

Life Cycle Assessment results



Product type	Class	Diameter (mm)	Production site
eCP pipes	Class 2	DN 225	Kilmore, Vic

Company

Reinforced Concrete Pipes Australia Pty Ltd (RCPA) is a national supplier of vertically cast, thin wall, steel reinforced concrete pipe and geopolymer concrete pipe (eCP). RCPA uses an efficient dry cast method throughout its production plants in Brisbane, Perth, Sydney and Melbourne.

Product

eCP pipes are made from a geopolymer concrete. Geopolymer concrete is concrete that is not based on ordinary Portland cement (OPC); instead it uses low CO₂ materials (typically fly ash and blast furnace slag) that react with an alkaline activator to form a hardened binder. The finished product can be used in similar applications as standard concrete pipes. RCPA testing indicates that eCP pipes' strength and durability are equal or better than for concrete pipes in the same class and diameter.

Life Cycle Assessment (LCA)

RCPA commissioned start2see to prepare an environmental Life Cycle Assessment (LCA) for its eCP pipes produced in Kilmore, Victoria. The LCA quantifies the environmental impacts of raw material extraction, transport to site, production of pipes and average transport to a construction site.

Declared unit

1 equivalent metre of reinforced eCP pipework

Joint	Class / DN (mm)	Effective length (mm)	Total length (mm)	Pipe weight (kg)	Weight/meter (kg/m)
Rubber ring	Class 2 / 225	2340	2420	180	76.9

Environmental performance per declared unit

The environmental performance is expressed for seven indicators as per EN15804:2012+A1:2013.

Life cycle stage (EN 15804)	Unit	Raw material supply, Transport to plant, Production	Transport to client site
Indicator		A1-A3	A4
Global warming potential	kg CO ₂ eq	1.3E+01	1.4E+00
Acidification potential	kg SO ₂ eq	6.3E-02	6.1E-03
Ozone layer depletion	kg CFC11 eq	5.2E-07	1.7E-07
Eutrophication potential	kg PO ₄ ³⁻ eq	1.6E-02	1.5E-03
Photochemical oxidant creation potential	kg C ₂ H ₄ eq	4.1E-03	4.0E-04
Resource depletion – mineral	kg Sb eq	1.9E-05	5.0E-06
Resource depletion – fossil	MJ _{NCV}	1.9E+02	2.1E+01

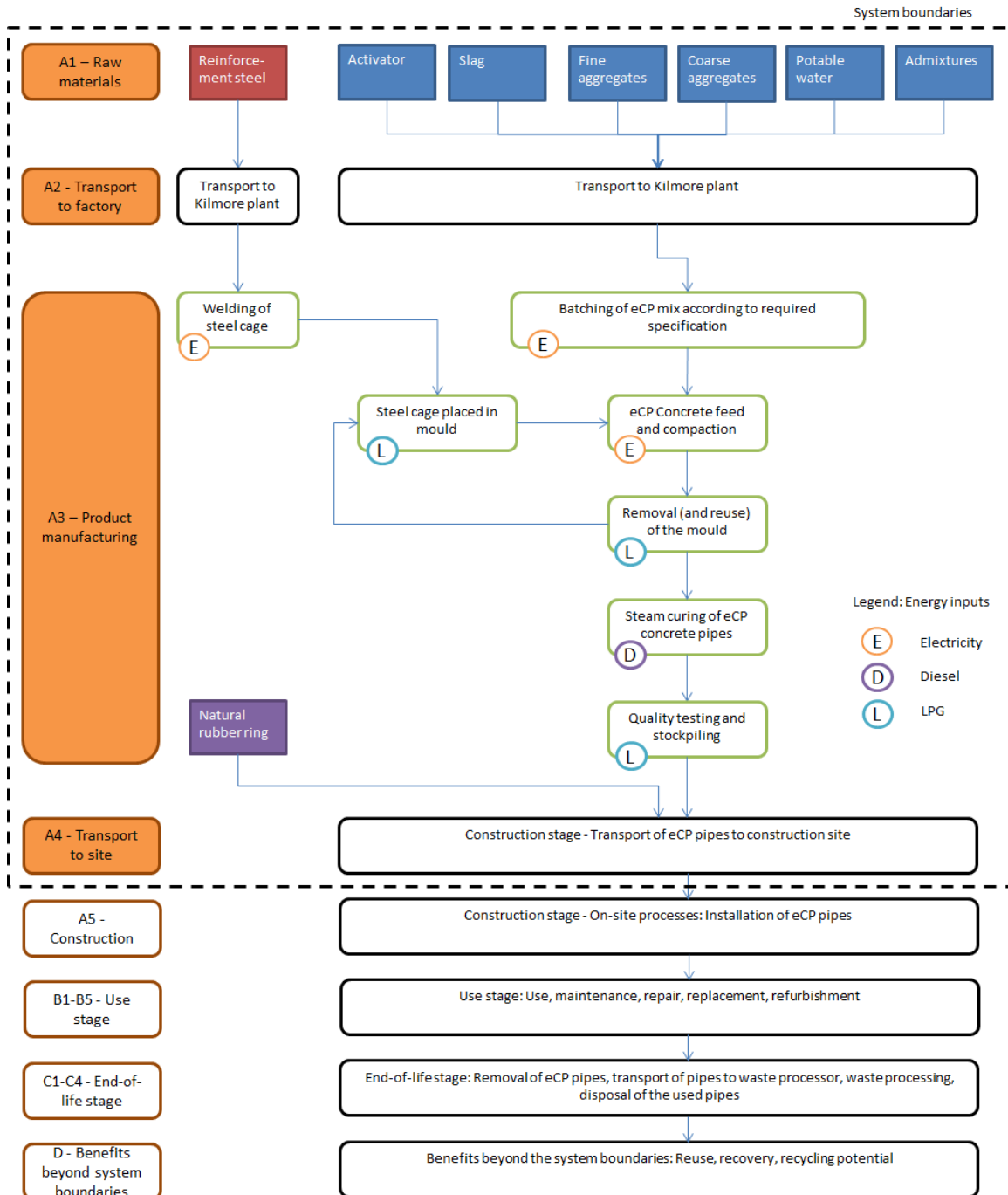
This environmental profile covers cradle-to-site (A1 – A4) life cycle stages.

Installation of pipes, use and maintenance, demolition and end-of-life treatment are excluded.

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System boundaries



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Geopolymer concrete composition

3. COMPOSITION/ INFORMATION ON INGREDIENTS

INGREDIENT:	CONTENT:	CAS NUMBER:
Supplementary cementitious materials such as fly ash, blast furnace slag, silica fume (amorphous silica)	10-20%	---
Aggregate containing crystalline silica (quartz)	20-85%	14808-60-7
Water	<20%	7732-18-5
OTHER INGREDIENTS MAY BE ADDED:		
Steel rod and bar	<10%	---
Admixtures such as water reducers, set retarders, set accelerators, plasticisers, and waterproofing agents (refer AS 1478)	<1%	---

Apart from the ingredients listed above, a ring of natural rubber is included in the LCA

Product range

In Victoria, RCPA produces:

- Rubber Ring Joint Reinforced Concrete Pipes: 225mm Dia to 2100mm Dia Classes 2, 3, 4 & 6
- Flush Joint Reinforced Concrete Pipes: 300mm to 3000mm Classes 2, 3, 4 & 6
- Higher Load Class pipes can be manufactured as special order items
- Reinforced Concrete Box Culverts: 1200mm to 2700mm Span and Leg Variances

RCPA can provide environmental profiles for geopolymer concrete and reinforced concrete pipes in class 2, class 3, class 4 and class 6, for pipe diameters ranging from DN225 to DN900.

Compliance

RCPA steel reinforced concrete pipes and geopolymer concrete pipes are manufactured to meet or exceed the requirements of AS/NZ 4058:2007 Precast concrete pipes (pressure and non-pressure) under a Quality Management System independently audited and certified to AS/NZS ISO 9001:2000.



Contact information

Reinforced Concrete Pipes Australia Pty Ltd
69-99 Ferris Rd
Melton South
Victoria 3338

e: sales@rcpa.com.au
t: (03) 9746 0600

Reference

Rouwette R. (2015). *LCA of eCP geopolymer concrete pipes*. start2see report S1309, Melbourne