SPECIFICATION SOLUTIONS

ELECTRO®

Environmental Product Declaration

Dulux® POWDER COATINGS

Programme	The International EPD® System **www.environdec.com**
Programme operator	EPD International AB
Fully aligned regional programme operator	EPD Australasia **www.epd-australasia.com**
EPD owner	Dulux Powder Coatings
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EPD INTERNATIONAL EPD SYSTEM AUSTRALASIA EPD® INTERNATIONAL EPD SYSTEM ECO PLATFORM EPD VERIFIED	In accordance with ISO 14025:2006 and EN 15804+A2:2019/AC:2021 An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.environdec.com **EPD of multiple products, based on the average results of the product group. The products covered are the Electro powder coat range in black and white, light and dark colours, manufactured in New Zealand and Australia, sold in New Zealand. Products are listed on page 21.**

New Zealand

About Dulux Powder Coatings

Dulux Powder Coatings manufactures premium quality powder coatings for protecting and enhancing aluminium and steel assets. We provide both warranty and non-warranty grade products, providing superior colour and durability solutions for architectural and industrial applications.

Photography (front cover): Murray McKean

Committed to a Sustainable Future

As part of our commitment to sustainability we aim to minimise our environmental footprint in everything we do. Our manufacturing plants in Australia and New Zealand are powered by renewable energy sources with solar panels installed at our Melbourne factory and hydroelectricity supplying energy to our Auckland factory. Dulux Powder Coatings cartons are made from approximately 58% recycled content in Australia, and 37% recycled content in New Zealand, and can be recycled after use.

We are committed to reducing waste to landfill by working with our customers to collect and reuse over-sprayed powder coatings during the application process and have partnered with a third-party manufacturer to recycle and repurpose powder waste from our Melbourne factory.

Dulux Powder Coatings are not formulated with VOC's or solvents, and no VOC's or solvents are added. Our comprehensive product stewardship programme ensures all of our products are formulated and monitored for chemicals of concern in line with leading international directives. This includes compliance to RoHS 3 (EU Directive 2015/863).

By protecting metal assets for longer and extending their life span over years and decades, powder coatings implicitly help conserve energy and resources required for the built environment. At the end of service life, powder coated aluminium and steel can both be recycled after the powder coating is chemically removed or incinerated, supporting a more circular economy for building and construction. Dulux is committed to continuous improvement and extending the life span of our powder coatings through ongoing product innovation and testing to maximise warranty periods wherever possible.

Warranted Performance

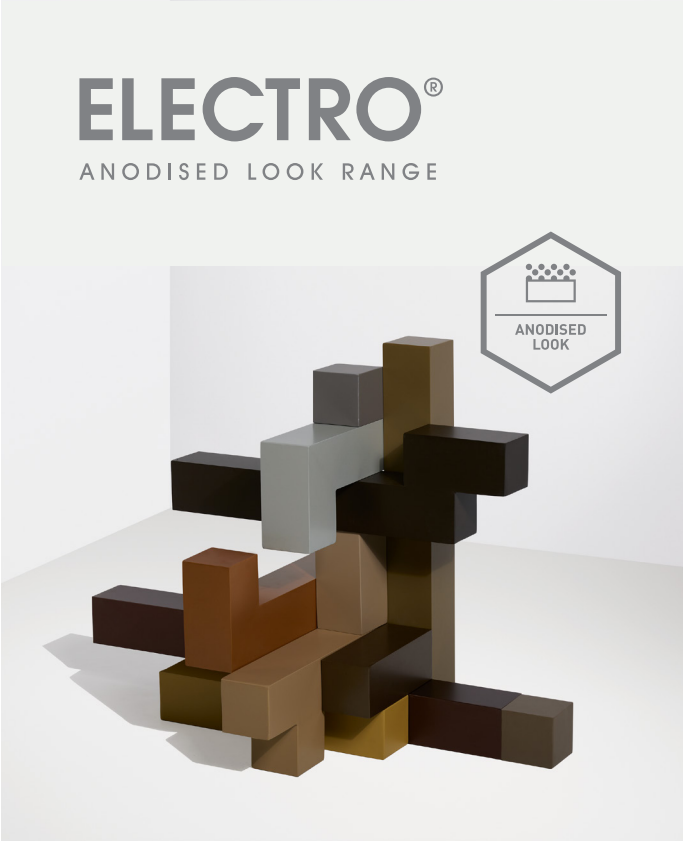
Our warranty grade products are designed to meet test procedures and performance requirements for both global AAMA and Australian AS 3715 standards for architectural aluminium finishes. Only Dulux Accredited Powder Coaters are able to issue our Dulux Alumi Shield™ and Steel Shield™ warranties after demonstrating their capability to meet stringent quality conditions and international standards. Our warranty periods are product and substrate specific, providing assurance against steel corrosion for 5 to 10 years and durability for aluminium for 10 to 35 years.

Memberships

Dulux Powder Coatings are proud members of the New Zealand Green Building Council (NZGBC) and Toitū Envirocare with Toitū Enviromark Gold certification.

Product-related or management system-related certifications	ISO 9001 SAP ERP data management
Name and location of production site(s)	**Dandenong South,** Melbourne, Australia **Glenfield**, Auckland, New Zealand

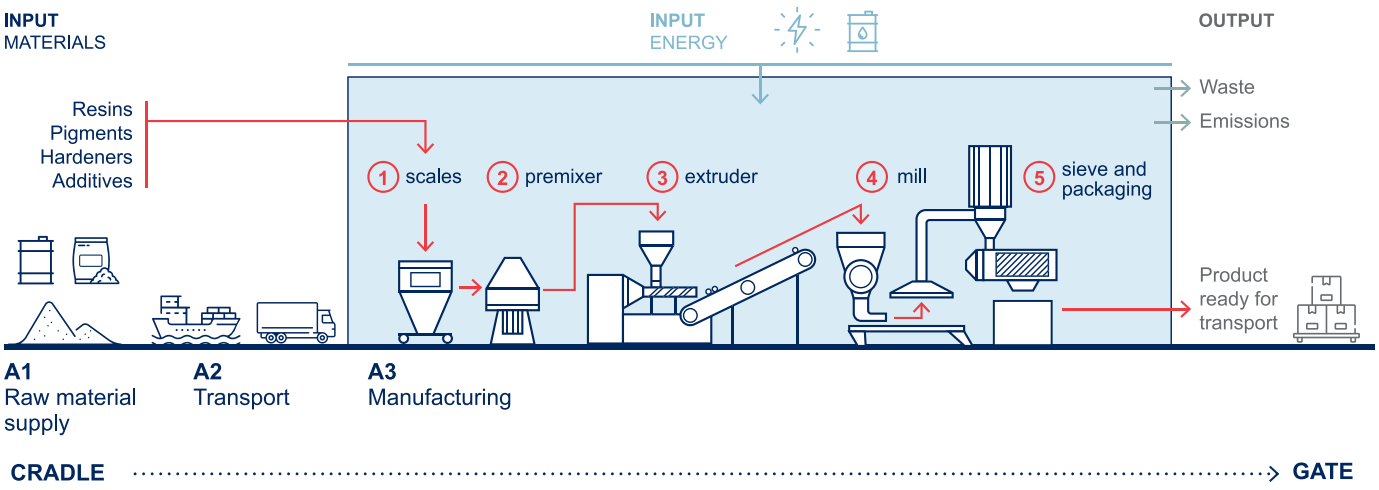
Product information



Product name	**Electro powder coat range**
Product range	Electro anodised look range
	See page 21 for a list of all products and colours covered in this EPD
Finish	Flat
Look	Anodised look
Coating type	Super Durable Polyester
AAMA Standards	Meets 2604
Product description	The Electro anodised look range is a collection of unique anodised look finishes, designed to subtly change in appearance as light conditions alter in the day, delivered with warranty grade advanced super durable polyester thermosetting powder and Kinetic technology.
Declared unit	**m^2** 0.11 kg of Dulux Powder Coating applied to 1 square metre of aluminium surface
UN CPC code	UN CPC Ver 2 35110: Paint and varnished and related products
Other classification codes	ANZSIC 2006 2293: Metal Coating and Finishing

Manufacturing process

Figure 1: A1-A3 Manufacturing process



The raw materials are weighed and mixed to obtain a homogenous mixture (1 and 2 in Figure 1). This mixture is then fed into an extruder which melts & disperses all the ingredients together to obtain a homogenous mixture which is cooled & granulated into small chips (3 in Figure 1). The chips are micronized or ground into a fine powder with a distinct particle size distribution, for optimum application, and sieved and packed into a box and sent to the warehouse for distribution to the applicator (4 and 5 in Figure 1).

Explanation of average products and variation

To simplify the communication of environmental profiles to Dulux customers, it is necessary to group products. Products were grouped based on their GWP-GHG results, to comply with the PCR 2019:14 v1.3.4 requirements (EPD International, 2024).

The modelling for this EPD was based on a weighted average of Electro products sold in New Zealand, with sales of 0% 'black and dark colours' not containing titanium dioxide and 100% 'light colours'. Light colours include white or any other colour containing titanium dioxide in the formulation, whereas black and dark colours do not. With this conservative approach, the EPD will represent all colours available within the respective product range.

The GWP-GHG impacts for all products in this group is within 8.7% of the weighted average.

System boundaries

As shown in the table below, this EPD is of the type cradle to gate with options, modules C1-C4, module D and with optional modules (A1-A3 + C + D and additional modules, A4-A5). Other life cycle stages (Modules B1-B7) are dependent on particular scenarios and best modelled at the building level.

Modules declared, geographical scope, share of specific data (in GWP-GHG results) and data variation (in GWP-GHG results):

	Product stage			Construction stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse – Recovery – Recycling – potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	X	X	X	X	X	ND	ND	ND	ND	ND	ND	ND	X	X	X	X	X
Geography	GLO	GLO	NZ/ AU	NZ/ AU	NZ	ND	ND	ND	ND	ND	ND	ND	NZ	NZ	NZ	NZ	NZ
Specific data used		3.4%		–	–	–	–	–	–	–	–	–	–	–	–	–	–
Variation – products		8.7%		–	–	–	–	–	–	–	–	–	–	–	–	–	–
Variation – sites		0.8%		–	–	–	–	–	–	–	–	–	–	–	–	–	–

X = included in the EPD; ND = Module not declared (such a declaration shall not be regarded as an indicator result of zero)

Specific data includes impacts related to the manufacturing processes (primarily electricity and natural gas) and raw materials transport. There is no specific data for the manufacturing of raw materials, which have the highest contribution to A1-A3 GWP-GHG.

The processes below are included in the product system to be studied. For modules beyond A3, the scenarios included are currently in use and are representative of one of the most probable alternatives.

System boundaries continued

Product stage (Modules A1-A3)

The production stage includes the environmental impacts associated with raw materials extraction and processing of inputs, transport to, between and within the manufacturing site, and manufacturing of average product at the exit gate of the manufacturing site. The impacts include the production and use of fuels and electricity, production of auxiliary materials and packaging materials, and waste treatment of production wastes.

Module A1 (raw materials supply) includes the extraction and processing of minerals, pigments, fillers, binders and extenders. These raw materials are then transported (Module A2) from extraction sites predominantly in Southeast Asia to the Dulux manufacturing facilities in Australia and New Zealand. Module A3 includes the processing of the raw materials into the finalised powder coating formulations, as well as the production of cardboard and LDPE packaging. Module A3 also includes the generation and transmission of electricity in New Zealand and Australia, and generation of thermal energy from natural gas.

Since Module C is included in the EPD, the use of Module A1-A3 (A1-A5 for services) results without considering the results of Module C is discouraged.

Transport (Module A2)

Specific transport data were collected from Dulux for all input materials to manufacturing sites, including the transport modes and distances.

Most of Dulux's raw materials come from Southeast Asia via sea freight, and then truck to the respective Dulux manufacturing facilities in New Zealand and Australia. Raw materials are transported a combined total of 7 043 km via ship and 13 km via truck to New Zealand, and 5 869 km via ship and 41 km via truck to Australia.

Distribution and Application (Module A4, A5)

The product is transported from the manufacturing facilities an average distance of 435 km by truck and 15 km by ferry in New Zealand to powder coating application sites.

To account for the portion of product that is manufactured in Australia and sold in New Zealand, the impact of transport from Melbourne to Auckland was included.

An additional travel distance of 50 km by truck from application sites to construction sites is assumed. A utilisation rate of 0.61 is applied to transport via truck.

Transport to building site

Scenario information	Unit (expressed per functional unit or per declared unit)
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat etc.	Litre of fuel type per distance or vehicle type, Commission Directive 2007/37/EC (European Emission Standard)
Distance	485 km and 15 km (truck and ferry resp. New Zealand)
Capacity utilisation (including empty returns)	61%
Bulk density of transported products	kg/m^3
Volume capacity utilisation factor (factor: =1 or < 1 or ≥ 1 for compressed or nested packaged products)	Not applicable

System boundaries continued

Module A5 involves the application of powder coating onto a metal surface, including preparation of the surface, application via electrostatic spraying, and curing with natural gas. The manufacture and consumption of powder coating equipment are outside the scope of this EPD.

Each product is modelled with two different loss rates occurring during Module A5 application, 10% and 30%. 10% loss rate is common for continuous powder coating in a factory, enabling overspray to be collected and recycled, whereas 30% loss rate occurs when there is no recovery of powder and any overspray goes to landfill. Impacts for 10% loss rate are provided with other modules in the Results section and impacts for 30% loss rate are provided on their own in Additional environmental information.

Installation of the product in the building

Scenario information	Unit (expressed per functional unit or per declared unit)
Ancillary materials for installation (specified by material):	0 kg or other units as appropriate
Water use	0 m^3
Other resource use	0 kg
Quantitative description of energy type and consumption during the installation process	42 MJ
Waste materials on the building site before waste processing, generated by the product's installation (specified by type)	0 kg
Output materials (specified by type) as a result of waste processing at the building site e.g. of collection for recycling, for energy recovery, disposal (specified by route)	0 kg
Direct emissions to ambient air, soil and water	0 kg

System boundaries continued

End-of-Life (Modules C1-C4)

When a building reaches its end-of-life, it will be demolished (C1) and the demolition waste is transported to a processing facility (C2). The waste processing (C3) includes the separation of steel and aluminium waste from other building materials and shredding activities. Material that cannot be recycled will be disposed (C4).

End of life scenarios for products

Process	Unit (expressed per declared unit of components products or materials and by type of material)
Collection process specified by type	0.85 kg powder in NZ collected separately (together with aluminium or steel) (HERA, 2021).
	0.15 kg powder in NZ collected with mixed construction waste (HERA, 2021).
Recovery system specified by type	0 kg for re-use
	0.85 kg powder in NZ for aluminium and steel recycling facility (HERA, 2021).
	0 kg for energy recovery
Disposal specified by type	0.15 kg powder in NZ for final deposition (HERA, 2021).
Assumptions for scenario development	Diesel consumption for dismantling metal surface after use with an excavator (100 kW): 0.172 g per kg of powder coating on metal surface. All waste is transported from construction site to end-of-life treatment facility via truck. Transport distance is assumed to be 50 km with a capacity utilisation of 50%.

Primary data was used for all manufacturing operations up to the factory gate. Data for the manufacturing of the powder coatings was provided by Dulux, covering operations from December 2020 – December 2021. Estimates were made for data pertaining to transport using information of routes provided by Dulux.

Recovery and Recycling potential (Module D)

Module D starts at the “end of waste” when the product or packaging are no longer in their first life cycle and start to be a potential input for their second life cycle. All powder is either sent to landfill or combusted together with steel where no energy is recovered. The impacts associated with the incineration and landfill are declared in Module C4.

Cardboard waste from packaging is either recycled or landfilled. All landfill gas that is combusted for energy recovery is assumed to be used to generate electricity via an alternator (Module A5) and the resulting electricity receives a credit for offsetting average electricity from the New Zealand or Australia grid (Module D).

Life cycle inventory (LCI) data and assumptions

Upstream data

Primary data for powder coating formulation were provided by Dulux. Data for energy were collected for Dulux's manufacturing sites in Dandenong South (Australia), and Glenfield (New Zealand).

For PTFE wax, we used Sphera's Polytetrafluoroethylene granulate (PTFE) European technology mix dataset from Germany (Sphera, 2023).

For Polyisocyanate, we used Sphera's Aliphatic Polyisocyanate dataset from Europe (Sphera, 2023).

Transportation was modelled using global transportation datasets. Fuels were modelled using the geographically appropriate datasets.

LCA software and database

Sphera Solutions' LCA for Experts (LCA FE) software version 10.7 was used together with Sphera Managed LCA Content (MLC) database version 2023.2 (Sphera, 2023) for all data in the background system. Most datasets have a reference year between 2018 and 2022 and all fall within the 10-year limit allowable for generic data under EN 15804.

Electricity

The composition of the residual electricity grid mix of New Zealand is modelled in LCA FE based on published data for the year 1st April 2021 – 31st March 2022 (BraveTrace, 2023). The New Zealand residual electricity mix is made up of hydro (56.6%), geothermal (19.7%) natural gas (12.5%), wind (6.55%), coal (4.25%), biomass (0.266%) and biogas (0.160%).

The emission factor for the New Zealand residual grid mix for the GWP-GHG indicator is 0.146 kg CO_2e/kWh (based on EF3.1).

The composition of the residual electricity grid mix of Victoria is modelled in LCA FE based on published data for the financial year 1st July 2022 – 30th June 2023 (thinkstep-anz, 2024). The Victorian residual electricity mix is made up of Brown coal 64.2%, Wind 14.4%, Solar 7.41%, Hydro 5.83%, Natural gas 2.15%, Biogas 0.662%, and Biomass 0.0391%.

The emission factor for the Victoria residual grid mix for the GWP-GHG indicator is 1.01 kg CO_2e/kWh (based on EF3.1).

Life cycle inventory (LCI) data and assumptions continued

Cut off criteria

Personnel-related processes are excluded as per section 4.3.2 in the PCR (EPD International, 2024).

thinkstep-anz consistently excludes environmental impacts from infrastructure, construction, production equipment, and tools that are not directly consumed in the foreground production process, ('capital goods') regardless of potential significance. High-quality infrastructure-related data isn't always available and there is no clear cut-off for what to include. For this reason, capital goods data are applied to LCA studies inconsistently. This is expected to lead to reduced consistency and comparability of EPDs. Capital goods were previously excluded from EPDs, thus including capital goods in current EPDs would further reduce their comparability.

Infrastructure used in electricity generation is included as standard in the MLC datasets, as this is important for renewable generation.

Allocation

Where subdivision of processes was not possible, allocation rules listed in PCR chapter 6.7 have been applied. Multi-output allocation generally follows the requirements of ISO 14044, section 4.3.4.2. Site level data for electricity, diesel for mobile plant (e.g. loaders), water, and lubricant usage are allocated by mass, based on the annual production. Allocation of background data (energy and materials) is according to MLC database; documentation is available at **www.sphera.com/product-sustainability-gabi-data-search**

Assumptions

The EPD declares the impacts of 1 m^2 of powder coated surface, or 0.11 kg, assuming a single coat at an average film thickness of 80 microns.

Content information

Content declaration (average) of product

Product components	Weight, kg	Post-consumer recycled material, weight-%	Biogenic material, weight-% and kg C/m²
Binder	7.09E-02	0	0 resp. 0
Pigment	3.46E-02	0	0 resp. 0
Extenders	0	0	0 resp. 0
Additive	4.47E-03	0	0 resp. 0
TOTAL	**0.110**	**0**	**0 resp. 0**

Content declaration (range) of other products covered in the EPD

Product components	Weight, kg	Post-consumer recycled material, weight-%	Biogenic material, weight-% and kg C/m²
Binder	7.09E-02	0	0 resp. 0
Pigment	9.93E-04 – 0.0346	0	0 resp. 0
Extenders	0	0	0 resp. 0
Additive	4.47E-03	0	0 resp. 0
TOTAL	**0.110**	**0**	**0 resp. 0**

Content declaration of packaging for products manufactured in New Zealand covered in the EPD

Packaging materials	Weight, kg/m²	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
LDPE	6.11E-04	5.55E-01	0
Cardboard	6.60E-03	6.00E+00	4.26E-03
LDPE film	2.75E-05	2.50E-02	0
Wood pallet	2.75E-03	2.50E+00	2.36E-04
TOTAL	**9.99E-03**	**9.08E+00**	**4.50E-03**

Content declaration of packaging for products manufactured in Australia covered in the EPD

Packaging materials	Weight, kg/m²	Weight-% (versus the product)	Weight biogenic carbon, kg C/kg
LDPE	6.11E-04	5.55E-01	0
Cardboard	6.60E-03	6.00E+00	4.26E-03
LDPE film	4.23E-05	3.85E-02	0
Wood pallet	4.23E-03	3.85E+00	2.36E-04
TOTAL	**1.15E-02**	**1.04E+01**	**4.50E-03**

None of the materials in this EPD, to the best of our knowledge, are on the Candidate List of substances of very high concern (SVHC), by the European REACH Regulation at a concentration greater than 0.1% by mass.

Environmental performance indicators

The results tables describe the different environmental indicators for each product per declared unit, for each declared module. The EN 15804 reference package based on EF 3.1 is used.

Indicator	Abbreviation	Description
 **Climate change (global warming potential)**	GWP-total GWP-fossil GWP-biogenic GWP-luluc	A measure of greenhouse gas emissions, such as CO_2 and methane. These emissions are causing an increase in the absorption of radiation emitted by the earth, increasing the natural greenhouse effect. This may in turn have adverse impacts on ecosystem health, human health and material welfare. The global warming potential total (GWP-t), is split into three sub indicators: fossil (GWP-f), biogenic (GWP-b) and land-use and land-use change (GWP-luluc).
 **Ozone depletion potential**	ODP	Depletion of the ozone leads to higher levels of UVB ultraviolet rays reaching the earth's surface with detrimental effects on humans and plants. Ozone depletion potential is a measure of air emissions that contribute to the depletion of the stratospheric ozone layer.
 **Acidification potential**	AP	Acidification potential is a measure of emissions that cause acidifying effects to the environment. A molecule's acidification potential indicates its capacity to increase the hydrogen ion (H^+) concentration in the presence of water, thus decreasing the pH value. Potential effects include fish mortality, forest decline, and the deterioration of building materials.
 **Eutrophication potential**	EP-freshwater EP-marine EP-terrestrial	Eutrophication covers all potential impacts of excessively high levels of macronutrients, the most important of which are nitrogen (N) and phosphorus (P). In aquatic ecosystems where this term is mostly applied, this typically describes a degradation in water quality. Eutrophication can result in an undesirable change in the type of species that flourish and an increase in the production of biomass. As the decomposition of biomass consumes oxygen, eutrophication may decrease the available oxygen level in the water column and threaten fish in their ability to respire.
 **Photochemical ozone formation potential**	POCP	Photochemical Ozone Formation Potential gives an indication of the emissions from precursors that contribute to ground level smog formation, mainly ozone (O3). Ground level ozone may be harmful to human health and ecosystems and may also damage crops. These emissions are produced by the reaction of volatile organic compounds (VOCs) and carbon monoxide in the presence of nitrogen oxides and UV light.
 **Abiotic resource depletion**	ADP-m&m ADP-fossil	The consumption of non-renewable resources decreases the availability of these resources and their associated functions in the future. Depletion of mineral resources and non-renewable energy resources are reported separately. Depletion of mineral resources is assessed based on total reserves.
 **Water use**	WDP	Water scarcity is a measure of the stress on a region due to water consumption.

Environmental performance indicators continued

Notes on other indicators

The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

The use of primary energy is separated into energy used as raw material and energy used as energy carrier as per option C in Annex 3 in the PCR (EPD International, 2024)

Energy indicators (MJ) are always given as net calorific value.

For powder coating, the following indicators are not relevant, hence result in zero values:

- Components for re-use (CRU) is zero since there are none produced.
- Exported electrical energy (EEE) is zero since there is none produced.
- Exported thermal energy (EET) is zero since there is none produced.

Disclaimers

The following apply to the indicators, as identified, in the result tables.

* 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.

1. This indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero. It has been included in the EPD following the PCR.

2. GWP-GHG (IPCC AR5) is an additional GWP100 indicator that is aligned with the Intergovernmental Panel on Climate Change (IPCC) 2013 Fifth Assessment Report (AR5) (IPCC 2013), national greenhouse gas reporting frameworks in Australia and New Zealand and previous versions of the Construction Products PCR (PCR2019:14v1.11). It excludes biogenic carbon and indirect radiative forcing.

3. 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 some construction materials, is also not measured by this indicator.

4. The results of the impact categories abiotic depletion of minerals and metals, land use, human toxicity (cancer), human toxicity, noncancer and ecotoxicity (freshwater) may be highly uncertain in LCAs that include capital goods/infrastructure in generic datasets, in case infrastructure/capital goods contribute greatly to the total results. This is because the LCI data of infrastructure/capital goods used to quantify these indicators in currently available generic datasets sometimes lack temporal, technological and geographical representativeness. Caution should be exercised when using the results of these indicators for decision-making purposes.

Results of the environmental performance indicators

Mandatory impact category indicators according to EN 15804+A2

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 10% loss rate in module A5

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D	Variation (A-C)
GWP-total	kg CO_2 eq.	4.62E-01	4.00E-02	2.73E+00	7.44E-05	1.62E-03	0	2.04E-01	0	9%
GWP-fossil	kg CO_2 eq.	4.66E-01	3.83E-02	2.71E+00	7.14E-05	1.62E-03	0	2.04E-01	0	8%
GWP-biogenic	kg CO_2 eq.	-4.69E-03	1.70E-03	1.92E-02	2.94E-06	2.19E-07	0	5.98E-08	0	49%
GWP-luluc	kg CO_2 eq.	2.09E-04	5.97E-07	1.03E-04	1.93E-09	4.29E-08	0	4.97E-06	0	50%
ODP	kg CFC 11 eq.	1.35E-12	3.52E-15	2.00E-13	7.35E-18	1.64E-16	0	1.27E-14	0	54%
AP	mol H^+ eq.	2.47E-03	2.24E-04	6.13E-03	3.85E-07	1.23E-05	0	2.42E-05	0	22%
EP-freshwater	kg P eq.	1.19E-06	6.57E-09	5.97E-07	1.13E-11	2.51E-10	0	1.77E-07	0	24%
EP-marine	kg N eq.	4.68E-04	1.10E-04	3.07E-03	1.87E-07	6.12E-06	0	5.52E-06	0	12%
EP-terrestrial	mol N eq.	5.09E-03	1.21E-03	3.36E-03	2.05E-06	6.72E-05	0	1.03E-04	0	12%
POCP	kg NMVOC eq.	1.60E-03	2.16E-04	8.21E-03	5.28E-07	1.23E-05	0	1.65E-05	0	12%
ADP-m&m*[4]	kg Sb eq.	6.92E-07	1.98E-10	1.70E-07	9.67E-13	2.15E-11	0	1.63E-10	0	1%
ADP-fossil*	MJ	9.33E+00	5.49E-01	4.75E+01	9.70E-04	2.16E-02	0	3.48E-02	0	8%
WDP*	m^3	6.38E-02	1.61E-04	9.71E-03	2.76E-07	6.16E-06	0	1.69E-02	0	59%

The use of Module A1-A3 results without considering the results of Modules C1-C4 is discouraged.

Acronyms: GWP-total = Climate change – total; GWP-fossil = Climate change – fossil; GWP-biogenic = Climate change – biogenic, GWP-luluc = Climate change – 5 Eutrophication aquatic freshwater; EP-marine = Eutrophication aquatic marine; EP-terrestrial = Eutrophication terrestrial; POCP = Photochemical ozone formation; ADP-m&m = Depletion of abiotic resources – minerals and metals; ADP-fossil = Depletion of abiotic resources – fossil fuels; WDP = Water use.

Additional mandatory and voluntary impact category indicators

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 10% loss rate in module A5

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG[1]	kg CO_2 eq.	4.91E-01	3.88E-02	2.77E+00	7.28E-05	1.65E-03	0	2.04E-01	0
IPCC AR5 GWP-GHG[2]	kg CO_2 eq.	4.71E-01	3.83E-02	2.71E+00	7.15E-05	1.62E-03	0	2.04E-01	0
PM	Disease incidences	3.23E-08	1.55E-09	3.06E-08	4.87E-12	6.34E-11	0	1.76E-10	0
IRP[3]	kBq U235 eq.	6.59E-03	1.02E-05	1.45E-03	2.03E-08	4.52E-07	0	2.22E-04	0
ETP-fw*[4]	CTUe	7.73E+00	2.39E-01	1.49E+01	4.33E-04	9.65E-03	0	2.45E-02	0
HTP-c*[4]	CTUh	1.94E-09	3.96E-12	6.04E-10	7.12E-15	1.59E-13	0	1.43E-12	0
HTP-nc*[4]	CTUh	2.19E-07	8.43E-11	2.72E-08	1.57E-13	3.48E-12	0	1.56E-11	0
SQP*[4]	Pt	2.76E+00	1.02E-03	4.11E-01	1.98E-06	4.40E-05	0	1.01E-02	0

The use of Module A1-A3 results without considering the results of Modules C1-C4 is discouraged.

Acronyms: GWP-GHG = Climate change; PM = Particulate matter emissions; IRP = Ionising radiation – human health; ETP-fw = Eco-toxicity (freshwater); HTP-c = Human toxicity, cancer; HTP-nc = Human toxicity, non-cancer; SQP = Land use related impacts/soil quality.

Results of the environmental performance indicators continued

Biogenic carbon content indicators

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 10% loss rate in module A5

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
BCC-prod	kg C	0	0	0	0	0	0	0	0
BCC-pack	kg C	3.09E-03	0	3.43E-04	0	0	0	0	0

The use of Module A1-A3 results without considering the results of Modules C1-C4 is discouraged.
Acronyms: BCC-prod = Biogenic carbon content – product; BCC-pack = Biogenic carbon content – packaging.

Resource use indicators

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 10% loss rate in module A5

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	1.08E+00	2.04E-03	1.66E-01	4.20E-06	9.35E-05	0	8.49E-03	0
PERM	MJ	1.04E-01	0	-7.33E-02	0	0	0	0	0
PERT	MJ	1.19E+00	2.04E-03	1.77E-01	4.20E-06	9.35E-05	0	8.49E-03	0
PENRE	MJ	9.27E+00	5.49E-01	4.75E+01	9.70E-04	2.16E-02	0	3.48E-02	0
PENRM	MJ	6.10E-02	0	-1.26E-03	0	0	-4.50E-02	0	0
PENRT	MJ	9.34E+00	5.49E-01	4.75E+01	9.70E-04	2.16E-02	0	3.48E-02	0
SM	Kg	0	0	0	0	0	0	0	0
RSF	MJ	0	0	0	0	0	0	0	0
NRSF	MJ	0	0	0	0	0	0	0	0
FW	m^3	2.28E-03	3.21E-06	3.56E-04	5.62E-09	1.25E-07	0	3.98E-04	0

The use of Module A1-A3 results without considering the results of Modules C1-C4 is discouraged.

Acronyms: 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 nonrenewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water.

Results of the environmental performance indicators continued

Waste indicators

Results for 1 m² (0.11 kg) of Electro powder coat range with 10% loss rate in module A5

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	3.32E-09	1.46E-12	2.39E-09	1.56E-14	3.48E-13	0	1.64E-11	0
NWHD	kg	1.31E-01	1.21E-05	3.93E-02	2.38E-08	5.31E-07	0	4.97E-02	0
RWD	kg	7.22E-05	8.36E-08	1.24E-05	1.89E-10	4.22E-09	0	1.42E-06	0

The use of Module A1-A3 results without considering the results of Modules C1-C4 is discouraged.
Acronyms: HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed, RWD = radioactive waste disposed.

Output flow indicators

Results for 1 m² (0.11 kg) of Electro powder coat range with 10% loss rate in module A5

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
CRU	kg	0	0	0	0	0	0	0	0
MFR	kg	1.15E-03	0	1.27E-04	0	0	0	0	0
MER	kg	0	0	0	0	0	0	0	0
EEE	MJ	0	0	0	0	0	0	0	0
EET	MJ	0	0	0	0	0	0	0	0

The use of Module A1-A3 results without considering the results of Modules C1-C4 is discouraged.
Acronyms: CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

Additional environmental information

Results for module A5 with 30% loss rate

Mandatory impact category indicators according to EN 15804+A2

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 30% loss rate in module A5

Indicator	Unit	A5
GWP-total	kg CO_2 eq.	2.88E+00
GWP-fossil	kg CO_2 eq.	2.86E+00
GWP-biogenic	kg CO_2 eq.	2.32E-02
GWP-luluc	kg CO_2 eq.	1.74E-04
ODP	kg CFC 11 eq.	6.35E-13
AP	mol H^+ eq.	6.93E-03
EP-freshwater	kg P eq.	1.91E-06
EP-marine	kg N eq.	3.22E-03
EP-terrestrial	mol N eq.	3.53E-02
POCP	kg NMVOC eq.	8.73E-03
ADP-m&m*[4]	kg Sb eq.	3.91E-07
ADP-fossil*	MJ	5.05E+01
WDP*	m^3	3.00E-02

Acronyms: GWP-total = Climate change – total; GWPfossil = Climate change – fossil; GWP-biogenic = Climate change – biogenic, GWP-luluc = Climate change – land use and land use change; ODP = Ozone depletion; AP = Acidification; EP-freshwater = Eutrophication aquatic freshwater; EP-marine = Eutrophication aquatic marine; EP-terrestrial = Eutrophication terrestrial; POCP = Photochemical ozone formation; ADP-m&m = Depletion of abiotic resources – minerals and metals; ADP-fossil = Depletion of abiotic resources – fossil fuels; WDP = Water use.

Additional mandatory and voluntary impact category indicators

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 30% loss rate in module A5

Indicator	Unit	A5
GWP-GHG[1]	kg CO_2 eq.	2.93E+00
IPCC AR5 GWP-GHG[2]	kg CO_2 eq.	2.86E+00
PM	Disease incidences	4.10E-08
IRP[3]	kBq U235 eq.	3.62E-03
ETP-fw*[4]	CTUe	1.74E+01
HTP-c*[4]	CTUh	1.22E-09
HTP-nc*[4]	CTUh	9.66E-08
SQP*[4]	Pt	1.30E+00

Acronyms: GWP-GHG = Climate change; PM = Particulate matter emissions; IRP = Ionising radiation – human health; ETP-fw = Eco-toxicity (freshwater); HTP-c = Human toxicity, cancer; HTP-nc = Human toxicity, non-cancer; SQP = Land use related impacts/soil quality.

Additional environmental information continued

Biogenic carbon content indicators

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 30% loss rate in module A5

Indicator	Unit	A5
BCC-prod	kg C	0
BCC-pack	kg C	1.32E-03

Acronyms: BCC-prod = Biogenic carbon content – product; BCC-pack = Biogenic carbon content – packaging.

Resource use indicators

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 30% loss rate in module A5

Indicator	Unit	A5
PERE	MJ	5.16E-01
PERM	MJ	-4.03E-02
PERT	MJ	5.61E-01
PENRE	MJ	5.05E+01
PENRM	MJ	1.81E-02
PENRT	MJ	5.05E+01
SM	Kg	0
RSF	MJ	0
NRSF	MJ	0
FW	m^3	1.09E-03

Acronyms: 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 nonrenewable 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 re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of nonrenewable secondary fuels; FW = Use of net fresh water.

Additional environmental information continued

Waste indicators

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 30% loss rate in module A5

Indicator	Unit	A5
HWD	kg	3.70E-09
NWHD	kg	1.16E-01
RWD	kg	3.59E-05

Acronyms: HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed, RWD = radioactive waste disposed.

Output flow indicators

Results for 1 m^2 (0.11 kg) of Electro powder coat range with 30% loss rate in module A5

Indicator	Unit	A5
CRU	kg	0
MFR	kg	4.91E-04
MER	kg	0
EEE	MJ	0
EET	MJ	0

Acronyms: CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EET = Exported thermal energy.

Additional environmental information continued

Conversion factors

The declared unit is 0.11 kg of Dulux Powder Coating applied to 1 m^2 of the aluminium surface. This is approximately equal to 1 kg of powder coating applied to 9 m^2 of the aluminium surface, assuming most of overspray powder is recovered & added back to the feed hopper. If no overspray powder is recovered and added back to the feed hopper 1 kg of powder may only be applied to 6 m^2 of the aluminium surface. If 100% overspray powder is recovered and added back to the feed hopper 1 kg of powder may be applied to 11 m^2 of the aluminium surface.

It is important to consider that EPDs within the same product category but registered under different EPD programmes or utilizing different Product Category Rules (PCRs) may not be comparable. Differences in declared or functional units, methods of data collection and geographical scope can all influence the validity of EPD comparisons. Please contact Dulux Powder Coatings for assistance in interpreting the data in this EPD.

Emissions Certification

Our product ranges meet the Green Building Council of Australia and New Zealand Green Building Council requirements for VOC and formaldehyde emissions for Green Star Design & As Built – Green Star Interiors. Test certificates are available on request.

Restricted Substances Statement

Our Dulux Powder Coatings RoHS 3 declaration is available at **duluxpowders.co.nz/spec-solutions**

Recycling/reclaiming Powder Coat Overspray

Powder coat applicators can minimise waste to landfill by recycling powder coat overspray. Under optimised controlled conditions, over 95% of overspray can be recovered and reused. Visit **duluxpowders.co.nz/tech-advice** for more information.

Care and Maintenance

To maximise the service life of powder coated assets and to comply with Dulux warranty requirements, a simple and regular maintenance program must be implemented in line with the Dulux Care and Maintenance of Powder Coated Surfaces brochure. Visit **duluxpowders.co.nz/tech-advice**

Safety Data Sheets (SDS)

Dulux Powder Coatings product health and safety information is contained in Safety Data Sheets available by visiting **duluxpowders.co.nz/datasheets-safety-data-sheets**

DuluxGroup Sustainability

Dulux Powder Coatings is part of the DuluxGroup business, home to some of Australia and New Zealand's most recognised and trusted brands, including Dulux, Selleys, Yates, B&D, and Cabot's. For more information on sustainability across the DuluxGroup business visit **duluxgroup.com.au/sustainability**

Products covered in this EPD

For more information and to order samples visit **duluxpowders.co.nz/products/electro**

Electro

Aged Brass Kinetic®
Brilliance Kinetic®
Burnished Copper Kinetic®
Clean Linen Kinetic®
Dark Bronze Kinetic®
Fresh Gold Kinetic®
Gold Pearl Kinetic®
Medium Bronze Kinetic®
Natural Silver Kinetic®
New Copper Kinetic®
Pale Bronze Kinetic®
Sensational Champagne Kinetic®
Venerable Silver Kinetic®

List of Acronyms

ADPE	Abiotic Depletion Potential – Elements
ADPF	Abiotic Depletion Potential – Fossil Fuels
AP	Acidification Potential
EP	Eutrophication Potential
EPD	Environmental Product Declaration
GaBi	Ganzheitliche Bilanzierung (German for holistic balancing)
GWP	Global Warming Potential
LCA	Life Cycle Assessment
LCI	Life Cycle Inventory
ODP	Stratospheric Ozone Depletion Potential
PCR	Product Category Rules
POFP	Photochemical Ozone Formation Potential
SVHC	Substance of Very High Concern

References

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General information

Accountabilities for PCR, LCA and independent, third-party verification

Declaration owner	Dulux Powder Coatings **www.duluxpowders.co.nz** **powders.advice@dulux.co.nz** 31B Hillside Road, Glenfield, Auckland 0627, New Zealand
Geographical scope	New Zealand
Reference year for data	2020-12-01 to 2021-12-01
EPD programme	The International EPD® System **www.environdec.com** **info@environdec.com** EPD International AB, Box 210 60, SE-100 31 Stockholm, Sweden
EPD regional programme operator	EPD Australasia Limited **www.epd-australasia.com** **info@epd-australasia.com** EPD Australasia Limited, 315a Hardy Street, Nelson 7010, New Zealand
Product Category Rules (PCR)	CEN standard EN 15804 serves as the Core Product Category Rules (PCR) PCR 2019.14 Construction Products, version 1.3.4
PCR review was conducted by	The Technical Committee of the International EPD® System. See **www.environdec.com** for a list of members.
Most recent Review Chair	Claudia A. Peña, PINDA LCT SpA, Chile. The review panel may be contacted via the Secretariat **www.environdec.com/support**
Life cycle assessment (LCA)	
LCA accountability	thinkstep Pty Ltd Barbara Nebel Noa Meron Martina Steiner **www.thinkstep-anz.com** **anz@thinkstep-anz.com** 25 Jubilee Street, Perth, Western Australia 6151, Australia
Third-party verification	
Independent verification of the declaration and data, according to ISO 14025:2006, via: EPD verification by individual verifier	
Third-party verifier	Claudia Peña (Director of PINDA LCT SpA) email: **pinda.lct@gmail.com**
Verifier approved by	EPD Australasia
Procedure for follow-up of data during EPD validity involves third party verifier:	☐ Yes ☒ No

An Environmental Product Declaration, or EPD, is a standardised and verified way of quantifying the environmental impacts of a product based on a consistent set of rules known as a PCR (Product Category Rules).

The EPD owner has the sole ownership, liability, and responsibility for the EPD. EPDs within the same product category but registered in different EPD programmes, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements, methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

The results for EN15804+A1 compliant EPDs are not comparable with EN15804+A2 compliant studies as the methodologies are different.

Dulux®

POWDER COATINGS

Advice line

Our dedicated consultants can help simplify the specification process, saving you time and money by providing the right coating advice for your project. They can provide:

- Documented project specific specifications
- Written confirmation of your project's eligibility for an Alumi Shield™ or Steel Shield™ warranty
- Design, coating system and colour advice

Call 0800 800 975 or visit **duluxpowders.co.nz**

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