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XYPEX[®] ECOLOGICAL RESILIENCE SUPPORTS
LONG-LASTING CONCRETE INFRASTRUCTURE

Xypex C-Series Admixtures (Xypex Admix C-1000 NF and Xypex Admix C-5000)

ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006, EN 15804:2012+A2:2019/AC:2021

BeingThere™ for the environment

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Note: EN 15804:2012+A1:2013 compliant results are also given in this document to assist comparability across EPDs and support use in tools such as Green Star and IS Rating.

PROGRAM INFORMATION AND VERIFICATION

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The EPD owner, Xypex Australia, has the sole ownership, liability and responsibility for the EPD.

This EPD is valid for two specific products: Xypex Admix C-1000 NF and Xypex Admix C-5000. No averaging has taken place.

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.

WHO WE ARE

Xypex Australia

Xypex Crystalline Technology has been established in Canada since 1969 and in Australia, as Xypex Australia with the one owner, since 1991. Xypex products are currently distributed to over 80 countries worldwide.

As an industry leader, Xypex Australia embraces Corporate Social Responsibility very seriously and is conscious of all social, environmental and economic factors that may impact on society. In recognition of this responsibility, Xypex Australia has adopted practices and research that supports the development of a 'Whole of Life', sustainable construction philosophy to all construction industry stakeholders. This philosophy is to advise the industry that by increasing the life and durability of civil and commercial infrastructure, it will provide long-term gains and benefits to not only the building and construction industry, but society as a whole.

Service, Value and Quality

Xypex Australia is dedicated to improving building standards within Australia and are committed to customised solutions to meet our client's needs in line with our holistic service value to drive innovation in concrete durability and waterproofing that results in providing ecological resilience and further supports long lasting concrete infrastructure.

Our brand of 'No Equal™' is an extension of our already well known Xypex brand that embodies the commitment we have to high performance systems in concrete. No Equal™ in service and No Equal™ in technology. By investing in your concrete durability and protection from inception, and recognising the benefits, both socially and financially, in meeting your project needs, investing in a quality solution that stands by its commitment to longer lasting concrete structures and a lower whole of life carbon impact is crucial in the industry-wide shift to more sustainable construction.



Beingthere™

The Xypex Australia team are passionate in not only what they do, but why they do it. With a Corporate Vision centred around contributing to something greater for generations to come, the Xypex Group focuses on delivering a consultative approach with all clients and enquiries. We know that in order to truly understand the concept of Beingthere™ for our Clients, the key is to listen.

Continual improvement, reassessing our processes and challenging our own thinking are key to ensure we are aligning to our own values, our Client's needs, and setting the industry standard for service, supply and expertise to the Construction Industry.

Our Mission

To facilitate an environment for our people that promotes social responsibility and encourages the growth of knowledge, skills and proficiencies in each person; to empower them to deliver an exceptional level of service, supply and expertise to the Construction Industry that cannot be equaled.

The Xypex team is adaptive and embraces the challenges of Market Growth and Leadership, and the continual improvement of Standards, whilst maintaining and exceeding Customer and Supplier service expectations.

Our Vision

Our Vision is to support and drive Environmental Awareness in all that we do, ensuring that our business practices provide sustainable solutions to Society as a whole, that leads and results in contributing to the delivery of creating durable and sustainable Concrete Infrastructure, for many generations to come.

"What we believe we achieve"



XYPEX C-SERIES ADMIXTURES

Delivering Lower Carbon Construction

Often in the design of concrete structures, the whole of life cycle impacts and long-term sustainability of the structures, are not as highly considered as the initial construction impacts. Cement is estimated as the source of 8% of the world's carbon dioxide emissions (2021)¹. It is therefore important to drive efficiencies to limit the unnecessary use of this high impact resource.

Xypex C-Series Admixtures, when used in concrete mixes, assist in increasing the life and structural integrity of our clients' concrete assets, potentially providing significant whole of life sustainability benefits with a reduced carbon footprint. These attributes support our adoption of practices and research to drive concrete sustainability in the construction industry to benefit future generations through longer lasting concrete infrastructure.



Lascelles Wharf, VIC

Extension of Service Life

Xypex C-Series Admixtures are designed to extend the service life of concrete and reduce the need for repairs and maintenance, by introducing Xypex Crystalline Technology into the concrete. This Technology is a non-toxic chemical treatment which provides watertightness and protection to concrete through its unique ability to generate a permanent, non-soluble crystalline structure which blocks the pores, capillary tracts and micro-cracks within the concrete matrix, permanently sealing the concrete against the penetration of water.

As the movement of water is present in all concrete corrosion mechanisms, Xypex Crystalline Technology delivers durability, protecting the steel reinforcement and concrete matrix from corrosion by blocking the pores and healing the cracks of up to 0.4 mm, thus extending the service life and reducing the need for repairs and maintenance throughout the life of the asset.

These benefits can reduce the need to demolish existing structures and rebuild new structures, and reduce the use of repair materials. Xypex solutions can play a pivotal role in reducing the built environment's greenhouse gas emissions over time.

Concrete panels used in the construction of 'Lascelles Wharf' were designed with a 50-year design service life and were treated with Xypex C-Series Admixture in 1995 prior to installation, in an aggressive marine environment. Samples of the concrete were taken at both 19 and 26 years service, and tested for carbonation ingress and chloride diffusion. Results showed no carbonation ingress at both intervals and a continued reduction in chloride diffusion over time. Using Ficks 2nd Law chloride diffusion modelling, the residual service life was estimated by independent consultants at 145 years in 2014 and then an increased 161 years in 2021².

¹ <https://psci.princeton.edu/tips/2020/11/3/cement-and-concrete-the-environmental-impact>

² Please contact Xypex Australia for Independent Consultant Reports: "BCRCV-10168 XYPEX AUSTRALIA LASCELLES WHARF SLP REPORT" and "Lascelles Wharf Report by Sharp N Howells" at xy.peng@xypex.com.au



LOCAL MANUFACTURING

Sustainable Supply Chain

Xypex Australia are proud to manufacture in Australia, servicing our client's needs across all States and Territories.

Our custom-built Head Office and Manufacturing site in Albury, New South Wales, supports keeping jobs local, supply chains simple and distribution readily available and flexible to meet our customers' requirements for both ease of supply and sustainable, low carbon solutions. Using a combination of imported and local raw materials, we are able to manufacture thousands of tonnes of Xypex product per year, meeting the continual increase of demand.

our mission of Beingthere™ in everything we do is underpinned by; our focus of commitment to our teams by keeping jobs local and our obligation to our clients to provide the highest quality concrete durability solutions, and our vision for the broader community.

DECLARED PRODUCTS

The product range covered by this EPD are Xypex Admix C-1000 NF and Xypex Admix C-5000

XYPEX ADMIX C-1000 NF Environmental Product Declaration

Declared Unit: This EPD provides data for 1kg of Xypex Admix C-1000 NF, manufactured by Xypex Australia in Albury, Australia.

Xypex Admix C-1000 NF is added to the concrete mix at the time of batching. Xypex Admix C-1000 NF consists of Portland cement and various active proprietary chemicals.

These active chemicals react with the moisture in fresh concrete and with the by-products of cement hydration to cause a catalytic reaction.

This reaction generates a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete that permanently seals the concrete and prevents the penetration of water and other liquids from any direction.

The Xypex Admix C-Series has been specially formulated to meet varying project and temperature conditions. Xypex Admix C-1000 NF is designed for concrete, where normal to a mild retarded set is desired.

Xypex Admix C-1000 NF complies with the requirements of AS 1478.1-2000, Chemical Admixture for Concrete, For Special Purpose Normal-Setting (Type SN) Admixture and AS 4020:2018 Standard for products for use in contact with drinking water.

ANZSIC Code: 1899 Other Basic Chemical Product Manufacturing n.e.c.

UN CPC Code: 35499 Other chemical products n.e.c.

Product Content: The composition of 1 kg of Xypex Admix C-1000 NF and its packaging is presented below³:

Product Component	Weight (kg)	Post consumer recycled material (weight-%)	Biogenic material (weight% and kg C/kg)
Silica Sand	0.05-0.15	0	0 resp. 0
Portland Cement	0.30-0.40	0	0 resp. 0
Base Mix	0.40-0.50	0	0 resp. 0
Hydrated Lime	0.05-0.15	0	0 resp. 0
Packaging Component	Weight (kg)	Weight-% versus the product	Weight biogenic carbon (kg C/kg)
Polypropylene bucket and lid	0.052	5.20%	0
Steel handle	0.004	0.40%	0
Soluble bag	0.003	0.27%	0

The products do not contain biogenic carbon and recycled material inputs. Xypex Admix C-1000 NF is compliant with the European REACH regulation (EC) 1907/2006 and does not release any hazardous substances when used as recommended. The product does not include substances listed in the latest "Candidate List of Substances of Very High Concern for authorisation" in quantities >0.1% by mass.

For safe use and maintenance, refer to the product Safety Data Sheet (SDS) available under Technical Data at <http://xypex.com.au/products/admixtures/xypex-admix-c-1000-nf>.



³ Proprietary composition. The exact product composition can be provided by Xypex Australia on demand (xypenq@xypex.com.au)



XYPEX ADMIX C-5000

Environmental Product Declaration

Declared Unit: This EPD provides data for 1kg of Xypex Admix C-5000, manufactured by Xypex Australia in Albury, Australia.

Xypex Admix C-5000 is a unique chemical treatment that has been specially formulated to enhance the durability of reinforced concrete exposed to aggressive conditions. Xypex Admix C-5000 is added to the concrete mix at the time of batching.

Xypex Admix C-5000 is a powdered additive consisting of various active proprietary chemicals and hydrated lime. These active chemicals react with the moisture in fresh concrete and the by-products of cement hydration to cause a catalytic reaction which generates a non-soluble crystalline formation throughout the pores and capillary tracts of the concrete.

The reaction products of Xypex Admix C-5000 are in mineral crystal form and prevent the penetration of deleterious ions and water into ordinary or blended Portland cement concrete. Experimental investigations conducted in Australia, Canada and Japan have demonstrated that Xypex C-5000 Admix enhances the durability of the concrete exposed to aggressive environmental conditions such as, but not limited to, marine environment, sulphate attack and acid attack whilst maintaining excellent hydrostatic pressure resistance.

Xypex Admix C-5000 complies with the requirements of AS 1478.1, as a Type SN Special Purpose Admixture and AS 4020:2018 Standard for products for use in contact with drinking water.

ANZSIC Code: 1899 Other Basic Chemical Product Manufacturing n.e.c.

UN CPC Code: 35499 Other chemical products n.e.c.

Product Content: The composition of 1 kg of Xypex Admix C-5000 and its packaging is presented below⁴:



Product Component	Weight (kg)	Post consumer recycled material (weight-%)	Biogenic material (weight% and kg C/kg)
Base Mix	0.80-0.90	0	0 resp. 0
Hydrated Lime	0.10-0.20	0	0 resp. 0
Packaging Component	Weight (kg)	Weight-% versus the product	Weight biogenic carbon (kg C/kg)
Polypropylene bucket and lid	0.052	5.2%	0
Steel handle	0.004	0.40%	0
Soluble bag	0.003	0.27%	0

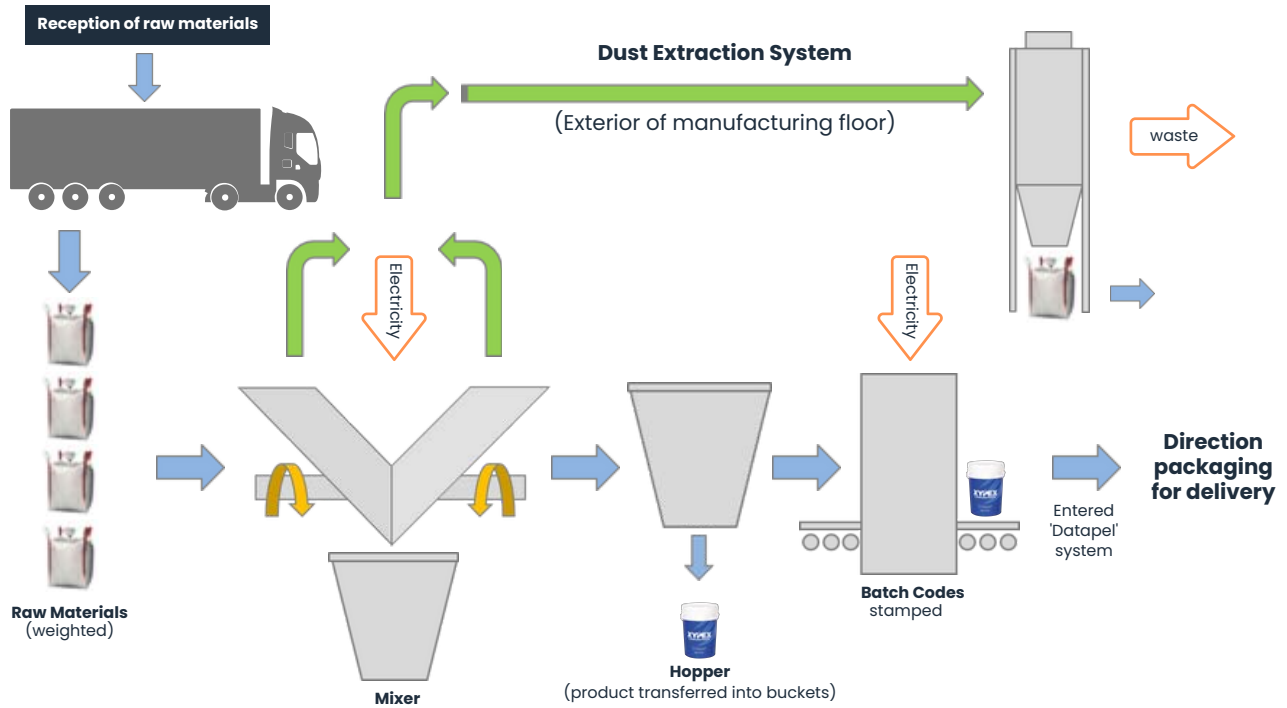
The products do not contain biogenic carbon and recycled material inputs. Xypex Admix C-5000 is compliant with the European REACH regulation (EC) 1907/2006 and does not release any hazardous substances when used as recommended. The product does not include substances listed in the latest "Candidate List of Substances of Very High Concern for authorisation" in quantities >0.1% by mass.

For safe use and maintenance, refer to the product Safety Data Sheet (SDS) available under Technical Data at <http://xypex.com.au/products/admixtures/xypex-admix-c-5000>.

⁴ Proprietary composition. The exact product composition can be provided by Xypex Australia on demand (xypengq@xypex.com.au)

MANUFACTURING PROCESS

The diagram summarises the key manufacturing processes to manufacture Xypex Admix C-1000 NF and Xypex Admix C-5000 in Albury



SYSTEM BOUNDARIES

This is EPD cradle to gate with options, modules C1-C4, and module D (A1-A3, A4-A5, C1-C4, D). It includes life cycle stages from extraction of raw materials, transport, manufacturing, installation, and disposal and/or recycling at the end-of-life..

The LCA excludes the use stage (modules B1-B7) due to the inability to predict how the material will be used following its installation (different application scenarios for each product).

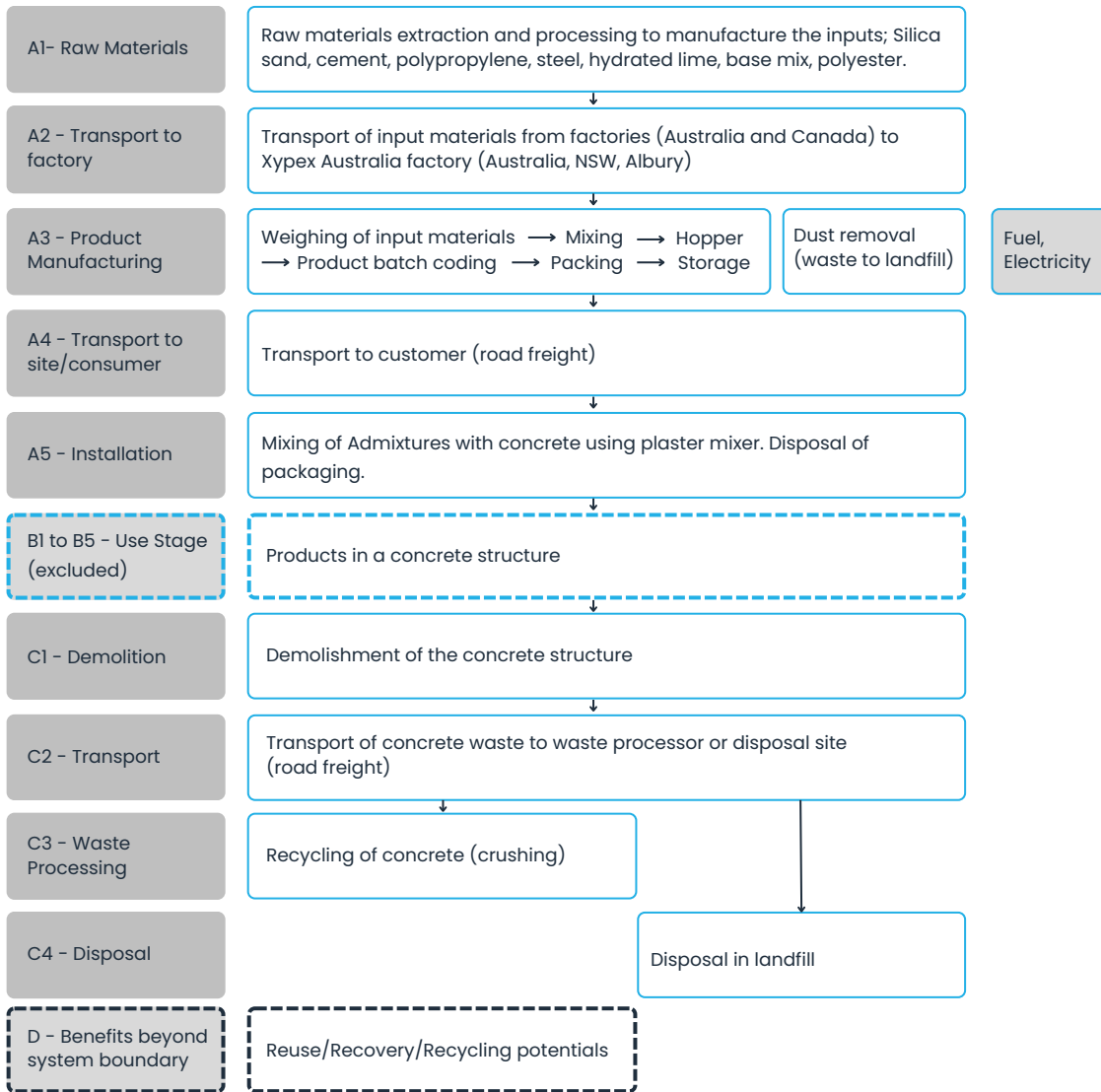
Module D sits outside the system boundary. It indicates a reuse, recovery and/or recycling potential of the products beyond the system boundary.

Scope of Declaration:

Module	Life Cycle Sub-Stage	Life Cycle Main Stage	Module Declared	Geographical Scope	Specific Data Used	Variation Products	Variation Sites
A1	Raw material supply	Product stage	X	AU (NSW, VIC), CA (British Columbia)	<30%	0%	None
A2	Transport		X	AU (NSW, VIC), CA (British Columbia)			
A3	Manufacturing		X	AU (NSW)			
A4	Transport	Installation process stage	X	AU	-	-	-
A5	Construction/Installation		X	AU	-	-	-
B1	Use	Use stage	ND	-	-	-	-
B2	Maintenance		ND	-	-	-	-
B3	Repair		ND	-	-	-	-
B4	Replacement		ND	-	-	-	-
B5	Refurbishment		ND	-	-	-	-
B6	Operational energy use		ND	-	-	-	-
B7	Operational water use		ND	-	-	-	-
C1	Deconstruction/Demolition	End-of-life	X	AU	-	-	-
C2	Transport		X	AU	-	-	-
C3	Waste processing		X	AU	-	-	-
C4	Waste disposal		X	AU	-	-	-
D	Reuse-Recovery-Recycling potential	Benefits and loads beyond the system boundary	X	AU	-		

*X = included in the EPD, ND = module is not declared in the study (such a declaration should not be regarded as an indicator result of zero)

Process Flow Diagram



Upstream Processes

The upstream processes include processes of module A1 – Material extraction and supply to produce all the raw materials (Silica sand, cement, polypropylene, steel, hydrated lime, base mix, polyester) required by Xypex Australia to manufacture its products. It also includes transport of the raw materials to Xypex factory in Australia (via road and sea freight).

Core Processes

The core processes are under module A3 and include:

- Dry mixing of the dry raw materials in a Gedge mixing machine at the factory in Albury, Australia.
- Packaging of the product in polypropylene buckets with lid and steel handle with Polypropylene grip. The buckets are then put on pallets using an LPG forklift and wrapped with low density polypropylene film.

Downstream Processes

The downstream processes are under Module A4 to C4, including:

- A4 – Transportation from the production gate to Xypex Australia’s warehouses and transportation from Xypex Australia warehouses to the construction sites or concrete plants. To estimate the average distance travelled from manufacturing facility to the consumer, an average distance from Xypex Australia facility to warehouse and then from warehouse to the client was selected as average of the 2021-07-01 to 2022-06-20 records as presented on the next page:

Product name	Manufacturing site to Xypex warehouses (km)	Xypex warehouses to construction site (km)	Modelled mode of transport
Xypex Admix C-1000 NF	649.82	42.65	Road Freight 16-32 metric ton lorry (0.209 kg diesel/km)
Xypex Admix C-5000	792.79	42.15	Road Freight 16-32 metric ton lorry (0.209 kg diesel/km)

- A5 - Xypex admixture products are directly mixed with the concrete (0.45% - 0.65% by weight of cementitious content for Xypex Admix C-5000 and 0.8% - 1.2% by weight of cementitious content for Xypex Admix C-1000 NF). The preparation of the product and mixing with concrete is modelled using a "plaster mixing" scenario in Simapro to estimate the energy usage from that life cycle stage (0.08 kWh/kg of plaster mixing). The transport of packaging bucket to landfill via road freight is also included (assumed 100km distance between site and landfill with Road Freight 16-32 metric ton lorry (0.209 kg diesel/km)).

(Use phase is excluded)

End-of-Life Scenarios

The end-of-life is modelled with a scenario as per the 2018-19 waste accounts published by Australian government⁵. At the end of the product's life, 81% of the concrete (along with the Xypex products) is assumed to be recycled and the remaining 19% of the concrete is disposed in landfill.

- C1 - This includes dismantling of the concrete structure in which Xypex products are used. This step is estimated using generic scenario for the demolition of concrete at construction sites. (requiring 0.0437 MJ of diesel/kg of Xypex C-Series Admixtures)
- C2 - Transport of waste generated at the end-of-life to a recycling factory or a landfill site (estimated at 100 km from the deconstruction site and modelled with the same mode of transport than stage A4).
- C3 - For the base case scenario, it is assumed that 81 % of the product total weight mixed in concrete goes to recycling
- C4 - Disposal of concrete in a landfill site. For the base case scenario, it is assumed that 19% of the product total weight mixed in concrete goes to landfill
- D - Potential of reuse/recovery/recycling of all the materials going through module C3 (crushed concrete aggregates used to replace virgin aggregates)

End of life scenarios parameters per kg of declared unit (kg Xypex Admix C-1000 NF and kg Xypex Admix C-5000)

End of Life		
Parameters	Unit	Total
Xypex Admixtures collected separately	kg	0.00
Xypex Admixtures collected with mixed construction waste	kg	1.00
Recovery for re-use	kg	0.00
Recovery for recycling	kg	0.81
Recovery for energy recovery	kg	0.00
Disposal to landfill	kg	0.19

⁵ <https://www.dcceew.gov.au/environment/protection/waste/national-waste-reports/2020>

LIFE CYCLE ASSESSMENT (LCA) METHODOLOGY

Foreground Data

Xypex Australia has supplied primary data for its manufacturing operations (stage A3) and transport of the product to the construction site (stage A4) for the one-year period of 2021-07-01 and 2022-06-30.

Background Data

Background data (e.g. for energy and transport processes, raw material extraction and manufacturing) have predominantly been sources from AusLCI database (v1.35) and Ecoinvent database (v3.8) using Simapro software version 9.4.0.2. Background data have been published between 2012 and 2022.

Electricity

For electricity consumption outside of Xypex Australia's manufacturing site, the electricity consumption (activity data) is taken as embedded in the Ecoinvent 3.8 and AUSLCI 1.35 processes selected in SimaPro.

The manufacturing of the products by Xypex Australia (module A3) is done in New South Wales using low voltage electricity. To model the potential impacts of electricity consumption at the manufacturing site, AUSLCI 1.35 database models the grid mixes using the National Greenhouse Accounts Factors, 2017.⁶ Other air and water pollution data are taken from the National Pollutant Inventory from the Department of Environment and Heritage and Water.

In 2017, the following sources contributed to the electricity supply: hydropower for 5.7%, black coal for 80.5%, natural gas for 5.4%, oil product for 0.5%, biomass for 1.6%, wind energy for 2.7% of the supply, small scale solar for 2.6%, and large scale solar for 0.9%.⁷ The GHG GWP factor of the 2017 NSW electricity mix 'Electricity, low voltage, New South Wales/AU U' based on the EN 15804+A2 method is 0.907 kg CO₂-e/kWh.

Allocation

The key material production processes that require allocation is:

- Shared electricity and LPG consumption at the Albury factory: five product ranges are produced at the factory. The share of electricity and LPG consumption has been allocated on a mass basis (total production mass of the five product categories during the period FY2022, i.e. 2021-07-01 until 2022-06-30.)

No secondary materials (that require allocation) are used in the product system.

Cut-off Criteria

The cut-off criteria applied is 1% of renewable and non-renewable primary energy usage and 1% of the total mass input of a process. The following processes are excluded:

- Contribution of capital goods such as equipment production and infrastructure (crane, machinery, trucks)
- Personnel-related impacts, such as workers' transportation to and from the factories, and installation sites.

Those processed are non-attributable to the products and would contribute less than 10% to the GWP-GHG indicator. This does not mean that they do not carry any environmental impacts throughout the life cycle.

Key Assumptions

The key choices and assumptions in the LCA are:

- The selection of background data from SimaPro to model the environmental impacts of Admixtures products when no foreground data was available.
- Xypex Admix C-1000 NF and Xypex Admix C-5000 composition: The composition of Xypex products is taken from Xypex's internal operating systems. These data are of high accuracy.
- To estimate the average distance travelled from manufacturing facility to the consumer (A4), an average distance from Xypex Australia facility to warehouse and then from warehouse to the client was selected as average of the FY2022 records.
- No direct data for demolition is available. Background data is taken from LCA software. It is assumed that 19% of the concrete mixed with Xypex product end up in landfill. The building demolition is assumed to be done with skid-steer loaders as per AUSLCI background data.
- The transport of waste materials to waste treatment facility is assumed to be done over a 100 km distance.

The end-of-life scenarios are based on a set of assumptions that may influence the outcome of the assessment. It is important to understand the scenarios before drawing conclusions based on this EPD.

⁶ http://auslci.com.au/Documents/AUSLCI_Manual%20V1_1.pdf

⁷ -

<https://www.energy.gov.au/sites/default/files/Australian%20Energy%20Statistics%2C%20Table%20O%20Electricity%20generation%20by%20fuel%20type%202018-19%20and%202019.pdf>

ASSESSMENT INDICATORS

The background LCA serves as the foundation for this EPD. An LCA analyses the environmental processes in the value chain of a product. It provides a comprehensive evaluation of all upstream and downstream material and energy inputs and outputs. The results are provided for a range of environmental impact categories, in line with EN 15804:2012+A2:2019. 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.

Potential environmental impacts – core indicators according to EN 15804:2012+A2:2019

Environmental Indicators	Environmental Indicators Abbreviation	Unit
Global Warming Potential – total	GWP-total	kg CO ₂ eq
Global Warming Potential – fossil fuels	GWP-fossil	kg CO ₂ eq
Global Warming Potential – biogenic	GWP-biogenic	kg CO ₂ eq
Global Warming Potential – land use and land use change	GWP-luluc	kg CO ₂ eq
Depletion Potential of the Stratospheric Ozone Layer	ODP	kg CFC-11 eq
Acidification potential	AP	mol H ⁺ eq
Eutrophication potential – freshwater	EP-freshwater	kg P eq
Eutrophication potential – marine	EP-marine	kg N eq
Eutrophication potential – terrestrial	EP-terrestrial	mol N eq
Formation potential of tropospheric ozone	POCP	kg NMVOC eq
Abiotic depletion potential of non-fossil resources*	ADP-minerals & metals	kg Sb eq
Abiotic depletion potential of fossil resources*	ADP-fossil	MJ
Water user (deprivation potential)*	WDP	m ³ world deprived

Potential environmental impacts – additional indicators according to EN 15804:2012+A2:2019

Environmental Indicators	Environmental Indicators Abbreviation	Unit
Particulate Matter emissions	PM	Disease incidence
Ionising Radiation – human health ***	IRP	kBq U-235 eq
Eco-toxicity – freshwater*	ETP-fw	CTUe
Human toxicity potential – cancer effects*	HTP-c	CTUh
Human toxicity potential – non-cancer effects*	HTP-nc	CTUh
Land use related impacts / soil quality*	SQP	dimensionless

Use of resources parameters

Environmental Indicators	Environmental Indicators Abbreviation	Unit
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ
Use of renewable primary energy resources used as raw materials	PERM	MJ
Total use of renewable primary energy resources	PERT	MJ
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ
Total use of non-renewable primary energy resources	PENRT	MJ
Use of secondary material	SM	kg
Use of renewable secondary fuels	RSF	MJ
Use of non-renewable secondary fuels	NRSF	MJ
Net use of freshwater	FW	m ³

Waste production and output flow parameters

Environmental Indicators	Environmental Indicators Abbreviation	Unit
Hazardous waste disposed	HWD	kg
Non-hazardous waste disposed	NHWD	kg
Radioactive waste disposed	RWD	kg
Components for re-use	CRU	kg
Materials for recycling	MFR	kg
Materials for energy recovery	MER	kg
Exported energy – electrical	EEE	MJ
Exported energy – thermal	EET	MJ

Results aligned with EN 15804:2012+A1:2013 standard are provided to assist our customers who want to use this EPD in tools, such as the Infrastructure Sustainability Council’s Sustainability Rating Tool, that are currently based on this method.

Environmental indicators for EN 15804:2012+A1:2013

Environmental Indicators	Environmental Indicators Abbreviation	Unit
Global warming potential	GWP	kg CO ₂ eq
Ozone layer depletion	ODP	kg CFC-11 eq
Acidification potential	AP	kg SO ₂ eq
Eutrophication potential	EP	kg PO ₄ ³⁻ eq
Photochemical ozone creation potential	POCP	kg C ₂ H ₄ eq
Abiotic depletion potential for non-fossil resources	ADPE	kg Sb eq
Abiotic depletion potential for fossil resources	ADPF	MJ

Additional Environmental indicator

Environmental Indicators	Environmental Indicators Abbreviation	Unit
Climate impact**	GWP-GHG	kg CO ₂ eq

* 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.

** This indicator is calculated using the characterisation factors from the IPCC AR5 report (IPCC 2013) and has been included in the EPD following the PCR. The indicator is more likely to be in line with other GHG reporting in Australia and New Zealand.

*** 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.

ENVIRONMENTAL PERFORMANCE

Results are presented using the scientific notation (i.e. 1.18E+00 should be read as 1.18, or 1.01E-01 as 0.10).

Xypex Admix C-1000 NF

In accordance to EN 15804:2012+A2:2019

Potential environmental impacts – core indicators according to EN 15804:2012+A2:2019 (Results per 1kg of Xypex Admix C-1000 NF)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	1.39E+00	1.01E-01	7.00E-02	3.64E-03	1.30E-02	3.43E-03	4.54E-04	-5.05E-03
GWP-fossil	kg CO ₂ eq	1.37E+00	1.01E-01	6.97E-02	3.64E-03	1.30E-02	3.43E-03	4.54E-04	-5.03E-03
GWP-biogenic	kg CO ₂ eq	9.96E-03	1.05E-05	2.62E-04	4.07E-07	1.30E-06	4.77E-06	6.17E-08	-2.18E-05
GWP-luluc	kg CO ₂ eq	4.30E-03	4.51E-08	1.96E-09	1.77E-09	6.05E-09	1.54E-09	2.18E-10	1.65E-10
ODP	kg CFC-11 eq	8.49E-08	1.88E-08	1.97E-10	5.90E-10	2.02E-09	4.19E-10	7.36E-11	1.00E-10
AP	mol H ⁺ eq	6.63E-03	3.59E-04	5.03E-04	8.91E-06	1.14E-04	1.23E-05	1.13E-06	-3.99E-05
EP-freshwater	kg P eq	5.89E-06	7.65E-09	6.80E-08	5.40E-10	9.04E-10	2.88E-09	6.81E-11	-5.90E-09
EP-marine	kg N eq	1.71E-03	1.30E-04	7.45E-05	1.61E-06	3.56E-05	2.04E-06	2.01E-07	-5.50E-06
EP-terrestrial	mol N eq	1.68E-02	1.43E-03	8.02E-04	1.76E-05	3.89E-04	2.22E-05	2.19E-06	-6.23E-05
POCP	kg NMVOC eq	5.89E-03	3.46E-04	2.11E-04	4.73E-06	9.50E-05	5.94E-06	5.89E-07	-1.64E-05
ADP-minerals & metals	kg sb eq	7.86E-07	8.75E-11	2.14E-12	4.34E-12	1.48E-11	8.25E-10	5.28E-13	-3.78E-10
ADP-fossil	MJ	1.04E+01	1.32E+00	3.30E-01	5.08E-02	1.74E-01	4.01E-02	6.30E-03	-1.67E-02
WDP	m ³ world deprived	8.03E+00	7.06E-02	2.09E+00	3.00E-03	9.54E-03	4.53E-02	4.60E-04	-2.23E-01

Potential environmental impacts – additional indicators according to EN 15804:2012+A2:2019 (Results per 1 kg of Xypex Admix C-1000 NF)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease incidence	2.78E-08	3.37E-09	4.35E-09	7.48E-09	6.42E-10	8.89E-11	6.14E-12	-3.54E-10
IRP	kgq U-235 eq	8.47E-03	2.03E-06	4.10E-08	7.53E-08	2.57E-07	6.70E-07	9.32E-09	-1.05E-07
ETP-fw	CTUe	7.27E+00	3.46E-01	6.98E-02	1.48E-02	5.05E-02	1.23E-02	1.82E-03	-2.72E-03
HTP-c	CTUh	1.43E-10	2.14E-12	4.58E-12	1.36E-13	2.13E-13	5.58E-13	1.67E-14	-4.24E-13
HTP-nc	CTUh	4.41E-08	2.58E-10	2.29E-10	1.34E-11	1.69E-11	1.86E-11	1.63E-12	-1.69E-11
SCP	dimensionless	1.69E+00	9.41E-03	1.67E-01	2.45E-04	7.80E-04	9.02E+00	1.06E-02	7.16E+00

Use of resources (Results per 1kg of Xypex Admix C-1000 NF)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	3.70E-01	1.64E-03	5.50E-02	7.06E-05	2.23E-04	7.27E-04	1.11E-05	-5.62E-03
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	3.70E-01	1.64E-03	5.50E-02	7.06E-05	2.23E-04	7.27E-04	1.11E-05	-5.62E-03
PENBE	MJ	1.31E+01	1.41E+00	7.77E-01	5.45E-02	1.86E-01	4.81E-02	6.77E-03	-7.04E-02
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.31E+01	1.41E+00	7.77E-01	5.45E-02	1.86E-01	4.81E-02	6.77E-03	-7.04E-02
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	1.67E-01	1.98E-04	1.42E-04	7.49E-06	2.55E-05	1.71E-05	9.32E-07	-1.13E-03

Waste production (Results per 1kg of Xypex Admix C-1000 NF)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	4.30E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	4.97E-03	1.22E-05	5.91E-02	5.26E-07	1.66E-06	5.14E-06	1.90E-01	-3.68E-05
RWD	kg	3.80E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Output flows (Results per 1kg of Xypex Admix C-1000 NF)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.10E-01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Xypex Admix C-1000 NF

Additional Results for in accordance to EN 15804:2012+A1:2013

Potential environmental impacts – mandatory indicators according to EN 15804:2012+A1:2013 (Results per 1 kg of Xypex Admix C-1000 NF)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO ₂ eq	1.31E+00	1.00E-01	6.89E-02	3.61E-03	1.28E-02	3.40E-03	4.51E-04	-6.47E-03
ODP	kg CFC-11 eq	8.32E-08	1.48E-08	1.56E-10	4.66E-10	1.59E-09	3.31E-10	5.82E-11	2.69E-11
AP	kg SO ₂ eq	4.61E-03	2.58E-04	9.64E-05	6.99E-06	6.25E-05	6.25E-06	8.73E-07	-1.42E-05
EP	kg PO ₄ ³⁻ eq	8.17E-04	4.47E-05	2.56E-05	5.55E-07	1.20E-05	7.08E-07	6.89E-08	-4.63E-06
POCP	kg C ₂ H ₄ eq	1.25E-03	2.85E-05	2.62E-06	9.24E-07	1.36E-05	7.33E-07	1.16E-07	-8.54E-07
ADPE	kg Sb eq	7.89E-07	8.80E-11	1.28E-11	4.37E-12	1.49E-11	8.25E-10	5.31E-13	-2.22E-08
ADPF	MJ	1.28E+01	1.30E+00	7.76E-01	5.01E-02	1.71E-01	4.50E-02	6.23E-03	-7.06E-02

Carbon footprint in line with Australian climate change reporting frameworks (Results per 1 kg of Xypex Admix C-1000 NF)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq	1.32E+00	1.01E-01	6.93E-02	3.62E-03	1.28E-02	3.41E-03	4.52E-04	-5.05E-03

Xypex Admix C-5000

In accordance to EN 15804:2012+A2:2019

Potential environmental impacts – core indicators according to EN 15804:2012+A2:2019 (Results per 1kg of Xypex Admix C-5000)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-total	kg CO ₂ eq	1.28E+00	1.00E-01	6.93E-02	3.62E-03	1.28E-02	3.41E-03	4.52E-04	-5.05E-03
GWP-fossil	kg CO ₂ eq	1.40E+00	1.01E-01	7.00E-02	3.64E-03	1.30E-02	3.43E-03	4.54E-04	-5.05E-03
GWP-biogenic	kg CO ₂ eq	1.38E+00	1.01E-01	6.97E-02	3.64E-03	1.30E-02	3.43E-03	4.54E-04	-5.03E-03
GWP-luluc	kg CO ₂ eq	1.85E-02	1.05E-05	2.62E-04	4.07E-07	1.30E-06	4.77E-06	6.17E-08	-2.18E-05
ODP	kg CFC-11 eq	4.48E-03	4.51E-08	1.96E-09	1.77E-09	6.05E-09	1.54E-09	2.18E-10	1.65E-10
AP	mol H ⁺ eq	1.10E-07	1.88E-08	1.97E-10	5.90E-10	2.02E-09	4.19E-10	7.36E-11	1.00E-10
EP-freshwater	kg P eq	6.79E-03	3.59E-04	5.03E-04	8.91E-06	1.14E-04	1.23E-05	1.13E-06	-3.99E-05
EP-marine	kg N eq	7.53E-06	7.64E-09	6.80E-08	5.40E-10	9.04E-10	2.88E-09	6.81E-11	-5.90E-09
EP-terrestrial	mol N eq	1.65E-03	1.29E-04	7.45E-05	1.61E-06	3.56E-05	2.04E-06	2.01E-07	-5.60E-06
POCP	kg NMVOC eq	1.54E-02	1.42E-03	8.02E-04	1.76E-05	3.89E-04	2.22E-05	2.19E-06	-6.23E-05
ADP-minerals & metals	kg Sb eq	7.12E-03	3.45E-04	2.11E-04	4.73E-06	9.50E-05	5.94E-06	5.89E-07	-1.64E-05
ADP-fossil	MJ	1.45E-06	8.74E-11	2.14E-12	4.34E-12	1.48E-11	8.25E-10	5.28E-13	-3.78E-10
WDP	m ³ world deprived	8.11E+00	1.32E+00	3.30E-01	5.08E-02	1.74E-01	4.01E-02	6.30E-03	-1.67E-02

Potential environmental impacts – additional indicators according to EN 15804:2012+A2:2019 (Results per 1 kg of Xypex Admix C-5000)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PM	Disease Incidence	2.37E-08	3.36E-09	4.35E-09	7.48E-09	6.42E-10	8.89E-11	6.14E-12	-3.54E-10
IRP	kBq U-235 eq	1.11E-02	2.03E-06	4.10E-08	7.53E-08	2.57E-07	6.70E-07	9.32E-09	-1.05E-07
ETP-lw	CTUe	9.32E+00	3.45E-01	6.98E-02	1.48E-02	5.05E-02	1.23E-02	1.82E-03	-2.72E-03
HTP-c	CTUh	1.72E-10	2.14E-12	4.58E-12	1.36E-13	2.13E-13	5.58E-13	1.67E-14	-4.24E-13
HTP-ng	CTUh	7.96E-08	2.58E-10	2.29E-10	1.34E-11	1.69E-11	1.86E-11	1.63E-12	-1.69E-11
SQP	dimensionless	2.02E+00	9.40E-03	1.67E-01	2.45E-04	7.80E-04	9.02E+00	1.06E-02	7.16E+00

Use of resources (Results per 1kg of Xypex Admix C-5000)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
PERE	MJ	4.93E-01	1.64E-03	5.50E-02	7.06E-05	2.23E-04	7.27E-04	1.11E-05	-5.62E-03
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	4.93E-01	1.64E-03	5.50E-02	7.06E-05	2.23E-04	7.27E-04	1.11E-05	-5.62E-03
PENBE	MJ	1.45E+01	1.41E+00	7.77E-01	5.45E-02	1.86E-01	4.81E-02	6.77E-03	-7.04E-02
PENRM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.45E+01	1.41E+00	7.77E-01	5.45E-02	1.86E-01	4.81E-02	6.77E-03	-7.04E-02
SM	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m³	2.91E-01	1.98E-04	1.42E-04	7.49E-06	2.55E-05	1.71E-05	9.32E-07	-1.13E-03

Waste production (Results per 1kg of Xypex Admix C-5000)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
HWD	kg	4.30E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NHWD	kg	1.13E-03	1.22E-05	5.91E-02	5.26E-07	1.66E-06	5.14E-06	1.90E-01	-3.68E-05
RWD	kg	3.80E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Output flows (Results per 1kg of Xypex Admix C-5000)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
CRU	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MFR	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	8.10E-01	0.00E+00	0.00E+00
MER	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EEF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EET	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Xypex Admix C-5000

Additional Results for in accordance to EN 15804:2012+A1:2013

Potential environmental impacts – mandatory indicators according to EN 15804:2012+A1:2013 (Results per 1 kg of Xypex Admix C-5000)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP	kg CO ₂ eq	127E+00	100E-01	6.89E-02	3.61E-03	1.28E-02	3.40E-03	4.51E-04	-6.47E-03
ODP	kg CFC-11 eq	1.04E-07	1.48E-08	1.56E-10	4.66E-10	1.59E-09	3.31E-10	5.82E-11	2.69E-11
AP	kg SO ₂ eq	5.05E-03	0.00E+00	0.00E+00	0.00E+00	6.25E-05	6.25E-06	8.73E-07	-1.42E-05
EP	kg PO ₄ ³⁻ eq	8.54E-04	4.36E-05	2.56E-05	1.11E-07	1.20E-05	7.08E-07	6.89E-08	-4.63E-06
POCP	kg C ₂ H ₄ eq	2.13E-03	2.78E-05	2.62E-06	1.58E-07	1.36E-05	7.33E-07	1.16E-07	-8.54E-07
ADPE	kg Sb eq	1.45E-06	8.59E-11	1.28E-11	7.29E-13	1.49E-11	8.25E-10	5.31E-13	-2.22E-08
ADPF	MJ	8.98E+00	1.27E+00	7.76E-01	8.94E-03	1.71E-01	4.50E-02	6.23E-03	-7.06E-02

Carbon footprint in line with Australian climate change reporting frameworks (Results per 1 kg of Xypex Admix C-5000)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
GWP-GHG	kg CO ₂ eq	1.28E+00	1.00E-01	6.93E-02	3.62E-03	1.28E-02	3.41E-03	4.52E-04	-5.05E-03

Sustainability Rating Schemes Credits

This EPD can contribute to the achievements of credit points under Green Star rating tools and IS rating scheme (IS) specifically within the Responsible, Sustainable Products, Lifecycle Assessment, Leadership and Innovation credit categories.

This EPD also provides:

- Environmental performance information including life cycle stages from extraction of raw materials, transport, manufacturing, installation, and disposal and/or recycling at the end-of-life.
- Carbon footprint data for use in Scope 3 carbon footprint calculations of your supply chain.
- A wide range of environmental metrics, such as water, energy and waste.





GREENTAG CERTIFICATION

Beingthere™ with sustainable solutions

Xypex C-Series Admixtures are recognised by Global Green Tag International, holding a GreenRate™ 'Level A' Certification⁸. This certification follows a whole-of-sustainability assessment and is a highly recognised third party Sustainable Product Certification that aligns with industry sustainability rating tool credit requirements.

These certified products have been examined to ensure Fit-for-Purpose and meet the Building Code compliance requirements, driven by a comprehensive audit process.

This certification assesses Health, Ecotoxicity and the other Priority Assessment Criteria of the products.

It examines different aspects of each product including resource use, recycled and rapidly renewable content, waste reduction and greenhouse gas and water footprints.

The endorsement by GreenTag highlights the progressive nature of Xypex Australia in continuing to show Industry Leadership, with a focus on the importance of sustainability and driving concrete sustainability in all that we do.

This GreenRate™ certification is unique to Xypex Australia products within the industry and enables credits for Sustainable Products within both the Green Building Council of Australia's and the Infrastructure Sustainability Council's sustainability ratings tools.

"Together we can build a more sustainable future now and for future generations to come."



⁸ <https://www.xypex.com.au/pdf/products/technical-data/admix-c-1000-nf-xypex/greentag-admix-c1000nf.pdf> and <https://www.xypex.com.au/pdf/products/technical-data/admix-c-5000-xypex/greentag-admix-c5000.pdf>

Collaboration

Beingthere™ transcends the four walls of Xypex Australia. We are committed to Beingthere™ for our Team and our Clients through the consultative approach we take in collaboration and partnering to deliver our aligned vision of a sustainable construction industry.

Whole of Life Cycle

Understanding whole of life cycle impact is crucial in the management of concrete infrastructure. At Xypex Australia we provide solutions that assist in maintenance scheduling and return to service planning, thereby reducing the need for early replacement or expensive repair of concrete structures, underpinning our focus of reducing carbon emissions and our commitment to concrete sustainability.

Low Carbon Construction

We have long put sustainability and the environment at the forefront of Xypex Australia's purpose. We understand the wider impact to the client, the environment and the industry by not placing environmental best practice at the forefront of what we do and how critical is it in determining the ultimate carbon footprint of construction.

Global Testing

Our investment in testing has been ongoing since inception. Testing globally has been active for even longer. The broader company takes pride in putting solutions to the test in a range of environments to give clients peace of mind and comfortability with these proven long-term, sustainable solutions for waterproofing and durability performance.



REFERENCES

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