Vinidex
by aliaxis

Environmental Product Declaration

In accordance with ISO 14025 and EN 15804:2012+A2:2019

PVC Pressure Pipes

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

ECO PLATFORM EPD VERIFIED

EPD registration number: S-P-00718
Version 2.0
Publication Date: 2 March 2016
Version Date: : 16 September 2022
Validity Period: 16 September 2022 - 16 September 2027
Geographical area of application of this EPD: Australia
Year taken as reference for the data: FY19/20 - 1st July 2019 to 30th Jun 2020

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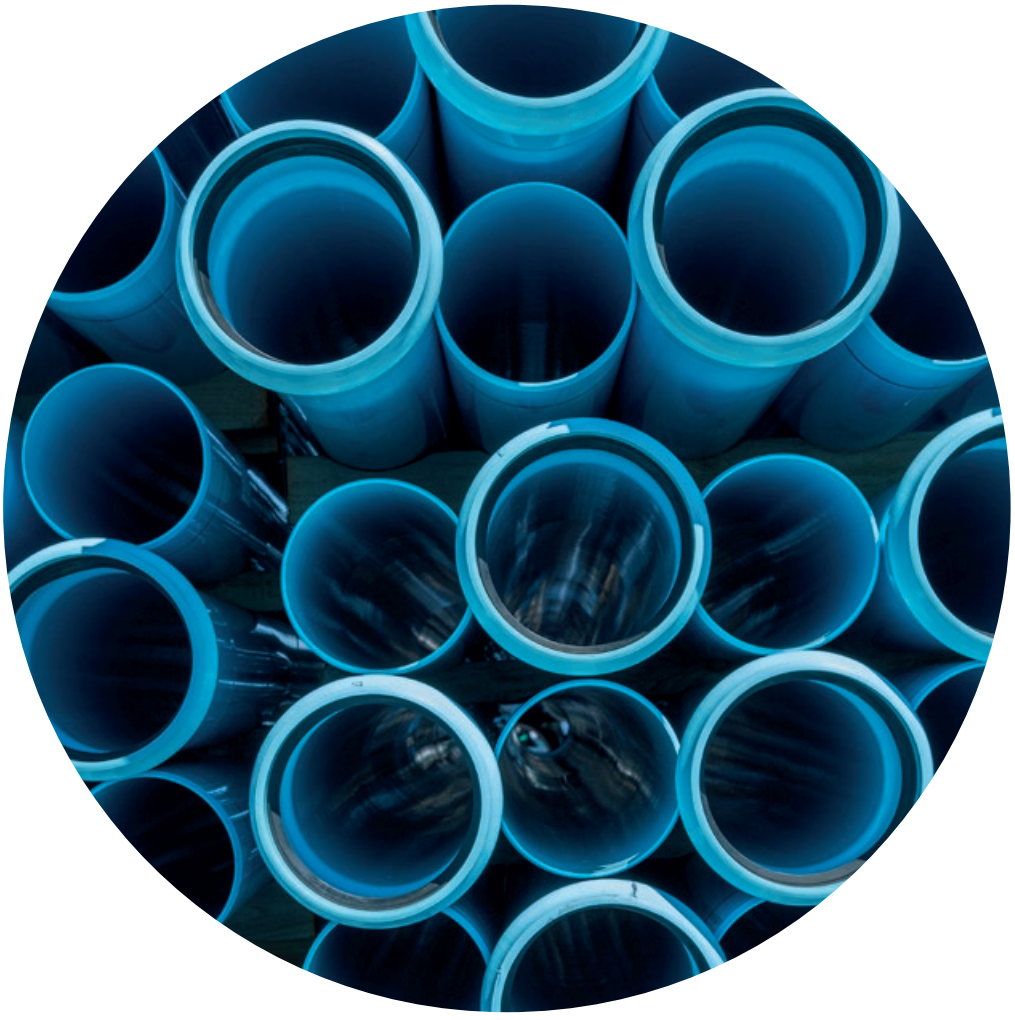
An EPD should provide current information and may be updated if conditions change. The stated validity is therefore subject to the continued registration and publication at www.epd-australasia.com.

Environmental Product Declaration details

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).

EPDs within the same product category but from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804. For further information about comparability, see EN 15804 and ISO 14025.



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Accredited or approved by	EPD Australasia
CEN standard EN 15804 served as the core PCR	
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Independent external verification of the declaration and data, according to ISO 14025:2010	☐ EPD process certification (Internal) ☑ EPD verification (External)
Procedure for follow-up of data during EPD validity involves third party verifier:	No

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

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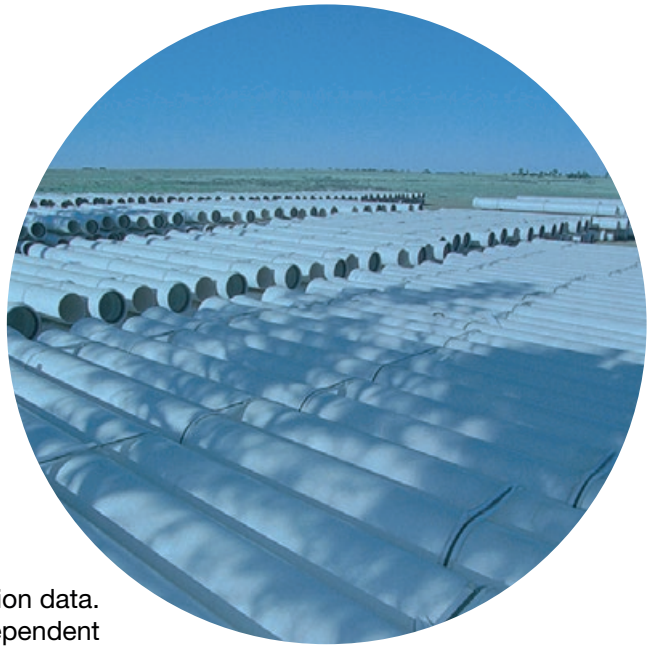


This version of the EPD has been updated with more recent production data. Module A5 hasn't been included in this study, because it is highly dependent on the specific installation conditions. Instead, an outline of the installation process is provided to highlight those factors that influence environmental and resource impacts.

Green Star EPD compliance

- ✓ The EPD conforms with ISO 14025 and EN 15804.
- ✓ The EPD has been verified by an independent third party.
- ✓ The EPD has at least a cradle-to-gate scope.
- ✓ The participants in the EPD are listed.
- ✓ All Vinidex PVC pipes meet Best Environmental Practice polyvinyl chloride (PVC) Green Building Council of Australia (GBCA) requirements

Environmental Product Declarations have been recognised as one of the initiatives that contribute to Green Star certification under the Green Building Council of Australia's (GBCA) Responsible Products Framework. At the time of publication, this product specific EPD and Vinidex's Best Environmental Practice (BEP) PVC certification combine to give a Responsible Product Value (RPV) of ≥ 6 for Responsible Systems in Green Star Projects.

About us

Vinidex is a leader in Australian manufacturing and supply of advanced pipe systems and solutions, connecting Australian people with water and energy. We provide a broad range of pipeline systems and solutions for building (plumbing, electrical), infrastructure (water, wastewater, drainage, gas, electrical, communications), irrigation and rural, mining and industrial applications.

A proud Australian manufacturer since 1960, we have a history of over 61 years in Australia with proven long-term performance and reliability. Vinidex manufactures PVC, polyethylene (PE) and polypropylene (PP) pipe and fittings systems in Australia. This is complemented by a wide range of specialised pipes and fittings from Australia and around the world to meet customer needs in diverse markets.
Vinidex 10 manufacturing locations and 12 distribution centres match Australian population centres and markets, strategically reaching across the country. Our customers are as diverse as the markets we serve, and include contractors, installers, distributors, specifiers and asset owners.

We aim to deliver quality, high-performance systems that are durable, reliable and consistently meet our customers' expectations as well as any relevant Australian and International Standards. We are passionate about creating sustainable, innovative solutions for our customers and communities. Our commitment to safety, health and environmental sustainability is integral to the way we do business.

Vinidex is committed to being a leader in sustainability.
- Vinidex is closing the loop. We will always ensure our products are engineered for long life, and then we will maximise the use of recycled material.
- Vinidex are leaders in innovation and development of sustainable products
- Vinidex is reducing the carbon footprint of products by efficient product design
- Vinidex manufactures Best Environmental Products
- Vinidex is changing our product packaging – less packaging and better environmentally

Vinidex is backed by the strength of Aliaxis, a global leader in plastic piping solutions.
This allows us to connect our customers with innovative technologies from around the world.

Product-related or management system-related certifications:
- AS/NZS 1477 - PVC pipes and fittings for pressure applications
- AS/NZS 4441 – Oriented PVC (PVC-O) pipes for pressure applications; and
- AS/NZS 4765 – Modified PVC (PVC-M) pipes for pressure applications.

Vinidex Sustainability

As an industry leader, Vinidex recognises our responsibility to care for the environment.
We have ambitious goals to create a more sustainable future for Australian communities.

CLOSE THE LOOP

Our goal is to quadruple recycled content by 2025, while ensuring the long-life performance of our products.

- We are increasing take back of recycled plastic and increasing recycled content in our products
- While ensuring we make engineered products designed for long service life
- Vinidex PVC pipes 100% recyclable at end of life supporting a circular economy

INNOVATE

Vinidex led the way with development of lower carbon footprint products such as Supermain®.

Our innovation program is focused on developing systems such as StormPRO® and StormFLO® which can meet customer needs for quality, long life products, in a more sustainable way than alternatives.

BEST ENVIRONMENTAL PRODUCTS

Our products are made to stringent Australian standards and best environmental practice.

- Vinidex PVC Non Pressure pipes are manufactured to the following standards to ensure its long life performance:
  - AS/NZS 1477 - PVC pipes and fittings for pressure applications
  - AS/NZS 4441 – Oriented PVC (PVC-O) pipes for pressure applications; and
  - AS/NZS 4765 – Modified PVC (PVC-M) pipes for pressure applications.
- Vinidex's quality management system is verified to the requirements of ISO 9001.
- Vinidex PVC pipes are accredited to Best Environmental PVC (BEP) Standards.

LEAD THE WAY

We undertake independently verified EPDs.

Vinidex is a partner in Operation Clean Sweep to prevent the loss of plastic pellets into our waterways – zero pellet loss is our goal.

We achieve Product Stewardship excellence.

REDUCE OUR FOOTPRINT

We have ambitious goals to reduce our carbon footprint:

- To achieve 100% renewable electricity to power our manufacturing plants by 2025
- To reduce our CO2 per tonne of production on Vinidex sites by 75% by 2025

We aim to use less water, less waste, and changing packaging for less carbon footprint

Product information

PVC pressure pipes are manufactured from PVC resin compounded with stabilisers, lubricants and pigments. They do not contain any plasticisers and hence are known as unplasticised PVC or PVC-U. Vinidex PVC-U pressure pipes are manufactured in accordance with the joint Australian /New Zealand Standard AS/NZS 1477. AS/NZS 1477 has two diameter Series, Series 1 and Series 2 where Series 2 pipes are compatible with Australian cast and ductile iron outside diameters.
PVC-U pipes may have solvent cement joints or elastomeric seal joint.
Further developments in PVC pressure pipe technology has led to the introduction of Oriented PVC and Modified PVC pressure pipes.

Vinidex Supermain® Oriented PVC pressure pipe is the most advanced PVC pipe available. Bi-axial molecular orientation further enhances the mechanical properties of PVC, allowing energy efficient production whilst also conferring considerable performance advantages. The result is a lighter weight pipe with an increased bore for greater flow capacity when compared with other PVC pipes. Orientation also results in improved impact resistance, greater ductility and high fatigue strength. Supermain® PVC-O pipes are manufactured in accordance with AS/NZS 4441 in Series 1 and Series 2 diameters and have elastomeric seal joints.

Vinidex Hydro® is a Modified Poly Vinyl Chloride or PVC-M pipe which extends the proven benefits of PVC pipes with enhancements in fracture behaviour and hydraulic efficiency. This is achieved by the addition of an impact modifier to the PVC formulation to increase the toughness and ductility of the material. Vinidex Hydro PVC-M pipes
are manufactured in accordance with AS/NZS 4765 in Series 1 and Series 2 diameters with either solvent cement joints or elastomeric seal joints.

Vinidex PVC-U, Supermain® PVC-O and Hydro® PVC-M pressure pipes are suitable for a wide range of pressure applications. including water supply, recycled water, irrigation, pressure sewerage, slurry transport and industrial process pipelines.

Table 1 - Product characteristics of PVC pressure pipes

Product Characteristics	
Product names/application	• PVC-U pressure pipe • Supermain® PVC-O pressure pipe • Hydro® PVC-M pressure pipe
Density	1420-1480 kg/m^3
Shore D Hardness	80
Coefficient of linear thermal expansion	7 x 10^{-5} / °C
Maximum working temperature	60 °C
Specific heat	1045 J/kg.K
Poisson's ratio	0.40
Tensile Strength	~50MPa, 90MPa (PVC-O in direction of orientation)
Flexural ring modulus	3000 – 3500MPa (PVC-U, PVC-M) 4000 MPa (PVC-O)

Table 2 - Content Declaration

Product components	PVC-U	PVC-O	PVC-M	CAS No.
PVC resin	91%	93%	89%	9002-86-2
Filler	5%	0.93%	0.89%	471-34-1
Stabilizer	3%	3.6%	3.1%	Confidential (nothing hazardous)
Titanium white (pigment)	1%	1.4%	1.3%	13463-67-7
Processing aid	0.0%	0.56%		9011-14-7
Lubricants	0.2%		0.27%	8002-74-2
Pigment	0.30%	0.30%	0.27%	Various (nothing hazardous)
CPE (Chlorinated Polyethylene)			5.3%	64754-90-1
Total	100.00%	100.00%	100.00%	
Packaging materials	**Weight-% (versus the product)**			
Wood	2.5%			
Steel	0.04%			
TOTAL	2.54%			

Product lifecycle overview

The life cycle of a building product is divided into three process modules according to the General Program Instructions (GPI) and four information modules according to ISO 21930 and EN 15804, and supplemented by an optional information module on potential loads and benefits beyond the building life cycle. Table 4 shows the system boundary and scope of the EPD. The scope of this EPD is cradle- Cradle to gate with module C1–C4, module D and optional module A4 as defined by EN 15804. The intent of the EPD is to cover all modules of significant environmental impact over the full product life cycle. Due to the durability of PVC pressure pipes, and lack of planned or required maintenance throughout the service life, modules B1- B7 were deemed not relevant.

Table 3 - Scope of assessment and system boundary

	Product Stage			Construction Stage Process		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-Recy-cling-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	MND	MND	MND	MND	MND	MND	MND	MND	x	x	x	x	X
Geography	Global/ Aus	Aus	Aus	Aus	Aus								Aus	Aus	Aus	Aus	Aus

X = module included in EPD
MND = module not declared (does not indicate zero impact result)

Life cycle of Vinidex pipes

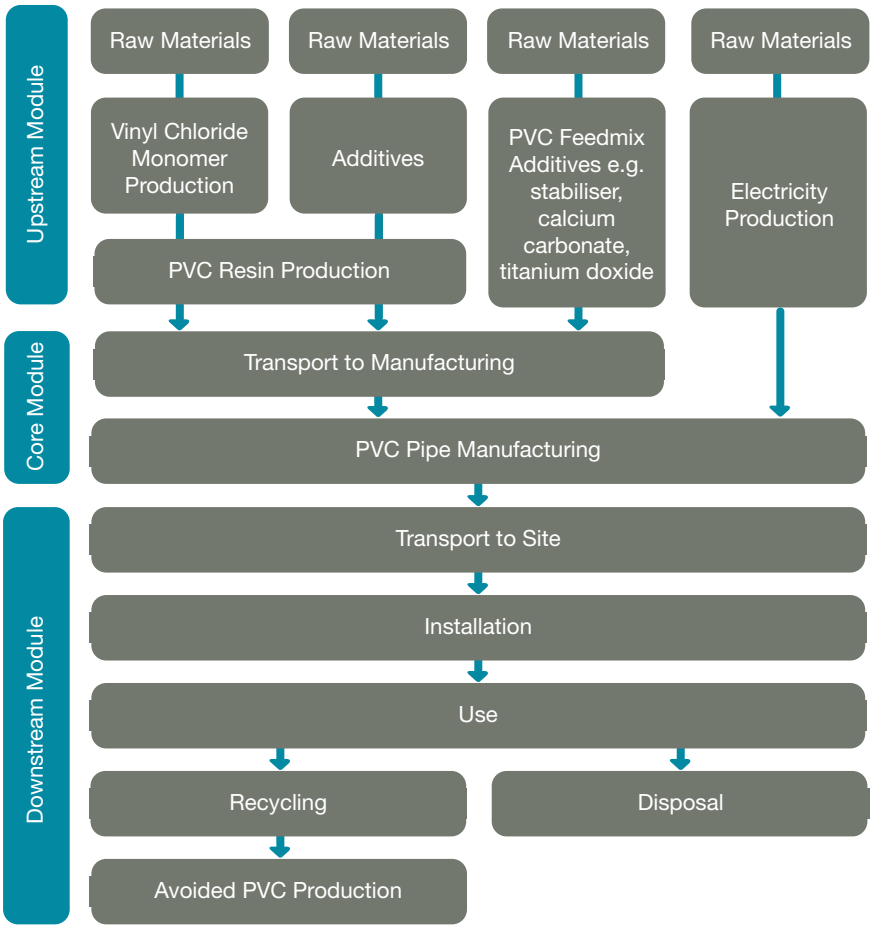


Figure 1 - Life cycle diagram of PVC pipe production

Vinidex PVC pressure pipe manufacture

Vinidex PVC pressure pipes are manufactured primarily from PVC resin along with additives, including: calcium carbonate, titanium dioxide, calcium based stabiliser, lubricants, processing aids and pigments. In the case of Vinidex Hydro® PVC-M pipe, chlorinated polyethylene is also used as an impact modifier. The PVC resin is the main ingredient in all PVC pressure pipes. Internal PVC pipe scrap from production is fed back into the feed mix and utilised in new pipe. The feed mix is heated and mixed prior to extrusion and then water cooled to form the pipe structure.

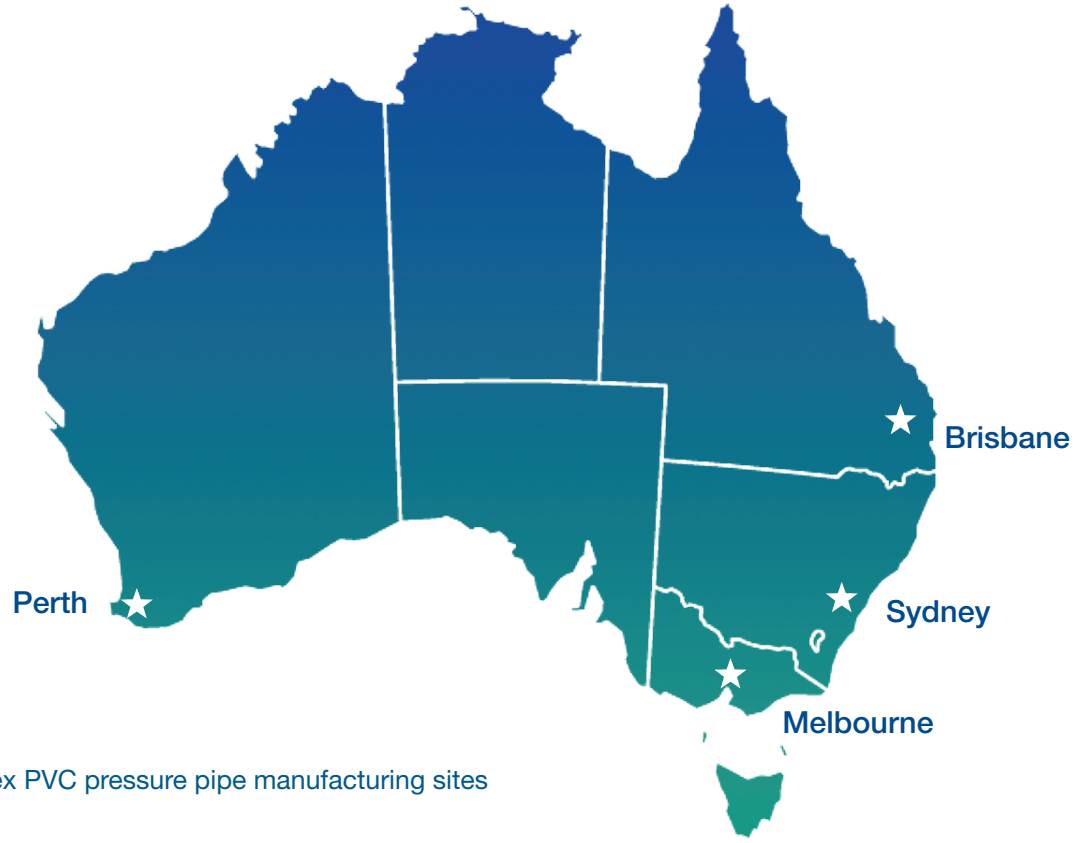


Figure 2 - Vinidex PVC pressure pipe manufacturing sites

For Supermain® PVC-O pressure pipe, the extrusion process is followed by an additional expansion process which takes place under well-defined and carefully controlled conditions of temperature and pressure. It is during the expansion that the molecular orientation, which imparts the high strength typical of PVC-O, occurs.

One end of the pipe is then re-heated after cutting and expanded to allow for pipe jointing. Finally, the lengths of pipe are palletised, packaged with a softwood timber frame, steel and PET strapping.

Distribution stage

Vinidex has PVC-U pipe manufacturing facilities in Australia's major markets, and the vast majority of pipe distribution is over short distances within Sydney, Melbourne, Brisbane and Perth metropolitan areas.The Supermain® PVC-O pressure pipe is only manufactured in Sydney and therefore requires significant distribution by road to other markets. The Vinidex Hydro® PVC-M pipe is manufactured in Melbourne, Brisbane and Perth, with a significant amount of pipe delivered interstate to the NSW market.

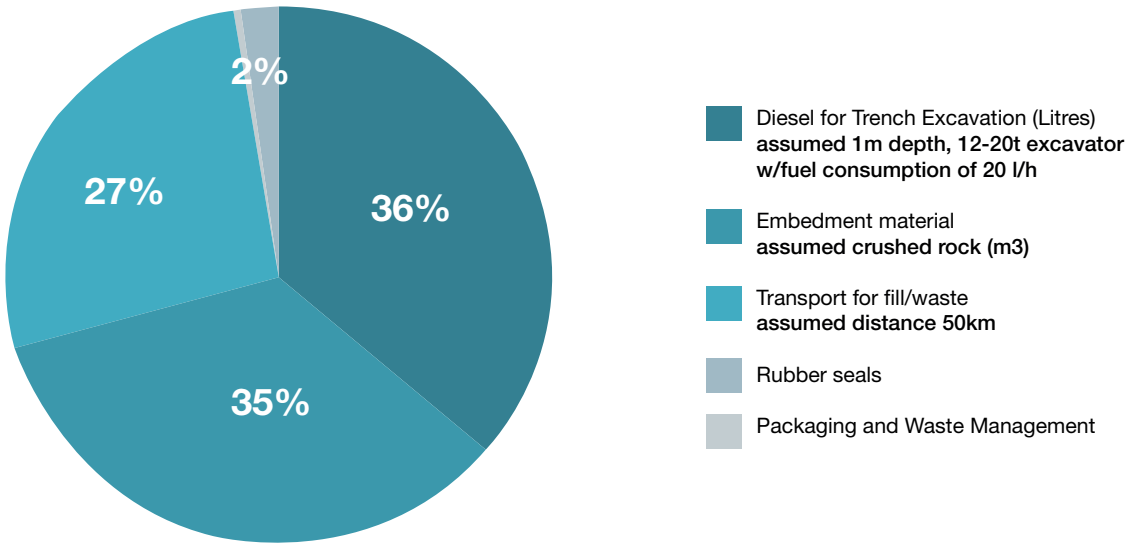
Installation

The environmental impacts and other indicators related to the installation stage of PVC pipes and other flexible pipes is highly dependent on the specific details relating to a particular pipeline's design. Variables include pipe diameter(s), length of the pipeline, terrain, geology, environmental conditions, trench depth, specified fill and embedment materials and the resultant installation techniques employed by the installing contractor. Given the significant number of variables involved, attempts to define an 'average' or 'typical' pipeline installation for the purpose of calculating environmental and resource impacts will be highly inaccurate. Moreover, it would be potentially misleading for the resultant numbers to be applied across a range of pipe diameters and buried pipelines installations and for these numbers to be used for comparative purposes. The main factors which contribute to the impacts of installation of buried 'flexible' pipes apply across a range of pipe materials. These factors, such as trench excavation and selection of embedment materials are influenced by designers, asset owners and pipeline installers. Consequently, the A5 Installation module will not be covered other than to outline the installation process and highlight those factors that influence the environmental impacts.

Vinidex PVC pressure pipe systems are usually installed underground in applications such as water supply, irrigation, and pressure sewerage. The pipes are laid in an excavated trench. Uniform guidance on the correct design and installation of PP pipes and other 'flexible' pipes is given in AS/NZS 2566.2 Buried flexible pipelines – Installation. Pipe materials covered by this Standard are as follows; PVC-U, PVC-M and PVC- O, polyethylene, polypropylene, GRP, ABS, ductile iron, and steel.

The AS/NZS 2566.2 Standard covers trench excavation and design, definition of fill and embedment zones and their respective compaction requirements and field testing of the installed pipeline. Installation design is also dependent on other design factors such location, construction and traffic loadings and minimum design requirements specified by Infrastructure Agencies such as Water Authorities. In all cases the diameter of the installed pipe significantly influences installation design which in turn directly influences environmental impacts associated with buried pipeline construction. LCA modelling of one assumed scenario shows the relative contribution of key construction factors in the chart below. In many cases, the specifier and constructor can influence these factors and consequently the overall environmental impact of pipe installation. For example, in the modelled scenario, the embedment material is assumed to be crushed rock. However other embedment materials could be selected which have lower environmental impacts. This is discussed further on the next page.

Figure 3. Relative Contribution of Construction factors to Global Warming Potential (kg CO2 eq)

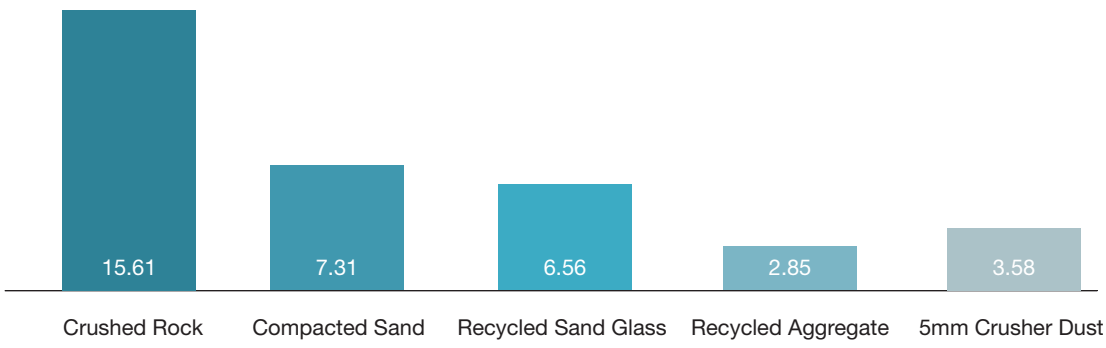


A more detailed summary of the construction factors influencing environmental impacts are outlined below

Trench Excavation
Trench excavation, in particular diesel consumption by trenching excavators governs most of the environmental and resource burden for the installation phase and is strongly correlated to the size of the trench and the type and configuration of excavator used. Additionally, there are various factors that affect efficiency of the excavator and speed of the excavation. Factors such as excavator bucket volume, bucket fill rate, cycle time, swing angle, type of excavated ground, as well as site environment and weather conditions, all influence the performance of the excavator. Equipment choice and operational efficiency is under the control of the trenching contractor.

Fill / Embedment
Type of fill / embedment materials are nominated by the pipeline designer, infrastructure owner or installer, and depend on the pipe application. LCA modelling shows that the use of screened and quarried virgin aggregate material (gravel) results in a higher environmental impact than other materials such as natural sand, recycled glass sand, crusher dust and concrete recycled into aggregate. The impact of different embedment materials is shown in Figure 4.

Figure 4 - Global warming potential (kg CO2 eq) per m3 of embedment material



Transportation of fill materials that are required to be imported to site, and of excavated material from the site that cannot be used in the embedment zone will impact carbon footprint and energy consumed.

The use of equipment for backfilling and compaction will also contribute to the total environmental impact. In terms of backfilling, this can be achieved either by using machinery or may be done manually. Compaction of embedment material can be achieved using powered portable compacting machines such as surface plate vibrators or by manual means using hand tampers in some circumstances. Where single size aggregate is used the required compaction may be achieved during material dumping.

Pipe lifting equipment
In many cases small diameter PVC pressure pipes are light enough to be lifted into the trench by hand. However, this will be dependent upon trench depth. Larger diameter pipes of course will require mechanical lifting equipment, in many cases an excavator is used.

Pipe jointing
PVC pressure pipes are jointed using sockets and spigots with either solvent cement joints for the smaller diameters, or rubber ring seals for larger sizes. Rubber ring jointing requires the application of lubricant to reduce jointing forces. PP pipes in smaller diameters are light enough to be joined using hand tools i.e., crowbar and block of wood to lever the last pipe into the preceding socket.

Packaging Materials and Waste
Packaging materials include timbers and strapping used to protect the pipe during transport. In many cases, these may be reused or recycled rather than disposed of to landfill.

Wastage of pipe is minimal as short lengths are often required elsewhere and easily reused on subsequent sites or within the same site. A very rough estimate puts wastage from unusable offcuts at less than 2%.
Waste pipe offcuts which cannot be reused can be recycled.

Use stage

Maintenance of the pipe systems is not required and not planned. These systems are designed with this in mind as access to these systems in a finished building is often limited given their location in floor slabs or behind finished walls and ceilings. The pipe systems are designed to outlast the building with a life expectancy of in excess of 100 years. The failure rate is also extremely low and is considered to be inconsequential (not relevant) in this EPD. Post installation problems, if any, tend to be linked to 3rd party damage such as inadvertently drilling through pipes behind ceiling and wall finishes. Apart from PVC pipes containing lead stabilisers, there are no significant emissions from leaching of chemicals during the use stage for PVC pipes (European Commission, 2004). There is no release of dangerous substances to indoor air, soil and water during the use stage.

End of life

PVC pressure pipes are generally installed underground and are assumed to remain underground at end of life. PVC pipes are inert and there is no incentive to dig them up to send for waste treatment.

Life cycle assessment methodology

This section includes the main details of the LCA study as well as assumptions and methods of the assessment. A summary of the key life cycle assessment parameters is given in Table 4.

Table 4 - Details of LCA

Declared unit	1 kg of installed pipe
Geographical coverage	Australia
LCA scope	Cradle to gate with module C1–C4, module D and optional module A4
Technical service life	100 years

Life cycle thinking is a core concept in sustainable consumption and production for policy and business. Upstream and downstream consequences of decisions must be taken into account to help avoid the shifting of burdens from one type of environmental impact to another, from one political region to another, or from one stage to another in a product's life cycle from the cradle to the grave.

LCA is the compilation of the inputs, outputs and environmental impacts of a product system throughout its life cycle. It is a technique that enables industries to identify the resource flows and environmental impacts (such as greenhouse gas emissions, water and energy use) associated with the provision of products and services.

According to EN 15804, EPDs of construction products may not be comparable if they do not comply with this standard, and EPDs might not be comparable, particularly if different functional units are used.

Core data collection

Lifecycle data has been sourced form material quantity data and production process data from Vinidex reporting systems and staff.

Core manufacturing data was collected directly from Vinidex manufacturing sites. Electricity consumption was allocated to pipe via mass of pipe produced.

Background data

Generic background data was sourced for raw materials in the upstream module, transportation and end of life waste treatment. Background data was adapted to represent Vinidex PVC-U pipe product as accurately as possible.

Database(s) and LCA software used:

The inventory data for the process are entered into the SimaPro (v9.1.1.1) LCA software program and linked to the pre-existing data for the upstream feedstocks and services selected in order of preference from:

- For Australia, the Australian Life Cycle Inventory (AusLCI) v1.31 compiled by the Australian Life Cycle Assessment Society (AusLCI, 2019), AusLCI shadow Database v1.27, and the Australasian Unit Process LCI v2014.09. The AusLCI database at the time of this report was 2 years old, the shadow database 5 years old, while the Australasian Unit Process LCI was 6 years old. In some cases processes were up to 8 years old, however, still compliant.

- Materials sourced from outside Australia were modelled based on global averages using the ecoinvent v3.6, 2019 database. Global averages were used since the sourcing of these materials often changes from year to year. At the time of reporting, the Ecoinvent v3.6 database was 2 years old.

All background data used was less than 10 years old.

Data quality & validation

Edge Environment has used the following criteria in selecting data for modelling:

- **Relevance:** select sources, data, and methods appropriate to assessing the chosen product's LCI,
- **Completeness:** include all LCI items that provide a material's contribution to a product's life cycle emissions,
- **Consistency:** enable meaningful comparisons in life cycle impact assessment (LCIA) information,
- **Accuracy:** reduce bias and uncertainty as far as is practical,
- **Transparency:** when communicating, disclose enough information to allow third parties to make decisions,
- **Time coverage:** the data collected represents recent practice for the construction of the project, and
- **Geographical coverage:** the data collected are representative of the sourcing of materials, whether from Australia or overseas, and are in line with the goal of the study.

Cut off rules

According to the PCR 2019:14, Life cycle inventory data shall according to EN 15804 A2 include a minimum of 95% of total inflows (mass and energy) per module. Inflows not included in the LCA shall be documented in the EPD. In accordance with the PCR 2019:14, the following system boundaries are applied to manufacturing equipment and employees:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI. Capital equipment and buildings typically account for less than a few percent of nearly all LCIs and this is usually smaller than the error in the inventory data itself. For this project, it is assumed that capital equipment makes a negligible contribution to the impacts as per Frischknecht et al. (2007) with no further investigation.

- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. For this project, the impacts of employees are excluded.

- Transport for raw materials accounting for less than 1% of the feedmix was excluded. This is because the impact contribution is considerably small.

Allocation

Allocation was carried out in accordance with the PCR (EPD International, 2019), section 4.5. No-allocation between co-products in the core module as there were no co-products created during manufacturing. Energy consumed in core module was allocated to pipe via mass of pipe produced.

Variation

To assess whether an average of the manufacturing sites can be applied without justification, it's necessary to ensure that the variation in the GWP-GHG impact between sites isn't higher than 10% in modules A1-A3. It was found that PVC pressure pipes differ only 6% between sites.

The purpose of this EPD is to represent the average Vinidex PVC pressure pipe supplied to the Australian market. By including manufacturing sites in different states, this EPD is representative of the average production and is less susceptible to variation when production volumes alter.

PVC pressure environmental performance

The potential environmental impacts used in this EPD are explained in Table 5.

Table 5 - Environmental indicators used in the EPD

	Impact category	Abbreviation	Unit	Definition
Environmental impacts	Global warming potential - Fossil	GWP - F	kg CO_2 eq.	Estimates GHG warming effect for fossil, given as kgCO_2-eq.
	Global warming potential - Biogenic	GWP - B	kg CO_2 eq.	Estimates GHG warming effect for biogenic, given as kgCO_2-eq.
	Global warming potential - Land use and Land use change	GWP - Luluc	kg CO_2 eq.	Estimates GHG warming effect for land use and land use change, given as kgCO_2-eq.
	Global warming potential - Total	GWP - T	kg CO_2 eq.	Estimates the total GHG warming effect, given as kgCO_2-eq.
	Ozone depletion potential	ODP	kg CFC 11 eq.	Estimates the potential reduction of ozone in Earth's atmosphere as per CFC-11 eq effects.
	Acidification potential	AP	mol H^+ eq.	Estimates the increase of oceans acidity as per SO2 eq effects.
	Eutrophication, freshwater	EP - F	kg PO_4^{3-} eq.	Estimates the potential increment of nutrients in freshwater as kg PO_4 effects.
	Eutrophication, freshwater	EP - F2	kg P eq.	Estimates the potential increment of nutrients in freshwater as kg P equivalent effects.
	Eutrophication, marine	EP - M	kg N eq.	Estimates the potential increment of nutrients in marine water as kg N equivalent effects.
	Eutrophication, terrestrial	EP – T	mol N eq.	Estimates the potential increment of nutrients in land as mol N equivalent effects.
	Photochemical ozone formation	POCP	kg NMVOC eq.	Estimates photochemical smog (air pollution) potential as kg C2H4 eq
	Abiotic depletion potential - minerals and metals	ADP	kg Sb eq.	Estimates the impact on minerals reserves as antimony (Sb) equivalents
	Abiotic depletion potential - Fossil	ADP - F	MJ	Estimates the impact on fossil fuels reserves as MJ
	Water depletion Potential	WDP	m^3 eq.	Estimates the potential of water deprivation, to either humans or ecosystems, and serves in calculating the impact score of water consumption at midpoint in LCA or to calculate a water scarcity footprint as per ISO 14046.
Resource use	Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ	Estimates the use of renewable primary energy excluding renewable primary energy resources used as raw materials
	Use of renewable primary energy resources used as raw materials	PERM	MJ	Estimates the use of renewable primary energy resources used as raw materials
	Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ	Estimates the total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)
	Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ	Estimates the use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials
	Use of non- renewable primary energy resources used as raw materials	PENRM	MJ	Estimates the use of non- renewable primary energy resources used as raw materials
	Total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ	Estimates the total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials)
	Use of secondary material	SM	kg	Estimates the use of secondary material
	Use of renewable secondary fuels	RSF	MJ	Estimates the use of renewable secondary fuels
	Use of non-renewable secondary fuels	NRSF	MJ	Estimates the use of non-renewable secondary fuels
	Use of net fresh water	FW	m^3	Estimates the use of net fresh water
Waste	Hazardous waste disposed	HWD	kg	Estimates the hazardous waste disposed
	Non-hazardous waste disposed	NHWD	kg	Estimates the non-hazardous waste disposed
	Radioactive waste disposed/stored	RWD	kg	Estimates the radioactive waste disposed/stored
	Components for re-use	CFR	kg	Estimates the components for re-use
Output flows	Material for recycling	MFR	kg	Estimates the material for recycling
	Materials for energy recovery	MFEE	kg	Estimates the materials for energy recovery
	Exported energy, electricity	EE - e	MJ	Estimates the exported energy, electricity
	Exported energy, thermal	EE - t	MJ	Estimates the exported energy, thermal
Additional environmental impact indicators	Global warming potential, excluding biogenic uptake, emissions and storage	GWP - GHG	kg CO_2 eq. (GWP100)	Estimates GHG warming effect for a change in a 100 years time, given as CO_2-eq.
	Particulate matter	PM	disease incidence	Estimates the potential incidence of disease due to PM emissions
	Ionising radiation - human health	IRP	kBq U-235 eq	Estimates the potential health damages related to the man-made routine releases of radioactive material to the environment
	Eco-toxicity, freshwater	ETP - fw	CTUe	Estimates the potential impact on fresh water ecosystems, as a result of emissions of toxic substances to air, water and soil.
	Human toxicity potential - cancer effects	HTP - c	CTUh	Estimates the potential Comparative Toxic Unit for humans - cancer
	Human toxicity potential - non cancer effects	HTP - nc	CTUh	Estimates the potential Comparative Toxic Unit for humans - non cancer
	Soil quality	SQP	dimensionless	Estimates the potential soil quality index (SQP)

Environmental information

To calculate the total environmental impact for a specific product and nominal diameter (DN), the values for each module must be added.

The total impact is the sum of the following parts:

- Value shown in A1-3
- Value of module A4
- C1-4: The four columns correspondent to module C (C1-C4)
- The value of column Module D

PVC Pressure - PVC-U

Table 6 - Potential environmental impact of 1kg of PVC-U pipe installed. Modules A1-A4, C1-4, D

Results per kg of PVC-U pressue pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3.46E+00	8.90E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-biogenic	kg CO_2 eq.	-6.84E-03	5.38E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO_2 eq.	2.29E-03	3.62E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-total	**kg CO_2 eq.**	**3.46E+00**	**8.90E-03**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
ODP	kg CFC 11 eq.	1.10E-06	3.43E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
AP	mol H^+ eq.	1.93E-02	4.79E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-freshwater	kg PO_4^{3-} eq.	3.73E-03	5.00E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-freshwater	kg P eq.	7.23E-04	1.99E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-marine	kg N eq.	4.01E-03	1.22E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-terrestrial	mol N eq.	4.15E-02	1.35E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POCP	kg NMVOC eq.	1.13E-02	4.38E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-minerals&metals*	kg Sb eq.	3.80E-05	1.98E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-fossil*	MJ	5.82E+01	3.20E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
WDP	m^3	1.07E+01	5.25E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Use of resources

Table 7. Use of resources of 1kg of PVC-U pipe installed. Modules A1-A4, C1-4, D

Results per kg of PVC-U pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.64E+00	6.63E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	**MJ**	**2.64E+00**	**6.63E-04**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
PENRE	MJ	6.21E+01	3.35E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ.	3.68E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	**MJ**	**9.89E+01**	**3.35E-02**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
SM	kg	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.09E-02	1.26E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production and output flows

Table 8. Waste production of 1kg of PVC-U pipe installed. Modules A1-A4, C1-4, D

Results per kg of PVC pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	3.92E-05	9.07E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	4.01E-01	8.92E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	kg	6.42E-05	4.22E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 9. Output flows of 1kg of PVC-U pipe installed. Modules A1-A4, C1-4, D

Results per kg of PVC-U pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Potential environmental impact - additional mandatory and voluntary indicators

Table 10. Additional environmental impacts of 1kg of PVC-U pipe installed. Modules A1-A4, C1-4, D

Results per kg of PVC-U pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO_2 eq.	3.34E+00	8.77E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

A1-A4, C1-C4, D Results per kg of PVC solid wall pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Particulate matter	disease incidence	1.48E-07	7.35E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ionising radiation - human health	kBq U-235 eq	1.61E-01	2.95E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eco-toxicity (freshwater)	CTUe	5.77E+01	1.84E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Human toxicity potential - cancer effects	CTUh	1.90E-09	2.94E-12	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Human toxicit potential - non cancer effects	CTUh	5.35E-08	1.50E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Soil quality	dimensionless	1.19E+01	1.27E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Information on biogenic carbon content

Table 11. Biogenic content in 1kg of PVC pressure pipe

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0.00E+00
Biogenic carbon content in packaging	kg C	2.72E-02

Note: 1kg biogenic carbon is equivalent to 44/12 kg CO_2.

Pressure Pipe - PVC-O

Table 12. Potential environmental impact of 1kg of PVC-O pipe installed. Modules A1-A4, C1-4, D

Results per kg of PVC-O pressue pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3.63E+00	8.64E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-biogenic	kg CO_2 eq.	-8.21E-03	5.63E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO_2 eq.	2.35E-03	3.42E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-total	**kg CO_2 eq.**	**3.62E+00**	**8.64E-02**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
ODP	kg CFC 11 eq.	1.13E-06	3.23E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
AP	mol H^+ eq.	2.02E-02	4.80E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-freshwater	kg PO_4^{3-} eq.	3.80E-03	4.84E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-freshwater	kg P eq.	7.43E-04	1.89E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-marine	kg N eq.	3.97E-03	1.17E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-terrestrial	mol N eq.	4.10E-02	1.29E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POCP	kg NMVOC eq.	1.12E-02	4.20E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-minerals&metals*	kg Sb eq.	3.89E-05	1.87E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-fossil*	MJ	6.36E+01	3.04E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
WDP	m^3	9.51E+00	5.03E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Use of resources

Table 13. Use of resources of 1kg of PVC-O pipe installed. Modules A1-A4, C1-4, D

A1-A3, C1-C4, D Results per kg of PVC-O pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.76E+00	6.39E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	**MJ**	**2.76E+00**	**6.39E-03**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
PENRE	MJ	6.77E+01	3.18E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ.	3.77E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	**MJ**	**1.05E+02**	**3.18E-01**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
SM	kg	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.16E-02	1.19E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production and output flows

Table 14. Waste of 1kg of PVC-O pipe installed. Modules A1-3, C1-4, D

A1-A4, C1-C4, D Results per kg of PVC-O pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	3.98E-05	8.57E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	4.31E-01	8.43E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	kg	6.59E-05	4.00E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Table 15. Output flows of 1kg of PVC-O pipe installed. Modules A1-3, C1-4, D

A1-A4, C1-C4, D Results per kg of PVC-O pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Potential environmental impact - additional mandatory and voluntary indicators

Table 16. Additional environmental impacts of 1kg of PVC-O pipe installed. Modules A1-A4, C1-4, D

A1-A3, C1-C4, D Results per kg of PVC-O pressure pipe								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
GWP-GHG	kg CO_2 eq.	3.49E+00	8.51E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

A1-A4, C1-C4, D Results per kg of PVC -O pressure pipe								
Indicator	Unit	A1-A3	A4	C1	C2	C3	C4	D
Particulate matter	disease incidence	1.45E-07	6.97E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ionising radiation - human health	kBq U-235 eq	1.65E-01	2.79E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eco-toxicity (freshwater)	CTUe	5.88E+01	1.79E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Human toxicity potential - cancer effects	CTUh	1.91E-09	2.82E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Human toxicity potential - non cancer effects	CTUh	5.41E-08	1.45E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Soil quality	dimensionless	1.23E+01	1.21E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Information on biogenic carbon content

Table 17. Biogenic content in 1kg of PVC-O pipe

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	Unit	QUANTITY
Biogenic carbon content in product	kg C	0.00E+00
Biogenic carbon content in packaging	kg C	2.72E-02

Note: 1kg biogenic carbon is equivalent to 44/12 kg CO_2.

Pressure Pipe - PVC-M

Potential environmental impact – mandatory indicators according to EN 15804

Table 18. Potential environmental impact of 1kg of PVC-M pipe installed. Modules A1-A4, C1-4, D

Results per kg of PVC-M pressue pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-fossil	kg CO_2 eq.	3.55E+00	4.41E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-biogenic	kg CO_2 eq.	-8.04E-03	3.08E-06	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-luluc	kg CO_2 eq.	2.29E-03	1.69E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
GWP-total	**kg CO_2 eq.**	**3.55E+00**	**4.41E-02**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
ODP	kg CFC 11 eq.	1.08E-06	1.60E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
AP	mol H^+ eq.	2.01E-02	2.52E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-freshwater	kg PO_4^{3-} eq.	3.83E-03	2.47E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-freshwater	kg P eq.	7.30E-04	9.42E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-marine	kg N eq.	4.24E-03	5.88E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EP-terrestrial	mol N eq.	4.41E-02	6.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
POCP	kg NMVOC eq.	1.19E-02	2.12E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-minerals&metals*	kg Sb eq.	3.85E-05	9.28E-08	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
ADP-fossil*	MJ	5.78E+01	1.52E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
WDP	m^3	1.03E+01	2.54E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

* Disclaimer: The results of this environmental impact indicator shall be used with care as the uncertainties of these results are high or as there is limited experience with the indicator.

Use of resources

Table 19. Use of resources of 1kg of PVC-M installed. Modules A1-A4, C1-4, D

A1-A4, C1-C4, D Results per kg of PVC-M pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
PERE	MJ	2.60E+00	3.24E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERM	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	**MJ**	**2.60E+00**	**3.24E-03**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
PENRE	MJ	6.18E+01	1.59E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRM	MJ.	3.81E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	**MJ**	**1.00E+02**	**1.59E-01**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**
SM	kg	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
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	2.10E-02	5.93E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Waste production and output flows

Table 20. Waste of 1kg of PVC-M pipe installed. Modules A1-A4, C1-4, D

A1-A4, C1-C4, D Results per kg of PVC-M pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Hazardous waste disposed	kg	3.91E-05	4.26E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Non-hazardous waste disposed	kg	4.01E-01	4.19E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Radioactive waste disposed	**kg**	**6.38E-05**	**1.99E-09**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**	**0.00E+00**

Table 21. Output flows of 1kg of PVC-M pipe installed. Modules A1-A4, C1-4, D

A1-A4, C1-C4, D Results per kg of PVC-M pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Components for re-use	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Material for recycling	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy, thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Potential environmental impact – additional mandatory and voluntary indicators

Table 22. Additional environmental impacts of 1kg of PVC-M pipe installed. Modules A1-3, C1-4, D

Results per kg of PVC-M pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
GWP-GHG	kg CO_2 eq.	3.42E+00	4.34E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Results per kg of PVC-M pressure pipe								
Indicator	**Unit**	**A1-A3**	**A4**	**C1**	**C2**	**C3**	**C4**	**D**
Particulate matter	disease incidence	1.50E-07	3.48E-09	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Ionising radiation - human health	kBq U-235 eq	1.60E-01	1.39E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Eco-toxicity (freshwater)	CTUe	5.77E+01	9.15E-01	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Human toxicity potential - cancer effects	CTUh	1.93E-09	1.43E-11	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Human toxicity potential - non cancer effects	CTUh	5.39E-08	7.34E-10	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Soil quality	dimensionless	1.21E+01	6.06E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00

Information on biogenic carbon content

Table 23. Biogenic content in 1kg of PVC-M pipe

Results per functional or declared unit		
BIOGENIC CARBON CONTENT	**Unit**	**QUANTITY**
Biogenic carbon content in product	kg C	0.00E+00
Biogenic carbon content in packaging	kg C	2.72E-02

Note: 1kg biogenic carbon is equivalent to 44/12 kg CO_2.

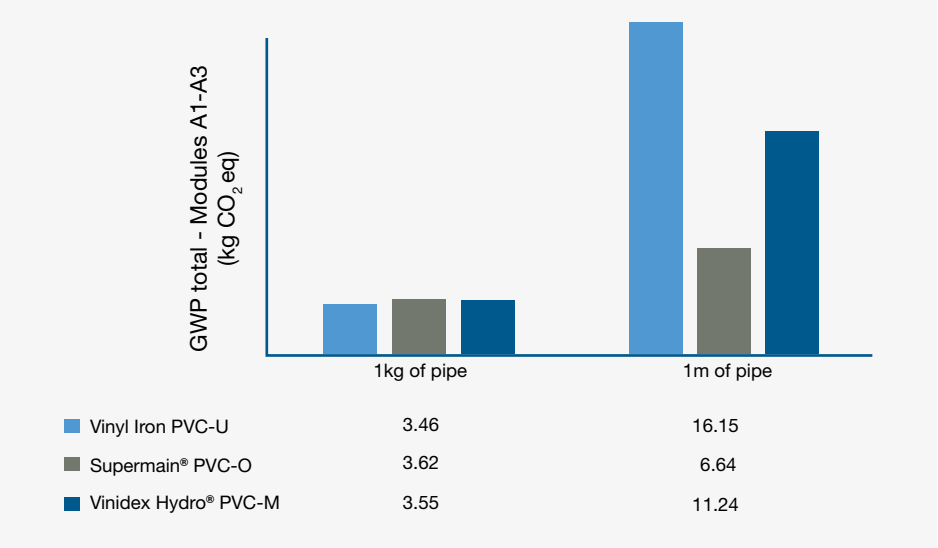
Additional environmental information

Sustainability has long been central to Vinidex's business strategies and is a fundamental part of our long-term vision. Our aim is to provide the community with smart, efficient and sustainable piping solutions.

Best Environmental Practice PVC

We are committed to minimising the energy used in the production of our products and have a plan to reach 100% renewable electricity use in our manufacturing by 2025. Vinidex also has a successful history of offering pipes with reduced embodied energy compared to others that perform the same function. Supermain PVC-O® is one example of a highly material efficient pipe. The enhanced strength produced by biaxial orientation means that a pipe can be produced with significantly less raw material than a conventionally extruded pipe. Although the declared unit for this EPD is 1kg of pipe, the environmental benefits of material efficient pipes can be more clearly seen when comparing a given length of pipe. The figure below shows the Global Warming Potential (total) results for the cradle-to-gate Modules A1-A3 for 1kg and 1m length of Vinidex Series 2, DN100, PN 16 PVC-U, PVC-O and PVC-M.

Figure 5 - Comparison of DN100, PN16 S2 PVC Pressure Pipes



Vinidex PVC pressure pipes are manufactured and certified to the following Australian Standards:

- AS/NZS 1477 – PVC pipes and fittings for pressure applications
- AS/NZS 4441 – Oriented PVC (PVC-O) pipes for pressure applications
- AS/NZS 4765 – Modified PVC (PVC-M) pipes for pressure applications

They are durable and intended for a long service life in a wide range of demanding applications. The foreword to AS/NZS 4765 states:

"Actual system life is dependent on manufacture, transport, handling, installation, operation, protection from third party damage and other external factors.

For water supply applications, the actual life can be expected to be in excess of 100 years before major rehabilitation is required."

Vinidex PVC pressure pipes are tested to AS/NZS 4020 and can be used safely with drinking water. PVC pressure pipes contain no heavy metals, such as lead and cadmium, no phthalates, no dioxins and no BPAs.

✔ PVC pipe recycling

Vinidex works actively to minimise waste.
We re-process all in-house scrap material back into our manufactured pipes and fittings, preventing waste from going to landfill. External recycled content cannot be incorporated into PVC pressure pipes as it is not allowed by Standards due to their stringent performance requirements.

Although this EPD assumes that pipes will be left in the ground at the end of their service life, it is important to know that Vinidex PVC pressure pipes can be fully recycled into new non-pressure pipe products. Vinidex will take back PVC pipe off-cuts or pipe that has reached the end of its service life into our Brisbane, Sydney, Melbourne and Perth manufacturing operations to allow for those products to be recycled.

Vinidex is investing millions of dollars in more equipment at our plants to screen, handle, clean and resize recycled plastic material to allow its incorporation back into the manufacturing process for new quality pipe products. We are also working with customers, end users and material recycling companies to source greater quantities of suitable post-industrial and post-consumer recycled plastic.

We have set ambitious future targets for increasing the proportion recycled content in our pipes and fittings without compromising the long-term performance and these initiatives will allow us to achieve these targets.

Interpretation of LCA results

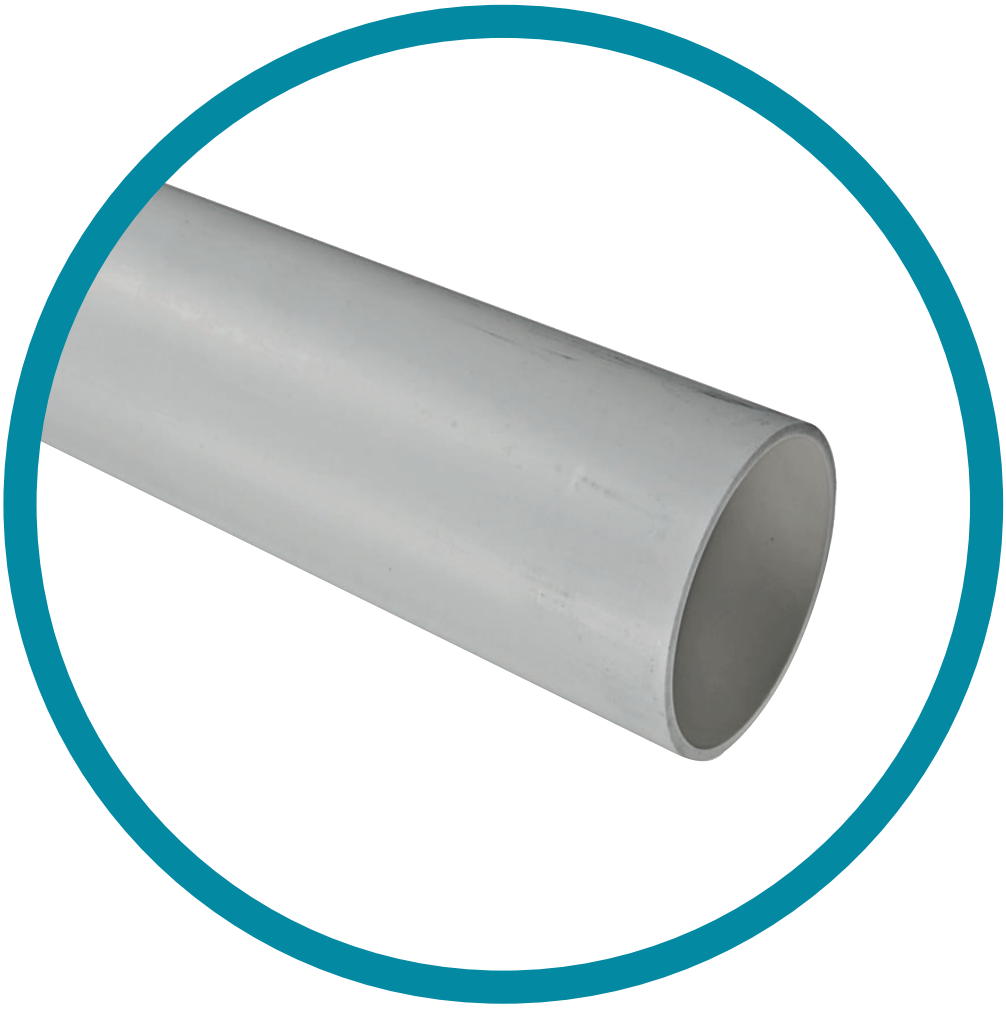
The majority of environmental impact lies within the raw material supplied to Vinidex manufacturing sites and the installation of pipes in ground – comparatively little impact is caused by the PVC pressure pipe manufacturing at Vinidex sites.

From the feed mix ingredients, PVC resin is responsible for the majority of all environmental impacts and use of resources, although additives were still found to have a significant impact. From installation it is diesel consumed during the operation of excavator which is responsible for significant impact.

Sensitivity analysis

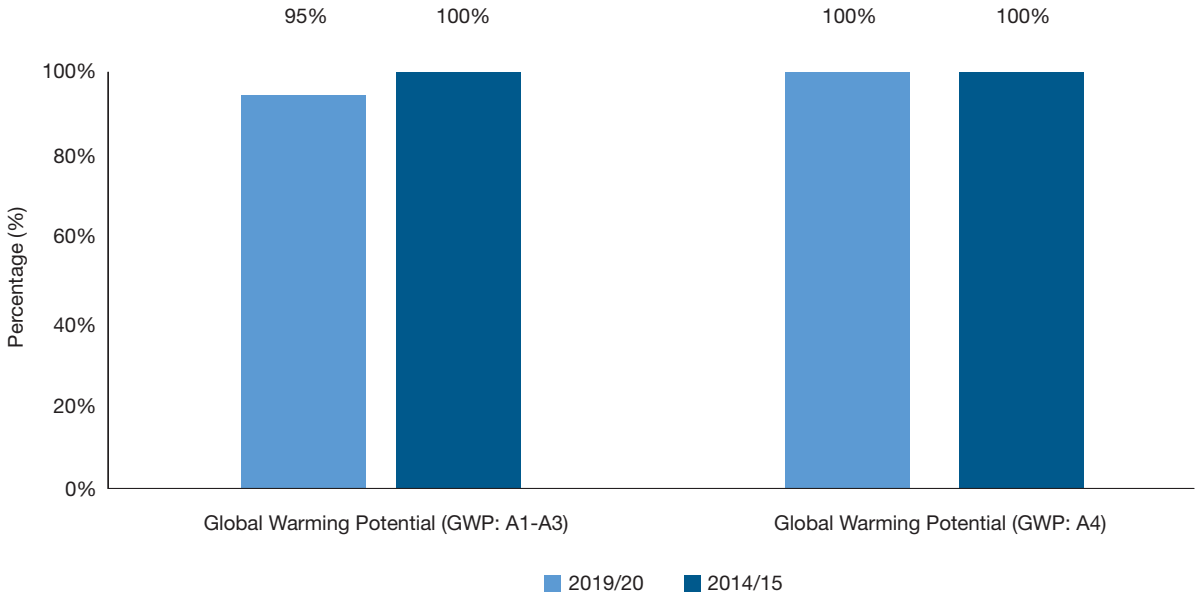
MANUFACTURING LOCATION

As the pipes covered in this study are manufactured in different locations with varying electricity intensities and water consumption, the maximum differences between sites was assessed for each product. However a weigther average was deemed appropriate as the purpose of this EPD is to represent the average Vinidex PVC- pressure pipe product supplied to the Australian market.



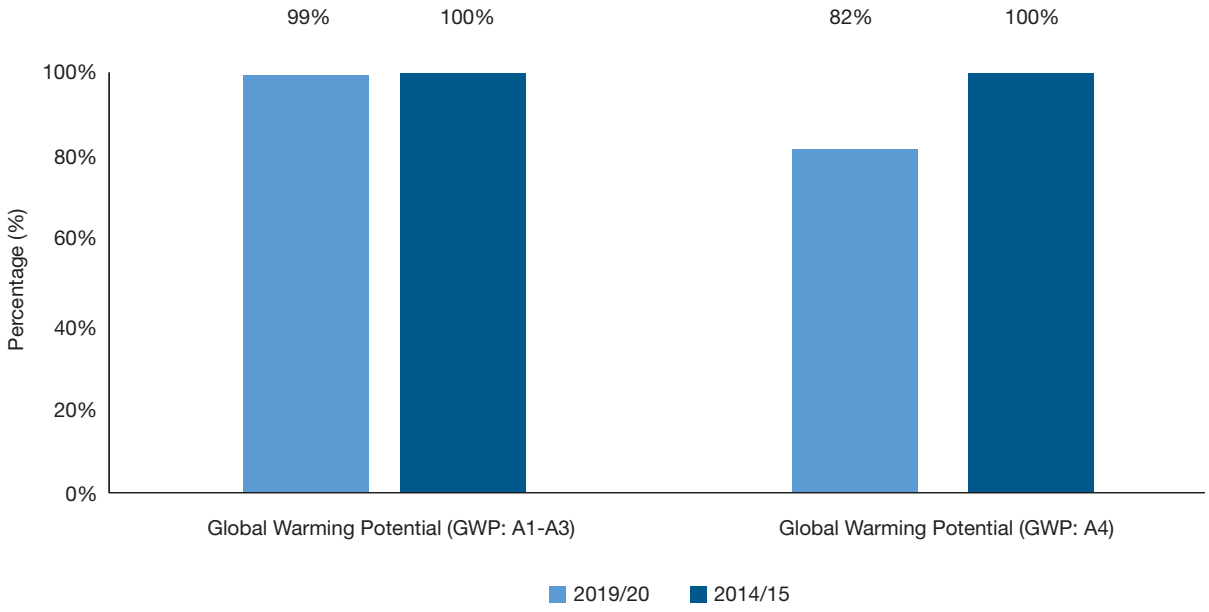
Differences versus previous versions of PVC-U pipe

The GWP impact for production of PVC-U pipes in 2019/20 is lower i.e. 5% than 2014/15. Despite the increase in electricity usage for manufacturing compared to 2015, there is a slight variation in the composition of 2019/20 and 2014/15 feedmix (due to inclusion of pigments and lubricants in the former). In addition the processes used in the model have been amended given a change in the PVC supplier. The GWP impact for distribution in 2019/20 and 2014/15 is very similar.



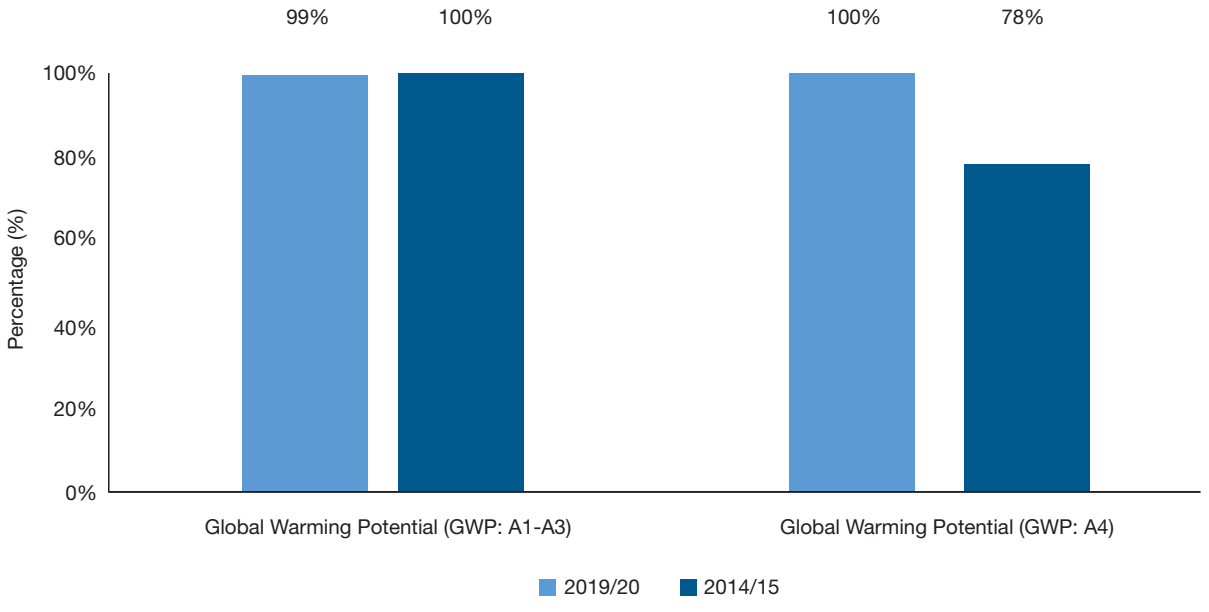
PVC-O pipe

The GWP impact for production of PVC-O pipes in 2019/20 is slightly lower i.e. 1% than 2014/15. Despite the increase in electricity usage for manufacturing compared to 2015, there is a slight variation in the composition of 2019/20 and 2014/15 feedmix (due to resin and stabiliser) and the PVC process used was updated due to a change in PVC supplier, which yields very similar GHG emissions. The GWP impact from distribution is 18% lower for 2019/20 compared to 2014/15. However, since distribution contributes to less than 1% of total environmental impacts, its influence is minimal.



PVC-M pipe

The GWP impact for production of PVC-M pipes in 2019/20 is slightly lower i.e. 1% than 2014/15. Despite the increase in electricity usage for manufacturing compared to 2015, the PVC process used was updated due to a change in PVC supplier, yielding similar GWP impact. The GWP impact from distribution is 22% lower for 2019/20 compared to 2014/15. However, since distribution contributes to less than 1% of total environmental impacts, its influence is minimal.



Appendix product details

Table 24 - Product specifications for PVC-U Series 1 pipe (Solvent cement joint)

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)
15mm S1 PVC-U Pressure Pipe SCJ	13510	18	6	White	0.15
20mm S1 PVC-U Pressure Pipe SCJ	13520	12	6	White	0.17
20mm S1 PVC-U Pressure Pipe SCJ	13550	18	6	White	0.24
25mm S1 PVC-U Pressure Pipe SCJ	13560	9	6	White	0.22
25mm S1 PVC-U Pressure Pipe SCJ	13570	12	6	White	0.26
25mm S1 PVC-U Pressure Pipe SCJ	13556	12	6	Purple	0.26
25mm S1 PVC-U Pressure Pipe SCJ	13590	18	6	White	0.37
32mm S1 PVC-U Pressure Pipe SCJ	13600	9	6	White	0.33
32mm S1 PVC-U Pressure Pipe SCJ	13610	12	6	White	0.42
32mm S1 PVC-U Pressure Pipe SCJ	13640	18	6	White	0.60
40mm S1 PVC-U Pressure Pipe SCJ	13650	6	6	White	0.32
40mm S1 PVC-U Pressure Pipe SCJ	13660	9	6	White	0.43
40mm S1 PVC-U Pressure Pipe SCJ	13680	12	6	White	0.55
40 mm S1 PVC-U Pressure Pipe SCJ	13703	12	6	Purple	0.55
40mm S1 PVC-U Pressure Pipe SCJ	13700	18	6	White	0.78
50mm S1 PVC-U Pressure Pipe SCJ	13710	6	6	White	0.46
50mm S1 PVC-U Pressure Pipe SCJ	13720	9	6	White	0.67
50mm S1 PVC-U Pressure Pipe SCJ	13740	12	6	White	0.85
50 mm S1 PVC-U Pressure Pipe SCJ	13770	12	6	Purple	0.86
50mm S1 PVC-U Pressure Pipe SCJ	13760	18	6	White	1.23
65mm S1 PVC-U Pressure Pipe SCJ	14520	12	6	White	1.35
80mm S1 PVC-U Pressure Pipe SCJ	14550	6	6	White	1.01
80mm S1 PVC-U Pressure Pipe SCJ	14560	9	6	White	1.46
80mm S1 PVC-U Pressure Pipe SCJ	14570	12	6	White	1.87
80mm S1 PVC-U Pressure Pipe SCJ	14590	18	6	White	2.70
100mm S1 PVC-U Pressure Pipe SCJ	14600	4.5	6	White	1.27
100mm S1 PVC-U Pressure Pipe SCJ	14610	6	6	White	1.64
100mm S1 PVC-U Pressure Pipe SCJ	14620	9	6	White	2.39
100mm S1 PVC-U Pressure Pipe SCJ	14630	12	6	White	3.12
100mm S1 PVC-U Pressure Pipe SCJ	14650	18	6	White	4.43
125mm S1 PVC-U Pressure Pipe SCJ	14660	4.5	6	White	1.90
125mm S1 PVC-U Pressure Pipe SCJ	14680	9	6	White	3.60
125mm S1 PVC-U Pressure Pipe SCJ	14690	12	6	White	4.65
150mm S1 PVC-U Pressure Pipe SCJ	14730	9	6	White	4.72
150mm S1 PVC-U Pressure Pipe SCJ	14740	12	6	White	6.13
150mm S1 PVC-U Pressure Pipe SCJ	14760	18	6	White	8.70

Table 25 - Product specifications for Polydex PVC-U Series 1 pipe (Rubber-ring joint)

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)
80mm PN6 S1 PVC-U Pressure Pipe RRJ	16100	6	6	White	1.02
80mm PN6 S1 PVC-U Pressure Pipe RRJ	16110	9	6	White	1.45
80mm PN6 S1 PVC-U Pressure Pipe RRJ	16120	12	6	White	1.89
80 mm PN6 S1 PVC-U Pressure Pipe RRJ	16127	12	6	Purple	1.90
100mm PN6 S1 PVC-U Pressure Pipe CRJ	16150	6	6	White	1.64
100mm PN6 S1 PVC-U Pressure Pipe RRJ	16160	9	6	White	2.42
125mm PN6 S1 PVC-U Pressure Pipe RRJ	16220	12	6	White	4.72
150mm PN6 S1 PVC-U Pressure Pipe CRJ	16260	6	6	White	3.22
200mm PN6 S1 PVC-U Pressure Pipe CRJ	16320	4.5	6	White	4.43
200mm PN6 S1 PVC-U Pressure Pipe CRJ	16330	6	6	White	5.87
225mm PN6 S1 PVC-U Pressure Pipe RRJ	16400	9	6	White	10.54
225mm PN6 S1 PVC-U Pressure Pipe CRJ	16410	12	6	White	13.90
250mm PN6 S1 PVC-U Pressure Pipe RRJ	16450	6	6	White	9.23
300mm PN6 S1 PVC-U Pressure Pipe CRJ	16510	6	6	White	11.65
300mm PN6 S1 PVC-U Pressure Pipe CRJ	16520	9	6	White	16.90
300mm PN6 S1 PVC-U Pressure Pipe CRJ	16530	12	6	White	21.95

Table 26 - Product specifications for Vinyl Iron PVC-U Series 2 pressure pipe

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)
100mm S2 PVC-U Pressure Pipe RRJ	17260	12	6	Blue	3.50
100mm S2 PVC-U Pressure Pipe RRJ	17270	16	6	Blue	4.67
100mm S2 PVC-U Pressure Pipe RRJ	17280	18	6	Blue	5.00
100mm S2 PVC-U Pressure Pipe RRJ	17290	20	6	Blue	5.50
150mm S2 PVC-U Pressure Pipe RRJ	17300	12	6	Blue	7.50
150mm S2 PVC-U Pressure Pipe RRJ	17310	16	6	Blue	9.67
150mm S2 PVC-U Pressure Pipe RRJ	17320	18	6	Blue	10.83
150mm S2 PVC-U Pressure Pipe RRJ	17330	20	6	Blue	11.83
200mm S2 PVC-U Pressure Pipe RRJ	17340	12	6	Blue	12.00
200mm S2 PVC-U Pressure Pipe RRJ	17342	16	6	Blue	15.50
225mm S2 PVC-U Pressure Pipe RRJ	17390	12	6	Blue	14.83
250mm S2 PVC-U Pressure Pipe RRJ	17350	12	6	Blue	18.00
250mm S2 PVC-U Pressure Pipe RRJ	17354	16	6	Blue	22.78
300mm S2 PVC-U Pressure Pipe RRJ	17360	12	6	Blue	26.33
300mm S2 PVC-U Pressure Pipe RRJ	17364	16	6	Blue	34.17
375mm S2 PVC-U Pressure Pipe RRJ	17379	12	6	Blue	40.33
375mm S2 PVC-U Pressure Pipe RRJ	17382	16	6	Blue	52.33
100mm S2 PVC-U Pressure Pipe RRJ	17268	12	6	Cream	3.50
150mm S2 PVC-U Pressure Pipe RRJ	17308	12	6	Cream	7.50
200mm S2 PVC-U Pressure Pipe RRJ	17341	12	6	Cream	12.00

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)
200mm S2 PVC-U Pressure Pipe RRJ	17343	16	6	Cream	15.50
250mm S2 PVC-U Pressure Pipe RRJ	17351	12	6	Cream	18.00
300mm S2 PVC-U Pressure Pipe RRJ	17361	12	6	Cream	26.33
300mm S2 PVC-U Pressure Pipe RRJ	17366	16	6	Cream	34.33
300mm S2 PVC-U Pressure Pipe RRJ	17367	16	6	Cream	35.67
375mm S2 PVC-U Pressure Pipe RRJ	17381	12	6	Cream	40.67
100 mm S2 PVC-U Pressure Pipe RRJ	17264	12	6	Purple	3.50
100mm S2 PVC-U Pressure Pipe RRJ	17275	16	6	Purple	4.67
150mm S2 PVC-U Pressure Pipe RRJ	17299	12	6	Purple	7.67
150mm S2 PVC-U Pressure Pipe RRJ	17315	16	6	Purple	9.67
250mm S2 PVC-U Pressure Pipe RRJ	17355	16	6	Purple	23.50
375mm S2 PVC-U Pressure Pipe RRJ	17385	16	6	Grey	52.33

Table 27 - Product Specification for Vinidex Hydro PVC-M Series 1 Pipe (Solvent cement joint)

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)
100mm S1 PVC-M Pressure Pipe SCJ	17040	9	6	White	1.50
150mm S1 PVC-M Pressure Pipe SCJ	17085	9	6	White	3.17
200mm S1 PVC-M Pressure Pipe SCJ	17115	9	6	White	6.17
100mm S1 PVC-M Pressure Pipe SCJ	17050	12	6	White	2.00
150mm S1 PVC-M Pressure Pipe SCJ	17095	12	6	White	4.00
100mm S1 PVC-M Pressure Pipe CRJ	17035	9	6	White	1.50
100mm S1 PVC-M Pressure Pipe CRJ	17045	12	6	White	2.00
150mm S1 PVC-M Pressure Pipe CRJ	17080	9	6	White	3.17
150mm S1 PVC-M Pressure Pipe CRJ	17090	12	6	White	4.00
200mm S1 PVC-M Pressure Pipe CRJ	17110	9	6	White	6.41
200mm S1 PVC-M Pressure Pipe CRJ	17120	12	6	White	8.15
225mm S1 PVC-M Pressure Pipe CRJ	17135	9	6	White	7.67
225mm S1 PVC-M Pressure Pipe CRJ	17140	12	6	Purple	9.67
250mm S1 PVC-M Pressure Pipe CRJ	17145	6	6	White	8.54
250mm S1 PVC-M Pressure Pipe CRJ	17150	9	6	White	9.66
250mm S1 PVC-M Pressure Pipe CRJ	17155	12	6	White	12.67
300mm S1 PVC-M Pressure Pipe CRJ	17160	6	6	White	11.07
300mm S1 PVC-M Pressure Pipe CRJ	17165	9	6	White	12.36
300mm S1 PVC-M Pressure Pipe CRJ	17170	12	6	White	16.00
375mm S1 PVC-M Pressure Pipe CRJ	17175	6	6	White	17.56
375mm S1 PVC-M Pressure Pipe CRJ	17180	9	6	White	19.37
375mm S1 PVC-M Pressure Pipe CRJ	17174	12	6	White	25.00
450mm S1 PVC-M Pressure Pipe SCJ	17171	6	6	White	26.91
450mm S1 PVC-M Pressure Pipe SCJ	17172	9	6	White	32.33
450mm S1 PVC-M Pressure Pipe SCJ	17173	12	6	White	41.17

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)
500mm S1 PVC-M Pressure Pipe SCJ	17415	6	6	White	33.50
500mm S1 PVC-M Pressure Pipe SCJ	17416	9	6	White	39.33
500mm PS1 PVC-M Pressure Pipe SCJ	17417	12	6	White	49.98
575mm S1 PVC-M Pressure Pipe SCJ	17418	6	6	White	42.64
575mm S1 PVC-M Pressure Pipe SCJ	17419	9	6	White	49.33
575mm S1 PVC-M Pressure Pipe SCJ	17420	12	6	White	64.67

Table 28 - Product Specification for Vinidex Hydro PVC-M Series 2 Pipe (Rubber ring joint)

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)
100mm S2 PVC-M Pressure Pipe CRJ	17181	12	6	Blue	2.50
100mm S2 PVC-M Pressure Pipe CRJ	17182	16	6	Blue	3.05
100mm S2 PVC-M Pressure Pipe CRJ	17183	18	6	Blue	3.35
100mm S2 PVC-M Pressure Pipe CRJ	17184	20	6	Blue	3.67
150mm S2 PVC-M Pressure Pipe CRJ	17185	12	6	Blue	5.00
150mm S2 PVC-M Pressure Pipe CRJ	17186	16	6	Blue	6.50
150mm S2 PVC-M Pressure Pipe CRJ	17187	18	6	Blue	7.07
150mm S2 PVC-M Pressure Pipe CRJ	17188	20	6	Blue	8.00
200mm S2 PVC-M Pressure Pipe RRJ	17189	12	6	Blue	8.67
200mm S2 PVC-M Pressure Pipe CRJ	17190	16	6	Blue	11.80
225mm S2 PVC-M Pressure Pipe CRJ	17194	16	6	Blue	13.83
250mm S2 PVC-M Pressure Pipe CRJ	17197	12	6	Blue	13.17
250mm S2 PVC-M Pressure Pipe CRJ	17198	16	6	Blue	17.52
300mm S2 PVC-M Pressure Pipe CRJ	17201	12	6	Blue	18.85
300mm S2 PVC-M Pressure Pipe CRJ	17202	16	6	Blue	25.04
375mm S2 PVC-M Pressure Pipe CRJ	17207	12	6	Blue	28.83
375mm S2 PVC-M Pressure Pipe CRJ	17208	16	6	Blue	37.62
450mm S2 PVC-M Pressure Pipe CRJ	17411	6	6	Blue	26.83
450mm S2 PVC-M Pressure Pipe CRJ	17413	12	6	Blue	41.50
450mm S2 PVC-M Pressure Pipe CRJ	17414	16	6	Blue	54.33
100mm S2 PVC-M Pressure Pipe RRJ	17281	12	6	Cream	2.33
100mm S2 PVC-M Pressure Pipe CRJ	17210	16	6	Cream	3.00
150mm S2 PVC-M Pressure Pipe CRJ	17217	16	6	Cream	6.33
200mm S2 PVC-M Pressure Pipe CRJ	17282	12	6	Cream	8.67
250mm S2 PVC-M Pressure Pipe CRJ	17285	12	6	Cream	13.50
300mm S2 PVC-M Pressure Pipe RRJ	17284	12	6	Cream	18.67
375mm S2 PVC-M Pressure Pipe CRJ	17205	12	3	Cream	30.33
375mm S2 PVC-M Pressure Pipe RRJ	17204	16	6	Cream	37.17
100mm S2 PVC-M Pressure Pipe CRJ	17052	12	6	Purple	2.33
100mm S2 PVC-M Pressure Pipe CRJ	17294	16	6	Purple	3.00
150mm S2 PVC-M Pressure Pipe CRJ	17092	12	6	Purple	4.83

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)
150mm S2 PVC-M Pressure Pipe CRJ	17223	16	6	Purple	6.77
200mm S2 PVC-M Pressure Pipe CRJ	17103	12	6	Purple	8.33
200mm S2 PVC-M Pressure Pipe RRJ	17211	16	6	Purple	11.00
225mm S2 PVC-M Pressure Pipe RRJ	17234	16	6	Purple	14.17
300mm S2 PVC-M Pressure Pipe CRJ	17233	16	6	Purple	25.00
375mm S2 PVC-M Pressure Pipe CRJ	17177	12	6	Purple	25.83

Table 29 - Product Specifications for Supermain PVC-O International Series Pipe

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)
160mm iso PVC-O Pressure Pipe 355	17535	10	6	White	2.67
225mm iso PVC-O Pressure Pipe 355	17534	10	6	White	5.33
250mm iso PVC-O Pressure Pipe 355	17533	10	6	White	6.50
280mm iso PVC-O Pressure Pipe 355	17532	10	6	White	8.33
315mm iso PVC-O Pressure Pipe 355	17531	10	6	White	10.50
160mm iso PVC-O Pressure Pipe 355	17528	12.5	6	White	2.67
225mm iso PVC-O Pressure Pipe 355	17529	12.5	6	White	5.33
250mm iso PVC-O Pressure Pipe 355	17530	12.5	6	White	6.50
280mm iso PVC-O Pressure Pipe 355	17527	12.5	6	White	8.33
315mm iso PVC-O Pressure Pipe 355	17526	12.5	6	White	11.17

Table 30 - Product Specifications for Supermain PVC-O Series 2 Pipe

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)	Stiffness
100mm S2 PVC-O Pressure Pipe 400	17220	12.5	6	Blue	1.84	
200mm S2 PVC-O Pressure Pipe 400	17230	12.5	6	Blue	6.61	
100mm S2 PVC-O Pressure Pipe 500	17221	16	6	Blue	1.83	
100mm S2 PVC-O Pressure Pipe 450	17491	16	6	Blue	1.95	SN10
150mm S2 PVC-O Pressure Pipe 500	17226	16	6	Blue	3.85	
150mm S2 PVC-O Pressure Pipe 450	17492	16	6	Blue	4.10	SN10
200mm S2 PVC-O Pressure Pipe 500	17231	16	6	Blue	6.62	
225mm S2 PVC-O Pressure Pipe 500	17241	16	6	Blue	8.25	
250mm S2 PVC-O Pressure Pipe 500	17455	16	6	Blue	9.95	
300mm S2 PVC-O Pressure Pipe 500	17464	16	6	Blue	14.70	
200mm S2 PVC-O Pressure Pipe 500	17493	20	6	Blue	7.78	SN11

Product Description	Vinidex Code	Pressure Class PN	Length (m)	Colour	Approx Weight (kg/m)	Stiffness
100mm S2 PVC-O Pressure Pipe 500	17496	16	6	Cream	1.84	
100mm S2 PVC-O Pressure Pipe 450	17495	16	6	Cream	1.95	SN10
150mm S2 PVC-O Pressure Pipe 500	17498	16	6	Cream	3.85	
200mm S2 PVC-O Pressure Pipe 500	17252	16	6	Cream	6.61	
225mm S2 PVC-O Pressure Pipe 500	17253	16	6	Cream	8.25	
250mm S2 PVC-O Pressure Pipe 500	17474	16	6	Cream	9.95	
300mm S2 PVC-O Pressure Pipe 500	17468	16	3	Cream	15.33	
200mm S2 PVC-O Pressure Pipe 500	17490	20	6	Cream	7.78	SN11
150mm S2 PVC-O Pressure Pipe 400	17229	12.5	6	Purple	3.85	
100mm S2 PVC-O Pressure Pipe 500	17222	16	6	Purple	1.83	
150mm S2 PVC-O Pressure Pipe 500	17227	16	6	Purple	3.85	
150mm S2 PVC-O Pressure Pipe 450	17489	16	6	Purple	4.10	SN10
200mm S2 PVC-O Pressure Pipe 500	17232	16	6	Purple	6.62	
225mm S2 PVC-O Pressure Pipe 500	17245	16	6	Purple	8.25	
250mm S2 PVC-O Pressure Pipe 500	17473	16	6	Purple	9.95	
300mm S2 PVC-O Pressure Pipe 500	17466	16	6	Purple	14.70	

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