Statement of Verification

BREG EN EPD No.: 000354 Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

PPG Architectural Coatings UK Ltd

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

PPG Steelguard 651

Company Address

Huddersfield Road
Birstall – Batley
West Yorkshire
WF17 9XA
United Kingdom

Signed for BRE Global Ltd	Emma Baker Operator	08 June 2021 Date of this Issue
08 June 2021 Date of First Issue		07 June 2026 Expiry Date

Environmental Product Declaration

EPD Number: 000354

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	**LCA consultant/Tool**
PPG Architectural Coatings UK Ltd. Huddersfield Road Birstall - Batley, West Yorkshire WF17 9XA United Kingdom	William Collinge Product Stewardship Functional Expert PPG Monroeville Business and Technology Center 440 College Park Drive Monroeville , PA 15146 USA
Declared/Functional Unit	**Applicability/Coverage**
PPG Steelguard 651 to protect 1m² of substrate, suitably prepared, on the basis of one layer of paint at a spreading rate of 1.0 m^2/L for the lifetime of the coating.	Product Specific
EPD Type	**Background database**
Cradle to Gate with options	Ecoinvent 3.5

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: Pat Hermon
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+A1:2013. 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+A1:2013 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)

PPG Architectural Coatings UK Ltd

PPG Industries (Dyrup SP z o.o.)
Lewkowiec 68
Ostrów Wielkopolski, Greater Poland 63-400
Poland

Construction Product:

Product Description

PPG Steelguard 651 is a one-component, thin film waterborne intumescent coating for fire protection of structural steelwork.

The EPD for this products covers the following product variants:

- Steelguard 651 (White)

Technical Information

Property	Value, Unit
Spreading rate	1.5 m^2/L
Time to Touch Dry	2 hrs
Time to Recoat	16 hrs

Main Product Contents

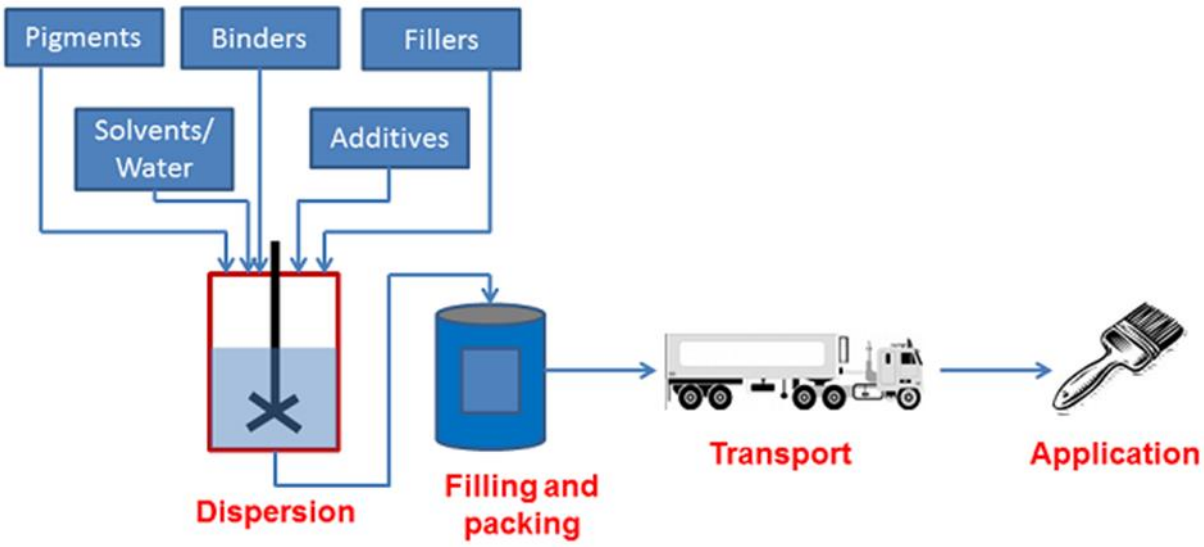
Material/Chemical Input	%
Additives	40-50%
Biocide	<0.1%
Binder	10-20%
Filler	<0.1%
Glycols and Esters	<5%
Pigments	<20%
Water	20-30%

PPG STEELGUARD 651 does not contain any substances listed in the REACH Candidate List of Substances for Very High Concern.

Manufacturing Process

The manufacturing process involves the mixing and dispersing of raw materials into a homogeneous mixture. The product is then packaged for distribution to the customer.

Process flow diagram



Construction Installation

All surfaces to be painted should be clean, dry and free from loose and flaking material. Prime bare surfaces with the appropriate primer. Rub down previously gloss painted surfaces with fine waterproof abrasive paper and rinse thoroughly. Stir well before use. Easy to apply by brush, roller or spray. Do not apply in temperatures below 10˚C.

Use Information

No activities are required during the use phase

End of Life

Coatings are often not removed from their substrate, so the end of life the product is that of the end of life of the underlying substrate. For interior wall paints this can be landfill or incineration.

Life Cycle Assessment Calculation Rules

Declared / Functional unit description

PPG Steelguard 651 to protect and decorate 1m² of substrate, suitably prepared, on the basis of one layer of paint at a spreading rate of 1.5 m^2/L.

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), Deconstruction/Demolition (C1), End-of-life transport (C2), Waste Processing (C3), and Disposal (C4).

Data sources, quality and allocation

Formulation is based on the current recipe extracted from PPG recipe systems. Data related to in-house PPG manufacturing processes has been collected from PPG reporting systems for the 2018 calendar year. This is based on recorded utility use and waste disposal and is of high quality.

For life cycle modelling of the process, SimaPro V.9.0 is used. All relevant background datasets are taken from Ecoinvent V3.5 database supplied with SimaPro and are documented in supporting Ecoinvent documentation.

Many Ecoinvent processes, such as waste disposal, are multi-input and not just for the material specified. For these processes the allocation used for the material in question is the one specified in the Ecoinvent process. Allocation of waste to reuse and waste disposal streams is made on the basis of recent data from reliable sources.

In cases where allocation is necessary, this has been performed on the basis of mass.

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. Exceptions are if flows have significant effects of or energy use in their extraction, use or disposal, or are classed as hazardous waste, then these are specifically included. In this study the cut-off criteria has not been applied.

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO2 equiv.	kg CFC 11 equiv.	kg SO2 equiv.	kg $(PO4)^{3-}$ equiv.	kg C2H4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	3.91E+00	5.03E-07	3.04E-02	4.16E-03	3.17E-03	2.77E-05	6.59E+01
Construction process stage	Transport	A4	4.65E-01	8.61E-08	1.50E-03	2.49E-04	2.42E-04	1.43E-06	7.06E+00
	Construction	A5	1.09E-01	9.94E-09	5.47E-04	7.97E-05	1.07E-04	4.05E-07	1.58E+00
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	3.19E-04	5.65E-11	2.38E-06	5.12E-07	3.73E-07	1.80E-10	4.58E-03
	Transport	C2	4.95E-03	9.16E-10	1.60E-05	2.65E-06	2.57E-06	1.52E-08	7.51E-02
	Waste processing	C3	7.88E-01	6.92E-10	5.02E-05	1.67E-05	4.81E-06	9.70E-09	7.00E-02
	Disposal	C4	1.14E-01	1.92E-09	5.03E-05	1.09E-05	1.73E-05	1.04E-08	1.76E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND	MND	MND	MND

GWP = Global Warming Potential;
ODP = Ozone Depletion Potential;
AP = Acidification Potential for Soil and Water;
EP = Eutrophication Potential;
POCP = Formation potential of tropospheric Ozone;
ADPE = Abiotic Depletion Potential – Elements;
ADPF = Abiotic Depletion Potential – Fossil Fuels;

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	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	3.56E+00	1.38E+00	4.94E+00	5.75E+01	1.33E+01	7.08E+01
Construction process stage	Transport	A4	7.55E-02	0.00E+00	7.55E-02	7.18E+00	0.00E+00	7.18E+00
	Construction	A5	1.50E+00	-1.38E+00	1.15E-01	1.64E+00	1.45E-01	1.78E+00
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	3.83E-05	0.00E+00	3.83E-05	4.64E-03	0.00E+00	4.64E-03
	Transport	C2	8.04E-04	0.00E+00	8.04E-04	7.64E-02	0.00E+00	7.64E-02
	Waste processing	C3	1.84E-03	0.00E+00	1.84E-03	7.27E-02	0.00E+00	7.27E-02
	Disposal	C4	3.00E-03	0.00E+00	3.00E-03	1.82E-01	0.00E+00	1.81E-01
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND	MND	MND

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.	m3
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00E+00	0.00E+00	0.00E+00	1.49E-01
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	1.30E-03
	Construction	A5	0.00E+00	0.00E+00	0.00E+00	2.62E-03
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	0.00E+00	0.00E+00	0.00E+00	7.37E-07
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	1.38E-05
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	5.86E-05
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	1.86E-04
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND

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	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (of product stage)	A1-3	6.72E-01	1.66E+00	2.18E-04
Construction process stage	Transport	A4	4.44E-03	3.73E-01	4.85E-05
	Construction	A5	5.11E-02	7.81E-02	5.47E-06
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	4.37E-06	2.59E-05	3.16E-08
	Transport	C2	4.72E-05	3.97E-03	5.16E-07
	Waste processing	C3	1.77E-02	3.24E-03	2.09E-07
	Disposal	C4	1.43E-03	6.55E-01	1.09E-06
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND

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
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Construction process stage	Transport	A4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Construction	A5	0.00E+00	2.46E-02	0.00E+00	0.00E+00
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	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	C2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Waste processing	C3	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Disposal	C4	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND

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	Transport to the construction site is assumed to occur by heavy duty lorry.		
	Transport by Lorry		Lorry 16-32 tonne EURO5
	Distance: (Road)	km	300
	Capacity utilisation (incl. empty returns)	%	50
	Bulk density of transported products	kg/m3	1180-1380
A5 – Installation in the building	The coating is applied to the interior wall surface using a roller. The area coated is considered 50 m2. One disposable plastic sheet is used to protect the floor from drops and spills for the entire job. After application the roller and plastic sheeting will be disposed of. Based on the practice of professional painters where as much paint removed from the cans as possible studies show 1.3 % of the paint is lost through spills and residual paint in the can. For projects where there is a higher proportion of paint waste through higher levels of spills or residual paint left after the job, this will increase the environmental impact accordingly. The scenario above allows for the calculation of impact for the tools and ancillaries for the job related to the declared unit, however for the product related aspects it is assumed the paint is completely used before disposal of the packaging. All values are related to the declared unit.		
	Roller for application	kg	2.14E-03
	Polyethylene sheeting for spill protection	kg	2.28E-03
	Polypropylene roller tray	kg	4.00E-03
	Amount of paint lost during application due drips splashes, and residue in the can/bucket	%	1.3
	Disposal of steel (From primary packaging. Assume 29% landfill, 71% incineration)	kg	8.89E-02
	Disposal of polyethylene (From pallet packaging, spill sheeting and roller packaging. Assume 29% landfill, 71% incineration)	kg	2.46E-03
	Disposal of polypropylene (From primary packaging, roller components and roller tray. Assume 29% landfill, 71% incineration)	kg	5.54E-03
	Disposal of wood (From pallet. Assume 31% recycling, 48% incineration and 20% landfill)	kg	4.76E-02
	Disposal of paper (From pallet interleaves and roller packaging. Assume 79% recycling, 14.8% incineration and 6.2% landfill)	kg	3.18E-03
	Disposal of miscellaneous plastic waste (From roller. Assume 29% landfill, 71% incineration)	kg	3.84E-04
	VOC Emitted	kg	1.00E-04
Reference service life	The service life is highly dependent on the environment in which the product is installed. Hence the EPD gives values for the first application of the coating for the lifetime applicable to the coating in the environment in which it is used.		
C1 to C4, End of life	Product is demolished with the building on which it is applied and then transported to disposal. The disposal occurs by landfill (29.6 %), incineration with energy recovery (65.4%) and incineration without energy recovery (5 %).		
	Transport distance to incineration/landfill	km	30
	Amount disposed at end of life	kg	1.01E+00

Summary, comments and additional information

Analysis

Analysis of the relative contributions of each Module shows that most of the impact comes from the raw materials stage (A1) for most of the indicators. This is shown in Figure 1. This high contribution of raw materials to the impact indicators is not unexpected. As paints are at the end of the chemical value chain much of the expenditure of energy, raw materials, processing, waste processing, etc. in bringing the product to existence has occurred prior to the entry of the raw materials onto the PPG production site.

The high contribution to the global warming indicator from Module C3 comes from the end of life scenario where a high proportion of the product is disposed via incineration with energy recovery

A further breakdown of the contribution of the different raw material types to environmental indicators in Module A1 shows that the majority of each impact comes from the titanium dioxide and the binder (Figure 2). This is typical for coatings products and not unexpected given these two raw materials are often present in high proportions and have a relatively high environmental impact.

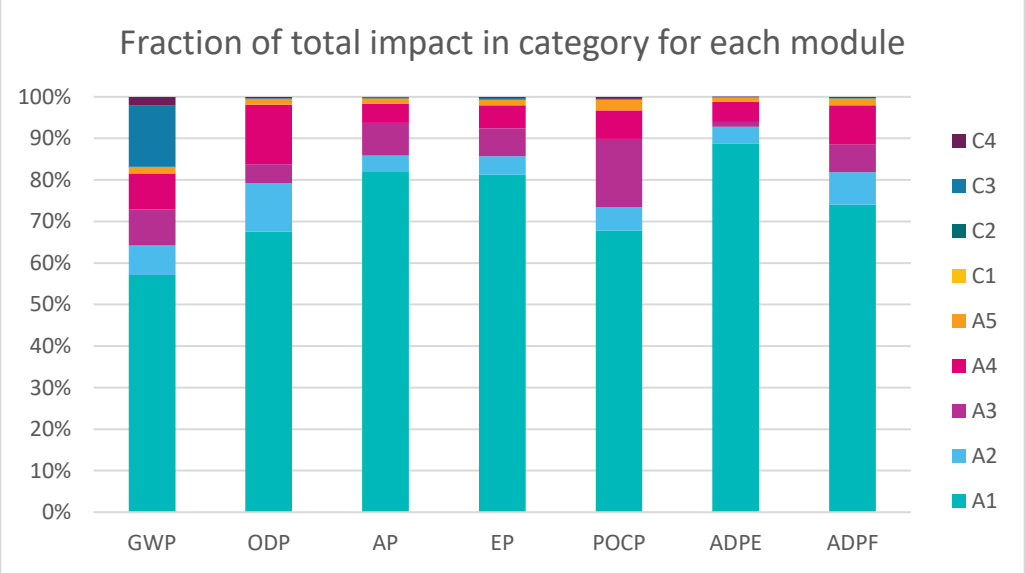


Figure 1

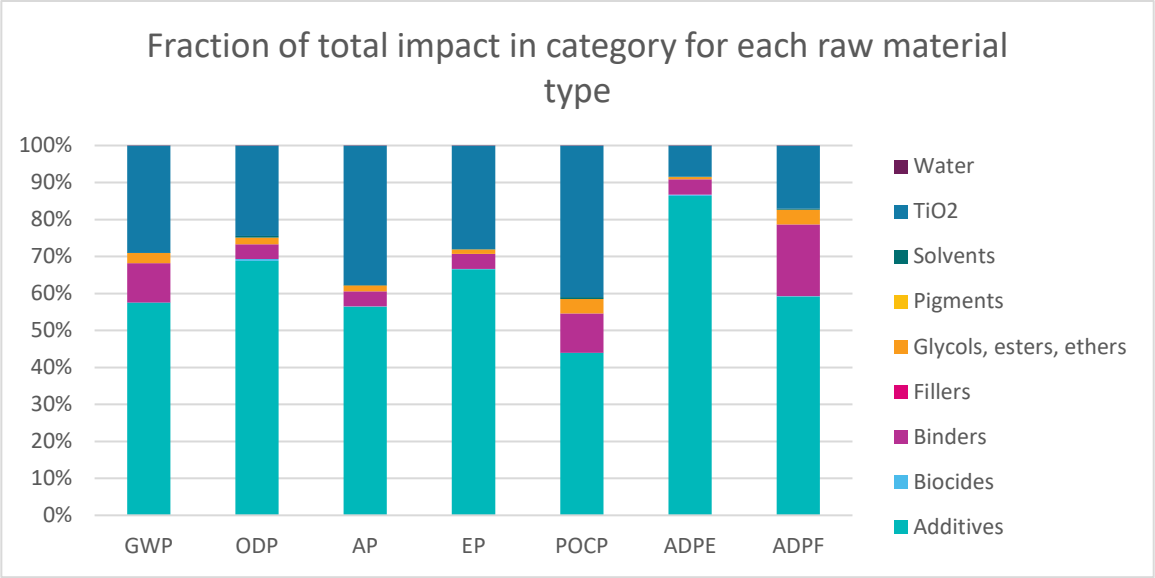


Figure 2

References

BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A1:2013. London, BSI, 2013.

BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.

BSI. Environmental management – Life cycle assessment – Principles and framework. BS EN ISO 14040:2006. London, BSI, 2006.

BSI. Environmental management – Life cycle assessment – requirements and guidelines. BS EN ISO 14044:2006. London, BSI, 2006.