PROGRAMME OPERATOR

Stichting MRPI®
Zuid-Hollandlaan 7
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Den Haag

COMPANY INFORMATION

AkzoNobel
International Paint Ltd.
Stoneygate Lane, Felling
Gateshead, Tyne & Wear
NE10 0JY, United Kingdom
www.akzonobel.com

PRODUCT

International Interfine 979 (Part A + Part B)

MRPI®-REGISTRATION

1.1.00026.2018

EPD-REGISTRATION

00000752

DATE OF ISSUE

14-9-2018

DATE OF EXPIRY

14-9-2023

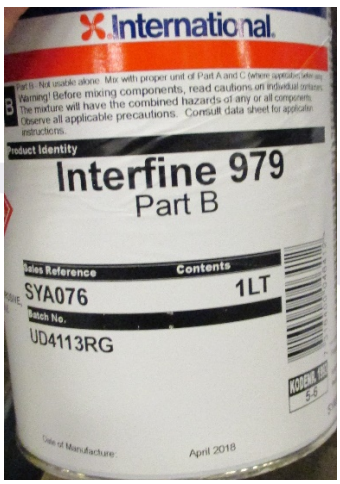
DECLARED UNIT/FUNCTIONAL UNIT

All impacts are calculated using the declared unit "coating of 1 m^2 of surface".

SCOPE OF DECLARATION

This MRPI®-EPD+ certificate is verified by NIBE.
The LCA study has been done by Ecomatters.
The certificate is based on an LCA-dossier according to ISO14025 and NEN-EN15804+A1.
It is verified according to the EPD-MRPI® verification protocol May 2017.
EPD of construction products may not be comparable if they do not comply with NEN-EN15804+A1.
Declaration of SVHC that are listed on the "Candidate List of Substances of Very High Concern for authorization" when content exceeds the limits for registration with ECHA.

VISUAL PRODUCT



DESCRIPTION OF PRODUCT

A patented (US 6,281,321 and EP 0 941290), high performance, two component, high solids inorganic hybrid finish which contains no free isocyanates.

MORE INFORMATION:

https://www.international-pc.com/product/interfine-979

DEMONSTRATION OF VERIFICATION

CEN standard EN15804 serves as the core PCR[a]
independent verification of the declaration and data, according to EN ISO 14025:2010 ☐internal ☑external
(where appropriate[b]) Third party verifier: Kamiel Jansen, NIBE
a Product Category Rules b Optional for B-to-B communication; mandatory for B-to-C communication (see EN ISO 14025:2010,9.4).

DETAILED PRODUCT DESCRIPTION

This EPD is representative for International Interfine 979 and International Interfine 979SG. International Interfine 979 is a patented (US 6,281,321 and EP 0 941290), high performance, two component, high solids inorganic hybrid finish which contains no free isocyanates.

International Interfine 979	
Life Time (years)	10
Density (kg/l)	1.3
Coverage (kg/m^2)	0.217
Number of Layers	1
Total product used (kg/m^2)	0.217

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. Finally, paint is tinted to the correct colour, the paint is undergoing QC (quality control), 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.

Typical Use

It is designed to provide excellent long-term colour and gloss retention and provide extended lifetime to first maintenance when utilised as part of a high performance anti-corrosive system. Interfine 979 is intended for use in those market sectors where visual impact is important, and the need for a high standard of cosmetic appearance is required. These include high performance constructions such as bridges, offshore structures and tank farms in addition to general industrial and commercial steelwork where high levels of cosmetic performance are a key requirement.

Pack size

The products are packed in a packaging with a capacity of 1, 5, and 20 litres.

Application Method

Airless Spray, Air Spray, Brush, Roller

COMPONENT*	[KG]
Epoxy Resin	Confidential
Plasticiser	Confidential
Additive	Confidential

***> 1% TOTAL MASS**

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. The coating is produced in the United States, China, Sweden, and Australia and the application market is for customers around the world. Likewise, for the end-of-life, the fate of the coating product is described within a global context.

The software GaBi 8.7 Professional is used to perform the LCA. The latest version of the AkzoNobel database for protective coatings (2017) was used, this includes the background datasets:

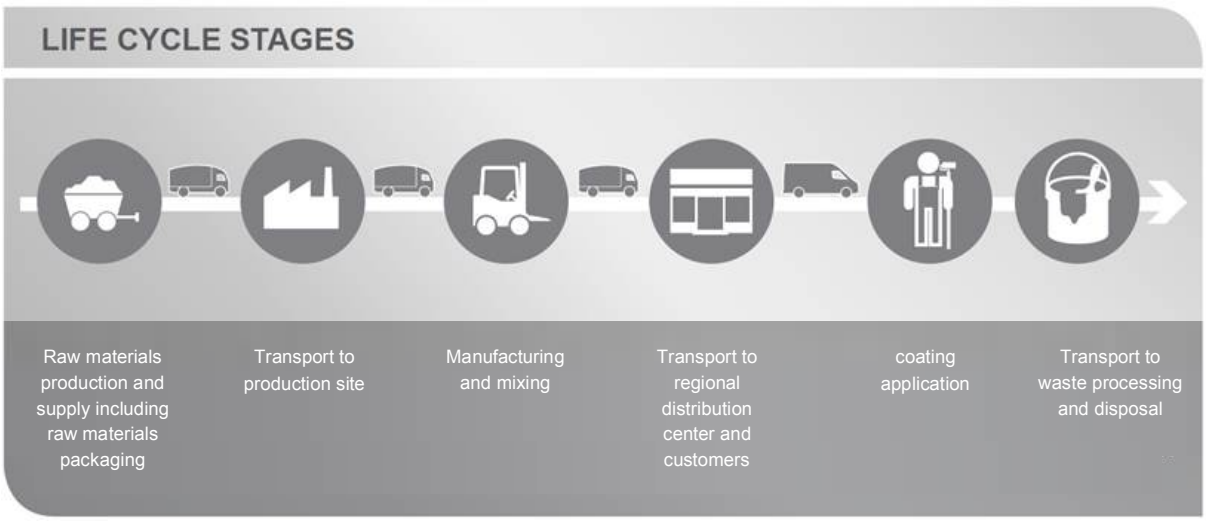
- Ecoinvent (2008).
- GaBi Professional Database
- Plastics Europe

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

PRODUCT STAGE			CONSTRUCTION PROCESS STAGE		USE STAGE							END OF LIFE STAGE				BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARIES
Raw material supply	Transport	Manufacturing	Transport gate to site	Assembly	Use	Maintenance	Repair	Replacement	Refurbishement	Operational energy use	Operational water use	De-construction emopliotion	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	MNA

X = included, MNA= module not assessed

All major steps from the extraction of natural resources to the final disposal of the product are included in the scope of the study. All impacts associated with the upstream production of materials and energy are included in the system boundaries. Mining activities and controlled landfills are included in the product systems. Similarly, wastewater treatment activities are also considered within the technological systems. The emissions and resource extractions derived from these processes are considered elementary exchanges between the product systems and the environment.



REPRESENTATIVENESS *(IF AVERAGE)*

The coating (part A and part B) is manufactured in different production sites (United States, China, Sweden, and Australia), therefore, the following average calculation rule is used: the weighted average based on production volumes of each site is calculated separately for part A and part B, and then the mixing ratio is applied.

The representative product is considered to be representative for the American variation of the product.

- Interfine 979SG

A sensitivity analysis is performed to assess the representativeness of the representative product. The environmental impact results for International Interfine 979SG have a maximum 12% difference when compared within a particular impact category: eutrophication potential.

These products are available in almost every colour of the rainbow. This EPD represents all the colour variations available through the product model. This model is created based on the weighted average of the actual produced product volumes of all different colours sold in 2017. The used data is representative for all manufacturing locations and thus this EPD is considered to be representative for products produced in United States, China, Sweden, and Australia which are sold in a global market.

ENVIRONMENTAL IMPACT per functional or declared unit

	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
ADPE	[kg Sb-Eq.]	2.63E-04	1.92E-09	2.32E-08	1.10E-10	3.58E-09	1.20E-07	0	0	0	0	0	0	0	0	1.10E-10	0	3.59E-07	INA
ADPF	[MJ]	2.31E+01	3.21E-01	1.55E+00	1.81E-02	5.89E-01	1.33E-01	0	0	0	0	0	0	0	0	1.81E-02	0	3.62E-01	INA
GWP	[kg CO2-Eq.]	1.68E+00	2.35E-02	1.20E-01	1.83E+00	4.29E-02	9.41E-02	0	0	0	0	0	0	0	0	1.32E-03	0	2.48E-01	INA
ODP	[kg CFC11-Eq.]	1.27E-06	1.93E-09	3.40E-09	1.27E-06	3.27E-10	1.07E-09	0	0	0	0	0	0	0	0	3.64E-17	0	2.62E-09	INA
POCP	[kg ethene-Eq.]	8.82E-04	2.95E-05	6.60E-05	9.77E-04	2.08E-05	1.31E-02	0	0	0	0	0	0	0	0	5.37E-07	0	1.57E-05	INA
AP	[kg SO_2-Eq.]	1.13E-02	5.33E-04	2.97E-04	1.22E-02	2.63E-04	6.46E-05	0	0	0	0	0	0	0	0	5.86E-06	0	1.75E-04	INA
EP	[kg $(PO_4)^{3-}$-Eq.]	1.35E-03	6.93E-05	2.56E-04	1.68E-03	5.54E-05	6.17E-05	0	0	0	0	0	0	0	0	1.48E-06	0	1.69E-04	INA

ADPE = Abiotic depletion potential for non-fossil resources; ADPF = Abiotic depletion potential for fossil resources
GWP = Global warming potential; ODP = Depletion potential of the stratospheric ozone layer; POCP = Formation potential of tropospheric ozone photochemical oxidants; AP = Acidification potential of land and water; EP = Eutrophication potential

RESOURCE USE per functional or declared unit

	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
PERE	[MJ]	2.06E-01	6.10E-03	1.52E-01	3.64E-01	3.06E-02	4.49E-04	0	0	0	0	0	0	0	0	1.00E-03	0	5.87E-07	INA
PERM	[MJ]	1.42E-02	2.10E-05	1.44E-02	2.86E-02	3.57E-06	3.63E-04	0	0	0	0	0	0	0	0	5.49E-12	0	1.09E-03	INA
PERT	[MJ]	2.20E-01	6.12E-03	1.66E-01	3.92E-01	3.06E-02	8.12E-04	0	0	0	0	0	0	0	0	1.00E-03	0	1.09E-03	INA
PENRE	[MJ]	2.59E+01	3.25E-01	1.90E+00	2.81E+01	5.92E-01	1.90E-01	0	0	0	0	0	0	0	0	1.82E-02	0	5.28E-01	INA
PENRM	[MJ]	6.04E-05	1.06E-08	5.23E-04	5.84E-04	1.79E-09	1.22E-06	0	0	0	0	0	0	0	0	0	0	3.63E-06	INA
PENRT	[MJ]	2.59E+01	3.25E-01	1.90E+00	2.81E+01	5.92E-01	1.90E-01	0	0	0	0	0	0	0	0	1.82E-02	0	5.28E-01	INA
SM	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
RSF	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
NSRF	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
FW	[m^3]	2.60E+00	3.45E-03	3.13E-02	2.64E+00	2.85E-03	1.17E-03	0	0	0	0	0	0	0	0	7.67E-05	0	2.50E-03	INA

PERE = Use of renewable primary energy excluding renewable primary energy resources used as raw materials; PERM = Use of renewable primary energy resources used as raw materials; PERT = Total use of renewable primary energy resources; PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy resources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water

OUTPUT FLOWS AND WASTE CATEGORIES per functional or declared unit

	UNIT	A1	A2	A3	TOTAL A1-A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
HWD	[kg]	0	0	2.15E-03	2.15E-03	0	7.23E-02	0	0	0	0	0	0	0	2.17E-01	0	0	0	INA
NHWD	[kg]	0	0	5.68E-02	5.68E-02	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
RWD	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
CRU	[kg]	0	0	0	0	0	1.04E-02	0	0	0	0	0	0	0	0	0	0	0	INA
MFR	[kg]	0	0	0	0	0	1.48E-02	0	0	0	0	0	0	0	0	0	0	0	INA
MER	[kg]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
EEE	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA
EET	[MJ]	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	INA

HWD = Hazardous waste disposed; NHWD = Non-hazardous waste disposed; RWD = Radioactive waste disposed; CRU = Components for re-use; MFR = Materials for recycling; MER = Materials for energy recovery; EEE = Exported electrical energy; EEE = Exported thermal energy

CALCULATION RULES

Cut off criteria

There is no cut-off of inputs and outputs in any of the processes during the life cycle stage, hence the environmental impact of all unit processes of each life cycle stage are considered.

Data quality and data collection period

Specific data was collected from AkzoNobel though a questionnaire, including inquiries about coating characteristics and packaging, logistics data (e.g. transport), production information and end-of-life. The data collection period for specific data was the year 2017.

Data gaps (i.e. transport data) were covered with data from internal AkzoNobel LCA studies concerning the same type of products (paints and coatings) and the latest reviewed version of their own AkzoNobel database (2017). Generic data (i.e. upstream acquisition and production of raw materials, energy generation, transport, waste treatment processes) was selected from their own AkzoNobel database (2017), which mostly includes different publicly available databases, such as Ecoinvent, ThinkStep and Plastics Europe. In the case of missing data, a relevant proxy was searched and adjusted to the corresponding unit process.

Allocation procedure

To allocate the emissions and inputs to the manufactured products, the decision-hierarchy in ISO 14044 is used (ISO 2006). It is not possible to sub-divide the site data into a more detailed level or find physical causalities between inputs and outputs, thus allocation is done based on mass, considering an annual production of coating product for each site and the mixing ratio (part A and Part B) for coating application. The coating production is basically a process of mixing ingredients and, therefore, the environmental impact is fairly to be related to the mass of the products.

SCENARIOS AND ADDITIONAL TECHNICAL INFORMATION

A1. Raw materials supply

This module considers the extraction and processing of all raw materials and energy which occur upstream to the International Interfine 979 manufacturing process, as well as waste processing up to the end-of waste state.

A2. Transport of raw materials to manufacturer

This includes the transport distance of the raw materials to the manufacturing facility via road, boat and/or train. On average, the transport characteristics for this life cycle stage are the following:

International Interfine 979			
Transport type	Truck 1	Truck 2	Container ship coast
Distance	107.605	511.193	4835.156
Capacity	34-40 t ,60% payload	40-60 t, 60% payload	70% utilization factor
Bulk density of transported products	1300 kg/m^3	1300 kg/m^3	1300 kg/m^3

A3. Manufacturing

This module covers the manufacturing of the International Interfine 979 coating and includes all processes linked to production such as storing, mixing, packing and internal transportation. Use of electricity and fuels in coating production are taken into account as well.

Data regarding coating production was provided for the manufacturing sites where International Interfine 979 coating is produced: United States, China, Sweden, and Australia. The manufacturing process does not differ from production site. Furthermore, the specific transportation distances and transportation modes for raw materials, coating packaging and transportation to customer were collected from the AkzoNobel logistics department. Primary data and site-specific data were retrieved. For electricity used the AkzoNobel electricity country models for 2017 were used for each of the countries where the production site is located. For upstream (raw material processes) and downstream processes (application, use, and waste processing) generic data is used when no specific data is obtained.

The construction site data includes lighting, heating, offices, etc. The manufacture of production equipment and infrastructure is not included in the system boundary. Packaging-related flows in the production process and all up-stream packaging are included in the manufacturing module. For the end-of-life packing of the coatings a landfill scenario is assumed.

A4. Transport to Regional Distribution Centre and customer

All coating containers are transported from the manufacturing facilities into a distribution centre and then finally to the customer. On average, the transport characteristics for this life cycle stage are the following:

PARAMETER	MANUFACTURING SITE TO REGIONAL DISTRIBUTION CENTER (RDC)	RDC TO CUSTOMER	
Type	Truck 40t-60t payload average fleet	Lorry 34t-40 payload average fleet	Ship: Small Container Ship (coastal boat)
Distance (km)	1,809.80	659.40	252.04
Capacity utilisation	60%	60%	70%
Bulk density of transported products	1300 kg/m^3	1300 kg/m^3	1300 kg/m^3

A5. Application and use

This module includes the environmental aspects and impacts associated with the application and of the coating. The use of energy from air spray for coating application purposes is included.

PARAMETER	(KWh/ declared unit)
Energy for application	0.1

There are some raw materials added in the coating formulations which contain small amounts of solvents. The VOC emissions during application per coating are included in this module.

C2. Transport to incineration or landfill

This module includes one-way transportation distance of the demolition or sorting site to the dump site.

PARAMETER	TRANSPORT TO WASTE PROCESSING
Vehicle type	Truck 34t-40t payload average fleet
Distance	100 km
Capacity utilisation	60%
Bulk density of transported products	1300 kg/m^3

C3. Waste processing and C4. Disposal

The end of life stage is encompassed in these modules. It is assumed that part of the coating is lost during application and the rest is applied. After its lifetime, it is assumed that the coatings end up in incineration. These assumptions are based on best knowledge of the end of life of coating from direct contact with AkzoNobel.

ADDITIONAL INFORMATION ON ENVIRONMENTAL IMPACTS

The CML-IA methods do not have characterization factors for the “unspecified VOC” emission flow in the Global Warming Potential environmental impact category. However, VOCs are known to have influence in this category. In order to include the impacts of the VOCs and align with current practice of AkzoNobel, it was decided to calculate the VOC impact on Global Warming Potential separately. The Global Warming Potential impact category has been modified, adding a generic factor of 8 KgCO2-eq/kg VOC, which is in line with AkzoNobel characterisation factors for carbon reporting.

	UNIT	A1	A2	A3	A4	A5	C2	C4
Global Warming potential (GWP 100 years)	[kg CO2-Eq.]	1.68E+00	2.35E-02	1.20E-01	4.29E-02	9.41E-02	1.32E-03	2.48E-01
Global Warming potential (GWP 100 years) including VOC characterization factor	[kg CO2-Eq.]	1.68E+00	2.35E-02	1.20E-01	4.29E-02	4.89E-01	1.32E-03	2.48E-01

DECLARATION OF SVHC

None of the substances contained in the product are listed in the “Candidate List of Substances of Very High Concern for authorisation”, or they do not exceed the threshold with the European Chemicals Agency.

REFERENCES

- EN 15804:2012+A1:2013 Sustainability of construction works. Environmental product declarations. Core rules for the product category of construction products, of 11/2013.
- ISO 14040/14044 on Life Cycle Assessments
- Duncan, Carola., 2018. Personal communication with Carola Duncan, AkzoNobel Protective Coatings.
- Hesselink, S.J. Bas, 2018. Personal communication with Bas Hesselink, AkzoNobel Protective Coatings.
- Akzonobel own latest reviewed database version 2017.
- Thinkstep GaBi Software-System and Database for Life Cycle Engineering. Copyright 1992-2017 thinkstep AG.

REMARKS

None