MRPI®-EPD STICHTING MRPI

PROGRAMME OPERATOR

Stichting MRPI®
Zuid-Hollandlaan 7
2596AL
Den Haag

COMPANY INFORMATION

AkzoNobel Decorative Paints
The AkzoNobel Building
Wexham Road
Slough
SL2 5DS England
0333 222 70 70
https://www.akzonobel.com/

PRODUCT

Dulux Trade Weathershield Smooth Masonry

MRPI®-REGISTRATION

1.1.00010.2017

EPD-REGISTRATION

00000555

DATE OF ISSUE

04-09-2017

DATE OF EXPIRY

04-09-2022

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 for use on most exterior masonry and rendering

MORE INFORMATION:

https://www.duluxtradepaintexpert.co.uk/products/dulux-trade/weathershield-smooth-masonry-paint

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 10 product paints belonging to the Dulux Trade Weathershield Smooth Masonry range:

1. Dulux Trade Weathershield Smooth Masonry Paint Pure Brilliant White
2. Dulux Trade Weathershield Smooth Masonry Paint Light Base
3. Dulux Trade Weathershield Smooth Masonry Paint Medium Base
4. Dulux Trade Weathershield Smooth Masonry Paint Extra Deep Base
5. Dulux Trade Weathershield Smooth Masonry Paint Magnolia
6. Dulux Trade Weathershield Smooth Masonry Paint Black
7. Dulux Trade Weathershield Smooth Masonry Paint Gardenia
8. Dulux Trade Weathershield Smooth Masonry Paint Sandstone
9. Dulux Trade Weathershield Smooth Masonry Paint County cream
10. Dulux Trade Weathershield Smooth Masonry Paint Buttermilk

Dulux Trade Weathershield Smooth Masonry Paint is an exterior quality emulsion paint based on all acrylic resin. It contains a fungicide to inhibit mould growth on the paint film and help it stay cleaner for longer. It is particularly suitable for use in changeable weather and is shower resistant within 30 minutes after application.

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

***> 1% TOTAL MASS**

VOC EU limit value for this product (cat.: A/c): 40g/l (2010). This product contains max 1g/l VOC. VOC Content Minimal (0-0.29%)

Typical Use
Ideal for use on most exterior masonry and rendering (including concrete, roughcast, pebbledash and brickwork which is normally suitable for painting, such as rustic or sand faced bricks).

Application Method
Brush, roller, conventional spray or airless spray. Do not use in extremes of temperatures (below 7ºC) or during rain, fog or relative humidity above 80%.

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 declaration does not imply an indicator result of zero. This EPD is representative for products produced and sold in the UK. The paint is produced in Stowmarket and Slough in the UK and the application market is also 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 6 Professional is used to perform the LCA. The background databases used are:

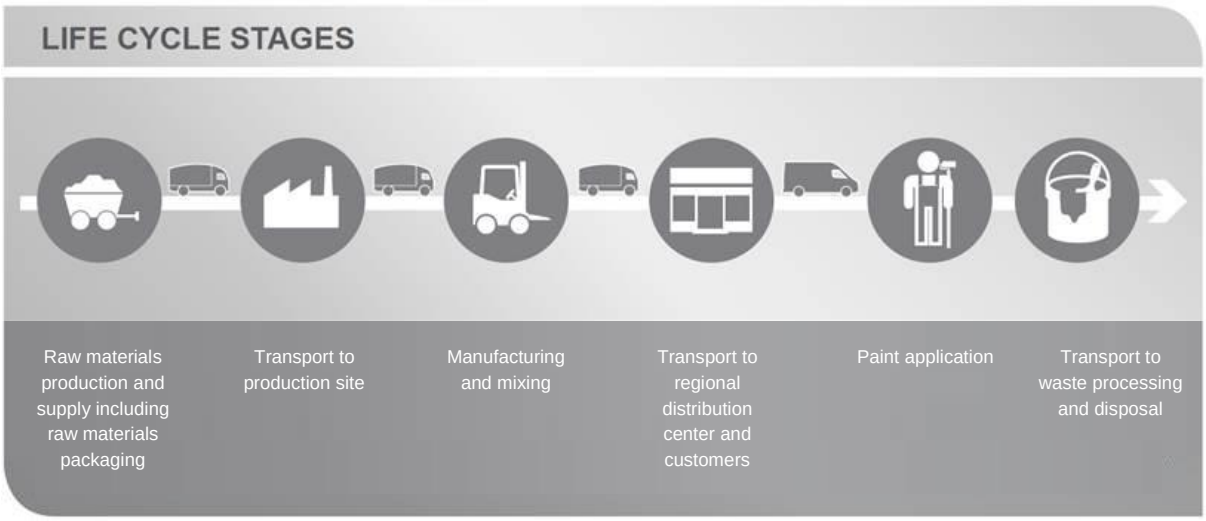
- Ecoinvent (2008)
- GaBi Professional Database (GaBi ts database, version 6.115)
- Plastics Europe (2006)

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 major steps from the extraction of natural resources to the final disposal of the product are included in the scope of the study. 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 7 products within the Dulux Trade Weathershield Smooth Masonry range:

1. Dulux Trade Weathershield Smooth Masonry Paint Pure Brilliant White
2. Dulux Trade Weathershield Smooth Masonry Paint Light Base
3. Dulux Trade Weathershield Smooth Masonry Paint Medium Base
4. Dulux Trade Weathershield Smooth Masonry Paint Extra Deep Base
5. Dulux Trade Weathershield Smooth Masonry Paint Magnolia
6. Dulux Trade Weathershield Smooth Masonry Paint Black
7. Dulux Trade Weathershield Smooth Masonry Paint Gardenia

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

DULUX TRADE WEATHERSHIELD SMOOTH MASONRY	
Density (kg/l)	1.346
Coverage (m^2/l)	10
Number of Layers	2
Total product used (kg/m^2)	0.269

A sensitivity analysis is performed to assess the representativeness of the representative product. The environmental impact results for the individual Dulux Trade Weathershield Smooth Masonry products have a maximum positive 10% difference when compared with the representative product, within a particular impact category.

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.]	1.61 E-06	3.95 E-10	1.49 E-08	1.62E-06	3.85 E-10	5.95 E-09	0	0	0	0	0	0	0	0	1.11 E-10	0	5.70 E-08	INA
ADPF	[MJ]	6.29 E+00	8.03 E-02	9.00 E-01	7.27E+00	7.86 E-02	1.24 E-02	0	0	0	0	0	0	0	0	2.27 E-02	0	1.20 E-01	INA
GWP	[kg CO_2-Eq.]	3.55 E-01	5.84 E-03	5.33 E-02	4.14E-01	5.72 E-03	1.89 E-02	0	0	0	0	0	0	0	0	1.65 E-03	0	1.21 E-01	INA
ODP	[kg CFC11-Eq.]	4.39 E-08	1.64 E-11	5.25 E-09	4.92E-08	2.62 E-14	1.36 E-10	0	0	0	0	0	0	0	0	7.58 E-15	0	1.12 E-09	INA
POCP	[kg ethene-Eq.]	1.98 E-04	2.58 E-06	2.49 E-05	2.26E-04	2.36 E-06	1.52 E-05	0	0	0	0	0	0	0	0	6.82 E-07	0	5.93 E-06	INA
AP	[kg SO_2-Eq.]	2.16 E-03	3.06 E-05	1.41 E-04	2.33E-03	2.64 E-05	5.58 E-06	0	0	0	0	0	0	0	0	7.64 E-06	0	4.85 E-05	INA
EP	[kg $(PO_4)^{3-}$-Eq.]	5.00 E-04	6.95 E-06	7.13 E-05	5.78E-04	6.45 E-06	7.09 E-05	0	0	0	0	0	0	0	0	1.86 E-06	0	1.46 E-03	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; HTP = Human Toxicity Potential; FAETP = Fresh-water Aquatic Ecotoxicity Potential; MAETP = Marine Aquatic Ecotoxicity Potential; TETP = Terrestrial Ecotoxicity 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]	2.23 E-02	4.46 E-03	1.04 E-02	3.72E-02	4.47 E-03	9.92 E-05	0	0	0	0	0	0	0	0	1.29 E-03	0	2.02 E-07	INA
PERM	[MJ]	4.50 E-03	1.79 E-07	4.90 E-04	4.99E-03	6.78 E-15	1.79 E-05	0	0	0	0	0	0	0	0	1.96 E-15	0	1.83 E-04	INA
PERT	[MJ]	2.68 E-02	4.46 E-03	1.09 E-02	4.22E-02	4.47 E-03	1.17 E-04	0	0	0	0	0	0	0	0	1.29 E-03	0	1.83 E-04	INA
PENRE	[MJ]	6.99 E+00	8.06 E-02	9.98 E-01	8.07E+00	7.89 E-02	1.58 E-02	0	0	0	0	0	0	0	0	2.28 E-02	0	1.50 E-01	INA
PENRM	[MJ]	2.19 E-04	9.00 E-11	4.49 E-05	2.64E-04	0	6.96 E-08	0	0	0	0	0	0	0	0	0	0	1.84 E-06	INA
PENRT	[MJ]	6.99 E+00	8.06 E-02	9.98 E-01	8.07E+00	7.89 E-02	1.58 E-02	0	0	0	0	0	0	0	0	2.28 E-02	0	1.50 E-01	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	[m^3]	1.37 E-01	3.89 E-04	3.78 E-03	1.41E-01	3.64 E-04	1.48 E-04	0	0	0	0	0	0	0	0	1.05 E-04	0	6.85 E-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	3.99 E-04	3.99E-04	0	5.38 E-03	0	0	0	0	0	0	0	2.69 E-01	0	0	0	INA
NHWD	[kg]	0	0	1.78 E-02	1.78E-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	7.71 E-06	0	0	0	0	0	0	0	0	0	0	0	INA
MFR	[kg]	0	0	0	0	0	5.81 E-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 2016.

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 Weathershield Smooth Masonry 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.

PARAMETER	TRANSPORT TO STOWMARKET		
Vehicle type	Lorry 34t-40 payload average fleet	Truck 40t-60t payload average fleet	Container ship coast
Distance	233 km	115 km	35 km
Capacity utilisation	60%	60%	70%
Bulk density of transported products	1012.5 kg/m^3	1012.5 kg/m^3	1012.5 kg/m^3

PARAMETER	TRANSPORT TO SLOUGH		
Vehicle type	Lorry 34t-40 payload average fleet	Truck 40t-60t payload average fleet	Container ship coast
Distance	266 km	128 km	35 km
Capacity utilisation	60%	60%	70%
Bulk density of transported products	1012.5 kg/m^3	1012.5 kg/m^3	1012.5 kg/m^3

A3. Manufacturing

This module covers the manufacturing of the Dulux Trade Weathershield Smooth Masonry 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 Weathershield Smooth Masonry paints are produced: Stowmarket and Slough, in United Kingdom. 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. For power used at the UK site, the country electricity mix for the year 2015 was chosen. 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 Slough manufacturing facilities into a distribution centre and then finally to the customer.

PARAMETER	STOWMARKET TO RDC	RDC TO CUSTOMER
Vehicle type	Truck 40t-60t payload average fleet	Lorry 34t-40 payload average fleet
Distance	142 km	200 km
Capacity utilisation	60%	60%
Bulk density of transported products	1290.5 kg/m^3	1290.5 kg/m^3

PARAMETER	SLOUGH TO RDC	RDC TO CUSTOMER
Vehicle type	Truck 40t-60t payload average fleet	Lorry 34t-40 payload average fleet
Distance	250 km	227 km
Capacity utilisation	60%	60%
Bulk density of transported products	1290.5 kg/m^3	1290.5 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	1290.5 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.]	3.55 E-01	5.84 E-03	5.33 E-02	5.72 E-03	1.89 E-02	1.65 E-03	1.21 E-01
Global Warming potential (GWP 100 years) including VOC characterization factor	[kg CO2-Eq.]	3.55 E-01	5.84 E-03	5.35 E-02	5.72 E-03	1.93 E-02	1.65 E-03	1.21 E-01

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
- Arendorf, J., 2017. Personal communication with Josephine Arendorf, AkzoNobel Decorative Paints, UK.
- Howard, P., 2013. Personal communication with Peter Howard, AkzoNobel Decorative Paints, UK.
- Dawson, G., 2013. Personal communication with Gordon Dawson, AkzoNobel Decorative Paints, UK.
- Cornish, D. 2013. Personal communication with David Cornish, AkzoNobel Decorative Paints, UK.
- Thinkstep GaBi Software-System and Database for Life Cycle Engineering. Copyright 1992-2017 thinkstep AG.

REMARKS

None