Environmental Product Declaration

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Hebel PowerFloor – Flooring
Manufactured by CSR Building Products Limited

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Geographical Scope: Australia and New Zealand
Version: 001

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

This EPD covers multiple products based on a representative product PowerFloor 75.

EPD® THE INTERNATIONAL EPD® SYSTEM | AUSTRALASIA EPD® ENVIRONMENTAL PRODUCT DECLARATION | ECO PLATFORM EPD VERIFIED

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021
Program: The International EPD® System — www.environdec.com
Program Operator: EPD International AB
Regional Program: EPD Australasia — www.epd-australasia.com

Contents

Tackling the sustainability challenge in building

As a trusted supplier of building solutions, we are taking on industry challenges to cut carbon emissions and waste, and better manage resources.

The global building industry has a vital role to play in making progress on sustainability goals. With building materials and operations accounting for approximately 37% of greenhouse gas (GHG) emissions globally[1], work to decarbonise products, processes and logistics will be a major factor in moving our sector towards net zero.

Manufacturing building materials and how these are packaged, used and disposed of can have negative impacts on the environment. If our industry is to make progress towards resource efficiency, waste reduction and preserving biodiversity, it's important to understand exactly how our products are having an impact – on our climate and resources, and on nature and communities.

Revealing sustainability opportunities for our industry, business and customers

At CSR, we are committed to leading the much-needed shift to sustainable manufacturing and driving decarbonisation of operations and products. As an innovator for our industry, we believe that finding ways to advance our sustainability agenda supports a better future for our industry, business and customers.

Providing Environmental Product Declarations (EPDs) to our customers enables us to share robust information about the environmental performance of our building materials. This supports them in making informed choices on the solutions that best meet their objectives for quality and sustainability outcomes in building projects.

It also creates an opportunity to establish embodied carbon baselines and identify key material sources of impact at a product level. Knowing where these impacts occur along the value chain will highlight opportunities to maximise material efficiency, reduce embodied carbon and extend product life across our range. This will provide CSR with information we need to innovate in our product design and manufacturing processes with the goal of optimising environmental performance across all our building solutions.

[1] United Nations Environment Program. "Global Status Report for Buildings and Construction", 2022.

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Building solutions for a better future

CSR offers a unique portfolio of products to provide complete customer solutions that build sustainable places and communities.

At CSR, our products have been used in buildings for almost a century. Our operations span Australia, New Zealand, parts of Asia and Europe and we have the scale and expertise to innovate for the sustainable solutions our customers and communities need to build for a better future.

As a trusted supplier of building solutions, we are taking on industry challenges to cut carbon emissions and waste, and better manage resources. **To set our ambition and ignite our progress, we are committed to 2030 targets across:**

1

Reducing our emissions, waste and water use

2

Increasing uptake of renewable energy

3

Improving biodiversity outcomes

Project name: Integrated Studies Centre
Architect: Mayoh Architects
Photography: Chris Warnes

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Towards net zero
in the built environment

We take a strategic approach to investing in solutions that reduce emissions - from increasing the uptake of renewable energy to exploring emerging technologies across our operations. This includes optimising our manufacturing plants, energy and process efficiencies and building collaborative partnerships across our operations.

CSR targets for 2030[2]

50% **of energy from renewables**

20% **energy reduction per tonne of saleable product manufactured**

30% **reduction in greenhouse gas (GHG) emissions per tonne of saleable product manufactured**

As part of an industry that accounts for a high proportion of carbon emissions, we are looking to partner with our peers on the best solutions for a successful net zero transition and reduction of embodied carbon for the built environment.

[2] 2030 targets baseline is 1st July 2019 to 30th June 2020.

Reducing waste and preserving resources to protect our environment

As a major supplier of building solutions, CSR has an important role in becoming a closed loop business to influence a circular economy in the built environment.

We are making it a priority to reduce our use of raw materials, increase regenerative and recycled material and actively seek solutions to reduce waste in the manufacturing, packaging and supply of our products.

Since 2018, our timber pallet recovery program has significantly reduced the amount of timber going to landfill. Being a member of the Australian Packaging Covenant Organisation (APCO) demonstrates our focus on redesigning packaging to minimise plastic use and waste. In collaboration with our suppliers, we are committed to monitoring our progress towards our 2025 sustainable packaging targets, where CSR packaging is closed loop (either 100% reusable, recyclable or compostable) and using an average of 50% recycled content in packaging.

CSR closing the loop goals for 2030[3]

75% **reduction in solid waste to landfill**

30% **reduction of potable water consumed (litre) per tonne of saleable product manufactured**

↑ **enhance biodiversity outcomes on CSR sites and developments**

We continually work to eliminate waste across our business and source the ‘right’ materials to manufacture building products from natural, reused, repurposed and recycled materials. Our approach includes working with our team and suppliers to look beyond energy, water and waste to explore holistic environmental management solutions and influence the wider industry to follow circular principles.

[3] 2030 targets baseline is 1st July 2019 to 30th June 2020.

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Hebel: the better way to build

With over 30 years' experience in producing autoclaved aerated concrete (AAC), Hebel is Australia's leading manufacturer of AAC solutions and is known for its design versatility and unparalleled performance benefits.

Hebel is available in lightweight panels or blocks that allow for easy, fast installation over a wide range of applications.

Reducing carbon emissions for a better building experience

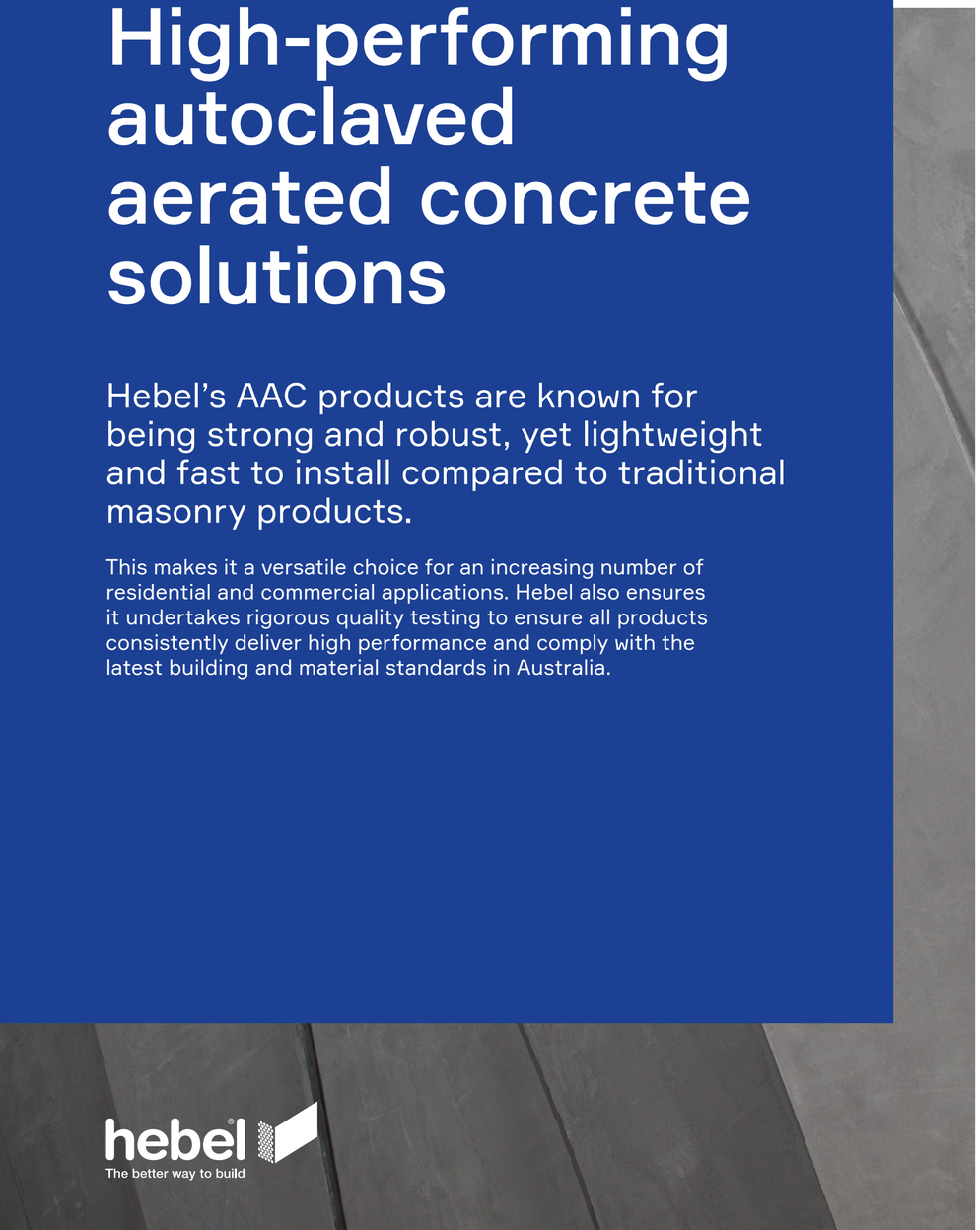
Hebel is part of CSR building products group, the name behind some of Australia's most trusted and recognised brands in the construction industry. To help CSR reach its ambition of a sustainable future for the built environment, Hebel is committed to delivering solutions that reduce emissions and contribute to the group's ambition of a successful net zero transition for the industry.

By taking a strategic approach, Hebel is making progress in addressing its own operational impact, as well as maximising the energy efficiency of its products. In May 2022, the Hebel factory located in Somersby NSW installed 1,900 solar panels. Since then, this has reduced the annual greenhouse gas (GHG) emissions by 880 tonnes. Some of the waste generated in the manufacturing process is also recycled, even down to the condensation that is produced.

High-performing autoclaved aerated concrete solutions

Hebel's AAC products are known for being strong and robust, yet lightweight and fast to install compared to traditional masonry products.

This makes it a versatile choice for an increasing number of residential and commercial applications. Hebel also ensures it undertakes rigorous quality testing to ensure all products consistently deliver high performance and comply with the latest building and material standards in Australia.



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First-rate thermal insulation and acoustic performance

Hebel panels have superior insulation qualities compared to other masonry products, which helps to improve the overall thermal insulation qualities of buildings. When compared to polystyrene and other fibre cement cladding options, Hebel has been shown to reduce external noise. When used for flooring, it can also bring down sound transference between different levels.

Proven fire-resistance properties

Hebel systems have been extensively tested in accordance with Australian Standards[4], including AS1530.1 for non-combustibility, AS1530.4 for fire-resistance capabilities and AS1530.8.2 for Bushfire Attack Level Flame Zone (BAL-FZ)[5]. These assessments demonstrate that Hebel solutions meet or exceed these performance requirements, ensuring that buildings are resilient and well-protected in this environment.

Unparalleled versatility and durability

With each panel containing steel reinforcement with an anti-corrosion layer, Hebel products are designed and manufactured to last. Each panel is significantly more lightweight when compared to other forms of concrete, which means faster, more cost-effective installations in a wide range of construction applications.

[4] Australian Standards are referenced by the National Construction Code (NCC) and outline the technical requirements for the design, construction and performance of buildings.
[5] BAL-FZ is the highest category in the bushfire attack levels prescribed by the Building Code of Australia. These standards represent how effective building materials are in response to ember attack, radiant heat and direct flame ignition resistance.

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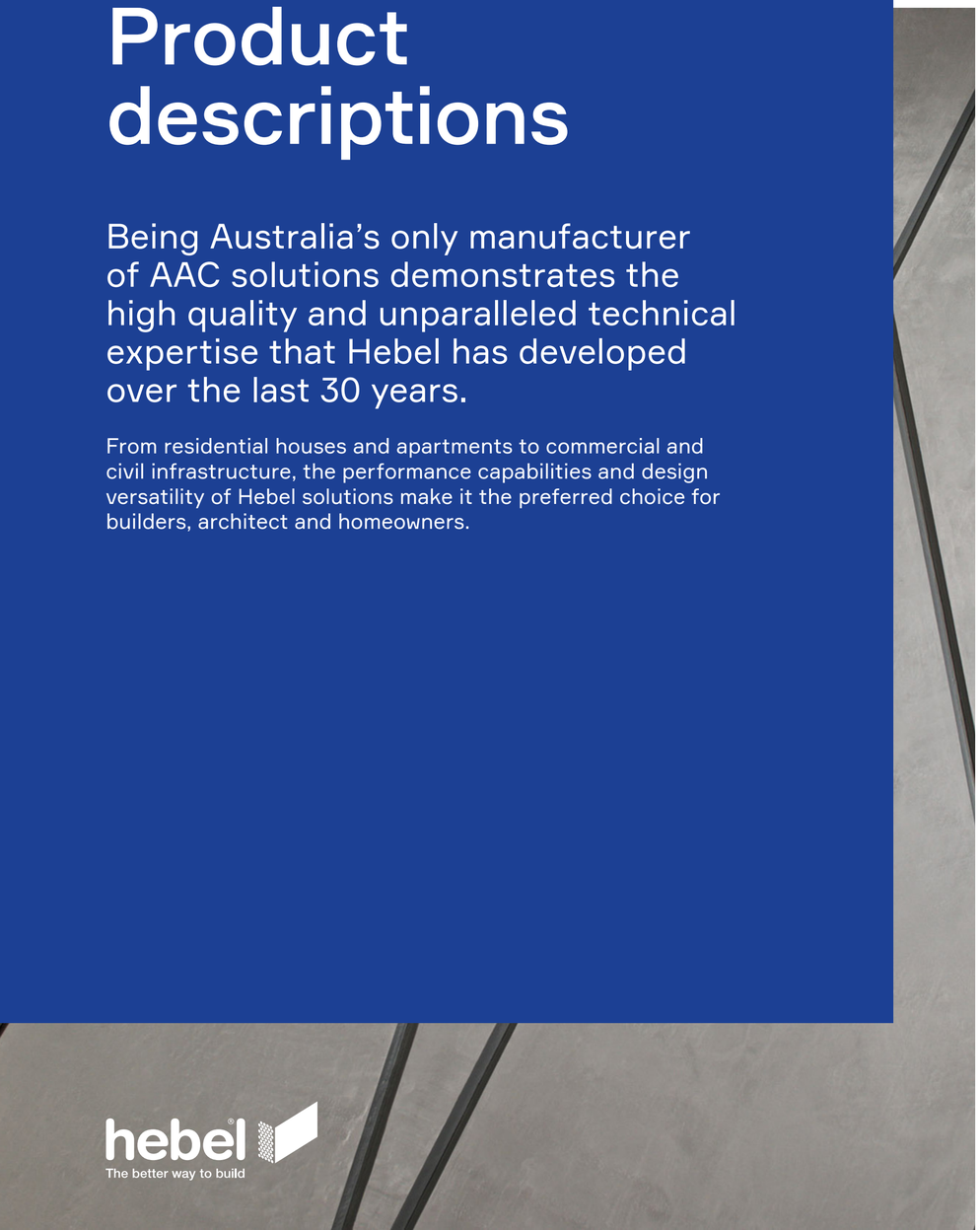
Product descriptions

Being Australia's only manufacturer of AAC solutions demonstrates the high quality and unparalleled technical expertise that Hebel has developed over the last 30 years.

From residential houses and apartments to commercial and civil infrastructure, the performance capabilities and design versatility of Hebel solutions make it the preferred choice for builders, architect and homeowners.



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PowerFloor

A platform flooring system that delivers strong acoustic performance and thermal insulation properties, making it an excellent base for just about any type of floor covering.

PowerFloor Plus

Provides a thick engineered panel that provides a secure cross-braced floor system with superior durability, fire resistance and thermal insulation properties.

PowerFloor 75
Thickness: 75mm
Width: 600mm
Length: 1800mm

PowerFloor Plus – 150 DP Joint Edge
Thickness: 150mm
Width: Various widths
Length: Various lengths

PowerFloor Plus – 175 DP Joint Edge
Thickness: 175mm
Width: Various widths
Length: Various lengths

PowerFloor Plus – 200 DP Joint Edge
Thickness: 200mm
Width: Various widths
Length: Various lengths

PowerFloor Plus – 225 DP Joint Edge
Thickness: 225mm
Width: Various widths
Length: Various lengths

PowerFloor Plus – 250 DP Joint Edge
Thickness: 250mm
Width: Various widths
Length: Various lengths

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Life cycle assessment information

Program Information

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CEN standard EN 15804 serves as the Core Product Category Rules (PCR)

Product Category Rules (PCR) 2019:14
Construction products, Version 1.3.4

UN CPC Code: 375

PCR review was conducted by:
The Technical Committee of the International EPD® System. A full list of members available on www.environdec.com for a list of members. The review panel may be contacted via info@environdec.com.

Review chair: Claudia A. Peña, University of Concepción, Chile.

Independent third-party verification of the declaration and data, according to ISO 14025:2006:

☐ EPD process certification

☒ EPD verification by individual verifier

Third party verifier:

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Jane Anderson

Approved by: EPD Australasia Ltd

Procedure for follow-up of data during EPD validity involves third party verifier:

☐ Yes ☒ No

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

EPDs within the same product category but registered in different EPD programs, or not compliant with EN 15804, may not be comparable. For two EPDs to be comparable, they must be based on the same PCR (including the same version number) or be based on fully-aligned PCRs or versions of PCRs; cover products with identical functions, technical performances and use (e.g. identical declared/functional units); have equivalent system boundaries and descriptions of data; apply equivalent data quality requirements,methods of data collection, and allocation methods; apply identical cut-off rules and impact assessment methods (including the same version of characterisation factors); have equivalent content declarations; and be valid at the time of comparison. For further information about comparability, see EN 15804 and ISO 14025.

Company Information

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Product Information

Product description: Hebel is a strong, versatile, high performance building product made from Autoclaved Aerated Concrete (AAC) in Australia. Hebel panels contain anti-corrosion steel reinforcement for added strength and are available in a range of lengths for applications including internal walls, floors and external cladding. Available in blocks and panels, Hebel is easy to handle, quick to build with, and better to live in.

The UN CPC code for these products is 375 (Articles of concrete, cement and plaster), according to version 2.1, 2015

LCA Information

TABLE 1 LCA INFORMATION

	Product Characteristics
Declared Unit	1m^2 Hebel PowerFloor 75 weighted 39.35kg
Modules Included	A1-A3, A4-A5, C1–C4, D
Technical lifetime	50 years
Geographical Coverage	Australia and New Zealand
Time Period	01 Apr 2022 to 31 Mar 2023

Declared unit:

This EPD provides data for 1m^2 of Hebel PowerFloor 75 weighted 39.35 kg, manufactured in Australia, and installed in Australia and New Zealand.

The PowerFloor 75 has been selected as the representative product for this EPD as it is the most commonly used Hebel AAC Flooring Panel in the Australian market.

Database(s) and LCA software used:

The inventory data for the process are entered into the SimaPro (v9.5) LCA software program and linked to the pre-existing data for the upstream feed stocks and services selected in order of preference from:

- For Australia, the Australian Life Cycle Inventory (AusLCI) v1.42 compiled by the Australian Life Cycle Assessment Society (ALCAS, 2023). The AusLCI database at the time of this report was less than a year old.
- Other authoritative sources (e.g., Ecoinvent v3.9.1, (Wernet, et al., 2023), where necessary adapted for relevance to Australian conditions (energy sources, transport distances and modes and so on, and documented to show how the data is adapted for national relevance). At the time of reporting, the Ecoinvent v3.9.1 database was 1 year old.

Life cycle content information

Description of system boundaries:

The scope of this EPD is cradle to gate (modules A1-A3) with options, modules A4-A5, modules C1-C4 and module D. The geographical scope of this EPD is Australia and New Zealand.

Upstream processes

The upstream processes include those involved in Module A1 – Raw material supply. This module includes:

- Extraction, transport and manufacturing of raw materials.
- Generation of electricity from primary and secondary energy resources, also including their extraction, refining and transport for Modules A1 and A3.
- Processing up to the end-of-waste state or disposal of final residues including any packaging not leaving the factory gate with the product.

Core Processes

The core processes include those involved in Module A2 and Module A3, including:

- External transportation of materials to the core processes and internal transport.
- Manufacturing of Hebel products.
- Packaging.
- Processing of waste to landfill and recycling.

Downstream Processes

The downstream processes include those involved in Module A4 to C4, including:

- Transportation from the production gate to the construction site.
- Transport of waste generated from the construction site.
- Installation of the product on the site.
- Wastage of construction products.
- Waste processing of the waste from product wastage during the construction processes up to the end-of-waste state or disposal of final residues.
- Transport of equipment and use of materials for deconstruction at the end of life.
- Transport of waste generated at the end of life.
- Treatment of waste generated at the end of life.

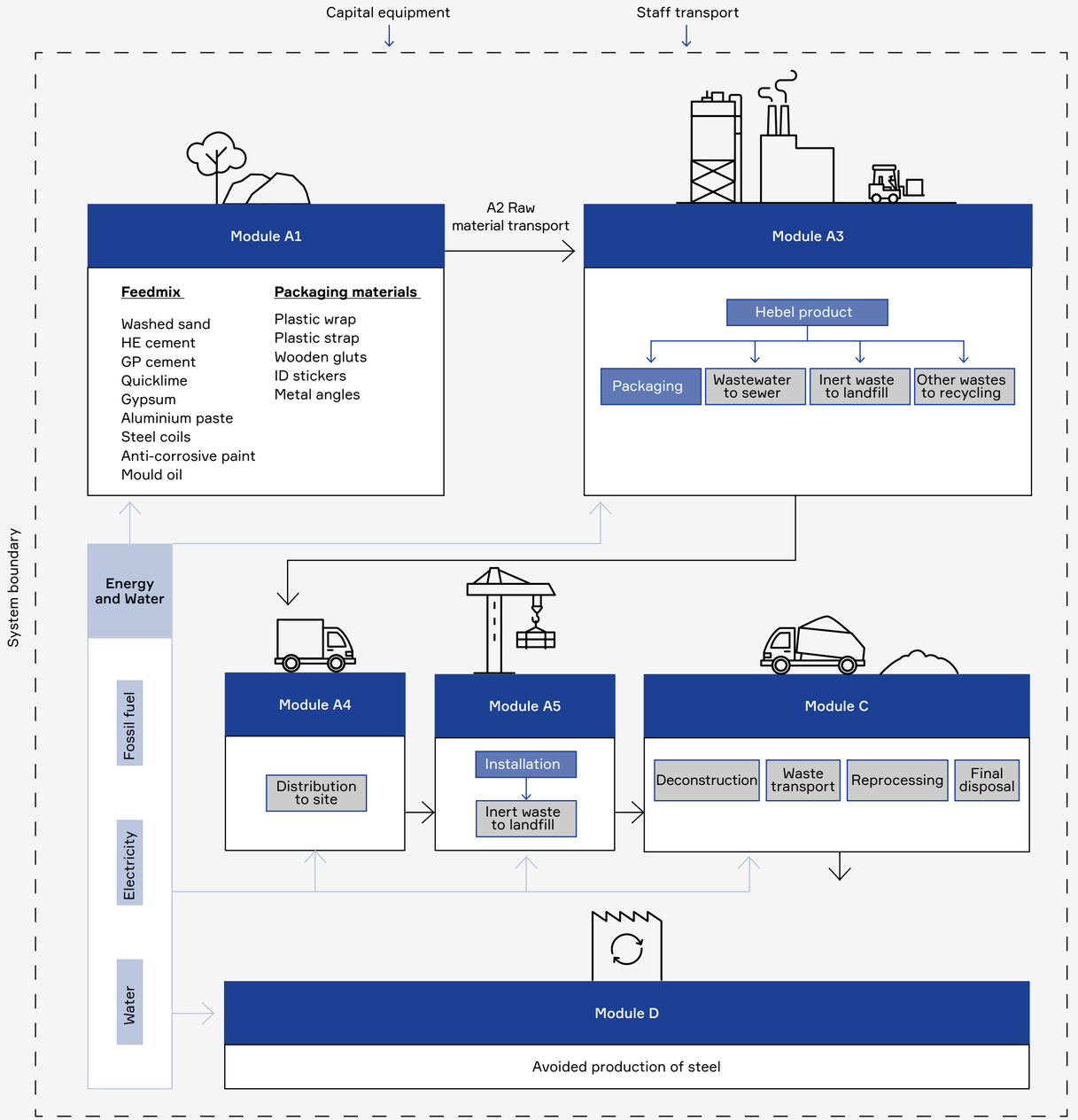

Figure 1: System Diagram

Cut-off rule

It is common practice in LCA/LCI protocols to propose exclusion limits for inputs and outputs that fall below a threshold % of the total, but with the exception that where the input/output has a “significant” impact it should be included. According to the PCR 2019:14, Life cycle inventory data shall according to EN 15804 + A2 include a minimum of 95% of total inflows (mass and energy) per module. Inflows not included in the LCA shall be documented in the EPD. Data gaps in included stages in the downstream modules shall be reported in the EPD, including an evaluation of their significance. In accordance with the PCR 2019:14, the following system boundaries are applied to manufacturing equipment and employees:

- Environmental impact from infrastructure, construction, production equipment, and tools that are not directly consumed in the production process are not accounted for in the LCI. Capital equipment and buildings typically account for less than a few percent of nearly all LCIs and this is usually smaller than the error in the inventory data itself. For this project, it is assumed that capital equipment makes a negligible contribution to the impacts as per Frischknecht et al. (2007) with no further investigation.
- A small portion of some Hebel products are distributed to New Zealand for installation and use, of which the transportation impacts are less than 1% of overall impacts. It is assumed that the impacts of installations in Australia and New Zealand are the same.
- Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. Impact of employees are excluded in this EPD.

Allocation

According to EN 15804+A2, in a process step where more than one type of product is generated, it is necessary to allocate the environmental stressors (inputs and outputs) from the process to the different products (functional outputs) in order to get product-based inventory data instead of process-based data. An allocation problem also occurs for multi-input processes. In an allocation procedure, the sum of the allocated inputs and outputs to the products shall be equal to the unallocated inputs and outputs of the unit process.

The following stepwise allocation principles shall be applied for multi-input/output allocations:

- The initial allocation step includes dividing up the system sub-processes and collecting the input and output data related to these sub-processes.
- The first (preferably) allocation procedure step for each sub-process is to partition the inputs and outputs of the system into their different products in a way that reflects the underlying physical relationships between them.
- The second (worst case) allocation procedure step is needed when physical relationship alone cannot be established or used as the basis for allocation. In this case, the remaining environmental inputs and outputs from a sub-process must be allocated between the products in a way that reflects other relationships between them, such as the economic value of the products.

The Hebel products are manufactured in one plant in Somersby, NSW, Australia. Mass and energy data have been sourced from the manufacturing plant by Hebel. Mass data was collected for individual products in April 2022 to March 2023. Energy and utilities used as well as waste generated during the production are allocated to Hebel products using the mass allocation method.

Impacts of recycling and energy recovery of wastes at module A3 have been economically allocated as co-products of module A1-A3, with an economic value of zero. No credits for recycling or energy recovery of manufacturing waste have been assigned.

Data Quality and Validation

The primary data used for the study is based on direct utility bills or feedstock quantities from Hebel's procurement records. Edge used contribution analysis to focus on the key pieces of data contributing to the environmental impact categories. The data was benchmarked against relevant benchmark data in ecoinvent. Edge considers the data to be of high quality for primary data used in this study.

For the background data, the quality was considered high when processes chosen were geographically, temporally, and technologically relevant. For data that was based on assumptions, quality was considered medium, unless based on official reports.

Scope of Declaration

The scope of this EPD is cradle-to-gate (modules A1-A3) with options, modules A4-A5, module C1-C4 and module D. The scope of this declaration is according to the General Program Instructions (GPI) and four information modules according to ISO 21930 and EN 15804 as given in Table 2.

TABLE 2 THE LIFE CYCLE OF PRODUCTS DECLARED

	Product stage			Construction process stage		Use stage							End of life stage				Resource recovery stage
	Raw material supply	Transport	Manufacturing	Transport	Construction installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
Module	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Modules declared	x	x	x	x	x	ND	ND	ND	ND	ND	ND	ND	x	x	x	x	x
Geography	AU/ GER	AU	AU	AU/ NZ	AU/ NZ	-	-	-	-	-	-	-	AU/ NZ	AU/ NZ	AU/ NZ	AU/ NZ	AU /NZ
Specific data used	32%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - products	<429%			-	-	-	-	-	-	-	-	-	-	-	-	-	-
Variation - locations	0%			-	-	-	-	-	-	-	-	-	-	-	-	-	-

ND = Not Declared
The following life cycle stages have not been declared, as they are deemed not applicable for Hebel product ranges:
Material emissions from usage (B1); Maintenance (B2); Repair (B3); Replacement (B4); Refurbishment (B5); Operational energy use (B6), and Operational water use (B7).

Variation – Products is measured by the difference between the declared GWP-GHG result, and the product with GWP-GHG results furthest away from the declared results, for modules A1-A3.

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Content information

6 Hebel products are covered in this EPD, which are shown in Table 3. Hebel products serve for multiple applications by having different mix recipes. The steel thickness and design of the mesh is dependent on the structural requirements of the panels. Other raw materials are proportional to the density.

TABLE 3 OVERVIEW OF HEBEL PRODUCTS

Product manufactured at site	Thickness (mm)	Width (mm)	Length (mm)	Product weight in use per m² (kg/m²)
PowerFloor 75	75	600	1800	39.35
PowerFloor Plus – 150 DP Joint Edge	150	Various widths	600	92.58
PowerFloor Plus – 175 DP Joint Edge	175	Various widths	600	117.28
PowerFloor Plus – 200 DP Joint Edge	200	Various widths	600	125.48
PowerFloor Plus – 225 DP Joint Edge	225	Various widths	Various lengths	128.88
PowerFloor Plus – 250 DP Joint Edge	250	Various widths	Various lengths	156.85

TABLE 4 PRODUCTION INVENTORY FOR 1M² OF HEBEL POWERFLOOR

Representative product: PowerFloor 75			Other PowerFloor products	
Product components	**Weight, %**	**Post-consumer recycled material, weight, %**	**Weight, %**	**Post-consumer recycled material, weight, %**
Sand	58	0	53-56	0
Cement	26	0	14-15	0
Lime	6	0	13-14	0
Steel	3	<1	9-14	<1
Gypsum	6	0	5-6	0
Other	<1	0	1	0
Sum	100	<1	100	<1

Product components	Weight, %	Post-consumer recycled material, weight, %	Weight, %	Post-consumer recycled material, weight, %
Wood	1	0	0-1	0
Steel	1	0	<1	0
Plastic	<1	<1	<1	<1
Other	<1	0	<1	0
Sum	2	<1	1	<1

Cradle to Gate (Modules A1 – A3)

Hebel products are manufactured by the mix of sand, cement, lime, gypsum, and other raw materials, while reinforced by steel mesh for strength, robustness, and durability. Most raw material are sourced from Australia, and aluminium paste is imported from overseas via both road and ship to Australia. The manufactured products are then packaged with plastics, wooden gluts, metal angles, and stickers.

During the manufacturing stage, wastes including but not limited to wood, metal, used oil, and wastewater are generated which are sent for recycling and disposal. The amount of material inputs and waste are subjected to the thickness of product.

Hebel is manufactured in Somersby, NSW, Australia. Local electricity mix (marked as electricity (fossil) in the report) was used, of which primary energy sources of energy in NSW region during the assessment period are black coal (75%), photovoltaic (17%) and other sources (8%) with emission of 0.72kg CO_2 eq./kWh (GWP-GHG). In addition, electricity generated from PV panel which is installed on the roof of the plant is implemented to the manufacturing of Hebel product, noted as electricity (solar).

Hebel products are produced with the inputs of water, which is partially stored in the products presented as its moisture content. The rest is evaporated during the manufacturing process.

Typical packaging is made up of plastic wrap (40% of recycled low-density polyethylene), plastic strap (100% of recycled polyethylene terephthalate), wooden gluts, metal angles, and ID stickers.

None of the products contain one or more substances that are listed in the “Candidate List of Substances of Very High Concern for authorisation”. Based on available information and safety data sheets, Hebel products are not classified as hazardous according to criteria of Safe Work Australia GHS 7.

TABLE 5 BIOGENIC CARBON OF 1M² OF HEBEL POWERFLOOR

Biogenic content, kg C/kg	PowerFloor 75	Other PowerFloor products
Product	0	0
Packaging – Timber pallet	0.206	0.200-0.488

Gate to Site (Module A4)

Hebel products are delivered to both Australia and New Zealand. All Hebel products transported within Australia is by road, and products delivering to New Zealand is transported to Sydney port and then shipped to the ports in New Zealand. The transport distances from manufacturing gate were calculated based on primary data from percentage of total products shipped to each location. The transport is per m^2 of product constrained as shown in Table 6.

TABLE 6 DISTRIBUTION DISTANCE FOR 1m² OF HEBEL PRODUCT

Product	PowerFloor 75	PowerFloor Plus – 150 DP Joint Edge	PowerFloor Plus – 175 DP Joint Edge	PowerFloor Plus – 200 DP Joint Edge	PowerFloor Plus – 225 DP Joint Edge	PowerFloor Plus – 250 DP Joint Edge
Local road distance (km)	902.84	218.51	218.51	218.51	218.51	218.51
Sea distance (km)	50.93	0.00	0.00	0.00	0.00	0.00

Installation (Module A5)

Energy required for machinery used during the construction has been included in the assessment. The products are trimmed and are coated with Hebel adhesive before being installed with top hats, screws, and/or tension ties to hold the structure in place. The installation procedures are the same across all Hebel products:

- 8% of the Hebel product trimmed as offcuts is sent to landfill.
- 100% of the packaging materials including plastic wrap, plastic strap, wooden gluts, and metal angles are sent to landfill.

TABLE 7 INSTALLATION OUTPUTS FOR 1m² OF HEBEL PRODUCTS

	Offcuts	Plastic wrap	Plastic strap	Wood gluts	Metal angles
Material to landfill	8%	100%	100%	100%	100%

Deconstruction and End of Life (Modules C1 – C4)

Following the use of Hebel products, CSR has limited evidence of the end-of-life fate for their products. The recommended cradle to grave environmental profile will be based on the most common scenario as construction products are deconstructed and transported to material recovery facilities. The steel is recovered and returned into recycling streams, while the rest of materials are diverted to landfill.

The following assumptions have been used in this study to model deconstruction and end of life scenarios of Hebel product:

- Hydraulic excavator is assumed as the operating tool for deconstruction.
- 100% of the products and their installation materials (top hats, screws, and/or tension ties) are assumed to be collected during deconstruction for further process.
- 25km delivery distance to landfill and material recovery facility is assumed for waste collection process.
- Material recovery processing is modelled including collection, sorting and processing steel in AusLCI database, assuming:
  - 100% of concrete material and ancillary materials from material recovery processing is disposed in landfill.
  - 74% of steel from material recovery processing, including steel coil in the product, and screws, top hats joinery and/or tension ties as ancillary materials, is returned into the steel recycling stream. The recycling and recovery rates of steel are sourced from waste account by Australian Bureau of Statistics (ABS, 2023).

Benefits and loads beyond the system boundary (Module D)

The recovery rate after use is 74% for steel according to ABS (2023). As there is no separate data for recycling and recovery rates, this EPD assumes that 100% of steel in the recycling activity is recovered.

TABLE 8 ASSUMPTIONS OR LIMITATIONS DATA ASSESSMENT SCHEME

Assumption or limitation	Impact on LCA results	Discussion
Hebel product material ingredient composition	Minor	Information obtained from Hebel. No proxy data was used for material.
Product distribution	Minor	Information obtained from Hebel. The transport includes road and sea transport. Relevant background database processes were used for each type of weighted average distance, with two sets of weighted average data: road truck, and sea international.
Exclusion of employees, capital goods and infrastructure	Minor	Personnel-related impacts, such as transportation to and from work, are also not accounted for in the LCI. The impacts of employees are also excluded from inventory impacts on the basis that if they were not employed for this production or service function, they would be employed for another. It is very hard to decide what proportion of the impacts from their whole lives should count towards their employment. Due to difficulty in proportioning daily impacts of employees towards their employment, this EPD excludes employee related impacts.
Average distance for transport from deconstruction site to waste plant	Minor	Using information and averages from similar EPDs to determine the average distance travelled from deconstruction to waste plant.
Recycling of steel, after use	Medium	The recycling rate has impact on Module D avoided production calculations. This EPD considers 100% of concrete materials from material recovery processing are disposed in landfill, and 74% of steel is returned into the steel recycling stream.

Compliance with Standards

The methodology and report format has been modified to comply with:

- ISO 14040:2006 and ISO14044:2006+A1:2018 which describe the principles, framework, requirements and provides guidelines for life cycle assessment (LCA).
- ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and procedures, which establishes the principles and specifies the procedures for developing Type III environmental declaration programs and Type III environmental declarations.
- EN 15804+A2:2019: Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products (referred to as EN 15804+A2).
- Product Category Rules (PCR) 2019:14, v1.3.4 – Construction products – Hereafter referred to as PCR 2019:14.
- General Program Instructions (GPI) for the International EPD System V5.0 – containing instructions regarding methodology and the content that must be included in EPDs registered under the International EPD System.
- Instructions of EPD Australasia V4.2 – a regional annex to the general program instructions of the International EPD System.

Environmental Impact Indicators

The potential environmental impacts, use of resources and waste categories included in this EPD were calculated using the SimaPro v9.5 tool and are listed below.
They are aligned to and adopted from Environmental Footprint 3.1.

TABLE 9 LIFE CYCLE IMPACT, RESOURCE AND WASTE ASSESSMENT CATEGORIES, MEASUREMENTS AND METHODS IN ACCORDANCE WITH EN 15804+A2

Impact Category	Abbreviation	Measurement Unit	Assessment Method and Implementation
Potential Environmental Impacts			
Total global warming potential	GWPT	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Global warming potential (fossil)	GWPF	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Global warming potential (biogenic)	GWPB	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Global warming potential (land use and land transformation)	GWPL	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021
Acidification potential	AP	mol H^+ eq.	Accumulated Exceedance, Seppälä et al. 2006, Posch et al., 2008
Eutrophication - aquatic freshwater	EP-freshwater	kg P equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication - aquatic marine	EP-marine	kg N equivalent	EUTREND model, Struijs et al., 2009b, as implemented in ReCiPe
Eutrophication - terrestrial	EP -terrestrial	mol N equivalent	Accumulated Exceedance, Seppälä et al. 2006, Posch et al.
Photochemical ozone creation potential	POCP	kg NMVOC equivalents	LOTOS-EUROS, Van Zelm et al., 2008, as applied in ReCiPe
Abiotic depletion potential (elements)*	ADPE	kg Sb equivalents	CML (v4.8)
Abiotic depletion potential (fossil fuels)*	ADPF	MJ net calorific value	CML (v4.8)
Ozone depletion potential	ODP	kg CFC 11 equivalents	Steady-state ODPs, WMO 2014
Water Depletion Potential*	WDP	m^3 equivalent deprived	Available WAter REmaining (AWARE) Boulay et al., 2016 (includes Australia flows calculated using 36 Australian catchments)
Resource use			
Use of renewable primary energy excluding renewable primary energy resources used as raw materials	PERE	MJ, net calorific value	Manual for direct inputs
Use of renewable primary energy resources used as raw materials	PERM	MJ, net calorific value	Manual for direct inputs[6]
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PERT	MJ, net calorific value	ecoinvent version 3.8 and expanded by PRé Consultants[7]
Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials	PENRE	MJ, net calorific value	Manual for direct inputs
Use of non-renewable primary energy resources used as raw materials	PENRM	MJ, net calorific value	Manual for direct inputs[8]

* Disclaimer: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.
** Disclaimer: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

[6] Calculated based on the lower heating value of renewable raw materials.
[7] Calculated as sum of renewables, biomass; renewable, wind, solar and geothermal, and renewable, water.
[8] Calculated based on the lower heating value of renewable raw materials.

Impact Category	Abbreviation	Measurement Unit	Assessment Method and Implementation
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials)	PENRT	MJ, net calorific value	ecoinvent version 3.8 and expanded by PRé Consultants[9]
Use of secondary material	SM	kg	Manual for direct inputs
Use of renewable secondary fuels	RSF	MJ, net calorific value	Manual for direct inputs
Use of non-renewable secondary fuels	NRSF	MJ, net calorific value	Manual for direct inputs
Use of net fresh water	FW	m^3	ReCiPe 2016
Output flow categories			
Components for re-use	CRU	kg	Manual for direct inputs
Material for recycling	MFR	kg	Manual for direct inputs
Materials for energy recovery	MERE	kg	Manual for direct inputs
Exported energy - electricity	EE - e	MJ per energy carrier	Manual for direct inputs
Exported energy - thermal	EE - t	MJ per energy carrier	Manual for direct inputs
Waste categories			
Hazardous waste disposed	HWD	kg	EDIP 2003 (v1.05)
Non-hazardous waste disposed	NHWD	kg	EDIP 2003 (v1.05)[10]
Radioactive waste disposed/stored	RWD	kg	EDIP 2003 (v1.05)
Additional environmental impact indicators			
Global warming potential, excluding biogenic uptake, emissions and storage	GWP-GHG	kg CO_2 equivalents (GWP100)	Baseline model of 100 years of the IPCC based on IPCC 2021[11]
Particulate matter	Potential incidence of disease due to PM emissions (PM)	Disease incidence	SETAC-UNEP, Fantke et al. 2016
Ionising radiation - human health**	Potential Human exposure efficiency relative to U235 (IRP)	kBq U-235 eq	Human Health Effect model
Eco-toxicity (freshwater)*	Potential Comparative Toxic Unit for ecosystems (ETP-fw)	CTUe	USEtox
Human toxicity potential - cancer effects*	Potential Comparative Toxic Unit for humans (HTP-c)	CTUh	USEtox
Human toxicity potential - non cancer effects*	Potential Comparative Toxic Unit for humans (HTP-nc)	CTUh	USEtox
Soil quality*	Potential soil quality index (SQP)	Dimensionless	Soil quality index (LANCA®)

* Disclaimer: The results of these environmental impact indicators shall be used with care as the uncertainties on these results are high or as there is limited experience with the indicator.
** Disclaimer: This impact category deals mainly with the eventual impact of low dose ionizing radiation on human health of the nuclear fuel cycle. It does not consider effects due to possible nuclear accidents, occupational exposure nor due to radioactive waste disposal in underground facilities. Potential ionizing radiation from the soil, from radon and from some construction materials is also not measured by this indicator.

[9] Calculated as sum of Non-renewable, fossil, Non-renewable, nuclear and Non-renewable, biomass.
[10] Calculated as sum of Bulk waste and Slags/ash.
[11] This indicator accounts for all greenhouse gases except biogenic carbon dioxide uptake and emissions and biogenic carbon stored in the product. As such, the indicator is identical to GWP-total except that the CF for biogenic CO_2 is set to zero..

Environmental Performance

The interpretation of results is presented in the following sections. Note that the use of results of modules A1-A3 or A1-A5, without considering the results of module C may mislead the communication and decision-making.
The estimated impact results are only relative statements, which do not indicate the endpoints of the impact categories, exceeding threshold values, safety margins and/or risks.

Environment Performance Indicators per m² of Hebel PowerFloor 75

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Potential environmental impacts									
GWP-total	kg CO_2 eq.	1.58E+01	2.52E+00	5.86E+00	3.99E-02	7.17E-02	2.05E-01	1.55E-01	-1.47E+00
GWP-fossil	kg CO_2 eq.	1.65E+01	2.52E+00	4.55E+00	3.99E-02	7.17E-02	2.04E-01	1.55E-01	-1.47E+00
GWP-biogenic	kg CO_2 eq.	-6.99E-01	1.89E-04	1.31E+00	3.07E-06	5.36E-06	6.43E-04	1.04E-04	-2.38E-04
GWP-luluc	kg CO_2 eq.	4.35E-03	1.62E-06	2.98E-03	1.70E-06	3.34E-08	9.95E-09	6.39E-08	-2.46E-04
ODP	kg CFC 11 eq.	1.91E-07	3.91E-07	1.51E-07	5.76E-10	1.12E-08	2.02E-09	2.11E-08	-3.29E-08
AP	mol H+ eq.	6.25E-02	1.64E-02	2.37E-02	3.76E-04	4.56E-04	7.38E-04	4.05E-04	-5.03E-03
EP-freshwater	kg P eq.	2.50E-03	3.35E-07	1.10E-03	2.75E-07	7.28E-09	2.31E-07	1.77E-07	-5.12E-04
EP-marine	kg N eq.	1.15E-02	3.80E-03	4.46E-03	1.76E-04	1.06E-04	1.37E-04	7.24E-05	-1.16E-03
EP-terrestrial	mol N eq.	1.60E-01	4.24E-02	4.88E-02	1.92E-03	1.18E-03	1.48E-03	7.90E-04	-1.22E-02
POCP	kg NMVOC eq.	4.79E-02	1.05E-02	1.64E-02	5.62E-04	2.92E-04	3.78E-04	2.10E-04	-7.17E-03
ADP-minerals & metals	kg Sb eq.	3.12E-05	3.01E-09	2.84E-05	1.61E-09	8.20E-11	1.38E-11	1.56E-10	-2.26E-07
ADP-fossil	MJ	1.47E+02	3.41E+01	5.36E+01	5.14E-01	9.68E-01	2.48E+00	2.12E+00	-1.40E+01
WDP	m^3	1.59E+01	2.18E-01	2.79E+00	6.81E-04	6.23E-03	4.60E-02	1.46E-02	-7.01E-02
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;								

Environment Performance Indicators per m² of Hebel PowerFloor 75 (Cont.)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Use of resources									
PERE	MJ	8.58E+00	4.91E-02	9.20E+00	8.82E-04	1.39E-03	1.73E-01	2.80E-02	-1.47E-01
PERM	MJ	5.56E+00	0.00E+00	-5.56E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PERT	MJ	1.41E+01	4.91E-02	3.64E+00	8.82E-04	1.39E-03	1.73E-01	2.80E-02	-1.47E-01
PENRE	MJ	1.46E+02	3.41E+01	5.54E+01	5.14E-01	9.68E-01	2.48E+00	2.12E+00	-1.40E+01
PENRM	MJ	1.65E+00	0.00E+00	-1.65E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
PENRT	MJ	1.48E+02	3.41E+01	5.37E+01	5.14E-01	9.68E-01	2.48E+00	2.12E+00	-1.40E+01
SM	kg	4.67E-01	0.00E+00	4.50E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF	MJ	4.73E-01	0.00E+00	4.11E-02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
FW	m^3	3.36E-01	5.04E-03	6.47E-02	2.60E-05	1.44E-04	9.56E-04	3.21E-04	-2.03E-03
Waste categories									
Hazardous waste disposed	kg	4.78E-04	8.82E-06	2.07E-04	3.45E-06	2.30E-07	6.75E-08	4.41E-07	-1.63E-04
Non-hazardous waste disposed	kg	8.02E-01	1.55E-03	4.47E+00	3.85E-05	4.39E-05	5.13E-03	7.85E-04	-2.02E-02
Radioactive waste disposed/stored	kg	3.68E-05	8.98E-09	3.69E-05	1.98E-08	5.97E-11	2.63E-11	1.17E-10	-2.45E-06
Output flows									
Components for reuse	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	5.09E-02	0.00E+00	4.42E-03	0.00E+00	0.00E+00	9.07E-01	0.00E+00	0.00E+00
Materials for energy recovery	kg	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - electricity	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Exported energy - thermal	MJ	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as 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 non- renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water								

Environment Performance Indicators per m² of Hebel PowerFloor 75 (Cont.)

Indicator	Unit	A1-A3	A4	A5	C1	C2	C3	C4	D
Additional environmental impact indicators									
GWP-GHG	kg CO_2 eq	1.66E+01	2.52E+00	5.17E+00	3.99E-02	7.17E-02	2.05E-01	1.55E-01	-1.47E+00
Particulate matter	disease incidence	5.88E-07	2.43E-07	2.60E-07	1.06E-08	6.94E-09	6.41E-09	2.45E-09	-9.97E-08
Ionising radiation - human health	kBq U-235 eq	4.14E+01	9.38E-05	3.74E+00	9.87E-05	1.69E-06	4.78E-07	3.25E-06	-1.01E-02
Ecotoxicity - freshwater	CTUe	7.44E+01	9.93E+00	5.52E+01	2.10E-01	2.82E-01	1.85E-01	5.40E-01	-2.49E+00
Human toxicity potential - cancer effects	CTUh	3.90E-08	8.43E-11	1.51E-08	1.51E-12	2.40E-12	1.22E-11	6.52E-12	-7.65E-09
Human toxicity potential - non cancer effects	CTUh	3.59E-07	6.03E-09	1.03E-07	1.75E-10	1.71E-10	4.54E-10	5.24E-10	-2.36E-08
Soil quality	Pt	1.07E+02	1.53E-01	1.87E+01	8.93E-04	4.35E-03	4.69E-01	7.70E-02	-1.42E+00
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage								

Additional Environmental Information

This EPD is declared as 1m² of installed PowerFloor product. The environmental impacts provided are for PowerFloor 75.As per section 5.4.6.1 of PCR, the following conversion factors can be applied to the results of the declared modules above to calculate the impacts of other product variants (e.g. PowerFloor Plus – 150 DP Joint Edge or PowerFloor Plus - 175 DP Joint Edge) of Hebel PowerFloor products.

Conversion factors of per m² of Hebel PowerFloor Plus - 150 DP Joint Edge

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of potential environmental impacts								
GWP-total	3.05	0.58	0.96	2.00	2.30	6.64	2.20	6.64
GWP-fossil	2.96	0.58	0.97	2.00	2.30	6.64	2.20	6.64
GWP-biogenic	0.95	0.58	0.94	2.00	2.30	6.64	2.20	6.64
GWP-luluc	3.59	0.42	0.46	2.00	2.30	6.64	2.20	6.64
ODP	3.85	0.58	0.57	2.00	2.30	6.64	2.20	6.64
AP	2.77	0.57	0.69	2.00	2.30	6.64	2.20	6.64
EP-freshwater	4.48	0.44	0.89	2.00	2.30	6.64	2.20	6.64
EP-marine	2.22	0.57	0.62	2.00	2.30	6.64	2.20	6.64
EP-terrestrial	2.36	0.57	0.78	2.00	2.30	6.64	2.20	6.64
POCP	3.07	0.56	0.87	2.00	2.30	6.64	2.20	6.64
ADP-minerals & metals	2.16	0.55	0.21	2.00	2.30	6.64	2.20	6.64
ADP-fossil	2.77	0.58	0.69	2.00	2.30	6.64	2.20	6.64
WDP	1.29	0.58	0.65	2.00	2.30	6.64	2.20	6.64
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;							

Conversion factors of per m² of Hebel PowerFloor Plus - 150 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of use of resources								
PERE	2.46	0.58	0.83	2.00	2.30	6.64	2.20	6.64
PERM	0.97	1.00	0.97	1.00	1.00	1.00	1.00	1.00
PERT	1.87	0.58	0.63	2.00	2.30	6.64	2.20	6.64
PENRE	2.79	0.58	0.73	2.00	2.30	6.64	2.20	6.64
PENRM	1.74	1.00	1.74	1.00	1.00	1.00	1.00	1.00
PENRT	2.77	0.58	0.70	2.00	2.30	6.64	2.20	6.64
SM	3.39	1.00	3.06	1.00	1.00	1.00	1.00	1.00
RSF	3.03	1.00	3.03	1.00	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FW	1.41	0.58	0.64	2.00	2.30	6.64	2.20	6.64
Conversion factors of waste production								
Hazardous waste disposed	4.01	0.53	0.82	2.00	2.30	6.64	2.20	6.64
Non-hazardous waste disposed	5.55	0.58	2.04	2.00	2.30	6.64	2.20	6.64
Radioactive waste disposed/stored	4.33	0.13	0.38	2.00	2.30	6.64	2.20	6.64
Conversion factors of output flows								
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	1.90	1.00	1.90	1.00	1.00	6.64	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as 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 non- renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

Conversion factors of per m² of Hebel PowerFloor Plus - 150 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of additional environmental impact indicators								
GWP-GHG	2.96	0.58	0.96	2.00	2.30	6.64	2.20	6.64
Particulate matter	3.50	0.58	0.77	2.00	2.30	6.64	2.20	6.58
Ionising radiation - human health	3.04	0.37	2.93	2.00	2.30	6.64	2.20	6.64
Ecotoxicity - freshwater	2.30	0.58	0.28	2.00	2.30	6.64	2.20	6.64
Human toxicity potential - cancer effects	2.81	0.58	0.63	2.00	2.30	6.64	2.20	6.64
Human toxicity potential - non cancer effects	3.32	0.58	1.03	2.00	2.30	6.64	2.20	6.58
Soil quality	2.01	0.58	1.02	2.00	2.30	6.64	2.20	6.64
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage							

Conversion factors of per m² of Hebel PowerFloor Plus - 175 DP Joint Edge

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of potential environmental impacts								
GWP-total	4.53	0.71	1.43	2.33	2.84	12.88	2.61	12.88
GWP-fossil	4.40	0.71	1.42	2.33	2.84	12.88	2.61	12.88
GWP-biogenic	1.44	0.71	1.44	2.33	2.84	12.88	2.61	12.88
GWP-luluc	6.09	0.52	0.77	2.33	2.84	12.88	2.61	12.88
ODP	5.97	0.71	0.84	2.33	2.84	12.88	2.61	12.88
AP	4.20	0.70	1.04	2.33	2.84	12.88	2.61	12.88
EP-freshwater	7.72	0.54	1.53	2.33	2.84	12.88	2.61	12.88
EP-marine	3.74	0.70	1.01	2.33	2.84	12.88	2.61	12.88
EP-terrestrial	3.63	0.70	1.18	2.33	2.84	12.88	2.61	12.88
POCP	5.00	0.70	1.39	2.33	2.84	12.88	2.61	12.88
ADP-minerals & metals	3.76	0.68	0.36	2.33	2.84	12.88	2.61	12.88
ADP-fossil	4.23	0.71	1.05	2.33	2.84	12.88	2.61	12.88
WDP	1.58	0.71	0.79	2.33	2.84	12.88	2.61	12.88
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;							

Conversion factors of per m² of Hebel PowerFloor Plus - 175 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of use of resources								
PERE	3.83	0.71	1.27	2.33	2.84	12.88	2.61	12.88
PERM	1.48	1.00	1.48	1.00	1.00	1.00	1.00	1.00
PERT	2.90	0.71	0.97	2.33	2.84	12.88	2.61	12.88
PENRE	4.25	0.71	1.09	2.33	2.84	12.88	2.61	12.88
PENRM	2.28	1.00	2.28	1.00	1.00	1.00	1.00	1.00
PENRT	4.22	0.71	1.05	2.33	2.84	12.88	2.61	12.88
SM	4.57	1.00	4.13	1.00	1.00	1.00	1.00	1.00
RSF	3.69	1.00	3.69	1.00	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FW	1.80	0.71	0.82	2.33	2.84	12.88	2.61	12.88
Conversion factors of waste production								
Hazardous waste disposed	7.05	0.65	1.43	2.33	2.84	12.88	2.61	12.88
Non-hazardous waste disposed	10.52	0.71	2.60	2.33	2.84	12.88	2.61	12.88
Radioactive waste disposed/stored	7.72	0.17	0.67	2.33	2.84	12.88	2.61	12.88
Conversion factors of output flows								
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	2.25	1.00	2.25	1.00	1.00	12.88	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as 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 non- renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

Conversion factors of per m² of Hebel PowerFloor Plus - 175 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of additional environmental impact indicators								
GWP-GHG	4.39	0.71	1.42	2.33	2.84	12.88	2.61	12.88
Particulate matter	5.96	0.71	1.27	2.33	2.84	12.88	2.61	12.77
Ionising radiation - human health	3.71	0.45	3.57	2.33	2.84	12.88	2.61	12.88
Ecotoxicity - freshwater	3.96	0.71	0.48	2.33	2.84	12.88	2.61	12.88
Human toxicity potential - cancer effects	4.70	0.71	1.06	2.33	2.84	12.88	2.61	12.88
Human toxicity potential - non cancer effects	4.74	0.71	1.47	2.33	2.84	12.88	2.61	12.77
Soil quality	2.73	0.71	1.39	2.33	2.84	12.88	2.61	12.88
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage							

Conversion factors of per m² of Hebel PowerFloor Plus - 200 DP Joint Edge

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of potential environmental impacts								
GWP-total	4.47	0.78	1.46	2.67	3.12	10.51	2.95	10.51
GWP-fossil	4.35	0.78	1.41	2.67	3.12	10.51	2.95	10.51
GWP-biogenic	1.64	0.78	1.62	2.67	3.12	10.51	2.95	10.51
GWP-luluc	5.52	0.57	0.70	2.67	3.12	10.51	2.95	10.51
ODP	5.76	0.79	0.84	2.67	3.12	10.51	2.95	10.51
AP	4.10	0.77	1.02	2.67	3.12	10.51	2.95	10.51
EP-freshwater	6.91	0.60	1.37	2.67	3.12	10.51	2.95	10.51
EP-marine	3.37	0.77	0.94	2.67	3.12	10.51	2.95	10.51
EP-terrestrial	3.51	0.77	1.16	2.67	3.12	10.51	2.95	10.51
POCP	4.62	0.77	1.31	2.67	3.12	10.51	2.95	10.51
ADP-minerals & metals	3.46	0.75	0.33	2.67	3.12	10.51	2.95	10.51
ADP-fossil	3.99	0.78	0.99	2.67	3.12	10.51	2.95	10.51
WDP	1.52	0.79	0.76	2.67	3.12	10.51	2.95	10.51
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;							

Conversion factors of per m² of Hebel PowerFloor Plus - 200 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of use of resources								
PERE	3.68	0.78	1.38	2.67	3.12	10.51	2.95	10.51
PERM	1.66	1.00	1.66	1.00	1.00	1.00	1.00	1.00
PERT	2.88	0.78	0.96	2.67	3.12	10.51	2.95	10.51
PENRE	4.00	0.78	1.05	2.67	3.12	10.51	2.95	10.51
PENRM	2.59	1.00	2.59	1.00	1.00	1.00	1.00	1.00
PENRT	3.99	0.78	1.00	2.67	3.12	10.51	2.95	10.51
SM	4.94	1.00	4.46	1.00	1.00	1.00	1.00	1.00
RSF	4.33	1.00	4.33	1.00	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FW	1.70	0.78	0.77	2.67	3.12	10.51	2.95	10.51
Conversion factors of waste production								
Hazardous waste disposed	6.24	0.72	1.27	2.67	3.12	10.51	2.95	10.51
Non-hazardous waste disposed	8.71	0.78	2.82	2.67	3.12	10.51	2.95	10.51
Radioactive waste disposed/stored	6.76	0.18	0.59	2.67	3.12	10.51	2.95	10.51
Conversion factors of output flows								
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	2.42	1.00	2.42	1.00	1.00	10.51	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as 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 non- renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

Conversion factors of per m² of Hebel PowerFloor Plus - 200 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of additional environmental impact indicators								
GWP-GHG	4.34	0.78	1.43	2.67	3.12	10.51	2.95	10.51
Particulate matter	5.36	0.78	1.16	2.67	3.12	10.51	2.95	10.42
Ionising radiation - human health	4.34	0.50	4.18	2.67	3.12	10.51	2.95	10.51
Ecotoxicity - freshwater	3.61	0.78	0.44	2.67	3.12	10.51	2.95	10.51
Human toxicity potential - cancer effects	4.40	0.78	0.99	2.67	3.12	10.51	2.95	10.51
Human toxicity potential - non cancer effects	4.90	0.78	1.52	2.67	3.12	10.51	2.95	10.42
Soil quality	2.98	0.78	1.52	2.67	3.12	10.51	2.95	10.51
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage							

Conversion factors of per m² of Hebel PowerFloor Plus - 225 DP Joint Edge

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of potential environmental impacts								
GWP-total	5.68	0.91	1.82	3.00	3.63	16.07	3.36	16.07
GWP-fossil	5.52	0.91	1.79	3.00	3.63	16.07	3.36	16.07
GWP-biogenic	1.93	0.91	1.91	3.00	3.63	16.07	3.36	16.07
GWP-luluc	7.61	0.66	0.97	3.00	3.63	16.07	3.36	16.07
ODP	7.50	0.92	1.07	3.00	3.63	16.07	3.36	16.07
AP	5.26	0.89	1.30	3.00	3.63	16.07	3.36	16.07
EP-freshwater	9.66	0.70	1.92	3.00	3.63	16.07	3.36	16.07
EP-marine	4.66	0.89	1.26	3.00	3.63	16.07	3.36	16.07
EP-terrestrial	4.55	0.90	1.49	3.00	3.63	16.07	3.36	16.07
POCP	6.25	0.89	1.75	3.00	3.63	16.07	3.36	16.07
ADP-minerals & metals	4.73	0.87	0.45	3.00	3.63	16.07	3.36	16.07
ADP-fossil	5.20	0.91	1.29	3.00	3.63	16.07	3.36	16.07
WDP	1.75	0.92	0.88	3.00	3.63	16.07	3.36	16.07
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;							

Conversion factors of per m² of Hebel PowerFloor Plus - 225 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of use of resources								
PERE	4.78	0.91	1.67	3.00	3.63	16.07	3.36	16.07
PERM	1.97	1.00	1.97	1.00	1.00	1.00	1.00	1.00
PERT	3.67	0.91	1.22	3.00	3.63	16.07	3.36	16.07
PENRE	5.22	0.91	1.35	3.00	3.63	16.07	3.36	16.07
PENRM	3.05	1.00	3.05	1.00	1.00	1.00	1.00	1.00
PENRT	5.20	0.91	1.30	3.00	3.63	16.07	3.36	16.07
SM	5.81	1.00	5.25	1.00	1.00	1.00	1.00	1.00
RSF	4.73	1.00	4.73	1.00	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FW	2.03	0.91	0.92	3.00	3.63	16.07	3.36	16.07
Conversion factors of waste production								
Hazardous waste disposed	8.85	0.84	1.80	3.00	3.63	16.07	3.36	16.07
Non-hazardous waste disposed	13.04	0.91	3.33	3.00	3.63	16.07	3.36	16.07
Radioactive waste disposed/stored	9.62	0.21	0.83	3.00	3.63	16.07	3.36	16.07
Conversion factors of output flows								
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	2.75	1.00	2.75	1.00	1.00	16.07	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as 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 non- renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

Conversion factors of per m² of Hebel PowerFloor Plus - 225 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of additional environmental impact indicators								
GWP-GHG	5.51	0.91	1.80	3.00	3.63	16.07	3.36	16.07
Particulate matter	7.44	0.91	1.59	3.00	3.63	16.07	3.36	15.93
Ionising radiation - human health	4.74	0.58	4.57	3.00	3.63	16.07	3.36	16.07
Ecotoxicity - freshwater	4.98	0.91	0.60	3.00	3.63	16.07	3.36	16.07
Human toxicity potential - cancer effects	5.96	0.91	1.34	3.00	3.63	16.07	3.36	16.07
Human toxicity potential - non cancer effects	6.00	0.91	1.86	3.00	3.63	16.07	3.36	15.93
Soil quality	3.49	0.91	1.78	3.00	3.63	16.07	3.36	16.07
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage							

Conversion factors of per m² of Hebel PowerFloor Plus - 250 DP Joint Edge

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of potential environmental impacts								
GWP-total	5.45	0.95	1.77	4.00	3.80	13.66	3.58	13.66
GWP-fossil	5.30	0.95	1.72	4.00	3.80	13.66	3.58	13.66
GWP-biogenic	1.98	0.95	1.95	4.00	3.80	13.66	3.58	13.66
GWP-luluc	6.90	0.69	0.88	4.00	3.80	13.66	3.58	13.66
ODP	7.08	0.96	1.03	4.00	3.80	13.66	3.58	13.66
AP	5.00	0.94	1.25	4.00	3.80	13.66	3.58	13.66
EP-freshwater	8.69	0.73	1.73	4.00	3.80	13.66	3.58	13.66
EP-marine	4.22	0.94	1.17	4.00	3.80	13.66	3.58	13.66
EP-terrestrial	4.30	0.94	1.42	4.00	3.80	13.66	3.58	13.66
POCP	5.75	0.93	1.63	4.00	3.80	13.66	3.58	13.66
ADP-minerals & metals	4.33	0.91	0.41	4.00	3.80	13.66	3.58	13.66
ADP-fossil	4.85	0.95	1.21	4.00	3.80	13.66	3.58	13.66
WDP	1.68	0.96	0.84	4.00	3.80	13.66	3.58	13.66
Acronyms	GWP-fossil = Global Warming Potential fossil fuels; GWP-biogenic = Global Warming Potential biogenic; GWP-luluc = Global Warming Potential land use and land use change; ODP = Depletion potential of the stratospheric ozone layer; AP = Acidification potential, Accumulated Exceedance; EP-freshwater = Eutrophication potential, fraction of nutrients reaching freshwater end compartment; EP-marine = Eutrophication potential, fraction of nutrients reaching marine end compartment; EP-terrestrial = Eutrophication potential, Accumulated Exceedance; POCP = Formation potential of tropospheric ozone; ADP-minerals & metals = Abiotic depletion potential for non-fossil resources; ADP-fossil = Abiotic depletion for fossil resources potential; WDP = Water (user) deprivation potential, deprivation-weighted water consumption;							

Conversion factors of per m² of Hebel PowerFloor Plus - 250 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of use of resources								
PERE	4.50	0.95	1.68	4.00	3.80	13.66	3.58	13.66
PERM	2.01	1.00	2.01	1.00	1.00	1.00	1.00	1.00
PERT	3.52	0.95	1.17	4.00	3.80	13.66	3.58	13.66
PENRE	4.87	0.95	1.27	4.00	3.80	13.66	3.58	13.66
PENRM	3.11	1.00	3.11	1.00	1.00	1.00	1.00	1.00
PENRT	4.85	0.95	1.22	4.00	3.80	13.66	3.58	13.66
SM	5.86	1.00	5.29	1.00	1.00	1.00	1.00	1.00
RSF	5.02	1.00	5.02	1.00	1.00	1.00	1.00	1.00
NRSF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FW	1.92	0.96	0.87	4.00	3.80	13.66	3.58	13.66
Conversion factors of waste production								
Hazardous waste disposed	7.91	0.87	1.61	4.00	3.80	13.66	3.58	13.66
Non-hazardous waste disposed	11.21	0.95	3.44	4.00	3.80	13.66	3.58	13.66
Radioactive waste disposed/stored	8.57	0.22	0.74	4.00	3.80	13.66	3.58	13.66
Conversion factors of output flows								
Components for reuse	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Materials for recycling	3.42	1.00	3.42	1.00	1.00	13.66	1.00	1.00
Materials for energy recovery	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - electricity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Exported energy - thermal	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Acronyms	PERE = Use of renewable primary energy excluding renewable primary energy resources used as 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 non- renewable primary energy resources used as raw materials; PENRM = Use of non-renewable primary energy resources used as raw materials; PENRT = Total use of non-renewable primary energy re-sources; SM = Use of secondary material; RSF = Use of renewable secondary fuels; NRSF = Use of non-renewable secondary fuels; FW = Use of net fresh water							

Conversion factors of per m² of Hebel PowerFloor Plus - 250 DP Joint Edge (Cont.)

Indicator	A1-A3	A4	A5	C1	C2	C3	C4	D
Conversion factors of additional environmental impact indicators								
GWP-GHG	5.29	0.95	1.74	4.00	3.80	13.66	3.58	13.66
Particulate matter	6.72	0.96	1.45	4.00	3.80	13.66	3.58	13.54
Ionising radiation - human health	5.04	0.60	4.85	4.00	3.80	13.66	3.58	13.66
Ecotoxicity - freshwater	4.53	0.95	0.55	4.00	3.80	13.66	3.58	13.66
Human toxicity potential - cancer effects	5.49	0.95	1.23	4.00	3.80	13.66	3.58	13.66
Human toxicity potential - non cancer effects	5.89	0.95	1.83	4.00	3.80	13.66	3.58	13.54
Soil quality	3.57	0.96	1.82	4.00	3.80	13.66	3.58	13.66
Acronyms	GWP-GHG = Global warming potential, excluding biogenic uptake, emissions and storage							

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Environmental Product Declaration

hebel
The better way to build

In accordance with ISO 14025:2006 and EN 15804:2012+A2:2019/AC:2021

Hebel PowerFloor – Flooring
Manufactured by CSR Building Products Limited

Program: The International EPD® System — www.environdec.com
Program Operator: EPD International AB
Regional Program: EPD Australasia — www.epd-australasia.com
EPD Registration No. EPD-IES-0015420

Publication Date: 2024-11-25
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Geographical Scope: Australia and New Zealand
Version: 001

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

This EPD covers multiple products based on a representative product PowerFloor 75.