ASP™ access floors

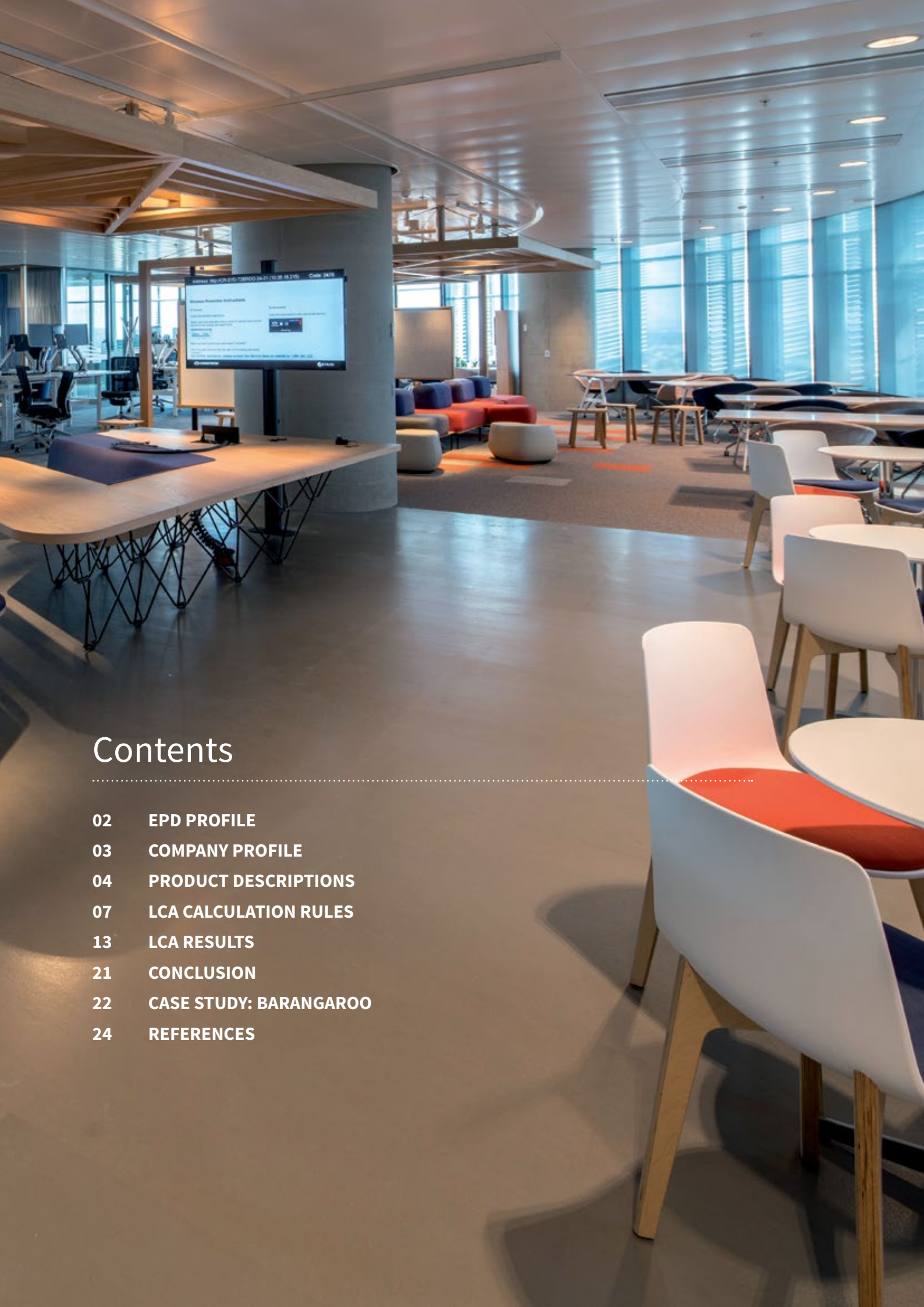
ENVIRONMENTAL PRODUCT DECLARATION OF

ICON ACCESS FLOOR SYSTEM

ENVIRONMENTAL PRODUCT DECLARATION (EPD)
IN ACCORDANCE WITH ISO 14025 AND EN 15804

EPD REGISTRATION NUMBER: S-P-00863
ORIGINAL REGISTRATION DATE: 15/3/2017
REVISION NUMBER: 1.1
DATE OF ISSUE: 11/03/2019
VALID UNTIL: 15/03/2022
GEOGRAPHICAL SCOPE: AUSTRALIA

AUSTRALASIA EPD®
ENVIRONMENTAL PRODUCT DECLARATION



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EPD Profile

An Environmental Product Declaration (EPD) provides standardized and verified environmental performance indicators for specific product. An EPD is based on a Life Cycle Assessment (LCA) using a consistent set of rules known as a Product Category Rules (PCR).

Environmental product declarations within the same product category from different programmes may not be comparable. EPDs of construction products may not be comparable if they do not comply with EN 15804

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CEN standard EN 15804 served as the core PCR

PCR: PCR 2012:01 Construction products and Construction services, Version 2.01, 2016-03-09

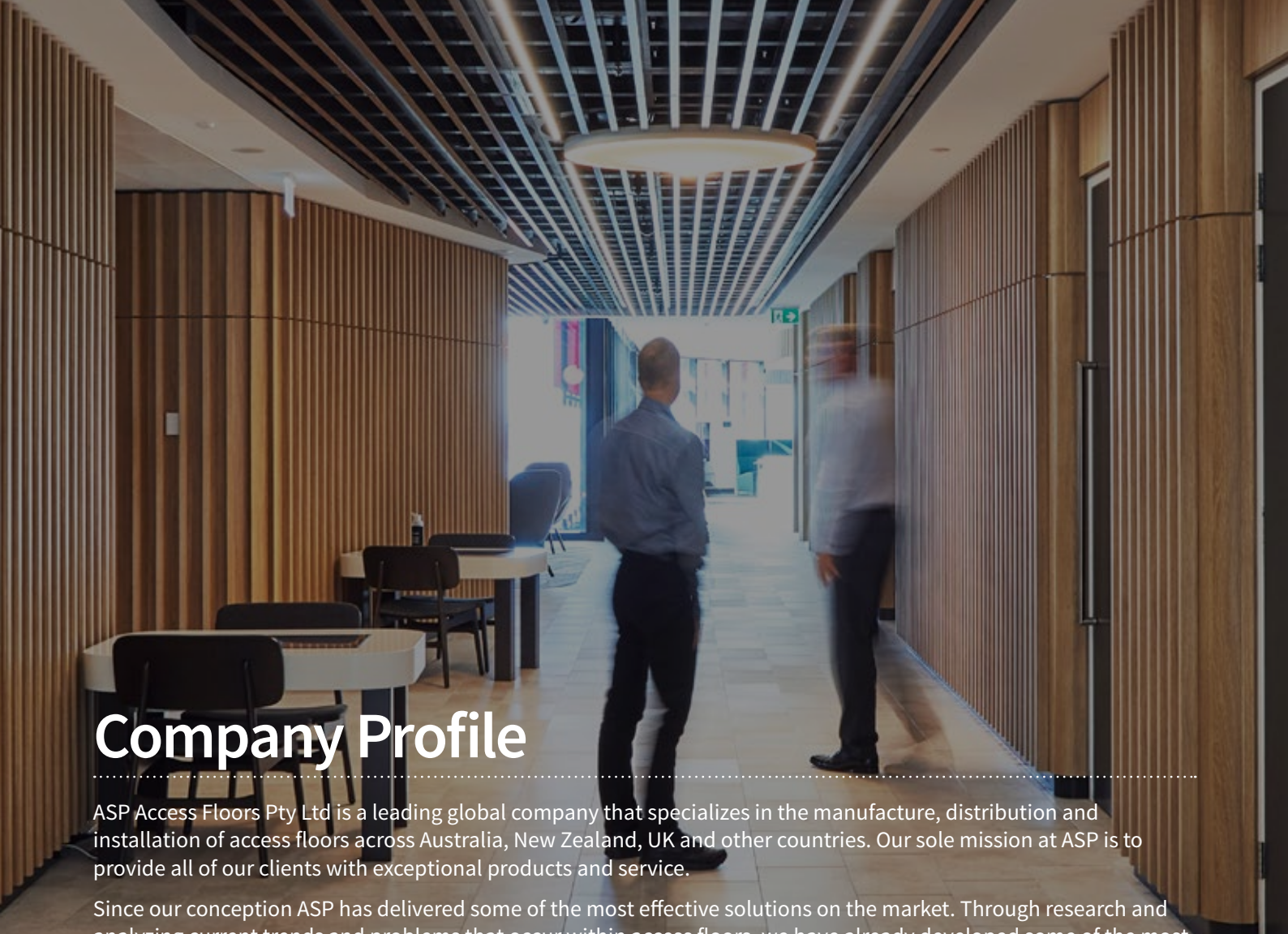
PCR review was conducted by: The Technical Committee of the International EPD® System.
Chair: Martin Erlandsson, IVL Swedish Environment Research Institute, martin.erlandsson@ivl.se

Independent verification of the declaration and data, according to ISO 14025:
☐ EPD process certification (Internal)
☑ EPD verification (External)

Accredited by: EPD Australasia Limited

This EPD can be used to claim points under Green Building Council Australia (GBCA) Green Star rating tools, specifically Material credits (up to 7 credits total) and Responsible Building Material credits (up to 3 credits total) in the Green Star Design & As Built tool.

This version of the EPD has been updated with new branding and product names. A typographical error in a table heading on page 18 has also been corrected. This version of the EPD replaces the earlier version with EPD registration number S-P-00863



Company Profile

ASP Access Floors Pty Ltd is a leading global company that specializes in the manufacture, distribution and installation of access floors across Australia, New Zealand, UK and other countries. Our sole mission at ASP is to provide all of our clients with exceptional products and service.

Since our conception ASP has delivered some of the most effective solutions on the market. Through research and analyzing current trends and problems that occur within access floors, we have already developed some of the most unique and effective products on the market.

Other key benefits include:

Ease of reconfiguration

the modular design of the access floor enables businesses to re-configure their offices.

Cost

The cost differentiation between the installation and maintenance of traditional suspended ceiling system vs. ASP access floor system are exceptionally high. Overall access floors are approximately 40% cheaper to install and maintain the services.

Project time line

Installing services in the floor in lieu of the suspended ceiling system dramatically cuts the time of installation, which in turn cuts the overall project construction time.

Maintenance

Services can be maintained regularly and without lengthy time delays as service men are able to isolate and service particular zones as required, which minimizes the interruptions to your work.

Comfort

With HVAC system installed in the floor, employees are able to individually control air pressure and temperature through their office floor diffusers.

> The use of access floors in the workplace is rapidly gaining popularity within the construction industry. Their specifically designed flexibility and capacity to change has made access floors the perfect solution for many owners, developers, designers and facility managers.

**The declarations presented in page 6, 12 and 20 and the boxed quote page 22 are ASP Access Floors self-declarations aim to describe our value proposition.*

Product Description

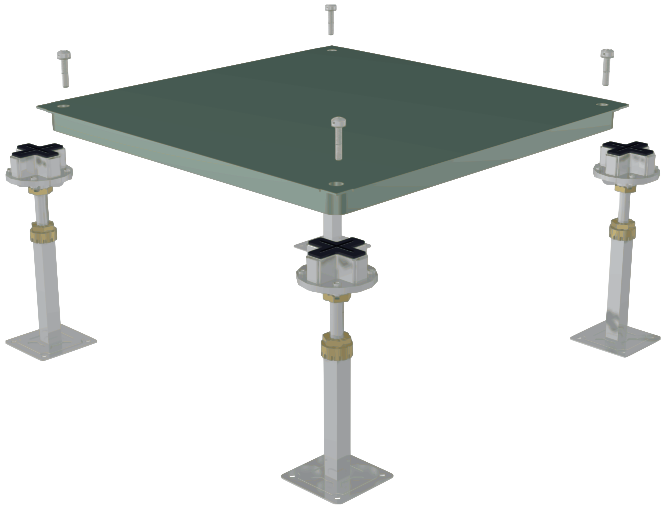
The access flooring system is made up of floor panels and pedestals. The Icon (Icon) panel is a robust lightweight cementitious panel which is steel encased to help provide maximum durability.

The Icon panel is the most specified panel in the industry and is regarded as ASP Access Floors' standard panel for numerous applications.

The standard Icon panel (600mm x 600mm) consists of a powder coated high density steel shell and edge. A cementitious core (cement, fly ash and grey water) is injected to provide a robust sound dampening flooring surface.

The understructure system is composed of Field and Perimeter Pedestals consisting of a head and a base, attached together with a gasket. Different combinations are available to control the cavity height.

In some cases, stringers (horizontal components that connects pedestals together) are used to provide additional lateral support at greater floor height and/or increase the structural performance of the raised floor system.



ASP Access Floor products are used in a variety of applications e.g. general office areas, gaming areas, education facilities, banks, libraries etc. Before designing the layout and functionality of an access floor, the load capacity and tolerance is determined (concentrated load, ultimate load, uniform load, impact load, rolling load…) and the relevant ASP Access Floors componentry selected.

EPD Product Inclusions

Products covered within this EPD are presented below, more information is available on the Table.

Icon X System is a stringer-less system where the panels are individually screw fixed onto the pedestal heads. This system is widely used for electrical and data cable management, and also for applications where there is a need for an under floor baffle/plenum of air highway. This system is recommended for applications such as general offices, banks, learning institutions and libraries.

Icon Air System is a system that is specifically designed to minimize air leakage, when the access floor is to be used as a plenum. This system incorporates the use of a clip on Air stringer that acts as a barrier in between the panels to eliminate air leakage. This system is recommended for applications such as general offices, banks, learning institutions, libraries, casinos and any project that seeks for 5 and 6 Green Star qualification under Green Building rating scheme.

Icon Concept + HPL is designed for those applications used for computer, data, comms, and switch room applications incorporating a 1.6 mm thick anti-static HPL covering. The HPL protects individuals from voltage shorts that can occur with electrical equipment on an access floor and also creates an electrostatic discharge which helps prevent buildup of the static electricity which can cause damage to the equipment. This system is recommended for applications such as IT rooms, Comms Rooms, Switch Rooms and Data Centre.

PRODUCT	CLASSIFICATION	CODE	CATEGORY
Icon Access Floor System	UN CPC Ver.2	37550	Prefabricated structural components for building or civil engineering, of cement, concrete or artificial stone
	ANZSIC 2006	324	Building Completion Services

PRODUCT NAME	PANEL	FFH[1]	PEDESTALS	STRINGERS
Icon X S3/S4	Medium Grade (3.0kN) 600x600mm Icon Panel Heavy Grade (4.5kN) 600x600mm Icon Panel	110-180mm	Field Pedestal: S3 Perimeter pedestal: S4	/
Icon X S5/S6	Medium Grade (3.0kN) 600*600mm Icon Panel Heavy Grade (4.5kN) 600x600mm Icon Panel	180-1200mm	Field Pedestal: S5 Perimeter pedestal: S6	/
Icon Air	Medium Grade (3.0kN) 600x600mm Icon Panel Heavy Grade (4.5kN) 600x600mm Icon Panel	180-1200mm	Field Pedestal: S5 Perimeter pedestal: S6	AT Stringer
Icon HPL	Heavy Grade (4.5kN) 600*600mm Icon Panel	180-1200mm	Unique Pedestal: S8	S600 Stringer

The declared unit (DU) is 1 square meter (m2) of access floor installed. Materials used in each product composition are presented in the Table below.

Table 4 Material composition of included products per declared unit

	Icon X S3-S4		Icon X S5-S6		Icon Air S5-S6		Icon HPL S8
	medium	heavy	medium	heavy	medium	heavy	heavy
Steel (kg)	14.67	16.33	17.63	19.29	18.19	19.85	21.53
Cement (kg)	14.45	14.45	14.45	14.45	14.45	14.45	14.45
Fly ash (kg)	3.095	3.095	3.095	3.095	3.095	3.095	3.095
Grey water (kg)	3.095	3.095	3.095	3.095	3.095	3.095	3.095
Paint (kg)	0.118	0.118	0.118	0.118	0.118	0.118	0.118
Aluminium (kg)	0.207	0.207	0.207	0.207	0.207	0.207	0.000
Zinc (kg)	0.419	0.419	0.419	0.419	0.432	0.432	0.449
ABS (kg)	0.019	0.019	0.019	0.019	0.019	0.019	0.000
Rubber (kg)	0.003	0.003	0.003	0.003	0.059	0.059	0.059
Paper (kg)	0.000	0.000	0.000	0.000	0.000	0.000	0.033
PACKAGING	0.175	0.175	0.190	0.190	0.195	0.195	0.195
Cardboard (kg)	0.088	0.088	0.094	0.094	0.098	0.098	0.098
Wood (kg)	0.028	0.028	0.030	0.030	0.031	0.031	0.031
PE film (kg)	0.004	0.004	0.007	0.007	0.009	0.009	0.009
Steel (kg)	0.055	0.055	0.058	0.058	0.058	0.058	0.058
TOTAL (kg)	36.25	37.91	39.22	40.89	39.85	41.52	43.02

FFH[1] = Finished Floor Height

ASP has delivered some of the most **effective solutions** on the market

LCA Calculation Rules

System Boundary

ASP Access Floors has decided to include all life cycle stages from the extraction of raw materials to product installation at the client's site. The scope is therefore a Cradle to Gate plus options.

Table 5 Modules of the production life cycle included in the EPD

PRODUCT STAGE			CONSTRUCTION STAGE		USE STAGE							END OF LIFE STAGE				RESOURCE RECOVERY STAGE
Raw materials	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-Recycling potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
X	X	X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

ND = Not declared, the module shall not be considered as equal to zero

Production

All components of the Icon X flooring system are manufactured, assembled and supplied by Changzhou Wujin Zhongtian Computer-Room Equipment Co. Ltd in China. The cementitious compound, steel, and aluminium used have verified recycled contents of 97%, 97% and 100% respectively.

The manufacturing process for each component is described briefly below.

Panels

600mm x 600mm sheets of mild steel are spot welded together with a 1.5mm edge to form a solid steel case. The case consists of an enclosed die formed cupped bottom pan and a steel top sheet. The steel provides the structural strength to the panel. A cementitious core consisting of cement, fly ash and grey water, is injected between the sheets to provide sound dampening and additional strength. Panels are then powder coated in an epoxy paint finish.

Pedestals

The steel plates are punched and then welded onto individual threaded rods. The resulting bases are powder coated and a nut is added to the threaded rod. Field pedestal heads (for S3 and S5 pedestals) are die-formed punched aluminium threaded onto a steel threaded tube. The inbuilt expansion joint gasket is moulded ABS. Perimeter pedestal heads (for S4, S6 and S8 pedestals) consist of a punched steel plate welded to a steel tube. This is zinc plated and a moulded ABS plastic gasket is attached.

Stringers

The steel plates are punched and then welded onto individual stringers. Steel stringers are then galvanized onsite. 0.3mm rubber band is added on the top for protection and air insulation.

All steel used within the manufacturing process (steel case of the panels, steel plate/base for the pedestals and galvanized steel for the stringers) is sourced from Changzhou Jietong Cold Rolled Sheet Co Ltd located 20 km from ASP Access Floor factory. Steel is produced using an Electrical Arc Furnace route (EAF), using 97% of steel scrap (89% post-consumer and 8% post-industrial scrap).

Manufacturing of both components and steel use electricity sourced from Chinese national mix.

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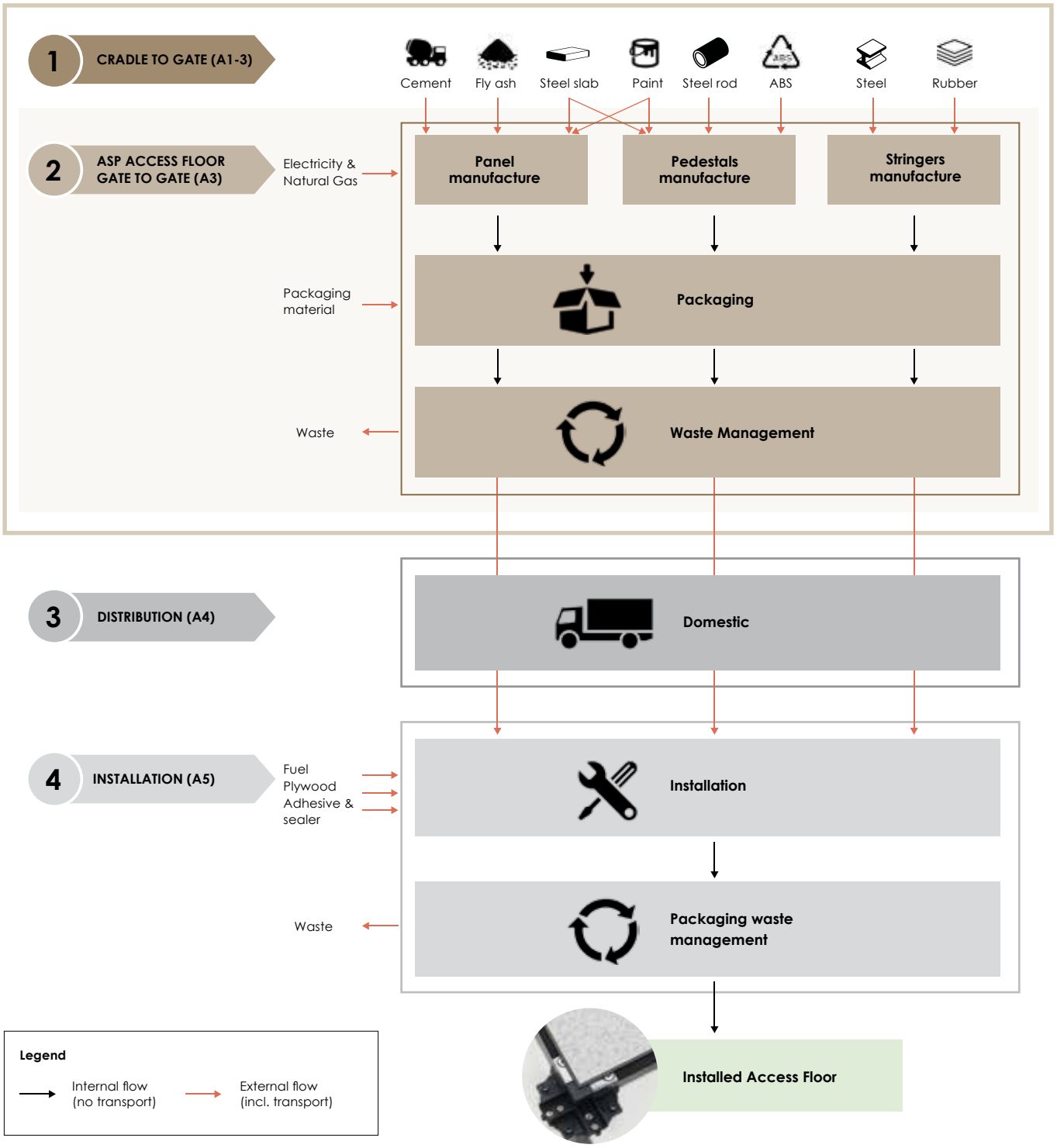
Manufacturing of the components and the steel uses electricity sourced from Chinese national grid.

Figure 9 Access floor system boundary



LCA Calculation Rules

Distribution

The distribution includes 4 legs:

LEG 1: Changhzou factory to Shanghai Port by truck

LEG 2: Shanghai Port to Australian Ports by container ship

LEG 3: Australian Port to regional warehouses by truck

LEG 4: Regional warehouses to installation site by truck

INSTALLATION

Depending on the building site, the product may be mechanically lifted into position using Diesel-powered machinery. Pedestals are screwed into position and the panels screwed onto these. An acrylic adhesive and an epoxy based sealer are used for finishing. In some case, plywood may be used after installation to protect the access panel when there is further building activity on site. Volatile Organic Compounds (VOC) emissions from the sealer and adhesive were calculated and included.

Packaging waste treatment is included to its end of waste state.

KEY ASSUMPTIONS

Primary data were used for all manufacturing operations up to the factory gate (Module A3). Bills of materials for the year 2012 were originally collected for a Product Carbon Footprint performed by Catalyst Ltd in 2013. At the beginning of this study, these data were verified by ASP Access Floors to ensure that they were representative of the year 2016.

Energy and water consumptions at the manufacturing plant were collected over the period June 2015-May 2016. Distribution data was collected for the year 2015 using a weighted average distance was applied for each leg.

As a conservative assumption, fuel for mechanical lifting of product to the installation site and plywood covering after installation have been systematically included. Gravitational energy potential for the heaviest product (Concept + HPL) lifted to a height of 20m with a 10% Diesel efficiency was used to estimate fuel consumption.

All datasets are within the 5 year limit allowable for specific data under EN 15804 and applicable PCR.

CUT-OFF CRITERIA

In accordance with the Construction PCR v2.01, a minimum of 95% of total inflows to the upstream and core module has be included in the Life Cycle Inventory.

In accordance with the Construction PCR v2.01, environmental impacts relating to personnel, infrastructure, and production equipment not directly consumed in the process are excluded from the system boundary. All other reported data were incorporated and modeled using the best available life cycle inventory data without the use of cut-off criteria.

Personnel-related impacts, such as transportation to and from work, are also not accounted for in the Life Cycle Inventory.

Production of capital equipment, facilities and infrastructure required for manufacture are outside the scope of the study.

Allocations

PRIMARY DATA

For the manufacturing data (electricity, natural gas and water consumption) no break down was available. Physical allocation by mass was used on total access floor production. No information on the different floor type production over the reporting period was available. As a conservative approach, it has been assumed that all the access floor systems manufactured were Icon X S3/S4 as it is the lightest system leading to the highest input per kg of material produced. No other allocation was used for the primary data.

BACKGROUND DATA

For all refinery products, allocation by mass and net calorific value has been applied. The specific manufacturing route of every refinery product is modeled and the impacts associated with the production of these products are calculated individually.

Materials and chemicals used in the manufacturing process are modeled using the allocation rule most suitable for the respective material. For further information on a specific material see available GaBi documentation (documentation. gabi-software.com).

In addition to the above mentioned allocation methods for refinery products and materials, inventories for electricity and thermal energy generation also include allocation by economic value for some by-products (e.g. gypsum, boiler ash and fly ash). In case of plants for the co-generation of heat and power, allocation by energy is applied.

BACKGROUND DATA

Data for all energy inputs, transport processes, packaging and raw materials (except steel manufacturing) are from GaBi Databases 2015 (thinkstep 2015).

No dataset was available in GaBi for 100% EAF steel manufacturing. Steel manufacturing processes were modeled using data from The Best Available Technology Reference Document for the Iron and Steel Industry issued by the European Commission in 2013. Recycled scrap content of 97% and a Chinese electricity mix has been applied.

Chinese electricity is assumed to be the 2013 national average with a Global Warming Potential of 864 gCO2eq/kWh, made up of 77% fossil fuel energy (75% hard coal, 2% natural gas), 26% renewable energy (22% hydro, 3% wind and 1% biofuels) and 2% nuclear energy.

Adhesive and floor sealer used at installation were modelled based on Material Safety Data Sheet (MSDS) provided by supplier. Plywood used for covering the floors after installation was modelled using the recently published EPD for Australian plywood.

The reference year for background data ranges from 2011-2015 and therefore all datasets are within 10 year limit allowable for generic data under EN 15804 and applicable PCR.

Our sole mission at ASP is to provide all of our clients with **exceptional products and service**

LCA Results

The LCA results are calculated for 1 square meter of installed access floor for the indicators presented in the Tables below.

Potential environmental impacts

INDICATOR	UNIT	ACRONYM
Global warming	kg CO_2 equivalents	GWP
Acidification of land and water	kg SO_2 equivalents	AP
Eutrophication	kg PO_4^{3-} equivalents	EP
Depletion of abiotic resources (elements)	kg Sb equivalents	ADPe
Depletion of abiotic resources (fossil)	MJ net calorific value	ADPf
Ozone depletion	kg CFC 11 equivalents	ODP
Photochemical ozone creation	kg C_2H_2 equivalents	POCP

Use of resources

INDICATOR	UNIT	ACRONYM
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	MJ, net calorific value	PERE
Use of renewable primary energy resources used as raw materials	MJ, net calorific value	PERM
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	PERT
Use of non- renewable primary energy excluding non-renewable primary energy resources used as raw materials	MJ, net calorific value	PENRE
Use of non- renewable primary energy resources used as raw materials	MJ, net calorific value	PENRM
Total use of non- renewable primary energy resources (primary energy and primary energy resources used as raw materials)	MJ, net calorific value	PENRT
Use of net fresh water	m3	FW
Use of secondary material	kg	SM
Use of renewable secondary fuels	MJ, net calorific value	RSF
Use of non-renewable secondary fuels	MJ, net calorific value	NRSF

LCA Results

Other indicators

INDICATOR	UNIT	ACRONYM
Components for re-use	kg	CRU
Materials for energy recovery	kg	MER
Materials for recycling	kg	MFR
Hazardous waste (deposited)	kg	HWD
Waste (deposited)	kg	NHWD
EDIP 1997, Nuclear waste [kg]	kg	RWD
Exported electrical energy	MJ	EEE
Exported thermal energy	MJ	EET

Environmental impact indicators

Icon X S3/S4 potential environmental impacts

	A1-3		A4		A5	
	medium	heavy	medium	heavy	medium	heavy
GWP ($kgCO_2$ eq)	2.77E+01	2.96E+01	5.04E+00	5.28E+00	3.73E+00	3.73E+00
AP ($kgSO_2$ eq)	8.70E-02	9.26E-02	1.39E-01	1.45E-01	2.69E-02	2.69E-02
EP ($kgPO_4$ eq)	1.59E-02	1.68E-02	1.37E-02	1.43E-02	5.41E-03	5.41E-03
ADPE (kgSb eq)	6.89E-04	6.89E-04	1.47E-07	1.53E-07	3.53E-06	3.53E-06
ADPF (MJ eq)	2.59E+02	2.77E+02	6.30E+01	6.60E+01	8.41E+01	8.41E+01
ODP (kgCFC11 eq)	2.18E-07	2.19E-07	1.94E-11	2.03E-11	8.76E-11	8.76E-11
POCP (kg C_2H_2 eq)	8.00E-03	8.56E-03	8.28E-03	8.68E-03	6.43E-03	6.43E-03

Icon X S5/S6 potential environmental impacts

	A1-3		A4		A5	
	medium	heavy	medium	heavy	medium	heavy
GWP ($kgCO_2$ eq)	3.27E+01	3.46E+01	5.45E+00	5.69E+00	3.73E+00	3.73E+00
AP ($kgSO_2$ eq)	1.10E-01	1.15E-01	1.50E-01	1.57E-01	2.69E-02	2.69E-02
EP ($kgPO_4$ eq)	2.89E-02	2.99E-02	1.48E-02	1.54E-02	5.41E-03	5.41E-03
ADPE (kgSb eq)	6.91E-04	6.91E-04	1.59E-07	1.65E-07	3.53E-06	3.53E-06
ADPF (MJ eq)	3.13E+02	3.32E+02	6.82E+01	7.12E+01	8.41E+01	8.41E+01
ODP (kgCFC11 eq)	2.19E-07	2.20E-07	2.09E-11	2.19E-11	8.76E-11	8.76E-11
POCP (kg C_2H_2 eq)	9.81E-03	1.04E-02	8.96E-03	9.35E-03	6.43E-03	6.43E-03

Icon Air potential environmental impacts

	A1-3		A4		A5	
	medium	heavy	medium	heavy	medium	heavy
GWP ($kgCO_2$ eq)	3.42E+01	3.60E+01	5.55E+00	5.79E+00	3.73E+00	3.73E+00
AP ($kgSO_2$ eq)	1.16E-01	1.22E-01	1.53E-01	1.59E-01	2.69E-02	2.69E-02
EP ($kgPO_4$ eq)	3.20E-02	3.30E-02	1.51E-02	1.57E-02	5.41E-03	5.41E-03
ADPE (kgSb eq)	7.16E-04	7.16E-04	1.61E-07	1.68E-07	3.53E-06	3.53E-06
ADPF (MJ eq)	3.31E+02	3.50E+02	6.95E+01	7.24E+01	8.41E+01	8.41E+01
ODP (kgCFC11 eq)	2.24E-07	2.24E-07	2.13E-11	2.22E-11	8.76E-11	8.76E-11
POCP (kg C_2H_2 eq)	1.03E-02	1.09E-02	9.13E-03	9.52E-03	6.43E-03	6.43E-03

Icon Concept + HPL potential environmental impacts

	A1-3	A4	A5
GWP ($kgCO_2$ eq)	3.83E+01	6.00E+00	3.73E+00
AP ($kgSO_2$ eq)	1.31E-01	1.65E-01	2.69E-02
EP ($kgPO_4$ eq)	4.04E-02	1.63E-02	5.41E-03
ADPE (kgSb eq)	7.88E-04	1.74E-07	3.53E-06
ADPF (MJ eq)	3.73E+02	7.50E+01	8.41E+01
ODP (kgCFC11 eq)	1.66E-07	2.30E-11	8.76E-11
POCP (kg C_2H_2 eq)	1.16E-02	9.85E-03	6.43E-03

LCA Results

Use of resources

Icon X S3/S4 use of resources

	A1-3		A4		A5	
	medium	heavy	medium	heavy	medium	heavy
PERE (MJ)	2.92E+01	3.12E+01	7.74E-01	8.10E-01	5.60E+01	5.60E+01
PERM (MJ)	4.49E-03	4.49E-03	2.87E-12	3.00E-12	5.67E+01	5.67E+01
PERT (MJ)	2.92E+01	3.12E+01	7.74E-01	8.10E-01	1.13E+02	1.13E+02
PENRE (MJ)	2.46E+02	2.64E+02	6.32E+01	6.62E+01	8.47E+01	8.47E+01
PENRM (MJ)	3.41E+01	3.49E+01	1.10E-11	1.15E-11	8.74E+00	8.74E+00
PENRT (MJ)	2.80E+02	2.99E+02	6.32E+01	6.62E+01	9.35E+01	9.35E+01
FW (m^3)	7.09E+01	7.80E+01	1.75E-01	1.83E-01	3.42E+00	3.42E+00
SM (kg)	3.56E+01	3.76E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF (kg)	INA	INA	INA	INA	INA	INA
NRSF (kg)	INA	INA	INA	INA	INA	INA

Icon X S5/S6 use of resources

	A1-3		A4		A5	
	medium	heavy	medium	heavy	medium	heavy
PERE (MJ)	3.46E+01	3.66E+01	8.37E-01	8.74E-01	5.60E+01	5.60E+01
PERM (MJ)	7.09E-03	7.09E-03	3.10E-12	3.24E-12	5.67E+01	5.67E+01
PERT (MJ)	3.46E+01	3.66E+01	8.37E-01	8.74E-01	1.13E+02	1.13E+02
PENRE (MJ)	3.01E+02	3.19E+02	6.84E+01	7.14E+01	8.47E+01	8.47E+01
PENRM (MJ)	3.56E+01	3.65E+01	1.19E-11	1.24E-11	8.74E+00	8.74E+00
PENRT (MJ)	3.36E+02	3.56E+02	6.84E+01	7.14E+01	9.35E+01	9.35E+01
FW (m^3)	8.96E+01	9.67E+01	1.89E-01	1.97E-01	3.42E+00	3.42E+00
SM (kg)	3.89E+01	4.08E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF (kg)	INA	INA	INA	INA	INA	INA
NRSF (kg)	INA	INA	INA	INA	INA	INA

Icon Air use of resources

	A1-3		A4		A5	
	medium	heavy	medium	heavy	medium	heavy
PERE (MJ)	3.72E+01	3.91E+01	8.52E-01	8.89E-01	5.60E+01	5.60E+01
PERM (MJ)	7.96E-03	7.96E-03	3.16E-12	3.30E-12	5.67E+01	5.67E+01
PERT (MJ)	3.72E+01	3.91E+01	8.52E-01	8.89E-01	1.13E+02	1.13E+02
PENRE (MJ)	3.14E+02	3.32E+02	6.97E+01	7.27E+01	8.47E+01	8.47E+01
PENRM (MJ)	4.12E+01	4.20E+01	1.21E-11	1.26E-11	8.74E+00	8.74E+00
PENRT (MJ)	3.55E+02	3.74E+02	6.97E+01	7.27E+01	9.35E+01	9.35E+01
FW (m^3)	1.01E+02	1.09E+02	1.92E-01	2.01E-01	3.42E+00	3.42E+00
SM (kg)	3.96E+01	4.16E+01	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF (kg)	INA	INA	INA	INA	INA	INA
NRSF (kg)	INA	INA	INA	INA	INA	INA

Icon Concept + HPL use of resources

	A1-3	A4	A5
PERE (MJ)	4.41E+01	9.20E-01	5.60E+01
PERM (MJ)	9.53E-03	3.41E-12	5.67E+01
PERT (MJ)	4.42E+01	9.20E-01	1.13E+02
PENRE (MJ)	3.61E+02	7.52E+01	8.47E+01
PENRM (MJ)	3.54E+01	1.30E-11	8.74E+00
PENRT (MJ)	3.96E+02	7.52E+01	9.35E+01
FW (m^3)	1.43E+02	2.08E-01	3.42E+00
SM (kg)	4.32E+01	0.00E+00	0.00E+00
RSF (kg)	INA	INA	INA
NRSF (kg)	INA	INA	INA

LCA Results

Other indicators

Icon X S3/S4 other indicators

	A1-3		A4		A5	
	medium	heavy	medium	heavy	medium	heavy
CRU (kg)	4.77E-04	4.77E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER (kg)	3.58E-04	3.58E-04	0.00E+00	0.00E+00	9.60E-03	9.60E-03
MFR (kg)	2.00E+00	2.19E+00	0.00E+00	0.00E+00	4.84E-02	4.84E-02
HWD (kg)	5.45E-03	5.53E-03	6.65E-06	6.96E-06	6.81E-04	6.81E-04
NHWD (kg)	4.56E+00	4.81E+00	1.96E-03	2.06E-03	3.02E+00	3.02E+00
RWD (kg)	1.12E-05	1.17E-05	1.20E-07	1.25E-07	4.18E-04	4.18E-04
EEE (MJ)	INA	INA	INA	INA	INA	INA
EET (MJ)	INA	INA	INA	INA	INA	INA

Icon X S5/S6 other indicators

	A1-3		A4		A5	
	medium	heavy	medium	heavy	medium	heavy
CRU (kg)	5.05E-04	5.05E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER (kg)	3.78E-04	3.78E-04	0.00E+00	0.00E+00	1.01E-02	1.01E-02
MFR (kg)	2.33E+00	2.52E+00	0.00E+00	0.00E+00	5.20E-02	5.20E-02
HWD (kg)	1.36E-02	1.37E-02	7.19E-06	7.51E-06	6.81E-04	6.81E-04
NHWD (kg)	5.02E+00	5.26E+00	2.12E-03	2.22E-03	3.02E+00	3.02E+00
RWD (kg)	1.22E-05	1.27E-05	1.30E-07	1.35E-07	4.18E-04	4.18E-04
EEE (MJ)	INA	INA	INA	INA	INA	INA
EET (MJ)	INA	INA	INA	INA	INA	INA

Icon Air other indicators

	A1-3		A4		A5	
	medium	heavy	medium	heavy	medium	heavy
CRU (kg)	5.10E-04	5.10E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER (kg)	3.83E-04	3.83E-04	0.00E+00	0.00E+00	1.03E-02	1.03E-02
MFR (kg)	2.40E+00	2.59E+00	0.00E+00	0.00E+00	5.29E-02	5.29E-02
HWD (kg)	1.53E-02	1.53E-02	7.33E-06	7.64E-06	6.81E-04	6.81E-04
NHWD (kg)	5.12E+00	5.36E+00	2.16E-03	2.26E-03	3.02E+00	3.02E+00
RWD (kg)	1.25E-05	1.29E-05	1.32E-07	1.38E-07	4.18E-04	4.18E-04
EEE (MJ)	INA	INA	INA	INA	INA	INA
EET (MJ)	INA	INA	INA	INA	INA	INA

The use of renewable secondary fuel (RSF) and non-renewable secondary fuel (NRSF) are listed as 'INA' (indicator not assessed). ASP Access Floors is not directly using secondary fuel and inclusion of these indicators in the EPD has been deemed not useful or necessary. The same applies for exported electrical energy (EEE) and exported thermal energy (EET).

Icon Concept + HPL other indicators

	A1-3	A4	A5
CRU (kg)	5.28E-04	0.00E+00	0.00E+00
MER (kg)	3.96E-04	0.00E+00	1.06E-02
MFR (kg)	2.78E+00	0.00E+00	5.52E-02
HWD (kg)	1.97E-02	7.91E-06	6.81E-04
NHWD (kg)	5.62E+00	2.34E-03	3.01E+00
RWD (kg)	1.22E-05	1.42E-07	4.18E-04
EEE (MJ)	INA	INA	INA
EET (MJ)	INA	INA	INA

ASP provides business and developers the **perfect balance** between **optimum design and functionality**

Conclusion

ASP Access Floor Sustainability Policy

As a member of the Green Building Council of Australia, ASP Access Floors' Environmental Policy outlines how ASP endeavours to use recycled materials and optimize its supply chain. The implementation of the policy will ensure ASP:

- Considers sustainability in all relevant decision making
- Reduce their greenhouse gas emissions
- Produce less waste and increase recycling

The aim of this policy is to incorporate ecologically sustainable development principles in every facet of design, manufacturing and installation with the introduction of the following four key objectives:

1. Indoor Environment Quality

2. Waste Management

3. Recycled Content

4. Life Cycle

In implementing this policy ASP Access Floors achieved carboNZero certification on Icon X S3/S4 installed in the Barangaroo International Towers (300,000m2 of flooring), has been a CEMARS certified organisation for the past three years and is committed to the long term measurement and monitoring of its greenhouse gas emissions.

ASP Access Floors has completed numerous Green Star projects. Some of these include:

- Barangaroo International Towers
- Brisbane Supreme Courts
- Medibank Head Office Melbourne
- ANZ Head Office Docklands
- Commonwealth Bank Darling Walk
- 1 Bligh St Sydney
- Australian Catholic University VIC
- University of Adelaide New Engineering Building

IMPROVEMENTS

The results from the LCA and the sensitivity analysis show potential improvements to reduce ASP's access floor systems overall environmental impacts. Areas of focus include:

- The use of certified 100% hydroelectricity at the steel manufacturing plant
- Increasing the percentage of recycled cement in the cementitious core mix
- Finding more environmental alternatives to the cementitious core
- Reducing the weight of the whole system to reduce both production and distribution environmental impacts
- The monitoring of freight services to ensure ships with the best available technology and least environmental impact are used
- Optimising distribution routes to eliminate unnecessary transport
- Substituting truck freight with rail freight where practical
- Ensuring plywood boards are reused and recycled

Beyond the scope of the study, ASP Access Floors is looking to set up a product stewardship programme to recover and recycle the access floor componentry at their end of life.

COMPLIANCE

- ASP Access Floors operates under the guidelines of an Environmental Management System (EMS) compliant with international standard ISO 14001.
- ASP products comply with Australian Standard AS4154 along with international standards CISCA, EN 12825, PSA MOB and DIN.

A compliance proof can be provided on demand, if required, please email ***sales@aspfloors.com.au***

Case Study

Barangaroo Embodied Carbon Reduction

BACKGROUND

Lendlease has committed to a range of sustainability initiatives as part of the Barangaroo South project. This includes a significant commitment to reduce the embodied carbon of building materials by 20% compared to standard construction practices. Embodied Carbon (EC) is the sum of all greenhouse gas emissions, usually reported as tonnes of carbon dioxide equivalents (tCO2-e), created over the lifecycle of a material from its creation to disposal.

The opportunities for reducing EC vary for each building at Barangaroo South. By completing an initial EC analysis for each building, we identify the top materials or trade packages that contribute most to total EC. We then collaborate with suppliers of each key trade package throughout the design and procurement process to develop specific strategies for reducing the impacts of their products.

For International Towers, consisting of three commercial high rise buildings, one of the trade packages targeted was access flooring given the significant area covered by these floors. An access flooring system is made up of floor panels and pedestals designed to allow for easy access to computer network cabling and other under floor services, they greatly improve tenant fitout flexibility and enable easy future adaptability to meet the demands of a modern office space. As part of the tender process, Lendlease provided a questionnaire asking access flooring suppliers to respond with potential initiatives for how they could reduce the EC of their products.

ASP Access Floors, the winning tenderer, took on the challenge of achieving carbon neutral certification for their flooring system. Carbon neutrality refers to a situation where the net greenhouse gas emissions of an organisation or a product are equal to zero. This is achieved first through the reduction of emissions through design and operational improvements and then, for any remaining emissions, the acquisition and cancellation of carbon offsets that meet stringent criteria. Lendlease supported ASP in gaining carbon neutral certification for the product used in the International Towers. The outcome was not only a reduction in EC for all three ICT buildings, but also improved environmental performance and operational efficiencies for ASP

ASP'S JOURNEY

ASP Access Floors have always believed that its flooring systems had good sustainability credentials as the components are made using renewable energy sources (hydro) and have more than 80% recycled content. However, ASP had never formally measured its environmental footprint.

To win the contract to supply Lend Lease with the 300,000m2 of access flooring needed in the International Towers at Barangaroo South, ASP needed quantitative data to back up its environmental claims.

ASP was new to this process and so enlisted the services of a sustainability consultant from Catalyst® Ltd. With Catalyst's guidance ASP put a plan into action to measure the carbon footprint of the Icon X system specified for the Barangaroo South project.

Not satisfied with simply measuring the footprint, ASP decided to take the further step of making the entire product going into the towers carbon neutral through carboNZero certification. With this evidence of environmental responsibility, ASP was awarded the contract with Lend Lease, and the project began in earnest.

To apply sustainability more broadly than just the product being used in Barangaroo South, ASP also joined the CEMARS programme for its organisational footprint. This involved:

- Measuring the company-wide carbon footprint,
- Developing and implementing a carbon reduction strategy, and
- Seeing how effective it is.

An annual independent audit ensures that ASP accurately tracks its footprint and makes real change.

The carbon reduction strategy has involved some exciting changes to operations. Reconfiguring some of the import supply routes contributed to a 20% reduction in the company's overall carbon footprint in the first year. Other initiatives, such as diverting waste from landfill, reducing business travel, and being more energy efficient are also proving successful, not only in reducing emissions but in staff engagement as well.

ASP has always believed that its flooring systems had good sustainability credientials

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