Dulux Trade Vinyl Matt Chic Shadow
13. Dulux Trade Vinyl Matt Natural Calico
14. Dulux Trade Vinyl Matt Natural Hessian
15. Dulux Trade Vinyl Matt Nutmeg White
16. Dulux Trade Vinyl Matt Polished Pebble
17. Dulux Trade Vinyl Matt White Cotton

Dulux Trade Vinyl Matt is a top-quality high opacity emulsion based on unique AkzoNobel technology which gives excellent coverage and application as well as a wipeable finish for everyday living. Suitable for all normal interior wall and ceiling surfaces. Dulux Trade Vinyl Matt Light & Space uses revolutionary Lumitec technology that helps reflect up to twice as much light around the room, making even the smallest rooms look and feel more spacious compared to our conventional emulsion paints with a similar hue (colour family) and chroma (intensity of colour).

COMPONENT*	[KG]
Pigment: Lightfast Pigments.	Confidential
Binder: Acrylic Copolymer Dispersion	Confidential
Solvent: Water	Confidential

***> 1% TOTAL MASS**

Typical Use
Suitable for interior use on all normal interior wall and ceiling surfaces.

Application Method
Brush, roller, conventional spray or airless spray. As with other water-based paints, do not apply at temperatures below 8ºC (as recommended by British Standard BS 6150).

Pack size
The products are packed in a packaging with a capacity of 2.5, 5, 7.5 and 10 litres.

Production process and conditions of delivery
During paint production, the raw materials are pre-weighed according to the percentage of each in the formulation. The pigment is then dispersed in a mixture of binder and solvent using a variety of

machines. The amount and type of dispersion is product specific and depends on the type of finish required. Finally, tinter is added to correct the colour, the paint is thinned to viscosity, filtered and filled into the appropriate packaging container. All paint containers are transported from the production sites to a distribution center and finally to the customers in the UK.

SCOPE AND TYPE

The type of this EPD is Cradle-to-Gate with options. All major steps from the extraction of natural resources to the final disposal of the product are included in the environmental performance of the manufacturing phase, except those that are not relevant to the environmental performance of the product. This EPD is representative for products produced and sold in the UK. The paint is produced in Stowmarket in the UK and Cork in Ireland and the application market is for customers within the UK. Likewise, for the end-of-life, the fate of the paint product is described within a UK context.

The software GaBi 8.7 Professional is used to perform the LCA. The latest version of the AkzoNobel database for decorative paints (2017) was used, this includes the background datasets:

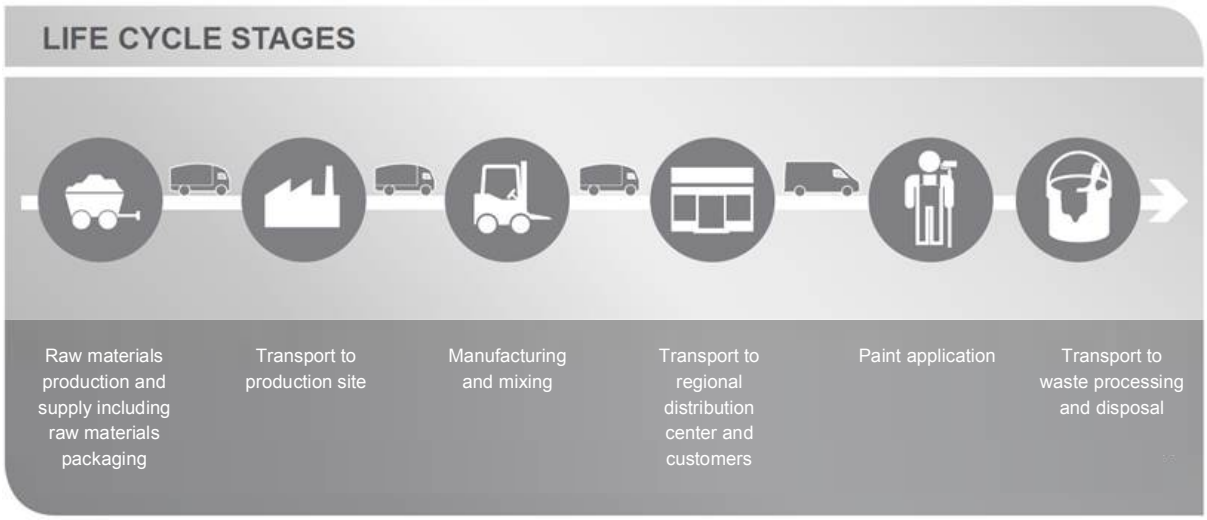
- Ecoinvent (2008).
- GaBi Professional Database
- Plastics Europe.

The validity of this EPD is in correspondence with the specifications of the LCA project report.

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishement	Operational energy use	Operational water use	De-construction emopliotion	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MNA

X = included, MNA= module not assessed

All impacts associated with the upstream production of materials and energy are included in the system boundaries. Mining activities and controlled landfills are included in the product systems. Similarly, wastewater treatment activities are also considered within the technological systems. The emissions and resource extractions derived from these processes are considered elementary exchanges between the product systems and the environment.



REPRESENTATIVENESS

The representative product consists of a weighted average based on annual production volumes of the formulation and characteristics (i.e. packaging format) of the 17 products within the Dulux Trade Vinyl Matt:

1. Dulux Trade Vinyl Matt White
2. Dulux Trade Vinyl Matt Magnolia
3. Dulux Trade Vinyl Matt Pure Brilliant White
4. Dulux Trade Vinyl Matt Light Base
5. Dulux Trade Vinyl Matt Medium Base
6. Dulux Trade Vinyl Matt Extra Deep Base
7. Dulux Trade Vinyl Matt Light & Space Absolute White
8. Dulux Trade Vinyl Matt Light & Space Lumitec Tinted Colour
9. Dulux Trade Vinyl Matt Black
10. Dulux Trade Vinyl Matt Gardenia
11. Dulux Trade Vinyl Matt Jasmine White
12. Dulux Trade Vinyl Matt Chic Shadow
13. Dulux Trade Vinyl Matt Natural Calico
14. Dulux Trade Vinyl Matt Natural Hessian
15. Dulux Trade Vinyl Matt Nutmeg White
16. Dulux Trade Vinyl Matt Polished Pebble
17. Dulux Trade Vinyl Matt White Cotton

This EPD is representative for products produced and sold in the UK. The paint is produced in two production sites: Stowmarket in the UK and Cork in Ireland.

DULUX TRADE VINYL MATT	
Density (kg/l)	1.427
Coverage (m^2/l)	17
Number of Layers	2
Total product used (kg/m^2)	0.168

A sensitivity analysis is performed to assess the representativeness of the representative product. The environmental impact results for the individual Dulux Trade Vinyl Matt products have a maximum positive 1180% difference for 1 of the individual Dulux Trade Vinyl Matt paints when compared with the representative product. This difference in only within the environmental impact category Photochemical Ozone Creation Potential (POCP) and is attributable to the VOC content of the paint.

ENVIRONMENTAL IMPACT per functional or declared unit

	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	[kg Sb-Eq.]	7.04 E-07	3.01 E-10	6.86 E-09	7.11 E-07	3.20 E-10	3.71 E-09	0	0	0	0	0	0	0	0	8.55 E-11	0	2.85 E-08	INA
ADPF	[MJ]	3.76 E+00	4.94 E-02	4.27 E-01	4.24 E+00	5.26 E-02	7.59 E-03	0	0	0	0	0	0	0	0	1.40 E-02	0	5.99 E-02	INA
GWP	[kg CO2-Eq.]	2.14 E-01	3.60 E-03	1.65 E-02	2.34 E-01	3.83 E-03	1.15 E-02	0	0	0	0	0	0	0	0	1.02 E-03	0	5.76 E-02	INA
ODP	[kg CFC11-Eq.]	2.05 E-08	1.03 E-11	2.59 E-09	2.31 E-08	1.06 E-16	8.24 E-11	0	0	0	0	0	0	0	0	2.82 E-17	0	5.60 E-10	INA
POCP	[kg ethene-Eq.]	9.45 E-05	1.57 E-06	1.15 E-05	1.08 E-04	1.56 E-06	7.22 E-02	0	0	0	0	0	0	0	0	4.15 E-07	0	2.96 E-06	INA
AP	[kg SO2-Eq.]	1.20 E-03	1.83 E-05	7.56 E-05	1.29 E-03	1.70 E-05	3.40 E-06	0	0	0	0	0	0	0	0	4.53 E-06	0	2.42 E-05	INA
EP	[kg $(PO_4)^3$ Eq.]	2.13 E-04	4.26 E-06	2.10 E-05	2.39 E-04	4.29 E-06	4.31 E-05	0	0	0	0	0	0	0	0	1.14 E-06	0	7.27 E-04	INA

ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources, GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; POCP = Formation potential of tropospheric ozone photochemical oxidants; AP = Acidification potential of land and water; EP = Eutrophication potential

RESOURCE USE per functional or declared unit

	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	5.60E-02	2.67E-03	1.75E-02	7.62E-02	2.91E-03	5.84E-05	0	0	0	0	0	0	0	0	7.77E-04	0	3.76E-06	INA
PERM	[MJ]	3.62E-03	1.12E-07	6.42E-03	1.00E-02	1.59E-11	1.12E-05	0	0	0	0	0	0	0	0	4.25E-12	0	9.13E-05	INA
PERT	[MJ]	5.97E-02	2.67E-03	2.39E-02	8.63E-02	2.91E-03	6.96E-05	0	0	0	0	0	0	0	0	7.77E-04	0	9.50E-05	INA
PENRE	[MJ]	4.22E+00	4.96E-02	4.74E-01	4.75E+00	5.28E-02	9.69E-03	0	0	0	0	0	0	0	0	1.41E-02	0	7.49E-02	INA
PENRM	[MJ]	1.17E-04	5.64E-11	7.24E-05	1.89E-04	0.00E+00	4.34E-08	0	0	0	0	0	0	0	0	0	0	9.16E-07	INA
PENRT	[MJ]	4.22E+00	4.96E-02	4.75E-01	4.75E+00	5.28E-02	9.69E-03	0	0	0	0	0	0	0	0	1.41E-02	0	7.49E-02	INA
SM	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
RSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
NSRF	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
FW	[m3]	2.91E-02	2.20E-04	5.79E-03	3.52E-02	2.22E-04	9.08E-05	0	0	0	0	0	0	0	0	5.93E-05	0	3.42E-03	INA

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

OUTPUT FLOWS AND WASTE CATEGORIES per functional or declared unit

	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	0	0	0	0	0	3.36E-03	0	0	0	0	0	0	0	1.68E-01	0	0	0	INA
NHWD	[kg]	0	0	1.36E-02	1.36E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
RWD	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
CRU	[kg]	0	0	0	0	0	4.66E-03	0	0	0	0	0	0	0	0	0	0	0	INA
MFR	[kg]	0	0	0	0	0	3.45E-03	0	0	0	0	0	0	0	0	0	0	0	INA
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
EEE	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
EET	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; ETE = Exported thermal energy

CALCULATION RULES

Cut off criteria

The only cut-off is considered in the installation stage (A5). The energy consumed during application, used for instance in spray applicators, has not been included due to its insignificance.

Data quality and data collection period

Specific data was collected from AkzoNobel though a questionnaire, including inquiries about paint characteristics and packaging, logistics data (e.g. transport), production information and end-of-life. The data collection period for specific data was the year 2018.

Data gaps (i.e. transport data) were covered with data from previous internal AkzoNobel LCA studies, concerning the same type of products (paints and coatings). Generic data (i.e. upstream acquisition and production of raw materials, energy generation, transport, waste treatment processes) was selected from different publicly available databases, such as Ecoinvent, ThinkStep and Plastics Europe. In the case of missing data, a relevant proxy was searched and adjusted to the corresponding unit process.

Allocation procedure

To allocate the emissions and inputs to the manufactured products, the decision-hierarchy in ISO 14044 is used (ISO 2006). It is not possible to sub-divide the site data into a more detailed level or find physical causalities between inputs and outputs, thus allocation is done based on mass, considering the annual production of paint product for each site. The paint production is basically a process of mixing ingredients and, therefore, the environmental impact is fairly to be related to the mass of the products.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

A1. Raw materials supply

This module considers the extraction and processing of all raw materials and energy which occur upstream to the Dulux Trade Vinyl Matt manufacturing process, as well as waste processing up to the end-of waste state.

A2. Transport of raw materials to manufacturer

This includes the transport distance of the raw materials to the manufacturing facility via road, boat and/or train.

Vinyl Matt			
Transport Type	Truck 1	Truck 2	Container ship coast
Distance (km)	234	115	35
Capacity	34-40 t ,60% payload	40-60 t, 60% payload	70% utilization factor
Bulk density of transported products	1427 kg/m^3	1427 kg/m^3	1427 kg/m^3

A3. Manufacturing

This module covers the manufacturing of the Dulux Trade Vinyl Matt paint and includes all processes linked to production such as storing, mixing, packing and internal transportation. Use of electricity, fuels and auxiliary materials in paint production is taken into account as well.

Data regarding paint production was provided for the manufacturing sites where the Dulux Trade Vinyl Matt paints are produced: Stowmarket in the United Kingdom and Cork, in Ireland. Furthermore, the specific transportation distances and transportation modes for raw materials, paint packaging and transportation to customer were collected from the AkzoNobel logistics department. Primary data and site-specific data were retrieved. An average electricity mix based on the corresponding production country electricity mixes was made. This average is calculated based on the fact that 3 of the Vinyl Matt paints are produced in Cork and the remaining paints are produced in Stowmarket. For electricity used the AkzoNobel electricity mix country models for 2017 were used for each of the countries where the production sites are located. For upstream (raw material processes) and downstream processes (application, use, and waste processing) generic data is used when no specific data is obtained.

The construction site data includes lighting, heating, offices, etc. The manufacture of production equipment and infrastructure is not included in the system boundary.

Packaging-related flows in the production process and all up-stream packaging are included in the manufacturing module. For the end-of-life packing of the paints a landfill scenario is assumed.

A4. Transport to Regional Distribution Centre and customer

All paint containers are transported from the Stowmarket and Cork manufacturing facilities into a distribution centre and then finally to the customer.

	Transport from factory to RDC	Transport from RDC to customer
Transport Type	Truck 1	Truck 2
Distance (km)	184	202
Capacity	34-40 t ,60% payload	40-60 t, 60% payload
Bulk density of transported products	1427 kg/m^3	1427 kg/m^3

A5. Application and use

This module includes the environmental aspects and impacts associated with the application and of the paint. It is assumed that no energy is required during the application of this paint. The use of paintbrushes and other appliances used during application are not included There are some raw materials added in the paint formulations which contain small amounts of solvents. The VOC emissions during application of paint are included in this module.

C2. Transport to incineration or landfill

This module includes one-way transportation distance of the demolition or sorting site to the dump site.

PARAMETER	TRANSPORT TO WASTE PROCESSING
Vehicle type	Truck 34t-40t payload average fleet
Distance	100 km
Capacity utilisation	60%
Bulk density of transported products	1427 kg/m^3

C3. Waste processing and C4. Disposal

The end of life stage is encompassed in these modules. It is assumed that paint is used as interior paint and exterior paint. In both cases, it is assumed that part of the paint is lost during application and the rest is applied.

CLASSIFICATION OF PAINT, BASED ON FUNCTION	% SOLD PAINT IN WALLS > 100 YEARS	% OF SOLD PAINT TO LANDFILLED	% OF SOLD PAINT TO INCINERATION
Interior Masonry Wall	70.4%	9.6%	20%
Exterior, Trim and other paints	88.0%	12.0%	0.0%

The main difference between interior and exterior paint is that for interior paints it is assumed that a percentage (20%) of the applied paint stays for more than 100 years. This is not valid for exterior paint because it is assumed that the polymer in exterior conditions will be flaking and finally disposed away.

ADDITIONAL INFORMATION ON ENVIRONMENTAL IMPACTS

The CML-IA methods do not have characterization factors for the “unspecified VOC” emission flow in the Global Warming Potential environmental impact category. However, VOCs are known to have influence in this category. In order to include the impacts of the VOCs and align with current practice of AkzoNobel, it was decided to calculate the VOC impact on Global Warming Potential separately. The Global Warming Potential impact category has been modified, adding a generic factor of 8 KgCO2-eq/kg VOC, which is in line with AkzoNobel characterisation factors for carbon reporting.

	UNIT	A1	A2	A3	A4	A5	C2	C4
Global Warming potential (GWP 100 years)	[kg CO2-Eq.]	2.1H4 E-01	3.60E-03	1.65E-02	3.83E-03	1.15E-02	1.02E-03	5.76E-02
Global Warming potential (GWP 100 years) including VOC characterization factor	[kg CO2-Eq.]	2.14E-01	3.60E-03	1.65E-02	3.83E-03	2.19E+00	1.02E-03	5.76E-02

DECLARATION OF SVHC

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, or they do not exceed the threshold with the European Chemicals Agency.

REFERENCES

- EN 15804:2012+A1:2013 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products, of 11/2013.
- ISO 14040/14044 on Life Cycle Assessments
- Murgett P., 2018. Personal communication with Paul Murgett, Sustainability Marketing Manager AkzoNobel Decorative Paints, UK (2018).
- Thinkstep GaBi Software-System and Database for Life Cycle Engineering. Copyright 1992-2017 ThinkStep AG.

REMARKS

None