Environmental Product Declaration

according to ISO 14025 and EN 15804

MRPI
milieu relevante product informatie

This declaration is for:
Dulux Trade Metalshield Gloss

Provided by:
AkzoNobel Decorative Paints

Dulux TRADE



program operator
Stichting MRPI®
publisher
Stichting MRPI®
www.mrpi.nl

MRPI® registration
1.1.00372.2022
date of first issue
04-09-2017
date of this issue
11-11-2022
expiry date
11-11-2027

ECO PLATFORM
EPD
VERIFIED

COMPANY INFORMATION

AkzoNobel Decorative Paints
Wexham Road
SL2 5DS
Slough, England
0333 222 70 70

https://www.akzonobel.com

PRODUCT

Dulux Trade Metalshield Gloss

DECLARED UNIT/FUNCTIONAL UNIT

All impacts are calculated using the declared unit "decoration of 1 m² of surface"

DESCRIPTION OF PRODUCT

Metalshield Gloss from Dulux Trade is specially formulated for metal with a quick drying formulation that can be overcoated within 4-8 hours

VISUAL PRODUCT



MRPI® REGISTRATION

1.1.00372.2022

DATE OF ISSUE

11-11-2022

EXPIRY DATE

11-11-2027

MORE INFORMATION

https://www.duluxtradepaintexpert.co.uk/en/products/dulux-trade-metalshield-gloss

SCOPE OF DECLARATION

This MRPI®-EPD certificate is verified by **ing. Kamiel Jansen, Aveco de Bondt.**
The LCA study has been done by **Mart van Assem & Jur Remeijn, Ecomatters.**
The certificate is based on an LCA-dossier according to ISO14025 and EN15804+A2. It is verified according to the 'MRPI®-EPD verification protocol November 2020.v4.0'. EPDs of construction products may not be comparable if they do not comply with EN15804+A2. Declaration of SVHC that are listed on the 'Candidate List of Substances of Very High Concern for authorisation' when content exceeds the limits for registration with ECHA.

PROGRAM OPERATOR

Stichting MRPI®
Kingsfordweg 151
1043GR
Amsterdam

ir. J-P den Hollander, Managing director MRPI®

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: X
Third party verifier: ing. Kamiel Jansen, Aveco de Bondt
[a] PCR = Product Category Rules

DETAILED PRODUCT DESCRIPTION

Metalshield Gloss from Dulux Trade is specially formulated for metal with a quick drying formulation that can be overcoated within 4-8 hours. It provides lasting protection against corrosion on metal substrates such as railings, garage doors, lift shafts, staircases and emergency exit routes.

*Applying our straightforward, single-pack system: an appropriate Metalshield primer from Dulux Trade + 2 coats of Metalshield Gloss from Dulux Trade will deliver up to 8 years metal protection

Typical Use

Suitable for use on interior and exterior ferrous & non-ferrous metals. Not suitable for use in high traffic areas such as floors and stair treads

Application Method

Brush or roller only. For Health & Safety reasons related to all solvent-based paints, spray application is not recommended.

As with other solvent-based paints, do not apply in temperatures below 5°C (as recommended by British Standard BS 6150).

Pack Size

The products are packed in packaging with a capacity of 1L, 2,5L and 5L.

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.

COMPONENT >1% of total mass	[kg / %]
Pigments	Confidential
Binder	Confidential
Solvent	Confidential

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 in the UK and EU. The paint is produced in Pilawa, Poland and the application market is for customers in the UK. Likewise, for the end-of-life, the fate of the paint product is described within an UK and EU context.

The software GaBi 10.5.1.124 Professional is used to perform the LCA. In the model Ecoinvent 3.8 database was used.

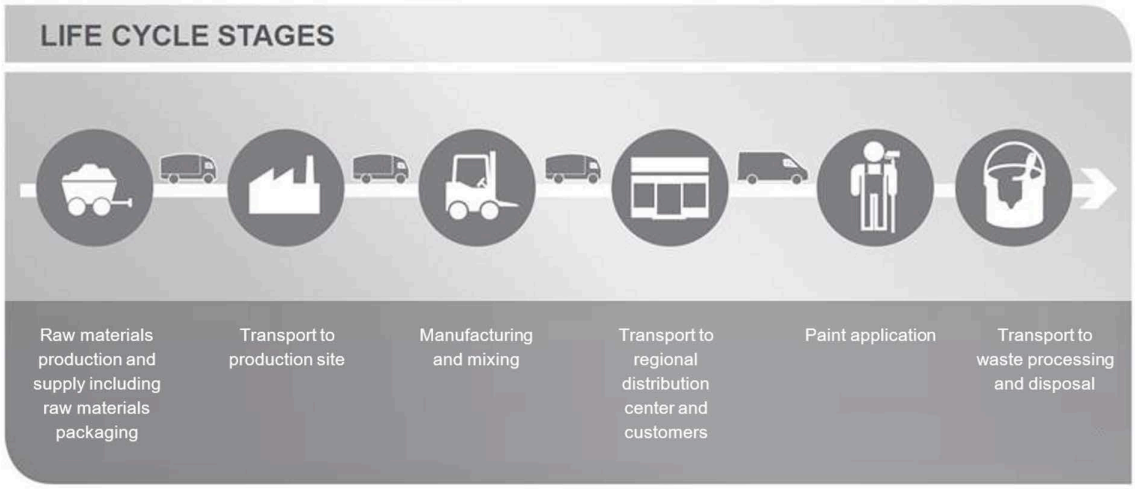
The validity of this EPD is in correspondence with the specifications of the LCA project report.

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. The emissions and resource extractions derived from these processes are considered elementary exchanges between the product systems and the environment.

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	Refurbishment	Operational energy use	Operational water use	De-construction demolition	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	x

X = Modules Assessed

ND = Not Declared



LCA process diagram according to EN 15804 (7.2.1)

REPRESENTATIVENESS

This EPD is representative for the 4 paint products belonging to the Dulux Trade Metalshield Gloss:

1. Dulux Trade Metalshield Gloss Black
2. Dulux Trade Metalshield Gloss White
3. Dulux Trade Metalshield Gloss Silver
4. Dulux Trade Metalshield Gloss Extra Deep Base

This EPD is representative for the products manufactured in Poland and sold in the UK. The paint is produced at one production site: Pilawa, Poland

ENVIRONMENTAL IMPACT per functional unit or declared unit (core indicators A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
GWP-total	kg CO2 eq.	-9.48 E-3	6.10 E-3	4.96 E-2	4.62 E-2	9.55 E-3	2.73 E-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.04 E-3	0.00	2.41 E-1	0.00
GWP-fossil	kg CO2 eq.	1.89 E-1	6.08 E-3	6.87 E-2	2.63 E-1	9.52 E-3	2.67 E-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.04 E-3	0.00	4.21 E-2	0.00
GWP-biogenic	kg CO2 eq.	-1.98 E-1	2.22 E-5	-1.91 E-2	-2.17 E-1	3.48 E-5	5.60 E-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.80 E-6	0.00	1.99 E-1	0.00
GWP-luluc	kg CO2 eq.	2.88 E-4	2.27 E-6	2.97 E-5	3.20 E-4	3.56 E-6	6.98 E-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.88 E-7	0.00	7.61 E-7	0.00
ODP	kg CFC11 eq.	6.70 E-8	1.46 E-9	1.20 E-9	6.97 E-8	2.29 E-9	1.12 E-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50 E-10	0.00	3.08 E-10	0.00
AP	mol H+ eq.	1.36 E-3	3.09 E-5	2.62 E-4	1.66 E-3	4.84 E-5	5.60 E-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.28 E-6	0.00	9.90 E-6	0.00
EP-freshwater	kg P eq.	6.13 E-5	3.82 E-7	1.90 E-5	8.07 E-5	5.97 E-7	2.32 E-7	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6.52 E-8	0.00	1.17 E-7	0.00
EP-marine	kg N eq.	1.25 E-3	1.06 E-5	5.30 E-5	1.31 E-3	1.66 E-5	3.05 E-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.81 E-6	0.00	3.82 E-6	0.00
EP-terrestrial	mol N eq.	2.96 E-3	1.16 E-4	5.19 E-4	3.59 E-3	1.82 E-4	1.90 E-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.98 E-5	0.00	4.19 E-5	0.00
POCP	kg NMVOC eq.	1.02 E-3	3.47 E-5	1.63 E-4	1.22 E-3	5.42 E-5	1.45 E-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.92 E-6	0.00	1.14 E-5	0.00
ADP-minerals & metals	kg Sb eq.	6.35 E-7	1.41 E-8	4.90 E-8	6.98 E-7	2.20 E-8	2.83 E-8	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.40 E-9	0.00	2.64 E-9	0.00
ADP-fossil	MJ, net calorific value	5.34 E+0	9.59 E-2	8.25 E-1	6.26 E+0	1.50 E-1	9.71 E-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64 E-2	0.00	2.27 E-2	0.00
WDP	m3 world eq. deprived	2.37 E+0	4.88 E-4	2.07 E-2	2.39 E+0	7.64 E-4	1.59 E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.34 E-5	0.00	9.99 E-4	0.00

GWP-total = Global Warming Potential total
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 Exceedence
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 Exceedence
POCP = Formation potential of tropospheric ozone photochemical oxidants
ADP-minerals&metals = Abiotic Depletion Potential for non fossil resources [2]
ADP-fossil = Abiotic Depletion for fossil resources potential [2]
WDP = Water (user) deprivation potential, deprivation-weighted water consumption [2]

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.

ENVIRONMENTAL IMPACT per functional unit or declared unit (additional indicators A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PM	Disease incidence	1.78 E-8	5.64 E-10	2.21 E-9	2.06 E-8	8.83 E-10	7.95 E-11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.64 E-11	0.00	1.51 E-10	0.00
IRP	kBq U235 eq.	2.73 E-2	4.83 E-4	1.83 E-3	2.97 E-2	7.56 E-4	5.91 E-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.26 E-5	0.00	9.49 E-5	0.00
ETP-fw	CTUe	1.38 E+1	7.74 E-2	4.36 E-1	1.43 E+1	1.21 E-1	1.40 E-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32 E-2	0.00	2.30 E-2	0.00
HTP-c	CTUh	2.47 E-10	2.06 E-12	5.98 E-11	3.09 E-10	3.23 E-12	7.15 E-12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.52 E-13	0.00	5.35 E-11	0.00
HTP-nc	CTUh	1.20 E-8	7.08 E-11	8.17 E-10	1.29 E-8	1.11 E-10	3.20 E-9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21 E-11	0.00	1.70 E-10	0.00
SQP	---	3.25 E+1	1.09 E-1	1.79 E+0	3.44 E+1	1.71 E-1	1.39 E-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.87 E-2	0.00	4.06 E-2	0.00

PM = Potential incidence of disease due to PM emissions
IRP = Potential Human exposure efficiency relative to U235 [1]
ETP-fw = Potential Comparative Toxic Unit for ecosystems [2]
HTP-c = Potential Comparative Toxic Unit for humans [2]
HTP-nc = Potential Comparative Toxic Unit for humans, non-cancer [2]
SQP = Potential soil quality index [2]

Disclaimer [1]

- This impact category deals mainly with the eventual impact of low dose ionizing 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 ionizing 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.

RESOURCE USE per functional unit or declared unit (A1 / A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	MJ	3.03 E+0	1.22 E-3	2.56 E-1	3.28 E+0	1.91 E-3	5.92 E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09 E-4	0.00	2.64 E-4	0.00
PERM	MJ	1.61 E-5	5.69 E-10	1.47 E-4	1.63 E-4	8.91 E-10	1.95 E-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.73 E-11	0.00	4.37 E-10	0.00
PERT	MJ	3.03 E+0	1.22 E-3	2.56 E-1	3.28 E+0	1.91 E-3	5.92 E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09 E-4	0.00	2.64 E-4	0.00
PENRE	MJ	5.34 E+0	9.59 E-2	8.25 E-1	6.26 E+0	1.50 E-1	9.71 E-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64 E-2	0.00	2.27 E-2	0.00
PENRM	MJ	1.90 E-6	0.00	1.85 E-9	1.90 E-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PENRT	MJ	5.35 E+0	9.59 E-2	8.26 E-1	6.28 E+0	1.50 E-1	9.72 E-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.64 E-2	0.00	2.27 E-2	0.00
SM	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
RSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NRSF	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FW	m3	5.51 E-2	1.14 E-5	4.97 E-4	5.56 E-2	1.78 E-5	3.70 E-6	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.94 E-6	0.00	2.33 E-5	0.00

PERE = Use of renewable energy excluding renewable primary energy resources
PERM = Use of renewable energy resources used as raw materials
PERT = Total use of renewable primary energy resources
PENRE = Use of non-renewable primary energy resources excluding non-renewable 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 materials
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 unit or declared unit (A1 / A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	kg	0.00	0.00	5.47 E-4	5.47 E-4	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
NHWD	kg	0.00	0.00	2.39 E-3	2.39 E-3	0.00	1.65 E-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.44 E-1	0.00
RWD	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CRU	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MFR	kg	0.00	0.00	0.00	0.00	0.00	9.21 E-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
MER	kg	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
EEE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ETE	MJ	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

HWD = Hazardous Waste Disposed
NHWD = Non Hazardous Waste Disposed
RWD = Radioactive Waste Disposed
CRU = Components for reuse
MFR = Materials for recycling
MER = Materials for energy recovery
EEE = Exported Electrical Energy
ETE = Exported Thermal Energy

BIOGENIC CARBON CONTENT per functional unit or declared unit (A1 / A2)

	UNIT	A1	A2	A3	A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
BCCpr	kg C	-5.41 E-2	0.00	0.00	-5.41 E-2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.41 E-2	0.00
BCCpa	kg C	0.00	0.00	-3.29 E-3	-3.29 E-3	0.00	3.29 E-3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

BCCpr = Biogenic carbon content in product
BCCpa = Biogenic carbon content in packaging

CALCULATION RULES

Cut off criteria

The cut-off is considered in the raw material supply stage (A1). Cut-off of inputs comprises of the raw materials, for which no appropriate proxies were found. In this study there were no cut-off inputs. The energy consumed during application, used for instance in spray applicators, has not been included due to its insignificance. For recycling of waste packaging material (metal and plastic), a cut-off approach was followed. The cut-off point is chosen to be the end of waste treatment.

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 2022.

Data gaps (i.e. transport data, end of life scenarios) were covered with data generic values for transport as described in the Product Environmental Footprint Category Rules - Decorative Paints document version 1.0 published by CEPE and reviewed in April 2018. Further data gaps (i.e. end-of-life transport data) were covered with data from 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 Ecoinvent 3.8 database. 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.

Parameter	Unit	Value
VOC content	g/l	400.9
Density	kg/l	0.93462
Coverage	m2/l	13
Number of layers	Quantity	2
Total product used	kg/m2	0.144

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 Metalshield Gloss 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.

Vehicle type used for transport	Truck
Distance, km	460
Capacity	>32 t ,64% payload
Bulk density of transported products, kg/m3	1441 kg/m3

A3. Manufacturing

This module covers the manufacturing of the Dulux Trade Metalshield Gloss 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 site where the Dulux Trade Metalshield Gloss is produced: Pilawa, Poland. 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 electricity sources (standard market mix, Poland, with 12.97% from renewable sources) the Ecoinvent 3.8 dataset was used. 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.

A4. Transport to Regional Distribution Centre and customer

All paint containers are transported from the production facility into a distribution centre and then finally to the customer. On average, the transport characteristics for this life cycle stage are the following

Coatings transport type	Transport from factory to RDC	Transport from RDC to PoS
Transport Type	Truck	Truck
Distance (km)	350	370
Capacity	>32 t, 64% payload	>32 t, 64% payload
Bulk density of transported products	1441 kg/m3	1441 kg/m3

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.

End-of-life transport type	Transport to waste processing
Vehicle type	Truck 34t-40t payload average fleet
Distance	80 km
Capacity utilisation	60%
Bulk density of transported products	1040 kg/m3

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	% of sold paint to landfill	% of sold paint to incineration
Interior Masonry Wall	88%	12%
Exterior, Trim and other paints	88%	12%

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+A2:2019 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products, of 2019.

• ISO 14040/14044 on Life Cycle Assessments

• Product Environmental Footprint Category Rules - Decorative Paints version 1.0, 2018. Developed by the Technical Secretariat Decorative Paints of the European Council of the Paint, Printing Ink and Artists' Colours Industry.

• Willener, Y, 2022. Personal communication with Yasmine Willener, Commercial Strategy & Planning Project Manager, Akzo Nobel Decorative Paints, UK.

• Thinkstep GaBi Software-System and Database for Life Cycle Engineering. Copyright 1992-2018 ThinkStep AG.

• Wernet, G., Bauer, C., Steubing, B., Reinhard, J., Moreno-Ruiz, E., and Weidema, B., 2016. The ecoinvent database version 3 (part I): overview and methodology. The International Journal of Life Cycle Assessment, [online] 21(9), pp.1218–1230. Available at: <http://link.springer.com/10.1007/s11367-016-1087-8> [Accessed 21 12 2021.]

REMARKS

None