Statement of Verification

BREG EN EPD No.: 000435 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

Crown Paints Ltd

is in accordance with the requirements of:

EN 15804:2012+A2:2019

and

BRE Global Scheme Document SD207

This declaration is for:

Crown Trade Matt Vinyl Emulsion

Company Address

Crown Paints Ltd
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Hollins Road
Darwen
BB3 0BG
United Kingdom

Signed for BRE Global Ltd	Emma Baker Operator	14 October 2022 Date of this Issue
14 October 2022 Date of First Issue		13 October 2027 Expiry Date

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Environmental Product Declaration

EPD Number: 000435

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Global Product Category Rules (PCR) for Type III environmental product declaration of construction products to EN 15804+A2 PN 514 Rev 3.0
Commissioner of LCA study	**LCA consultant/Tool**
Crown Paints Ltd Crown House Hollins Road Darwen BB3 0BG United Kingdom	Will Schreiber &Xana Villa Garcia 3Keel LLP 7 Fenlock Court Blenheim Business Park Long Hanborough Oxfordshire OX29 8LN United Kingdom www.3keel.com
Declared Unit	**Applicability/Coverage**
1 m^2 coverage of substrate for one coat of paint	Product Average.
EPD Type	**Background database**
Cradle to Gate with options	Ecoinvent 3.7.1

Demonstration of Verification
CEN standard EN 15804 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: Nigel Jones
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A2:2019. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A2:2019 for further guidance.

Information modules covered

Product			Construction		Use stage							End-of-life					Benefits and loads beyond the system boundary
					Related to the building fabric					Related to the building							
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☑	☑	☑	☑	☑	☐	☐	☐	☐	☐	☐	☐	☑	☑	☑	☑		☑

Note: Ticks indicate the Information Modules declared.

Manufacturing site(s)

Crown Paints Ltd
Sculcoates Lane
Hull
HU5 1RU
United Kingdom

Construction Product

Product Description

Crown Trade Matt Vinyl Emulsion is a premium quality matt emulsion for use on interior walls and ceilings, where a flat non-reflective finish is required.

Technical Information

Property	Value, Unit
Spreading Rate	17.2 m^2 per litre
VOC content	0.02 g per litre

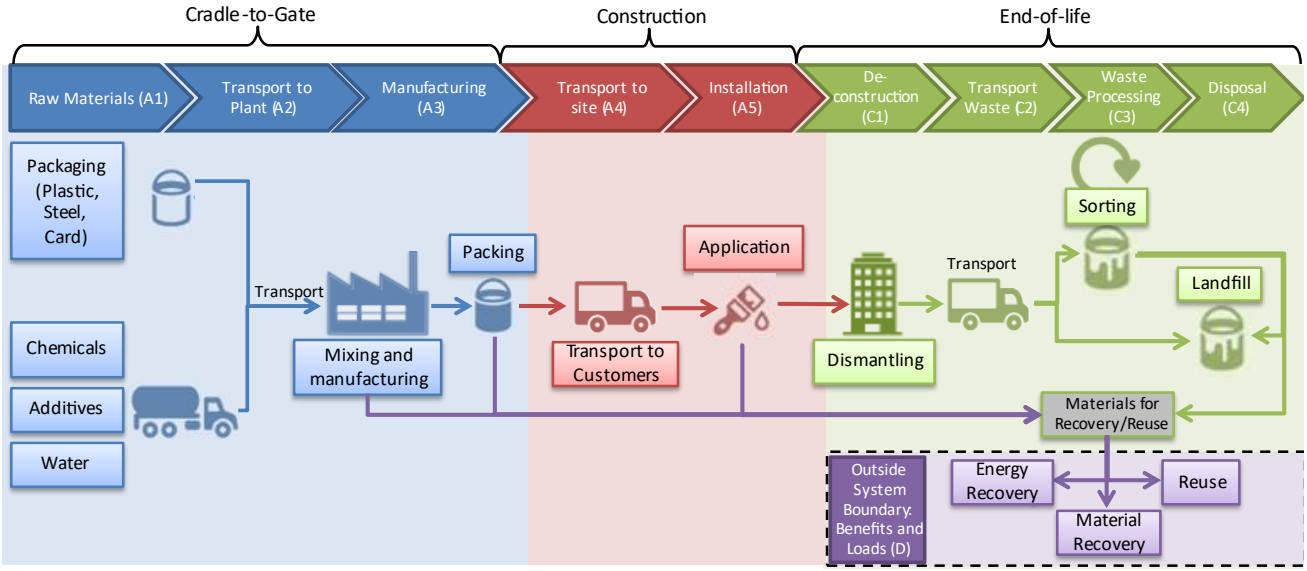
Main Product Contents

Material/Chemical Input	%
Solvent/Water	43%-52%
Pigment and Binder	36%-54%
Additives	2%-6%

Manufacturing Process

The manufacturing process for paint involves combining and mixing multiple chemicals and materials into a single homogenous product. The product is them packaged and distributed to trade outlets.

Process flow diagram



Construction Installation

All surfaces must be sound, clean, suitably dry and free from anything that will interfere with the adhesion of the materials to be applied.

Apply all products in accordance with BS 6150: Code of practice for painting of buildings and BS 8000: Part 12: Code of practice for decorative wall coverings and painting. Stir well before use. Apply by brush or medium roller.

Use Information

Module not declared.

End of Life

Coatings are typically disposed of with the substrate they are painted on. Dried paint film is not currently recycled, the coating itself is unlikely to be separated from the substrate during disposal and they are treated together as construction waste. Most construction waste is first sent to recovery where it is sorted, the remainder is sent directly to landfill. Sorted waste is assumed to be sent to landfill rather than to incineration, because dry paint film is integrated with a mineral substrate (no energy content).

Life Cycle Assessment Calculation Rules

Declared unit description

The Declared Unit (DU) is one square metre (m^2) coverage of substrate with one coat of paint. This is equivalent to 79.7 grams of Crown Trade Matt Vinyl Emulsion. The results are weighted averages of all shades and sizes of paint analysed.

System boundary

The system boundaries of the product LCA follow the modular design defined by EN15804. This cradle-to-gate with options study includes the Product stage (A1 – A3), Transport stage (A4), Installation stage (A5), Dismantling (C1), End-of-life transport (C2), Waste Treatment (C3), Disposal (C4), and Benefits/loads beyond system boundary (D).

Data sources, quality and allocation

Crown Paints primary data was used for all internal processes. The products included in the product group presented in this EPD are 901, 902, 905, 906, Black, Brilliant White, Magnolia, Soft White and White shades packaged in 2.5, 5, 6, 7.5, and 10 litre containers. The different products were combined using production volumes to obtain a weighted average of impacts for all shades and pack sizes.

Product Name	Shade	Production Volume
Crown Trade Matt Vinyl Emulsion (MT)	901	15%
	902	22%
	904	3%
	906	3%
	Black	1%
	Brilliant White	7%
	Soft White	<1%
	Magnolia	9%
	White	39%

Data provided directly by Crown were collated under EN15084 guidelines to ensure cut-off criteria and other LCA requirements were met. Data were sense-checked against published data for similar products and other secondary sources. Data questions arising during the analysis were satisfactorily answered by technical experts at Crown.

Site wide, 2020 data were received for manufacturing and physically allocated, on a per litre basis, to the paint produced during the period.

Secondary characterisation and resource use factors were obtained from the Ecoinvent 3.7.1 database for life cycle modelling up and down the supply chain. Additional data used were as follows:

- Data from published EPD to estimate amounts of plastic sheeting used during paint application;
- Data from Plastics Europe to determine the impacts from polypropylene primary packaging;
- End of life reuse and disposal stream rates are listed on the basis of Crown knowledge and recent data from reliable sources;
- Substrate disposal reuse and disposal streams are made on the basis of UK construction industry recycling statistics from Defra´s UK Statistics on Waste (2015) Table 3.1: Recovery rate from non-hazardous Construction and demolition waste 2010-2012, and end-of-life scenarios from the PEFCR for Decorative Paints.

Overall, data received were technologically, temporally and geographically representative and of good quality.

Cut-off criteria

Cut off criteria are:
1% of the renewable and non-renewable energy usage
1% of the mass of the process under consideration.

The total neglected flows shall be no more than:
5% of the energy usage
5% of the total mass.

Biogenic Carbon

The mass of biogenic carbon containing material in the product is less than 5% of the mass of the product and is omitted from this declaration.

The mass of biogenic carbon containing material in the packaging is less than 5% of the total mass of the packaging and is omitted from this declaration.

LCA Results

The Declared Unit for this study was defined as "1m^2 coverage of substrate with one coat of paint".
(MND = module not declared; INA = indicator not assessed)

Parameters describing environmental impacts

			GWP-total	GWP-fossil	GWP-biogenic	GWP-LULUC	ODP	AP	EP - freshwater
			kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CO_2 eq	kg CFC 11 eq	mol H^+ eq	kg P^-eq
Product stage	Raw material supply	A1	9.18E-02	9.13E-02	2.86E-04	2.25E-04	1.13E-08	1.09E-03	2.81E-05
	Transport	A2	5.36E-03	5.36E-03	1.75E-06	2.02E-06	1.16E-09	3.08E-05	3.98E-07
	Manufacturing	A3	1.17E-03	1.17E-03	6.68E-07	1.26E-06	9.43E-11	3.35E-06	1.98E-07
	Total (of product stage)	A1-3	9.83E-02	9.78E-02	2.89E-04	2.28E-04	1.26E-08	1.13E-03	2.87E-05
Construction process stage	Transport	A4	4.32E-03	4.31E-03	1.44E-06	1.54E-06	9.35E-10	1.76E-05	3.32E-07
	Construction	A5	1.55E-02	1.54E-02	2.05E-04	1.05E-05	3.81E-10	1.44E-06	2.60E-06
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	5.69E-04	5.69E-04	1.90E-07	2.03E-07	1.23E-10	2.32E-06	4.38E-08
	Waste processing	C3	8.53E-03	8.53E-03	9.30E-07	2.47E-07	3.55E-10	8.34E-06	9.63E-08
	Disposal	C4	5.62E-05	5.62E-05	4.19E-08	1.45E-08	4.15E-11	7.75E-07	4.14E-09
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.40E-03	-1.40E-03	-1.50E-06	-9.24E-07	-1.06E-10	-4.42E-06	-3.22E-07

GWP-total = Global warming potential, total;
GWP-fossil = Global warming potential, fossil;
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; and
EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment

LCA Results (continued)

Parameters describing environmental impacts									
			EP- marine	EP-terrestrial	POCP	ADP – mineral &metals	ADP - fossil	WDP	PM
			kg N eq	mol N eq	kg NMVOC eq	kg Sb eq	MJ, net calorific value	m3 world eq deprived	disease incidence
Product stage	Raw material supply	A1	9.95E-05	8.40E-04	3.31E-04	5.10E-07	1.54E+00	1.34E-03	5.52E-09
	Transport	A2	8.71E-06	9.54E-05	2.77E-05	1.80E-08	7.94E-02	4.28E-06	3.56E-10
	Manufacturing	A3	7.89E-07	8.51E-06	2.22E-06	9.63E-09	2.75E-02	3.54E-05	1.65E-11
	Total (of product stage)	A1-3	1.09E-04	9.44E-04	3.61E-04	5.38E-07	1.65E+00	1.38E-03	5.89E-09
Construction process stage	Transport	A4	5.29E-06	5.76E-05	1.75E-05	1.50E-08	6.45E-02	3.59E-06	2.96E-10
	Construction	A5	1.05E-05	1.04E-04	4.11E-05	8.04E-08	3.27E-01	3.38E-05	4.23E-10
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	6.98E-07	7.60E-06	2.31E-06	1.98E-09	8.51E-03	4.74E-07	3.91E-11
	Waste processing	C3	3.19E-06	3.48E-05	1.17E-05	3.19E-09	2.60E-02	2.23E-06	1.83E-10
	Disposal	C4	2.94E-07	3.23E-06	8.67E-07	1.22E-10	2.61E-03	7.21E-08	1.68E-11
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-1.08E-06	-1.03E-05	-3.59E-06	-9.08E-09	-3.07E-02	-3.82E-06	-4.78E-11

EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment;
EP-terrestrial = Eutrophication potential, accumulated exceedance;
POCP = Formation potential of tropospheric ozone;
ADP-mineral&metals = Abiotic depletion potential for non-fossil resources;
ADP-fossil = Depletion potential of the stratospheric ozone layer;
WDP = Water (user) deprivation potential, deprivation-weighted water consumption; and
PM = Particulate matter.

LCA Results (continued)

Parameters describing environmental impacts							
			IRP	ETP -fw	HTP-c	HTP -nc	SQP
			kgBq U^{235} eq	CTUe	CTUh	CTUh	dimensionless
Product stage	Raw material supply	A1	6.98E-03	5.30E-01	2.23E-08	1.70E-08	8.42E-01
	Transport	A2	3.62E-04	1.30E-02	1.06E-10	7.26E-10	7.44E-02
	Manufacturing	A3	7.82E-04	7.35E-04	2.30E-11	1.31E-10	1.77E-02
	Total (of product stage)	A1-3	8.12E-03	5.43E-01	2.24E-08	1.79E-08	9.34E-01
Construction process stage	Transport	A4	2.94E-04	1.10E-02	8.30E-11	6.13E-10	6.34E-02
	Construction	A5	1.05E-03	1.02E-02	4.03E-10	9.25E-10	8.25E-02
Use stage	Use	B1	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	3.88E-05	1.46E-03	1.10E-11	8.09E-11	8.36E-03
	Waste processing	C3	1.88E-04	2.79E-03	8.90E-11	1.15E-10	8.13E-02
	Disposal	C4	1.14E-05	4.55E-05	1.83E-12	3.05E-12	4.06E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-3.48E-04	-6.64E-03	-6.19E-10	-1.71E-10	-1.02E-02

IRP = Potential human exposure efficiency relative to U235;
ETP-fw = Potential comparative toxic unit for ecosystems;
HTP-c = Potential comparative toxic unit for humans;
HTP-nc = Potential comparative toxic unit for humans; and
SQP = Potential soil quality index.

LCA Results (continued)

Parameters describing resource use, primary energy								
			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	1.06E-01	8.99E-02	1.96E-01	1.52E+00	INA	1.52E+00
	Transport	A2	8.70E-04	1.75E-04	1.04E-03	8.32E-02	INA	8.32E-02
	Manufacturing	A3	4.00E-03	1.12E-03	5.12E-03	2.76E-02	INA	2.76E-02
	Total (of product stage)	A1-3	1.11E-01	9.12E-02	2.02E-01	1.63E+00	INA	1.63E+00
Construction process stage	Transport	A4	7.22E-04	1.45E-04	8.68E-04	6.75E-02	INA	6.75E-02
	Construction	A5	1.16E-02	1.43E-03	1.30E-02	3.36E-01	INA	3.36E-01
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	INA	0.00E+00
	Transport	C2	9.53E-05	1.92E-05	1.14E-04	1.41E-03	INA	1.41E-03
	Waste processing	C3	1.37E-03	2.91E-04	1.67E-03	2.76E-02	INA	2.76E-02
	Disposal	C4	4.00E-05	4.96E-05	7.74E-05	2.81E-03	INA	2.81E-03
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-2.06E-03	-5.12E-04	-2.57E-03	-3.09E-02	INA	-3.09E-02

PERE = Use of renewable primary energy excluding renewable primary energy 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 resource

LCA Results (continued)

Parameters describing resource use, secondary materials and fuels, use of water						
			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m^3
Product stage	Raw material supply	A1	INA	INA	INA	9.11E-02
	Transport	A2	INA	INA	INA	3.30E-04
	Manufacturing	A3	INA	INA	INA	2.10E-04
	Total (of product stage)	A1-3	INA	INA	INA	9.17E-02
Construction process stage	Transport	A4	INA	INA	INA	2.73E-04
	Construction	A5	INA	INA	INA	1.50E-02
Use stage	Use	B1	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	0.00E+00
	Transport	C2	INA	INA	INA	3.60E-05
	Waste processing	C3	INA	INA	INA	2.91E-01
	Disposal	C4	INA	INA	INA	4.53E-02
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	INA	INA	INA	-5.15E-04

SM = Use of secondary material;
RSF = Use of renewable secondary fuels;
NRSF = Use of non-renewable secondary fuels;
FW = Net use of fresh water

LCA Results (continued)

			Other environmental information describing waste categories		
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.21E-06	4.07E-02	1.21E-06
	Transport	A2	1.99E-07	3.53E-03	1.99E-07
	Manufacturing	A3	2.35E-08	7.79E-05	2.35E-08
	Total (of product stage)	A1-3	1.43E-06	4.43E-02	1.43E-06
Construction process stage	Transport	A4	1.67E-07	3.01E-03	4.18E-07
	Construction	A5	5.34E-06	3.81E-03	5.98E-07
Use stage	Use	B1	MND	MND	MND
	Maintenance	B2	MND	MND	MND
	Repair	B3	MND	MND	MND
	Replacement	B4	MND	MND	MND
	Refurbishment	B5	MND	MND	MND
	Operational energy use	B6	MND	MND	MND
	Operational water use	B7	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	2.20E-08	3.97E-04	5.52E-08
	Waste processing	C3	2.53E-05	2.27E-02	8.46E-06
	Disposal	C4	3.94E-06	3.55E-03	1.32E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	-5.05E-08	-2.40E-04	-9.99E-08

HWD = Hazardous waste disposed;
NHWD = Non-hazardous waste disposed;
RWD = Radioactive waste disposed

LCA Results (continued)

Other environmental information describing output flows – at end of life								
			CRU	MFR	MER	EE	Biogenic carbon (product)	Biogenic carbon (packaging)
			kg	kg	kg	MJ per energy carrier	kg C	kg C
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	INA	INA
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	INA	INA
	Manufacturing	A3	0.00E+00	1.57E-03	1.19E-04	0.00E+00	INA	INA
	Total (of product stage)	A1-3	0.00E+00	1.57E-03	1.19E-04	0.00E+00	INA	INA
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	INA	INA
	Construction	A5	0.00E+00	4.63E-04	3.96E-03	0.00E+00	INA	INA
Use stage	Use	B1	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	INA	INA
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00	INA	INA
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	INA	INA
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	INA	INA
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	0.00E+00	0.00E+00	0.00E+00	0.00E+00	INA	INA

CRU = Components for reuse;
MFR = Materials for recycling

MER = Materials for energy recovery;
EE = Exported Energy

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	Parameter	Units	Results
A4 – Transport to the building site	Transportation of product using an average weighted distance from the manufacturing site to all customers.		
	Fuel type / Vehicle type	Litre of fuel type per distance or vehicle type	Heavy Duty Vehicle diesel
	Distance:	km	280-353
	Capacity utilisation (incl. empty returns)	%	65-85%
	Bulk density of transported products	kg/m^3	1,392
A5 – Installation in the building	Application tools and residual paint and packaging during installation. No additional water or energy required.		
	Brush for application	g per m^2	0.16
	Roller for application	g per m^2	31.15
	Dust sheet disposal from installation	g per m^2	1.30-1.33
	Paint lost in spills and residue	%	1
	Disposal of primary packaging 60% incinerated (soiled), 10% recycled (clean), 30% landfilled.	g per m^2	2.40-6.46
	Disposal secondary packaging 50% incinerated, 50% landfilled	g per m^2	1.46-1.63
B2 – Maintenance	MND		
B3 – Repair	MND		
B4 – Replacement	MND		
B5 – Refurbishment	MND		
Reference service life	Highly variable service life linked to the use environment and decorative tastes		
B6 – Use of energy; B7 – Use of water	MND		
C1 to C4 End of life,	Waste type and average distance travelled to waste disposal. C1 - considered immaterial (No additional materials, water or energy required.).		
	Disposal paint on packaging residue 50% incinerated, 50% landfilled	g per m^2	0.67-0.83
	Disposal paint on wall 86.5% to recovery (sorting), then landfilled 13.5% directly to landfill	g per m^2	66.33-82.17
	Waste transport	km	40
Module D	Incinerated material substitutes GB electricity and district/industrial heat. Recycled materials is assumed to substitute virgin material 1:1.		

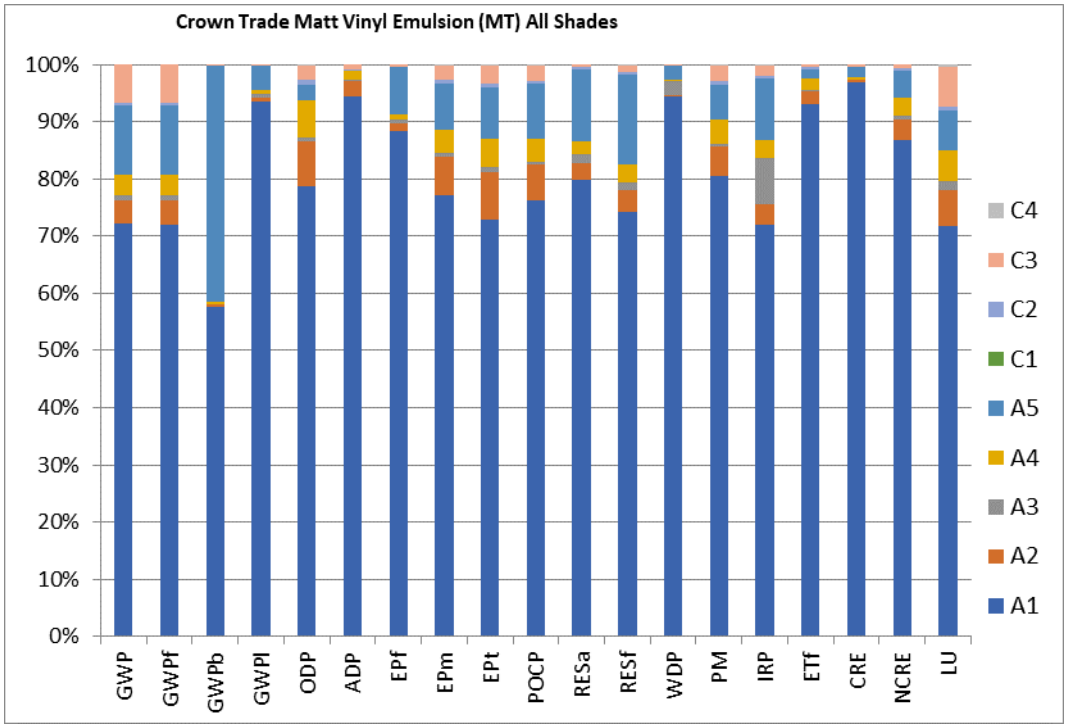
Summary, comments and additional information

Interpretation

The majority of impacts associated with paint products relate to the materials that compose the paint itself (A1, Figure 1). This is expected and is consistent with other analyses of paint products whereby the actions of Crown Paints are the last of a supply chain of material production (i.e. energy inputs, raw materials use, processing). Crown Paints' use of these materials is relatively small by comparison as the production site for these products only mixes existing materials into the final product.

The most significant environmental impacts of Crown Paints' products come from the use of titanium dioxide (pigment) and a polymer additive as a raw material ingredients (Figure 2). For darker shades, carbon black (pigment) is also an important contributor to environmental impacts. These materials are used to create opacity and are used widely in all paint products. Depending on the colour of paint, the amount of titanium dioxide will vary and thus the range of impacts between shades can be significant. The variability of different pack sizes is negligible (Figure 3). It Is typical that titanium dioxide is the highest impact component of paint throughout its lifecycle as it has high impact intensity and can make up a high proportion of the paint formulation.

All of the products assessed in this LCA have minimal impacts during the application stage of the product (A5, Figure 4). The majority of impacts occur in the application materials – such as drop sheets and rollers – and these impacts in reference to the functional unit of the study are quite small (Figure 1).



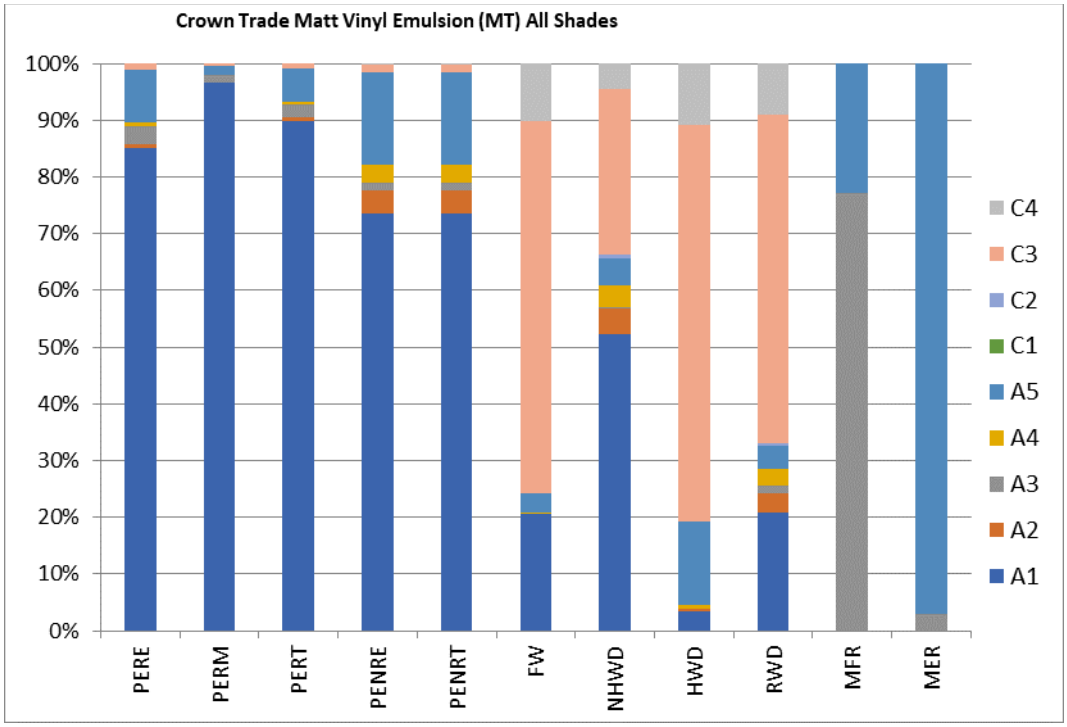


Figure 1

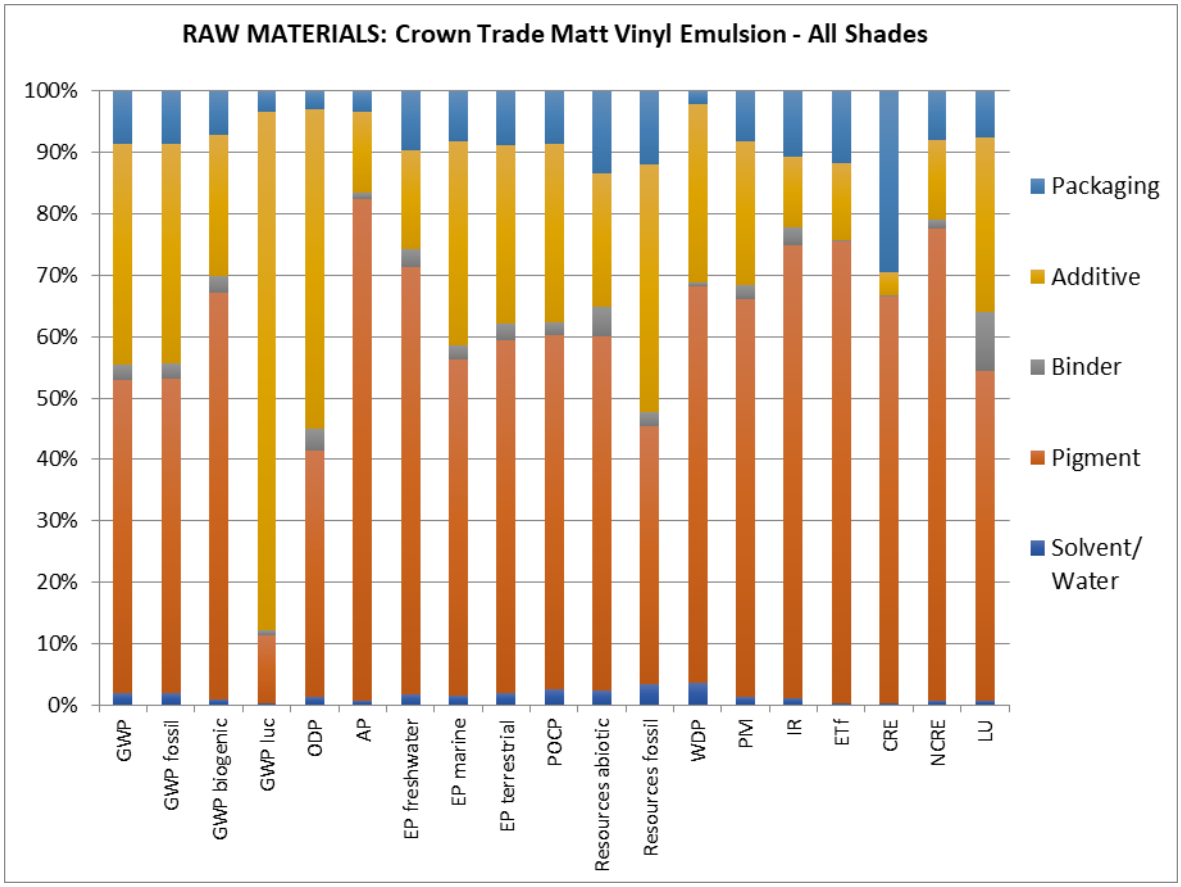


Figure 2

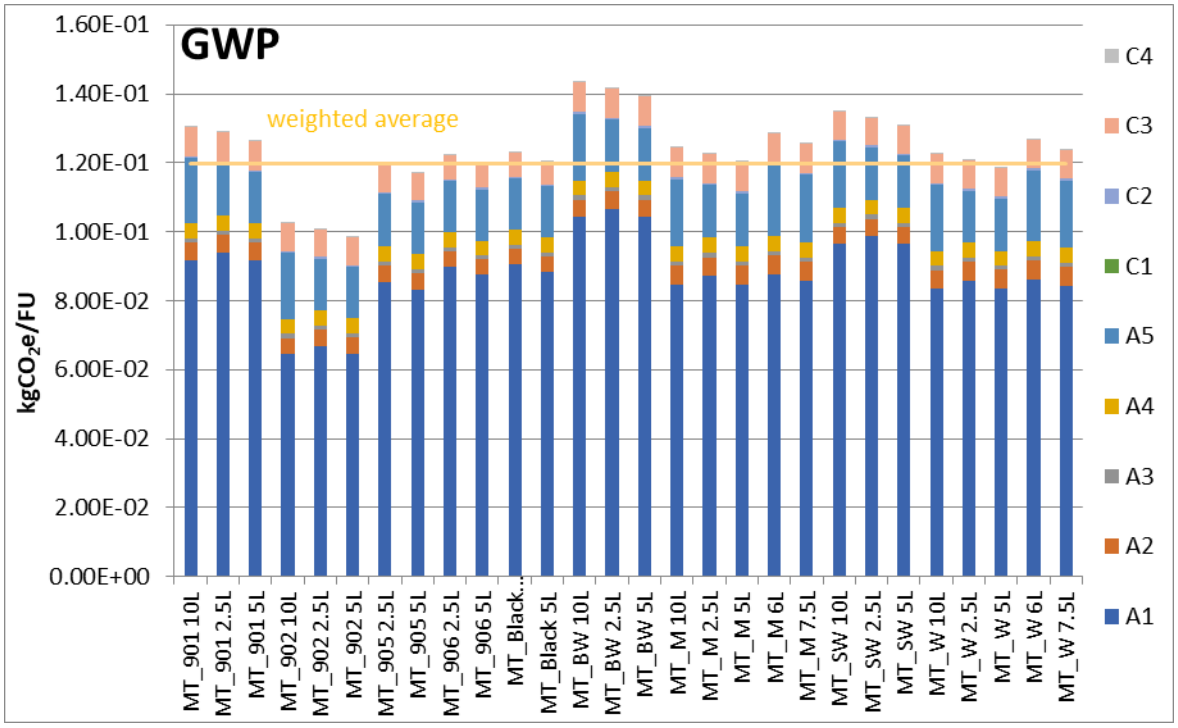


Figure 3

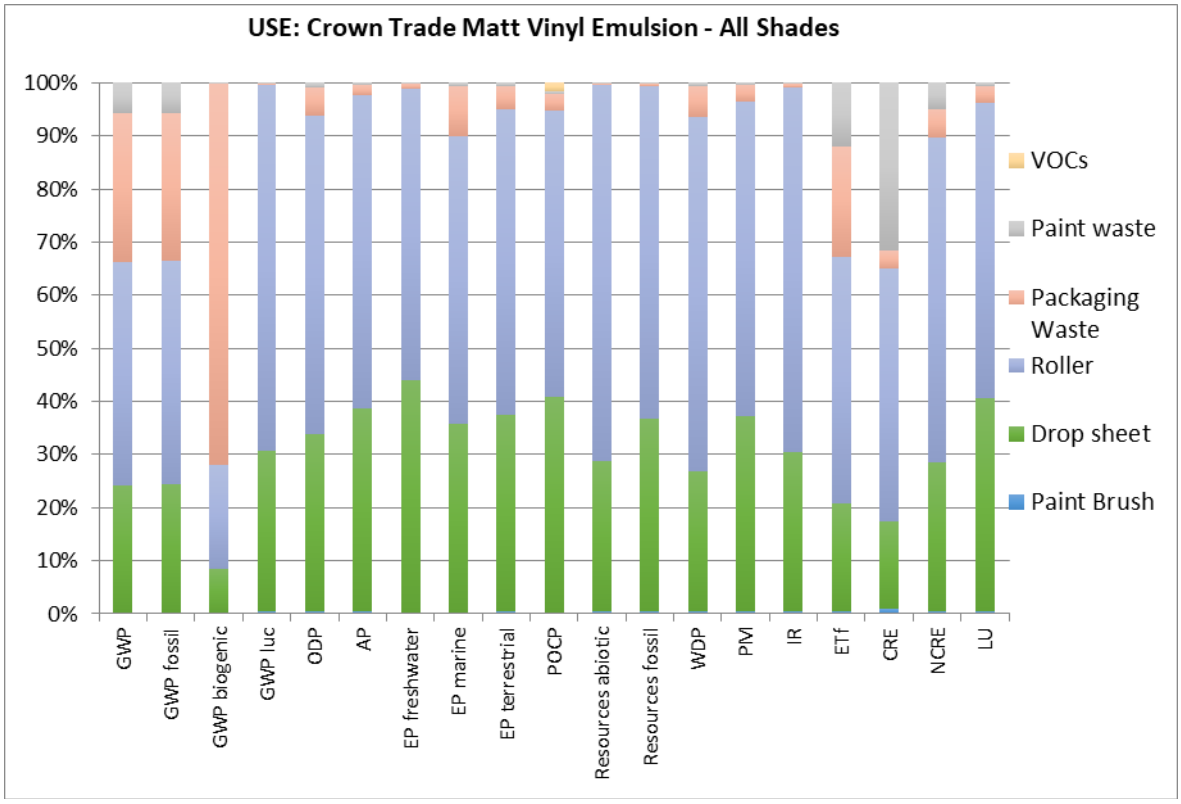


Figure 4

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