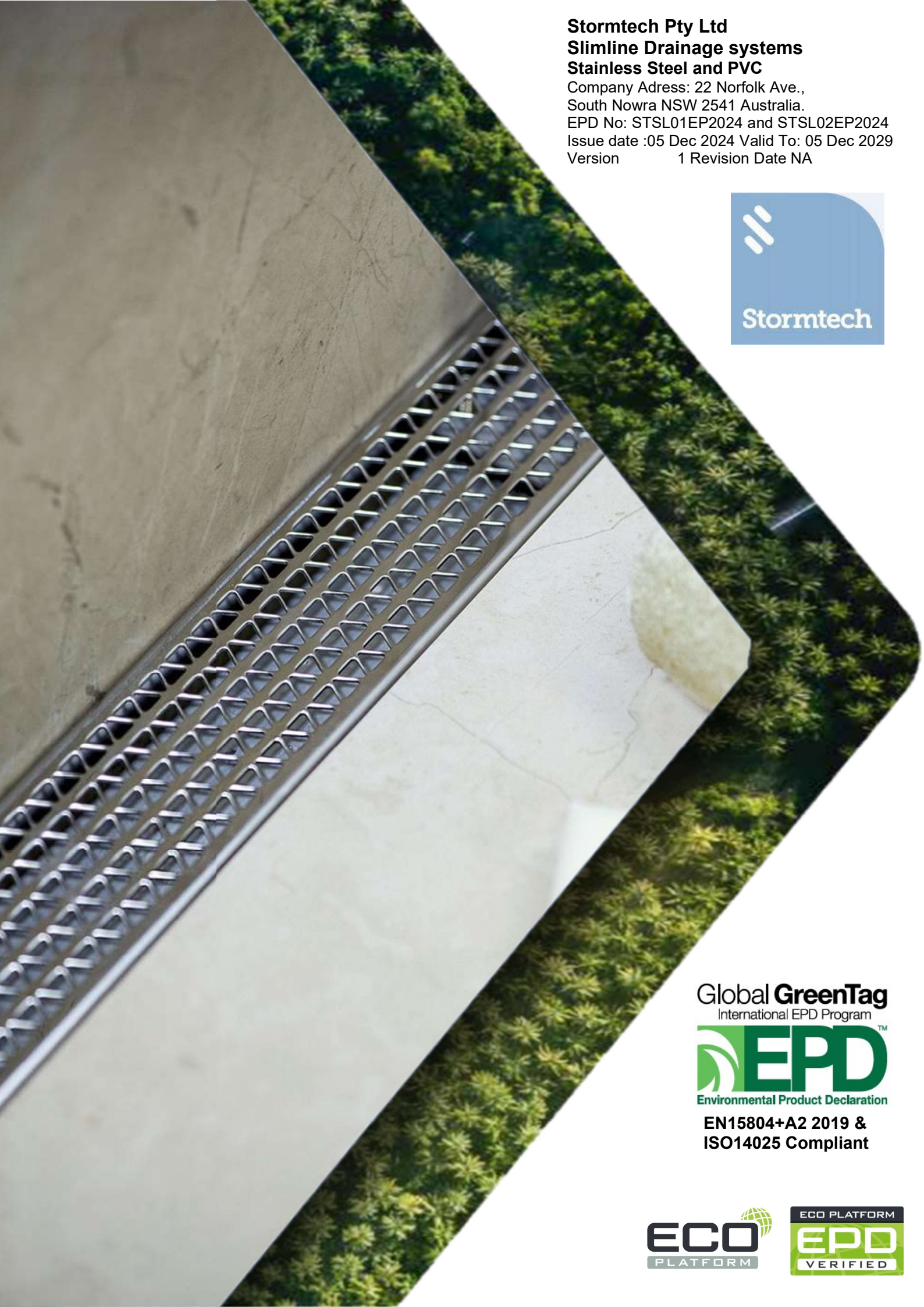

Stormtech Pty Ltd
Slimline Drainage systems
Stainless Steel and PVC
Company Adress: 22 Norfolk Ave.,
South Nowra NSW 2541 Australia.
EPD No: STSL01EP2024 and STSL02EP2024
Issue date :05 Dec 2024 Valid To: 05 Dec 2029
Version 1 Revision Date NA

Stormtech

Global GreenTag
International EPD Program
EPD
Environmental Product Declaration

EN15804+A2 2019 &
ISO14025 Compliant

ECO PLATFORM

ECO PLATFORM
EPD
VERIFIED

Mandatory Disclosures

EPD type	Cradle to grave A1 to C4 + D	**Issue Date**	05 Dec 2024
Product Range	Slimline Drainage systems	**Valid Until**	05 Dec 2029
Brand Name	Stainless Steel and Composite uPVC/SS drains		
Product Code	Stainless Slimline ‘i’ series drains	Composite Slimline 'G' series drains	
EPD Number	STSL01EP2024	STSL02EP2024	
Communication	This Environmental Product Declaration (EPD) discloses potential environmental outcomes compliant with EN 15804 for communicating business-to-business plus mandatory independent external EPD and data verification according to ISO 14025:2010 for communicating business-to-consumer [2].		
Comparability	Construction product EPDs may not be comparable if not EN15804 compliant. Different program EPDs may not be comparable. Comparability is further dependent on the product category rules and data source used.		
Reliability	Life Cycle Impact Assessment (LCIA) results are relative expressions that do not predict impact on category endpoints, threshold exceedance, safety margins or		

EPD Program Operator	LCA and EPD Producer	Declaration Owner
Global GreenTag International Pty Ltd Level 38, 71 Eagle St, Brisbane City, QLD 4000 Australia Phone: +61 (0)7 33 999 686 http://www.globalgreentag.com	Ecquate Pty Ltd PO Box 123 Thirroul NSW 2515 Australia Phone: +61 (0)7 5545 0998 http://www.ecquate.com	Stormtech Pty Ltd 22 Norfolk Ave, South Nowra NSW 2541 Australia Phone: +61 (0)2 4423 1989 https://www.stormtech.com.au

PCR	Standard EN 15804+A2 2019 serves as core Product Category Rules (PCR) [2]. Sub-PCR PDP:2023 Plumbing and Drainage Piping also applies [3].
EPD Owner	This EPD is the property of the declared manufacturer tabled above.

Signed and Dated Demonstration of Internal and External Verification

Internal	Delwyn Jones 05 Dec 2024 Life Cycle Assessment (LCA) developed by Delwyn Jones, The Evah Institute 05 Dec 2024 LCA peer reviewed by Dr Sharmina Begum, Ecquate Pty Ltd 05 Dec 2024 EPD Platform Operator review by Dr Nana Bortsie-Aryee, Global GreenTag International Pty Ltd
External Verifier Statement	I, the undersigned, verifier, hereby confirm my examination did not find any relevant deviations by the EDP owner, LCA report or PCRs based on EN 15804 2012+A2:2019 and ECO Platform agreed interpretations by CEN TR 16970. Company-specific, upstream and downstream data in the LCA & environmental features report files held at The Evah Institute were plausible and consistent. This verification applied Global GreenTag International adopted ECO Platform checklists and this EPD states where to find PCRs and programme rules. 05/12/2024 Verified by Murray Jones Ecquate Pty Ltd
Explanations	Further explanatory information is available at info@globalgreentag.com or by contacting certification1@globalgreentag.com [3].

Program Description

EPD Scope	The scope is cradle to grave A1 to C4 + D as defined by ISO14025. [1]
System boundary	The system boundary with nature includes material and energy acquisition, processing, manufacture, transport, installation, use plus waste arising to end of life.
Stages included	All known operations and stages in modules A1 to D3 are included.
Stages excluded	Stages B5, B6 & B7 were excluded. All B1, B4, B5 & C3 flows and results were zero.
Information	Figure 1 depicts A1 to C4 modules inside this cradle to grave system boundary.

Model	**Building Life Cycle Assessment**																**Beyond system**		
Information	**Actual**			**Scenarios**															
Stages	Product			Construct		Use								End-of-Life					Benefit & load		
						Fabric					Operate								
Modules	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4		D1	D2	D3
Phases	√	√	√	√	√	√	√	√	√	√	MND		√	√	√	√		√	√	√
Operations Cradle to Grave Fate C_2F & beyond system to Cradle (C_2C)	Resources	Transport	Manufacture	Transport	Construct	Use	Maintain	Repair	Replace	Refurbish	Energy use	Water use	Demolish	Transport	Process Waste	Disposal		Reuse	Recovery	Recycling

Figure 1 Modules A to C in the Cradle to Grave System Boundary and Beyond

Data Sources

Primary Data	Data is from primary sources 2018 to 2023 including manufacturer and supplier standards, logistics, technology, market share and management system in accordance with EN ISO 14044:2006, 4.3.2. All are physically allocated not economically allocated.
A1-A3 Stage inclusions	Operations include all known raw material acquisition, refining and processing plus scrap or material reuse from prior systems; electricity generated from all sources with extraction, refining & transport plus secondary fuel energy and recovery processes. Also, transport to factory gate; manufacture of inputs, ancillary material, product, packaging, maintenance, replacement plus flows leaving at end-of-waste boundary and fate of all flows at end of life.
Variability	Significant differences of average LCIA results are declared.
Chemicals of Concern	Contains no substances in the European Chemicals Agency “Authorised or Candidate Lists of Substances of Very High Concern (SVHCs)”.

LCA Data Quality

Data quality parameters are tabled below. Data was <10 years, cut-off & quality is ISO14025.[compliant.[1]

Background	**Data Quality**	**Parameters and Uncertainty (U)**			
Correlation	**Metric σg**	U ±0.01	U ±0.05	U ±0.10	U ±0.20
Reliability	**Reporting**	Site Audit	Expert verify	Region	Sector
	Sample	>66% trend	>25% trend	>10% batch	>5% batch
Completion	**Including**	>50%	>25%	>10%	>5%
	Cut-off	0.01%w/w	0.05%w/w	0.1%w/w	0.5%w/w
Temporal	**Data Age**	<3 years	≤5 years	<7.5 years	<10 years
	Duration	>3 years	<3 years	<2 years	1 year
Technology	**Typology**	Actual	Comparable	In Class	Convention
Geography	**Focus**	Process	Line	Plant	Corporate
	Range	Continent	Nation	Plant	Line
	Jurisdiction	Representation is Global, Australasia and Pacific Rim			

System Scope and Boundaries

Figure 2 shows included processes in a cradle to grave system boundary to end of life fates reuse, recycling, or landfill grave.

Stages A1 to 3 model actual operations to acquire, refine, transport, fabricate, coat, use, clean, repair, reuse and dispose of metal, masonry, ceramic, timber, glass, plastic and composites. Stage A4 to C4 are modelled on typical scenarios to forecast operations including those of:

- Mining, extracting and refining resources to make commodities and packaging;
- Acquiring, cultivating, harvesting, extracting, refining produce and biomass;
- Fuel production to supply power and process energy and freight;
- Chemicals use in processing resources, intermediates and ancillaries;
- Process energy, fuel and freight of resources, intermediates and ancillaries;
- Use, cleaning, recoating, repair, recycling, re-use and landfill, as well as
- Infrastructure process energy transformed and material wear loss e.g. tyres.

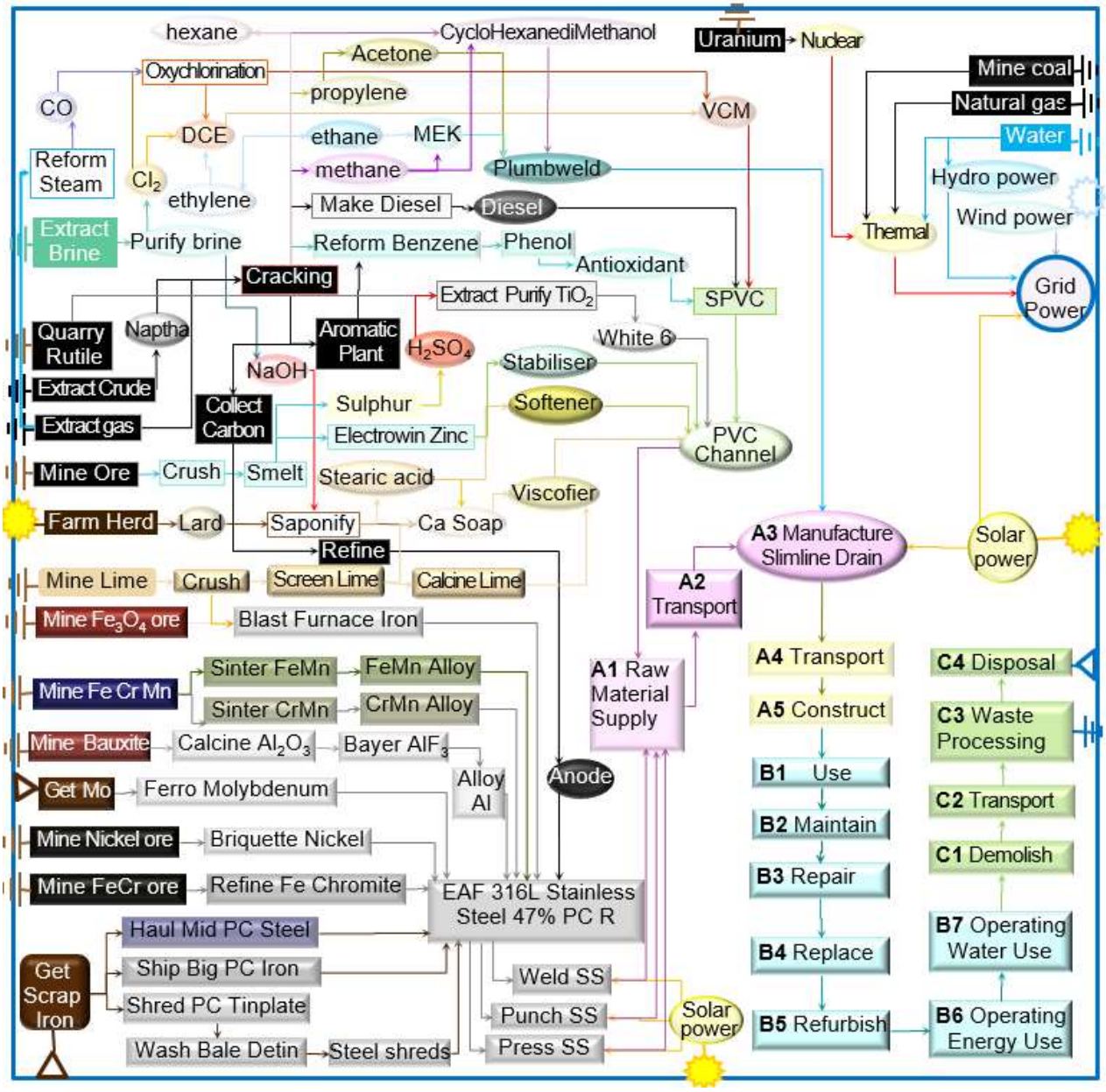

Figure 2. Product Process Flow Chart

Details of Manufacturer

Since 1989 Stormtech, an Australian designed and manufactured solutions, has provides innovative, patented designs of architectural grates and drains. Their products are easy to install and maintain. Designed to last, they are made from highest quality materials with high workmanship and durability quality standards.

The range of drains and grate designs suit both residential and commercial applications. The declared products are used in bathrooms, showers, landscape and pools. These are available in a range of coloured finishes, from deep to luminous metallic coatings. Stormtech made-to-length products are a complete finished stainless steel drainage unit ready for installation with custom waste outlet position. The Company proudly builds on its unrivalled environmental reputation as a manufacturer with Level-A Green Tag Certification.

Product Information

This section provides data required to calculate assessment results factoring different mass and periods.

Range Names	Slimline 'i' &' G' Series Drainage Systems
Brand Name & Code	Slimline 'i' All Stainless Steel Drain and Slimline Composite 'G' Series Drain
Factory warranty	Fit for purpose use, 7 to 10 years.
Manufacturer	Stormtech Pty Ltd
Factory address	22 Norfolk Ave, South Nowra, NSW 2541 Australia
Site representation	Australasia
Time	Made and sold in 2024 for single use
Application	All Building and Curtilage Water Drainage Systems
Function	Internal and External Drainage of Water
Lifetime	60 years Reference Service Life (RSL) as in ISO 15686. [5,6]
Declared unit	Declared product of tabled kg/m length on exterior and interior buildings
Functional unit	60 years use of declared product/kg cradle to grave and beyond

Whole of life Performance

This section provides qualitative information on whole of life performance.

Effluent	LCI results and ESCAP raised no red light concerns in emissions to water.1
Waste	Cradle to grave waste to landfill from operations was non-hazardous.
Standard Reference	https://www.stormtech.com.au
Practices Reference	https://www.stormtech.com.au
Ecological Health	No potential in-use impacts on environment or health are known.

Whole of life Health Safety & Environment Performance

This section provides qualitative information on Health Safety & Environment whole of life performance.

Health Safety & Environment	Apart from compliance to occupational and workplace health safety and environmental laws no additional personal protection is considered essential for manufacture, use or reuse.
Health Protection	The product does not contain levels of carcinogenic, toxic or hazardous substances that warrant ecological or human health concern cradle to grave. It passed the Eco specifier Cautionary Assessment Process (ESCAP) and no issues or red-light concerns existed for product human or ecological toxicity.
Environmental Protection	Continuous improvement under the maker's uncertified management system avoids toxics, waste and pollution plus reduce their material and energy use.

1 According with national standards in ANZECC Guideline For Fresh & Marine Water Quality (2000)

Product Components

This section summarises factory components, functions, source nation and % mass share.

Base Material Origin and Detail

This section lists Stormtech key components &packaging by function, type, sources & % mass share.

Product	Slimline 'i' Series Drain		Slimline 'G' Series Drain	
Function	**Component**	**Amount**	**Component**	**Amount**
Grate	316 Stainless Steel ex Pacific Rim	>51 <52	316 Stainless Steel	>81 <82
Channel		>39 <40	Unplasticised Polyvinyl Chloride (uPVC) ex Pacific Rim	>17 <18
Stop ends		>1.0<2.0		>5.5 <6.0
Spigot		>1.0<2.0		>0.2<0.3
Joiners		>5.5 <6.0		0

Packaging	Component	Source	Amount
Pallet & Crate	Wood	Australia	>2.0 <3.0
Wrapping	Linear Low Density Polyethylene	Global	>0.10<0.20
tape	Polyester	Australia	>0.01 <0.02

Product Functional & Technical Performance Information

This section provides manufacturer specifications and additional information.

Stainless Steel							
Width*Depth	**Cover**	**Width*Depth**	**Cover**	**Width*Depth**	**Cover**	**Width*Depth**	**Cover**
65*25mm	**kg/m**	**65*25mm**	**kg/m**	**65*40mm**	**kg/m**	**100*20**	**kg/m**
		65ARi25	3.4	**65ARi40**	4.0	**100ARi20**	3.7
65MNDi25	2.3					**100MNDi20**	2.9
65MNDip25	2.3					**100MNDip20**	2.9
65PHi25	2.4			**65PHi40**	2.9		
65PSi25	2.4			**65PSi40**	3.1	**100PSi20**	3.1
				65Tii40	2.8		
		65TRi25	3.4	**65TRi40**	4.3	**100TRi20**	3.7
		65TRTii25	2.6				
Composite							
38*40mm	**kg/m**	**65*25mm**	**kg/m**	**65*40**	**kg/m**	**100*20**	**kg/m**
		65ARG25	2.7	**65ARG40**	3.3	**100ARG20**	3.2
		65MNDG25	1.7			**100MNDG20**	2.3
		65MNDGP25	1.7			**100MNDGP20**	2.3
		65PASG25	1.8	**65PASG40**	2.2	**100PASG20**	2.5
38PHG40	1.7	**65PHG25**	1.7	**65PHG40**	2.2		
		65PPSG25	1.8	**65PPSG40**	2.2	**100PPSG20**	2.5
38PSG40	1.8	**65PSG25**	1.8	**65PSG40**	2.2	**100PSG20**	2.5
		65TiG25	1.9			**100TiG20**	2.2
		65TRG25	2.7	**65TRG40**	3.6	**100TRG20**	3.2
		65TRTiG25	1.9				

Scenarios Descriptions

This section defines modelling stages scenarios A4 to D3 beyond actual operations in module A1 to A3.

Module	Type specified	Amount	Type specified	Amount
Construction Modules				
A4 Transport factory to depot then to site	Sea Shipping	13,000	85% Capacity	Full back load
	Interstate Rail	1,300 km	85% Capacity	Full back load
	25t semi-trailer	200 km	85% Capacity	No back load
A5 Install	VOCs indoors	0%	Packaging & Waste	0%
Building Modules				
B1 Use	VOCs	0%	No other flows	0%
B2 Maintain	fit for purpose	100%	fit for purpose	0%
B3 Repair	fit for purpose	95%	Repair damaged	5%
			Repaint 8 yearly	100%
B4 Replace	fit for purpose	100%	No other flows	0%
B5 Refurbish	fit for purpose	100%	fit for purpose	100%
B6 Energy use	off grid	100%	Solar and wind energy	100%
B7 Water use	off grid	100%	Rain and dew	100%
End of Life Modules				
C1 Demolish	fit for purpose	100%	No other flows	0%
C2 Transport	fit for purpose	100%	No other flows	0%
C4 Disposal	fit for purpose	100%	No other flows	0%
Beyond System Boundary Modules				
D1 Reuse	fit for purpose	75%	No other flows	0%
D2 Recover	fit for purpose	22.5%	No other flows	0%
D3 Recycle	fit for purpose	2.5%	No other flows	0%

Environmental Impact Terminology

Environmental impacts contributing to risks of social and ecological issues and collapse are tabled below with common names and remedies given for each indicator.

Global warming forcing Climate Change	Greenhouse gases absorb infra-red radiation. This heat reduces thermal energy differentials, from equator to poles, forcing ocean current and wind circulation to blend and regulate climate. Weakly blended "lumpier" weather has more frequent, extreme heat wave, fire-storm, cyclone, rain-storm, flood and blizzard events. Accumulation of carbon dioxide, natural gas methane, nitrous oxides and volatile organic compounds from burning fossil fuels causes global warming. Forest and wilderness growth absorbing air-borne carbon in biomass can drawdown such accumulation. Urgent renewable energy reliance is vital in time to avoid imminent tipping points and the worsening "***climate emergency***".
Ozone layer depletion	Stratospheric ozone loss weakens the planet's solar shield so more shorter wavelength ultraviolet (UVB) light reaching earth damages plants and increases malignant melanoma and skin cancer in humans and animals. Chlorofluorocarbons, hydrochlorofluorocarbons (HCFC), chlorobromomethane, hydrobromofluorocarbons, carbon tetrachloride, methyl chloroform, methyl bromide and halon gas cause ozone layer loss. To repair the "***ozone hole***" reliance on ozone-safe refrigerants, aerosols and solvents is essential to avoid further its depletion and enable accumulation of naturally-formed ozone.
Acidification	Acidification reduces soil and waterway pH, impedes nitrogen fixation vital for plant growth and inhibits natural decomposition. It increases rates and incidence of fish kills, forest loss and deterioration of buildings and materials. Chief synthetic causes of "***acid rain***" are emissions of sulphur and nitrogen oxides, hydrochloric and hydrofluoric acids and ammonia from burning fossil fuels polluting precipitation of rain and snow world-wide.
Eutrophication of terrestrial, freshwater and marine life	Eutrophication from excessively high macronutrient levels added to natural waters promotes excessive plant growth that severely reduces oxygen, water and habitat security for aquatic and terrestrial organisms across related ecosystems. Chief synthetic cause of "***algal blooms***" is nitrogen (N, NOx, NH_4) and phosphorus (P, PO_4^{3-}) in rain run-off over-fertilised land catchments.
Photochemical ozone creation	Tropospheric photochemical ozone, called "***summer smog***" near ground level, is created from natural and synthetic compounds in UV sunlight. Low concentration smog damages vegetation and crops. High concentration smog is hazardous to human health. Chief synthetic causes are nitrogen oxides, carbon monoxide and volatile organic compounds (VOC) pollutants. Avoiding reliance on dirtiest coal fuel and volatile chemicals has reduced smog incidence in many areas globally.
Depletion of minerals, metals & water	Abiotic depletion of finite mineral resources increases time, effort and money required to obtain more resources to the point of extinction of naturally viable reserves. This can limit access to available, valuable and scarce elements vital for human-life. The youth movement "***extinction rebellion***" calls on adults to secure climate, reserves and biodiversity for current and future generations.
Depletion of fossil fuel reserves	Abiotic depletion of resources by consuming finite oil, natural gas, coal and yellowcake fossil fuel reserves leaves current and future generations suffering limited available, accessible, plentiful, essential valuable as well as scarce raw material, medicinal, chemical, feedstock and fuel stock. Approaching "***peak oil***" acknowledged fossil fuel reserves are finite and the need for decision-makers to act to avoid market instability, insecurity and or oil and gas wars.

Inventory and Damage Impact Result Categories, Units and References to Methods

This section summarises impact and inventory result units with descriptions and references to methods.

Impact & Inventory Results/Functional Unit

Result		Units	Description of Methods
Climate Change biogenic	GWP $_{BIO}$	kg CO_{2eq}	GWP sequestered from air [4]
Climate Change luluc	GWP $_{LULUC}$	kg CO_{2eq}	GWP land use & change (luluc) [4]
Climate Change fossil	GWP $_{FF}$	kg CO_{2eq}	GWP fossil fuels [4]
Climate Change total	GWP $_{TOTAL}$	kg CO_{2eq}	Global Warming Potential [4]
Stratospheric Ozone Depletion	ODP	kg CFC_{11e}	Stratospheric Ozone Loss [5]
Photochemical Ozone Creation	POCP	kg $NVOC_{e}$	Summer Smog [6]
Acidification Potential	AP	mol H^{+} $_{eq}$	Accumulated Exceedance [7]
Eutrophication Freshwater	EP_{FRESH}	kg P $_{eq}$	Excess freshwater nutrients [8]
Eutrophication Marine	EP $_{MARINE}$	kg N $_{eq}$	Excess marine nutrients [9]
Eutrophication Terrestrial	EP_{LAND}	mol N $_{eq}$	Excess nutrients to land [8]
Mineral and Metal Depletion	ADP $_{MIN}$	MJ $_{ncv}$	Abiotic Depletion fossil fuel [10]
Fossil Depletion	ADP $_{FF}$	kg Sb $_{eq}$	Abiotic Depletion minerals [9]
Water Scarcity Depletion	WDP	m^3 $_{WDP\ eq}$	Water Deprivation Scarcity [11,12]
Input flows	Input		
Net Fresh Water Use	FW	m^3	Lake, river, well & town water
Secondary Material	SM	kg	Post-consumer recycled (PCR)
Secondary Renewable Energy Use	RSF	MJ $_{ncv}$	PCR biomass burnt
Secondary Fossil Energy Use	NRSF	MJ $_{ncv}$	PCR fossil-fuels burnt
Primary Renewable Feedstock Material	PERM	MJ $_{ncv}$	Biomass retained material
Primary Renewable Energy Used	PERE	MJ $_{ncv}$	Biomass fuels burnt
Total Primary Renewable Energy	PERT	MJ $_{ncv}$	Biomass burnt + retained
Primary Fossil Feedstock Material	PENRM	MJ $_{ncv}$	Fossil feedstock retained
Primary Fossil Energy Use	PENRE	MJ $_{ncv}$	fossil-fuel used or burnt
Total Primary Fossil Energy Use	PENRT	MJ $_{ncv}$	Fossil feedstock & fuel use
Output flows	Output		
Hazardous Waste Disposed	HWD	kg	Reprocessed to contain risks
Non-hazardous Waste Disposed	NHWD	kg	Municipal landfill facility waste
Radioactive Waste Disposed	RWD	kg	Most ex nuclear power stations
Components For Reuse	CRU	kg	Product scrap for reuse as is
Material For Recycling	MFR	kg	Factory scrap to remanufacture
Material For Energy Recovery	MFE	kg	Factory scrap use as fuel
Exported Energy Electrical	EEE	MJ $_{ncv}$	Uncommon for building products
Exported Energy Thermal	EET	MJ $_{ncv}$	Uncommon for building products

Results Cradel to Grave A1 to C4 within the System Boundary

Table 1 lists A1 Resources, A2 Transport, A3 Manufacture, A4 Delivery, A5 Construct, B2 Maintain, B3 Repair, B4 Replace, B5 Refurb, C1 Demolish, C2 Transport and C4 Disposal results. Modules B1 Use, B4 Replace, B5 Refurbish, B6 Water use, B7 energy use or C3 Processing waste had no flows or result.

Table 1 Impact & Input and Output Results/kg Functional Unit

Burdens	A1-3	A4	A5	B2	B3	C1	C2	C4
GWP $_{BIO}$	-4.5E-02	-1.9E-04	2.3E-03	-0.10	-2.3E-03	-7.0E-06	-5.4E-07	-1.9E-04
GWP $_{LULUC}$	5.6E-05	1.9E-04	-4.7E-03	0	-6.1E-05	7.0E-06	5.4E-07	-1.2E-05
GWP $_{FF}$	5.7	1.9E-02	2.9E-01	0.71	0.29	1.9E-03	6.1E-03	1.5E-02
GWP $_{TOTAL}$	5.6	1.9E-02	2.8E-01	0.61	0.28	1.9E-03	6.1E-03	1.5E-02
ODP	5.7E-09	1.7E-13	2.9E-10	3.1E-09	2.9E-10	7.0E-17	1.1E-13	5.0E-12
POCP	2.0E-02	1.2E-04	1.0E-03	2.9E-03	1.0E-03	7.6E-06	6.0E-05	8.1E-05
AP	6.7E-03	1.2E-05	3.4E-04	1.2E-03	3.4E-04	3.5E-06	5.0E-06	2.7E-05
EP$_{FRESH}$	7.1E-08	5.6E-10	5.5E-09	6.4E-07	5.5E-09	4.0E-13	3.1E-10	7.0E-10
EP $_{MARINE}$	1.2E-03	2.3E-06	6.2E-05	2.0E-04	6.2E-05	6.4E-07	9.4E-07	5.0E-06
EP$_{LAND}$	4.0E-03	7.7E-06	2.2E-04	1.4E-03	2.2E-04	4.1E-06	3.2E-06	2.4E-05
ADP $_{MIN}$	3.1	7.2E-06	0.15	3.1E-04	0.15	5.6E-12	4.0E-06	1.2E-02
ADP $_{FF}$	6.1E-04	2.2E-02	2.9E-05	0.52	2.9E-05	9.2E-04	7.5E-03	1.3E-06
WDP	2.4E-03	2.9E-06	1.2E-04	9.7E-03	1.2E-04	8.5E-08	1.4E-06	9.3E-05
Input								
FW	1.5E-02	1.8E-05	7.5E-04	6.0E-02	7.5E-04	5.20E-07	8.70E-06	5.7E-04
SM	0.56	2.3E-06	2.5E-02	2.7E-03	2.5E-02	1.50E-05	1.70E-06	5.0E-02
RSF	1.5	6.8E-06	7.3E-02	0.16	7.3E-02	3.0E-04	9.2E-05	1.6E-03
NRSF	-1.2	7.4E-04	-5.3E-02	1.1	-5.3E-02	-6.6E-06	1.6E-03	2.1E-03
PERM	1.1	3.0E-04	6.6E-02	0.56	6.6E-02	2.0E-03	2.0E-04	7.9E-03
PERE	-9.0E-02	2.4E-03	1.4E-02	1.8	1.4E-02	2.0E-03	1.8E-03	1.0E-02
PERT	-1.8E-02	2.7E-03	-1.3E-03	4.2E-02	-1.3E-03	-3.8E-10	-4.8E-04	-1.1E-04
PENRM	7.8	0.11	0.47	1.7	0.47	2.5E-04	3.7E-02	4.0E-02
PENRE	42	0.19	2.14	7.6	2.14	1.6E-02	6.3E-02	0.14
PENRT	50	0.3	2.61	9.3	2.61	1.7E-02	0.1	0.18
Output								
HWD	0.18	3.7E-05	8.1E-03	9.9E-04	8.1E-03	7.2E-08	1.2E-05	1.4E-05
NHWD	0.24	3.1E-04	1.1E-02	0.10	1.1E-02	4.3E-06	9.6E-05	0
RWD	1.0E-16	1.0E-31	4.9E-18	2.5E-17	4.9E-18	5.0E-38	8.0E-32	7.3E-20
CRU	3.5E-11	5.0E-06	1.0E-06	0	1.0E-06	0	0	2.3E-12
MFR	3.5E-02	5.7E-06	1.9E-03	7.6E-02	1.9E-03	2.2E-05	4.0E-06	3.5E-04
MER	4.1E-05	2.3E-07	7.9E-06	3.4E-05	7.9E-06	1.2E-13	1.5E-07	5.0E-08
EEE	0	0	0	0	0	0	0	0
EET	0	0	0	0	0	0	0	0

Results for Module D: Beyond System Boundaries

Table 2 lists D1 reuse, D2 recovery and D3 recycling benefit and load results beyond the system boundary.

Table 2 D1 to D3 Impact & Inventory Results/Functional Unit

Result	D1	D2	D3
Climate Change biogenic	3.4E-02	-3.7E-02	1.2E-03
Climate Change luluc	-4.2E-05	3.7E-02	-6.7E-06
Climate Change fossil	-4.3	2.5E-04	-0.14
Climate Change total	-4.2	2.3E-04	-0.14
Stratospheric Ozone Depletion	-4.3E-09	5.7E-13	-1.4E-10
Photochemical Ozone Creation	-1.5E-02	9.9E-07	-5.1E-04
Acidification Potential	-5.0E-03	4.3E-07	-1.7E-04
Eutrophication Freshwater	-5.3E-08	1.2E-10	-2.7E-09
Eutrophication Marine	-9.0E-04	7.6E-08	-3.1E-05
Eutrophication Terrestrial	-3.0E-03	5.2E-07	-1.1E-04
Mineral and Metal Depletion	-2.3	1.5E-04	-7.7E-02
Fossil Depletion	-4.6E-04	5.7E-08	-1.4E-05
Water Scarcity Depletion	-1.8E-03	1.8E-05	-6.1E-05
Input			
Net Fresh Water Use	-1.1E-02	1.1E-04	-3.7E-04
Secondary Material	-0.42	0	-1.3E-02
Secondary Renewable Fuel	1.1	5.6E-05	3.6E-02
Secondary Non-renewable Fuel	-0.9	1.9E-04	-2.6E-02
Primary Renewable Material	0.83	2.2E-04	3.3E-02
Primary Energy Renewable Not Feedstock	-6.5E-02	4.1E-04	6.8E-03
Primary Energy Renewable Total	-1.4E-02	-7.7E-06	-6.5E-04
Primary Energy Non-renewable Material	-5.9	3.2E-04	-0.23
Primary Non-renewable Energy Not Feedstock	-32	2.4E-03	-1.1
Primary Energy Non-renewable Total	-38	2.7E-03	-1.3
Output			
Hazardous Waste Disposed	-0.13	1.9E-07	-4.0E-03
Non-hazardous Waste Disposed	-0.18	1.8E-05	-5.7E-03
Radioactive Waste Disposed	-7.5E-17	4.6E-21	-2.4E-18
Components For Reuse	-7.5E-06	1.0E-05	-5.0E-07
Material For Recycling	-2.6E-02	1.5E-05	-9.5E-04
Material For Energy Recovery	-3.1E-05	6.2E-09	-3.9E-06
Exported Energy Electrical	0	0	0
Exported Energy Thermal	0	0	0

Results Cradel to Grave A1 to C4 within the System Boundary

Table 1 lists A1 Resources, A2 Transport, A3 Manufacture, A4 Delivery, A5 Construct, B2 Maintain, B3 Repair, B4 Replace, B5 Refurb, C1 Demolish, C2 Transport and C4 Disposal results. Modules B1 Use, B4 Replace, B5 Refurbish, B6 Water use, B7 energy use or C3 Processing waste had no flows or result.

Table 1 Impact & Input and Output Results/kg Functional Unit

Burdens	A1-3	A4	A5	B2	B3	C1	C2	C4
GWP $_{BIO}$	4.9E-02	-1.9E-04	-2.5E-03	-0.1	-2.3E-03	-7.0E-06	-5.4E-07	0
GWP $_{LULUC}$	-9.9E-02	1.9E-04	9.5E-05	0.0E+00	-6.1E-05	7.0E-06	5.4E-07	-2.0E-04
GWP $_{FF}$	5.7	1.9E-02	0.29	0.71	0.29	1.9E-03	6.1E-03	1.5E-02
GWP $_{TOTAL}$	5.7	1.9E-02	0.28	0.61	0.28	1.9E-03	6.1E-03	1.5E-02
ODP	5.7E-09	1.7E-13	2.9E-10	3.1E-09	2.9E-10	7.0E-17	1.1E-13	5.0E-12
POCP	2.0E-02	1.2E-04	1.0E-03	2.9E-03	1.0E-03	7.6E-06	6.0E-05	8.1E-05
AP	6.9E-03	1.2E-05	3.4E-04	1.2E-03	3.4E-04	3.5E-06	5.0E-06	2.7E-05
EP$_{FRESH}$	1.5E-07	5.6E-10	5.5E-09	6.4E-07	5.5E-09	4.0E-13	3.1E-10	7.0E-10
EP $_{MARINE}$	1.3E-03	2.3E-06	6.2E-05	2.0E-04	6.2E-05	6.4E-07	9.4E-07	5.0E-06
EP$_{LAND}$	4.7E-03	7.7E-06	2.2E-04	1.4E-03	2.2E-04	4.1E-06	3.2E-06	2.4E-05
ADP $_{MIN}$	3.0	7.2E-06	0.15	3.1E-04	0.15	5.6E-12	4.0E-06	1.2E-02
ADP $_{FF}$	5.2E-04	2.2E-02	2.9E-05	0.52	2.9E-05	9.2E-04	7.5E-03	1.3E-06
WDP	2.5E-03	2.9E-06	1.2E-04	9.7E-03	1.2E-04	8.5E-08	1.4E-06	9.3E-05
Input								
FW	1.5E-02	1.8E-05	7.5E-04	6.0E-02	7.5E-04	5.2E-07	8.7E-06	5.7E-04
SM	0.46	2.3E-06	2.5E-02	2.7E-03	2.5E-02	1.5E-05	1.7E-06	5.0E-02
RSF	1.4	6.8E-06	7.0E-02	0.16	7.3E-02	3.0E-04	9.2E-05	1.6E-03
NRSF	-0.91	7.4E-04	-4.5E-02	1.1	-5.3E-02	-6.6E-06	1.6E-03	2.1E-03
PERM	1.5	3.0E-04	7.6E-02	0.56	6.6E-02	2.0E-03	2.0E-04	7.9E-03
PERE	0.61	2.4E-03	3.1E-02	1.8	1.4E-02	2.0E-03	1.8E-03	1.0E-02
PERT	-3.2E-02	2.7E-03	-1.6E-03	4.2E-02	-1.3E-03	-3.8E-10	-4.8E-04	-1.1E-04
PENRM	11	0.11	0.54	1.7	0.47	2.5E-04	3.7E-02	4.0E-02
PENRE	43	0.19	2.2	7.6	2.1	1.6E-02	6.3E-02	0.14
PENRT	53	0.30	2.7	9.3	2.6	1.7E-02	1.0E-01	0.18
Output								
HWD	0.15	3.7E-05	8.1E-03	9.9E-04	8.1E-03	7.2E-08	1.2E-05	1.4E-05
NHWD	0.21	3.1E-04	1.1E-02	0.10	1.1E-02	4.3E-06	9.6E-05	0
RWD	9.5E-17	1.0E-31	4.9E-18	2.5E-17	4.9E-18	5.0E-38	8.0E-32	7.3E-20
CRU	3.4E-11	5.0E-06	1.0E-06	0	1.0E-06	0	0	2.3E-12
MFR	4.0E-02	5.7E-06	1.9E-03	7.6E-02	1.9E-03	2.2E-05	4.0E-06	3.5E-04
MER	2.7E-04	2.3E-07	7.9E-06	3.4E-05	7.9E-06	1.2E-13	1.5E-07	5.0E-08
EEE	0	0	0	0	0	0	0	0
EET	0	0	0	0	0	0	0	0

Results for Module D: Beyond System Boundaries

Table 2 lists D1 reuse, D2 recovery and D3 recycling benefit and load results beyond the system boundary.

Table 2 D1 to D3 Impact & Inventory Results/Functional Unit

Result	D1	D2	D3
Climate Change biogenic	3.7E-02	-3.7E-02	1.2E-03
Climate Change luluc	-4.7E-04	3.7E-02	-4.7E-05
Climate Change fossil	-4.3	2.5E-04	-0.14
Climate Change total	-4.3	2.3E-04	-0.14
Stratospheric Ozone Depletion	-4.3E-09	5.7E-13	-1.4E-10
Photochemical Ozone Creation	-1.5E-02	9.9E-07	-5.1E-04
Acidification Potential	-5.2E-03	4.3E-07	-1.7E-04
Eutrophication Freshwater	-1.1E-07	1.2E-10	-2.7E-09
Eutrophication Marine	-9.4E-04	7.6E-08	-3.1E-05
Eutrophication Terrestrial	-3.5E-03	5.2E-07	-1.1E-04
Mineral and Metal Depletion	-2.3	1.5E-04	-7.7E-02
Fossil Depletion	-3.9E-04	5.7E-08	-1.4E-05
Water Scarcity Depletion	-1.8E-03	1.8E-05	-6.1E-05
Input			
Net Fresh Water Use	-1.1E-02	1.1E-04	-3.7E-04
Secondary Material	-0.35	0	-1.3E-02
Secondary Renewable Fuel	-1.05	5.6E-05	3.6E-02
Secondary Non-renewable Fuel	-0.68	1.9E-04	-2.6E-02
Primary Renewable Material	-1.1	2.2E-04	-3.3E-02
Primary Energy Renewable Not Feedstock	0.46	4.1E-04	-6.8E-03
Primary Energy Renewable Total	-2.4E-02	-7.7E-06	-6.5E-04
Primary Energy Non-renewable Material	-8.0	3.2E-04	-0.23
Primary Non-renewable Energy Not Feedstock	-32	2.4E-03	-1.1
Primary Energy Non-renewable Total	-40	2.7E-03	-1.3
Output			
Hazardous Waste Disposed	-0.11	1.9E-07	-4.0E-03
Non-hazardous Waste Disposed	-0.16	1.8E-05	-5.7E-03
Radioactive Waste Disposed	-7.1E-17	4.6E-21	-2.4E-18
Components For Reuse	-7.5E-06	1.0E-05	-5.0E-07
Material For Recycling	-3.0E-02	1.5E-05	-9.5E-04
Material For Energy Recovery	-2.0E-04	6.2E-09	-3.9E-06
Exported Energy Electrical	0	0	0
Exported Energy Thermal	0	0	0

Life Cycle Assessment Method

LCA Author	The Evah Institute as described at www.evah.institute
Study Period	Factory data was collected over the last 3 years
Study Goal	The attributional LCA was undertaken for ecolabelling
LCA Method	Compliant with ISO 14040 and ISO 14044 Standards
LCIA method	ReCiPe 2016, EcoIndicator 99 and CML as cited
Scope	Cradle to Fate including all supply chain phases and stages
The system	System boundaries are in accordance with EN 15804+A2 modular design
Phases	The LCA covered all known flows in all known stages cradle to end of life fate.
Assumptions	Use is to typical Australian Facility Management professional practice.
Scenarios	Use, cleaning, maintenance plus disposal and re-use were scenario-based using Facility Management Association denoted and published typical operations.
System Boundaries	The LCA covers all operations in the system boundary depicted in Figure 1.
Processes	All known processes are included from resource acquisition, water, fuel & energy use, power generation & distribution, freight, refining, intermediates, manufacture, scrap re-use, packing and dispatch, installation, use, maintenance and landfill. All significant waste and emission flows from all supply chain operations involved to make, pack and install the product are included.
Inclusions	Evah industry databases cover all known domestic and global scope 1 and 2 operations
Exclusions	They exclude scope 3 burdens from capital facilities, equipment churn, noise and dehydration as well as incidental activities and employee commuting
General LCA Report Information	Statement of en15804 +A2:2019 used for the study and EPD Other independent LCI/LCA data verification is documented EPD states compliance with added EEE construction products demands
Power mix	Power Guarantee of Origin was documented for EPD verification

Primary Data Sources Representativeness and Quality

Primary data used for modelling the state of art of each operation includes all known process for:

- Technology sequences;
- Energy and water use;
- Landfill and effluent plus
- Reliance on raw and recycled material;
- High and reduced process emissions;
- Freight and distribution systems.

Electricity supply models in active databases are updated annually. Primary data is sourced from clients, Annual Reports and their publications on corporate locations, logistics, technology use, market share, management systems, standards and commitment to improved environmental performance.

Information on operations is also sourced from client:

- Supply chain mills, their technical manuals, corporate annual reports and sector experts, and
- Manufacturing specifications websites and factory site development license applications.

Background data Sources Representativeness and Quality

Background data is sourced from the IBISWorld, USGS Minerals, Franklin Associates, Plastics Europe, CML2, Simapro 9.5, EcoInvent 3.9 and NREL USLCI model databases.

Background Power and fuel supply models in active databases are updated annually with data sourced from each power supplier and power station as well as the International Energy Agency.

Information on operations is also sourced from:

- Library, document, NPI and web searches, review papers, building manuals and
- Global Industry Association and Government reports on Best Available Technology (BAT).

For benchmarking, comparison and integrity checks inventory data is developed to represent BAT, business as usual and worst practice options with operations covering industry sector supply and infrastructure in Australia and overseas.

Such technology, performance and license conditions were modelled and evaluated across mining, farming, forestry, freight, infrastructure and manufacturing and building industry sectors by Evah Institute Directors and Associates since 1995.

Quality Assurance

As each project is modelled and new data is available the databases are updated and audited by external Type 1 ecolabel certifiers.

The databases exist in top zones of commercial global inventory modelling and calculating engines and LCIA software including OpenLCA, Australian LCADesign™ as well as Simapro models as of 2014.

Quality control methods are applied to ensure:

- Coverage of place in time with all information[2] for each dataset noted, checked and updated;
- Consistency to Evah guidelines[3] for all process technology, transport and energy demand;
- Completeness of modeling based on reports, literature and industry reviews;
- Plausibility in 2 way checks of LCI input and output flows of data checked for validity, plus
- Mathematical correctness of all calculations in mass and energy balance cross checks.

[2] Jones D G (2004) LCI Database for Commercial Building Report 2001-006-B-15 Icon.net, Australia
[3] Evah Tools, Databases and Methodology Queensland, Australia at http://www.evah.com.au/tools.html

Supply Chain Modelling Assumptions

Australian building sector rules and Evah Institute assumptions applied are defined in Table b.

Table b Scope Boundaries Assumptions and Metadata

Quality/Domain	National including Import and Export
Process Model	Typical industry practice with currently most common or best (BAT) technology
Resource flows	Regional data for resource mapping, fuels, energy, electricity and logistics
Temporal	Project data was collated over the last 3 years
Geography	Designated client, site, regional, national, Pacific Rim then European jurisdiction
Representation	Designated client, their suppliers and energy supply chains back to the cradle
Consistency	Model all operations by known given operations with closest proximity
Technology	Pacific Rim Industry Supply Chain Technology typical of the last 3 years
Functional Unit	Typical product usage with cleaning& disposal/m^2 over the set year service life
System Control	
Primary Sources	Clients and suppliers' mills, publications, websites, specifications & manuals
Other Sources	IEA, GGT, Boustead, Simapro, IBIS, EcoInvent
Data mix	Power grid and renewable shares updated to latest IEA reports
Operational	Company data for process performance, product share, waste and emissions
Logistics	Local data is used for power, fuel mix, water supply, logistics share & capacity
New Data Entry	VliegLCA, Evah Institute; Global Green Tag Researchers
Data Generator	Manufacturers, Evah Institute ; GGTI; Meta: IBIS
Data Publisher	The Evah Institute to Global GreenTag and designated client only
Contributors	All pE0ple's contributors cited in Evah & Global GreenTag records or websites
Data Flow & Mix	
System Boundary	Earth's cradle of all resource & emission flows to end of use, fitout or build life
System flows	All known from and to air, land, water and community sources & sinks
Capital inclusions	Natural stocksΔ, industry stockpilesΔ, capital wear Δ, system losses and use
Arid Practice	Dry technology adopted; Water use is factored by 0.1 as for e.g. Mining
Transportation	Distance >20% than EU; >20% fuel efficient larger vehicles, load & distance
Industrial	Company or industry sector data for manufacturing and minerals involved
Mining	All raw material extraction is based on Australian or Pacific Rim technology
Imported fuel	Mix is from nearest sources is e.g. UAE, SE Asia, Canada or New Zealand
Finishes	Processing inputs with finishing burdens are factored in. If not, that is denoted
Validation	
Accuracy	10th generation study is ± 5 to 10% uncertain due to some background data
Completeness	All significant operations are tracked and documented from the cradle to grave
Precision	Tracking of >90% flows applies a 90:10 rule sequentially to 99.9% and beyond
Allocation	100% to co products on reaction stoichiometry by energetic or mass fraction
Burdens	All resource use from & emissions to community air land, water are included
Plausibility	Results are checked and benchmarked against BAT, BAU & worst practice
Sensitivity	Calculated U is reported & compared to libraries of Bath U RICE & EcoInvent 3.9
Validity Checks	Are made versus Plastics Europe, Ecobilan, GaBi & or Industry LCA Literature

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Further and explanatory information is found at

http://www.globalgreentag.com/

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Global GreenTagCertTM EPD Program

Environmental Product Declaration

Compliant to ISO 14025