Vinidex
Systems & Solutions

Environmental Product Declaration

Polyethylene Pipes

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION

Environmental Product Declaration (EPD) in accordance with ISO 14025 and EN 15804
Version: 1.2 1 May 2018
Date of Issue: 4 August 2016
Registration Number: S-P-00719
Validity: 4 August 2016 - 3 August 2021
Geographical area of application of this EPD: Australia
Year taken as a reference for the data: 2014

EPD of Vinidex Polyethylene pipe products - in collaboration with the Plastics Industry Pipe Association of Australia (PIPA).

PIPA

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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).

Environmental product declarations within the same product category from different programmes may not be comparable. EPD of construction products may not be comparable if they do not comply with EN 15804. This version of the EPD has been updated to clarify and correct impact assessment results for Abiotic Resource Depletion Potential.

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CEN standard EN 15804 served as the core PCR	
PCR	Construction Products and Services, Version 2, 2015-03-03
PCR prepared by	**IVL Swedish Environmental Research Institute** Moderator: Martin Erlandsson, martin.erlandsson@ivl.se
Independent external verification of the declaration and data, according to ISO 14025:2010	☐ EPD process certification (Internal) ☑ EPD verification (External)
Accredited or approved by	The Australasian EPD® Programme

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.

This EPD may be used to obtain Sustainable Product credit points under the GBCA's Green Star rating tools.

The polyethylene (PE) pipe EPD results can also be used to represent PE pipe products in Whole of Building Life Cycle Assessments under Green Star rating tools. See the product details tables to convert the product results from kilogram of installed pipe to length of pipe for individual pipe products.

VINIDEX SYSTEMS AND SOLUTIONS

Vinidex Pty Limited (Vinidex) is Australia's leading manufacturer and supplier of quality PVC, PE and PP pipe systems and solutions for the transportation of fluid, data and energy with pipe systems ranging from 16 mm to 1200 mm.

Vinidex pipe and fittings systems are used in a broad range of applications including plumbing, water supply, sewerage and wastewater, stormwater and drainage, mining, industrial, rural, irrigation, electrical, telecommunications and gas.

Vinidex has eleven manufacturing sites across Australia and a comprehensive nationwide network of warehousing and distribution facilities to enable efficient distribution of our own products and those of our national and international partners. Vinidex has extensive logistics experience with major projects and a proven track record for project delivery.

As part of the world wide Aliaxis Group of companies, Vinidex can provide products, access to international technologies and innovative solutions that are world class. The Aliaxis Group is a leading global manufacturer and distributor of plastics pipe systems, present in over 40 countries, with more than 100 commercial entities and employs over 15,000 people.

Vinidex is renowned for a commitment to technical advancement and product innovation. Our continuous evaluation programmes, examining new materials, processing technology and manufacturing equipment, ensure our continued position as a major participant in the pipe industry. Vinidex participates in Australian and International pipe associations as well as Australian and ISO standards committees.

At every level of Vinidex, you'll find a genuine commitment from our staff to exceed expectations and ensure that you are satisfied with the overall experience. We offer total solutions from design assistance, technical support, product supply, delivery logistics management and field support.

VINIDEX POLYETHYLENE PIPES

Polyethylene (PE) pipe manufacture commenced in Australia in the 1950's with small diameter pipes used for rural, irrigation and industrial applications. Since then, PE use and the number of applications for PE pipes has grown enormously, due to its versatility and the advantages it offers over iron, steel and cement systems.

The flexibility of PE pipe allows cost savings in installation. Trenchless technology can avoid the need for open trenches and reduce the disturbance to the public and environment by pulling long lengths of PE pipes through holes below ground bored by mechanical moles. PE is often used in renovation of old pipelines as it can be readily inserted as a structural lining into an old pipeline.

PE pipe can be supplied in straight lengths or in coils, reducing the need for joints and fittings. PE pipes can be jointed using butt and electrofusion techniques or using mechanical fittings.

PE pressure pipes are manufactured in accordance with AS/NZS 4130 and are designated by their outside diameter or DN. For water and other general pressure applications, the maximum allowable operating pressure (MAOP) with a minimum service coefficient is designated by the pressure rating or PN. The SDR of a PE pipe refers to its 'Standard Dimension Ratio' which describes the geometry of the pipe and is the ratio of the outside diameter and the minimum wall thickness. Pipes with a higher SDR have a thinner wall than pipes with a low SDR. The SDR can be related to the MAOP using the material MRS and the service coefficient appropriate for the application.

PE pipes are available in a range of identification colours that may be either coextruded as stripes or 'jackets' that completely surround the pipe. Such colours include yellow, blue and purple for identification purposes and white jackets used minimise temperature rise in above ground applications exposed to direct sunlight.

A commitment to using only the highest standard of raw materials and the latest manufacturing technology has established Vinidex with a reputation as a quality supplier of Polyethylene Pipes in sizes ranging from 13mm to 1000mm in diameter. PE pipes are used in a wide range of applications including:

- Water supply
- Irrigation
- Mining and Slurry Lines
- Gas
- Recycled and Reclaimed Water Transfer
- Sewerage
- Drainage
- Compressed Air
- Conduits for Directional Drilling
- Conduits for telecommunication and electrical applications

Table 1 - Product characteristics of PE pipe

Product Characteristics	
Product names	PE 100, Polimax, Polymain, Maxicoil, Rural Plus, Sewertech
UN CPC Code	36320 - Tubes, pipes and hoses, and fittings therefor, of plastics
Density	960 kg/m^3
Melt Flow Rate 190/5	0.3-0.5 g/10 min
Minimum Required Strength (50 year @ 20˚C)	10 MPa
Tensile Yield Strength	23 MPa
Elongation at Yield	8%
Circumferential Flexural Modulus (3 minute)	950 MPa
Circumferential Flexural Creep Modulus (50 year)	260 MPa
Poisson's ratio	0.4
Thermal Expansion Coefficient	2.4 x 10^{-4}/˚C
Thermal Conductivity	0.4 W/m.k

The PE100 resin is supplied to Vinidex pre-compounded from suppliers with 2-3% carbon black and <1% of the non-hazardous proprietary additives. The content declaration is shown in Table 2.

Table 2 - Content Declaration

Material	Percentage Content	CAS No.
Polyethylene	96-98%	9002-88-4
Carbon black	2-3%	1333-86-4
Non-hazardous proprietary additives	<1%	
Total	100%	

PRODUCT LIFE CYCLE OVERVIEW

The life cycle of a building product is divided into three process modules according to the General Program Instructions (GPI) of the Australasian EPD Programme (AEPDP, 2015) and four information modules according to ISO 21930 and EN 15804. The scope of the EPD is “cradle to gate with options” as defined by EN 15804 – the specific system boundary is shown in Table 3. The intent of the EPD is to cover all significant environmental impact over the full product lifecycle. Due to the fact that the pipes are left in the ground at end of life with negligible potential environmental impact, modules C1-C4 were deemed not relevant (of negligible impact). All other use stage modules were also deemed not relevant (of negligible impact).

Table 3 - System boundary and scope of assessment

Product Stage			Con-struc-tion Stage		Use Stage							End of Life Stage				Benefits & Loads Beyond the System Boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw material supply	Transport	Manufacturing	Transport	Installation	Material emissions	Maintenance	Repair	Replacement	Refurbishment	Operational energy	Operational water	Deconstruction/Demolition	Transport	Waste processing	Disposal	Reuse/Recycling/ Recovery potential
X	X	X	X	X	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR

X = module included in EPD
NR = module not relevant (does not indicate zero impact result)

LIFE CYCLE OF VINIDEX PE PIPES

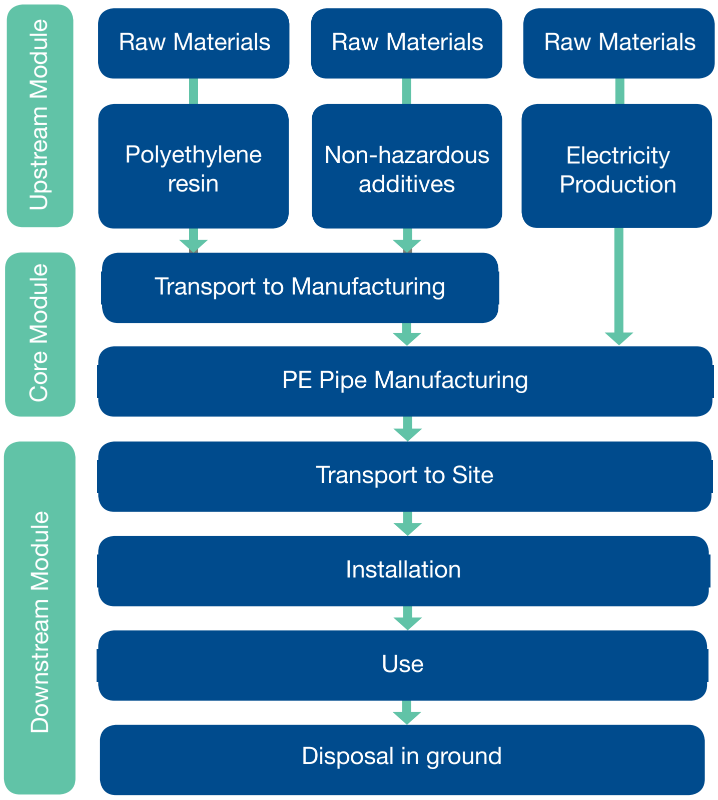

Figure 1 - Life cycle diagram of PE pipe production

VINIDEX PE PIPE MANUFACTURING

Vinidex PE pipes are produced using a sophisticated, highly controlled manufacturing process and extrusion technology. Materials used are precompounded in a pelletised form containing precise amounts of polymer, lubricants, stabilisers, anti oxidants and pigments for the specific end product application. The PE compound is preheated to remove moisture and volatiles and is conveyed to the extruder using a controlled rate feeder. The extruder consists of a single screw configuration which melts and conveys the PE material along the length of the extruder barrel. The design of the extruder barrel/screw is complex and takes into account the properties of the various types of PE material grades used in pipe applications. Various zones exist along the length of the screw and act to melt, mix, de-gas and compresses the PE compound. External electrical heater bands along the barrel, together with the frictional heat generated as the PE material passes through the gaps between barrel and screw provide the energy needed to fully melt the PE compound materials. The total heat input is carefully controlled to ensure full melting of the PE without thermal degradation.

After passing through a mixing zone at the tip of the extruder, the PE melt then feeds into a head and die combination, where the melt is formed into the size of pipe required. Once the molten PE pipe form leaves the die, it enters the sizing system, where it is initially cooled to the required dimensions. This is performed using an external vacuum pressure system where the pipe surfaces are cooled with refrigerated water sprays whilst in contact with precision machined sizing sleeves. The initially cooled pipe is then progressively passed through a series of water spray cooling tanks to reduce the PE material to ambient temperature, and to finalise the pipe dimensions.

The pipe information of size, material, class, and batch data required by Australian Standards, or by specific client specification, is then marked on the pipe by an in-line printer to provide continuous branding at specified intervals. The completed pipe is then cut to standard or required length by an in-line saw. Smaller diameter pipes are either cut to standard length, or coiled, and the finished coils are strapped in standard coil sizes.

Vinidex PE pipe is manufactured in Melbourne (VIC), Perth (WA), Brisbane (QLD), Townsville (QLD) and Toowoomba (QLD) as shown below in Figure 2.

Figure 2 - Vinidex PE pipe manufacturing sites

DISTRIBUTION STAGE

The majority of PE pipe is sold for agricultural and mining applications, which generally require greater transportation from manufacturing facilities than civil and industrial applications. The impact of distribution was calculated by using the average distance from each manufacturing site to major markets, and calculating a weighted average distribution distance using market volumes. The weighted average distance to site was estimated to be approximately 160 km. A much shorter distance is required for civil and building applications in major markets close to manufacturing sites, while a longer distance was required for minor markets away from manufacturing sites, as well as agricultural and mining installation sites.

INSTALLATION STAGE

Vinidex PE pipes are usually installed below ground. The pipe is available in a variety of lengths typically from 6m straight lengths to coils that are hundreds of metres long (size limitations apply). PE pipe systems utilise welded joints and as such results in long continuous lengths of pipeline that can take advantage of trenchless installation techniques (e.g. pipe cracking, slip lining and directional drilling).

PE is also installed using typical open trench options and is mostly used for pressure applications or non-pressure applications where installation to grade is not required (for example in communications applications). In this EPD a deliberately conservative approach to installation has been adopted where the installation conditions will reflect the open trench technique.

A typical open trench installation based around a DN200 pipe requires an average trench width of around 400 mm and a typical trench depth of 900 - 1000 mm. Note that 95% of pipes sold are smaller than this so would need smaller trenches, and given that many PE pipes are installed by trenchless methods, this is very conservative estimate. The results in module A5 do not apply to larger pipe sizes than DN200. Bedding and backfill materials vary in specification. In many cases no imported material is used but for many city-based agencies sand bedding and gravel are used in the areas immediately below and at the sides of the pipe. It is estimated that if imported backfill materials are used there would be less than 0.3 m^3 of material per metre of pipeline. Handling and positioning of individual pipes on site is done predominately by hand or with the assistance of a small excavator.

The joints for PE pipes are almost always welded - butt fusion being the most commonly used technique. Specified welding parameters are nominated in a PIPA document POP003 Butt Fusion Jointing of PE Pipes and Fittings (PIPA, 2011). Wastage of pipe is minimal and is estimated that unusable offcuts account for less than 1%.

USE STAGE

According to AS/NZS 4130:2009 and 4401:2006, the pipe systems can logically be expected to have a life expectancy of in excess of 100 years before major rehabilitation is required (Standards Australia, 2009: Standards Australia 2006). Maintenance of these pipe systems is not planned as deterioration of the pipe in service is not an issue.

The failure rate of the pipe itself is extremely low and is considered to be inconsequential (not relevant) in this EPD. Given the major risk with plastics pipe systems is third party interference, and that these PE pipe systems used primarily in mining and irrigation applications not sharing restricted footway allocations as with water and gas reticulation, it is significantly less likely that third parties will encounter these pipe systems.

END OF LIFE STAGE

The PE pipes which are installed underground are assumed to remain underground at end of life. The PE 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 Study

Declared unit	1 kg of installed pipe
Geographical coverage	Australia
LCA scope	Cradle to gate with options
Reference service life	100 years

Life cycle assessment (LCA) requires a compilation of the inputs, outputs and environmental impacts of a product system throughout its life cycle. LCA can enable businesses to identify resource flows, waste generation and environmental impacts (such as climate change) associated with the provision of products and services.

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.

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

Life cycle data has been sourced from material quantity data and production process data from:

- Vinidex reporting systems and staff
- Vinidex suppliers

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 and transportation. Background data was adapted to represent Vinidex PE pipe product as accurately as possible. Australian inputs were primarily modelled with the AusLCI database (AusLCI, 2016) and the Australasian Unit Process LCI (Life Cycle Strategies, 2015) and the ecoinvent v3 database where suitable Australian data was not available. The polyethylene monomer and polymer inputs sourced from outside Australia were modelled based on global averages using the ecoinvent v3 database. Global averages were used since the sourcing of these materials often changes from year to year. All background data used was less than 10 years old.

CUT OFF CRITERIA

Environmental impacts relating to personnel, infrastructure, and production equipment not directly consumed in the process are excluded from the system boundary as per the PCR (IEPDS, 2015). The pre-compounded polyethylene resin includes <1% minor non-hazardous additives which are confidential and were not included in the LCA. All other reported data were incorporated and modelled using the best available life cycle inventory data.

ALLOCATION

Allocation was carried out in accordance with the PCR (IEPDS, 2015). 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.

POLYETHYLENE PIPE ENVIRONMENTAL PERFORMANCE

The potential environmental impacts used in this EPD are explained in Table 5 and the results for Vinidex PE pipe are shown in Table 6. The use of energy and fresh water resources is shown in Table 7. The use of secondary material and secondary material used as energy resources is listed as 'INA' (indicator not assessed). Although Vinidex do not directly use secondary material, it is unknown whether secondary material is used in the supply chain and therefore exists in the product life cycle. Table 8 shows the generation of waste throughout the product life cycle.


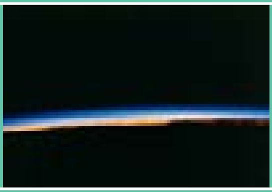




Table 5 - Environmental indicators used in the EPD

Environmental Indicator	Unit	Description
Global Warming Potential [a]	kg carbon dioxide equivalents	Increase in the Earth's average temperature, mostly through the release of greenhouse gases. A common outcome of this is an increase in natural disasters and sea level rise.
Ozone Depletion Potential [b]	kg CFC-11 equivalents	The decline in ozone in the Earth's stratosphere. The depletion of the ozone layer increases the amount of UVB that reaches the Earth's surface. UVB is generally accepted to be a contributing factor to skin cancer, cataracts and decreased crop yields.
Acidification Potential [c]	kg sulphur dioxide equivalents	A process whereby pollutants are converted into acidic substances which degrade the natural environment. Common outcomes of this are acidified lakes and rivers, toxic metal leaching, forest damage and destruction of buildings.
Eutrophication Potential [c]	kg phosphate equivalents	An increase in the levels of nutrients released to the environment. A common outcome of this is high biological productivity that can lead to oxygen depletion, as well as significant impacts on water quality, affecting all forms of aquatic and plant life.
Photochemical Ozone Creation Potential [c]	kg ethylene equivalents	Ozone in the troposphere is a constituent of smog that is caused by a reaction between sunlight, nitrogen oxide and volatile organic compounds (VOCs). This is a known cause for respiratory health problems and damage to vegetation.
Abiotic Depletion Potential – Elements / minerals [c]	kg antimony equivalents	The extraction of non-living and non-renewable elements and minerals. These resources are essential in our everyday lives and many are currently being extracted at an unsustainable rate.
Abiotic Depletion Potential – Fossil Fuels [c]	MJ net calorific value	The extraction of non-living and non-renewable fossil fuels. These resources are essential in our everyday lives and many are currently being extracted at an unsustainable rate.

Life cycle impact assessment methods used: a - CML (v4.1) – based on IPCC AR4 (GWP 100); b - CML (v4.1) – based on WMO 1999; c - CML (v4.1)

PE PIPE ENVIRONMENTAL PERFORMANCE

Table 6 - Potential environmental impacts

	A1 - A3	A4	A5
GWP ($kgCO_2$ eq)	3.10	0.0412	1.08
ODP (kgCFC11 eq)	4.6E-08	1.04E-09	5.45E-08
AP ($kgSO_2$ eq)	0.0107	1.00E-04	3.43E-03
EP ($kgPO_4^{3-}$ eq)	1.01E-03	2.43E-05	8.35E-04
POCP (kgC_2H_2 eq)	4.64E-04	6.43E-06	1.77E-04
ADPE (kgSb eq)	1.27E-06	7.28E-08	2.57E-06
ADPF (MJ)	79.4	0.641	14.2

GWP = Global Warming Potential, **ODP** = Ozone Depletion Potential, **AP** = Acidification Potential, **EP** = Eutrophication Potential, **POCP** = Photochemical Oxidant Formation Potential, **ADPE** = Abiotic Resource Depletion Potential – Elements, **ADPF** = Abiotic Resource Depletion Potential – Fossil Fuel

Table 7 - Use of resources

	A1- A3	A4	A5
PERE (MJ)	1.58	2.84E-03	0.356
PERM (MJ)	INA	INA	INA
PERT (MJ)	1.58	2.84E-03	0.356
PENRE (MJ)	91.8	0.644	14.5
PENRM (MJ)	INA	INA	INA
PENRT (MJ)	91.8	0.644	14.5
SM (kg)	INA	INA	INA
RSF (MJ)	INA	INA	INA
NRSF (MJ)	INA	INA	INA
FW (m^3)	0.179	9.21E-03	0.863

PERE = Use of renewable primary energy excluding raw materials, **PERM** = Use of renewable primary energy resources used as raw materials, **PERT** = Total use of renewable primary energy resources, **PENRE** = Use of non-renewable primary energy excluding raw materials, **PENRM** = Use of non-renewable primary energy resources used as raw materials, **PENRT** = Total use of non-renewable primary energy resources, **SM** = Use of secondary material, **RSF** = Use of renewable secondary fuels, **NRSF** = Use of non-renewable secondary fuels, **FW** = Use of net fresh water, **INA** = Indicator not accessed due to a limitation of the LCA tools and databases used to calculate the required resource flows. INA does not imply zero impact

Table 8 - Generation of waste

	A1 - A3	A4	A5
HWD (kg)	3.57E-06	3.41E-07	1.44E-05
NHWD (kg)	0.141	3.27E-03	0.254
RWD (kg)	2.38E-05	8.29E-09	4.50E-07

HWD = Hazardous waste disposed, **NHWD** = Non-hazardous waste disposed, **RWD** = Radioactive waste disposed

INTERPRETATION OF LCA RESULTS

The majority of environmental impact lies within the PE raw material supplied to Vinidex followed by the energy used for excavation during the pipe installation phase and pipe distribution – comparatively little impact is caused by the PE pipe manufacturing at Vinidex sites. From the feed mix ingredients, PE100 resin is responsible for the majority of all environmental impacts and use of resources, followed by the pipe installation.

ADDITIONAL ENVIRONMENTAL INFORMATION

At Vinidex we recognise the importance of incorporating environmental sustainability into our business strategies. Environmental issues are now the subject of greater community awareness. Vinidex have long been mindful of these issues, demonstrated by our achievements in minimising waste, post-industrial and post-consumer recycling, minimising energy use on production as well as minimising embodied energy on our products.

Table 9 - Pipe specifications for polyethylene pipe

Vinidex Capability and PE100 Polyethylene Pipe Dimensions (Based on AS/NZS 4130:2009)

Nom.	SDR 41			SDR 33			SDR 26			SDR 21			SDR 17		
Size DN	Min. Wall Thickness (mm)	Mean I.D. (mm)	Approx. Weight (kg/m)	Min. Wall Thickness (mm)	Mean I.D. (mm)	Approx. Weight (kg/m)	Min. Wall Thickness (mm)	Mean I.D. (mm)	Approx. Weight (kg/m)	Min. Wall Thickness (mm)	Mean I.D. (mm)	Approx. Weight (kg/m)	Min. Wall Thickness (mm)	Mean I.D. (mm)	Approx. Weight (kg/m)
16	1.6	13	0.07	1.6	13	0.07	1.6	13	0.07	1.6	13	0.07	1.6	13	0.07
20	1.6	17	0.10	1.6	17	0.10	1.6	17	0.10	1.6	17	0.10	1.6	17	0.10
25	1.6	22	0.12	1.6	22	0.12	1.6	22	0.12	1.6	22	0.12	1.6	22	0.12
32	1.6	29	0.16	1.6	29	0.16	1.6	29	0.16	1.6	29	0.16	1.9	28	0.18
40	1.6	37	0.20	1.6	37	0.20	1.6	37	0.20	1.9	36	0.23	2.4	35	0.29
50	1.6	47	0.25	1.6	47	0.25	2	46	0.31	2.4	45	0.37	3	44	0.45
63	1.6	60	0.32	2	59	0.39	2.4	58	0.47	3	57	0.58	3.8	55	0.73
75	1.9	71	0.45	2.3	70	0.54	2.9	69	0.67	3.6	67	0.83	4.5	66	1.02
90	2.2	86	0.62	2.8	84	0.79	3.5	83	0.98	4.3	81	1.19	5.4	78	1.47
110	2.7	105	0.93	3.4	103	1.17	4.3	101	1.47	5.3	99	1.79	6.6	96	2.20
125	3.1	119	1.22	3.9	117	1.52	4.8	115	1.86	6	113	2.30	7.4	110	2.81
140	3.5	133	1.54	4.3	131	1.88	5.4	129	2.34	6.7	126	2.88	8.3	123	3.52
160	4	152	2.01	4.9	150	2.45	6.2	148	3.07	7.7	144	3.78	9.5	140	4.61
180	4.4	171	2.49	5.5	169	3.09	6.9	166	3.85	8.6	163	4.75	10.7	158	5.84
200	4.9	190	3.08	6.2	188	3.87	7.7	184	4.77	9.6	180	5.89	11.9	175	7.22
225	5.5	215	3.89	6.9	211	4.85	8.6	207	6.00	10.8	203	7.46	13.4	198	9.14
250	6.2	238	4.87	7.7	235	6.01	9.6	230	7.44	11.9	225	9.13	14.8	219	11.2
280	6.9	267	6.07	8.6	263	7.52	10.7	258	9.29	13.4	253	11.5	16.4	246	13.9
315	7.7	300	7.63	9.7	296	9.55	12.1	290	11.8	15.0	285	14.5	18.7	278	17.9
355	8.7	338	9.71	10.9	333	12.1	13.6	328	15.0	16.9	320	18.4	21.1	311	22.7
400	9.8	380	12.3	12.3	376	15.4	15.3	370	19.0	19.1	362	23.5	23.7	351	28.7
450	11	429	15.6	13.8	422	19.4	17.2	415	24.0	21.5	406	29.7	26.7	395	36.4
500	12.3	476	19.3	15.3	470	23.9	19.1	462	29.6	23.9	452	36.7	29.6	440	44.9
560	13.7	534	24.1	17.2	526	30.1	21.4	518	37.2	26.7	506	45.9	33.2	494	56.4
630	15.4	600	30.5	19.3	592	38.0	24.1	582	47.1	30	570	58.0	37.3	554	71.3
710	17.4	676	38.8	21.8	667	48.4	27.2	656	59.9	33.9	641	73.9	42.1	624	90.6
800	19.6	762	49.3	24.5	752	61.2	30.6	739	75.9	38.1	723	93.6	47.4	704	115
900	22	858	62.3	27.6	846	77.6	34.4	831	96.0	42.9	814	119	53.5	791	146
1000	24.5	953	77.0	30.6	940	95.6	38.2	924	118	47.7	904	146	59.3	880	180
1200	29.4	643	110.9	36.7	1128	137.6	45.9	1109	171	57.2	1085	211	67.9	1063	248

GUIDANCE FOR PE PIPE RECYCLING

All PE pipe offcuts from installation can be completely recycled back into new pipe products. There are general plastics recyclers in all Australian capital cities that will recycle PE or contact Vinidex. Although the PE pipes covered in this EPD are most likely to be left in the ground at end of life, PE has a high recyclability and can be recycled to replace virgin polyethylene in new products.

PRODUCT SPECIFICATIONS

The following table (Table 9) can be used to calculate the environmental results for specific Vinidex PE pipe products. The mass for a standard length of pipe is given for each product code.

Table 9 - Pipe specifications for polyethylene pipe (continued)

Vinidex Capability and PE100 Polyethylene Pipe Dimensions (Based on AS/NZS 4130:2009)												
Nom.	SDR 13.6			SDR11			SDR 9			SDR 7.4		
Size DN	Min. Wall Thickness (mm)	Mean I.D. (mm)	Approx. Weight (kg/m)	Min. Wall Thickness (mm)	Mean I.D. (mm)	Approx. Weight (kg/m)	Min. Wall Thickness (mm)	Mean I.D. (mm)	Approx. Weight (kg/m)	Min. Wall Thickness (mm)	Mean I.D. (mm)	Approx. Weight (kg/m)
16	1.6	13	0.07	1.6	13	0.07	1.8	12	0.08	2.2	11	0.10
20	1.6	17	0.10	1.9	16	0.11	2.3	15	0.13	2.8	14	0.16
25	1.9	21	0.14	2.3	20	0.17	2.8	19	0.20	3.5	18	0.24
32	2.4	27	0.23	2.9	26	0.27	3.6	24	0.33	4.4	23	0.39
40	3	34	0.36	3.7	32	0.43	4.5	31	0.52	5.5	28	0.61
50	3.7	42	0.55	4.6	40	0.67	5.6	38	0.80	6.9	35	0.96
63	4.7	53	0.88	5.8	51	1.07	7.1	48	1.28	8.6	45	1.51
75	5.5	63	1.23	6.8	61	1.50	8.4	58	1.80	10.3	53	2.15
90	6.6	76	1.78	8.2	73	2.16	10.1	69	2.60	12.3	65	3.08
110	8.1	93	2.66	10	89	3.22	12.3	84	3.88	15.1	78	4.62
125	9.2	106	3.44	11.4	101	4.18	14	96	5.01	17.1	89	5.95
140	10.3	118	4.31	12.7	114	5.21	15.7	108	6.29	19.2	99	7.48
160	11.8	136	5.64	14.6	130	6.85	17.9	123	8.20	21.9	114	9.76
180	13.3	153	7.15	16.4	145	8.65	20.1	138	10.4	24.6	128	12.3
200	14.7	170	8.78	18.2	162	10.7	22.4	154	12.8	27.3	143	15.2
225	16.6	191	11.2	20.5	183	13.5	25.1	173	16.2	30.8	161	19.3
250	18.4	212	13.7	22.7	203	16.6	27.9	192	20.0	34.2	179	23.8
280	20.6	238	17.2	25.4	228	20.9	31.3	215	25.1	38.3	200	29.9
315	23.2	268	21.8	28.6	256	26.4	35.2	242	31.8	43.0	226	37.7
355	26.1	301	27.7	32.2	289	33.5	39.6	273	40.3	48.5	255	47.9
400	29.4	340	35.1	36.3	326	42.6	44.7	307	51.2	54.6	287	60.8
450	33.1	382	44.5	40.9	366	54.0	50.2	347	64.7	61.5	322	77.1
500	36.8	424	55.0	45.4	407	66.5	55.8	385	79.9	67.6*	360	94.3
560	41.2	475	68.9	50.8	455	83.4	62.5	431	100	75.7*	403	118
630	46.3	535	87.1	57.2	512	106	70.3	485	127	85.1*	454	150
710	52.2	603	111	64.5	578	134	79.3	546	161	96.0*	512	190
800	58.8	679	141	72.5	651	170	89.3	616	205	-	-	-
900	66.2	765	178	81.7	732	216	100.0*	694	258	-	-	-
1000	72.5	852	217	90.2	815	265	111.2*	771	319	-	-	-
1200	88.2	1020	316	109.1*	976	384	133.4*	925	459	-	-	-

* = calculated using Appendix D of AS/NZS 4130

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EPD of Vinidex Polyethylene pipe products - in collaboration with the Plastics Industry Pipe Association of Australia (PIPA).

VIN104-
20180501