

ENVIRONMENTAL PRODUCT DECLARATION






In accordance with ISO 14044 and EN15804 for:



TecCrete Raised Access Floor

from *Global Integrated Flooring Solutions (Global IFS)*



EPD DETAILS

Program Operator	NSF Certification, LLC 789 N Dixboro Road Ann Arbor, MI 48105, USA www.nsf.org		
General Program instructions and Version Number	NSF Program Operator Rules, January 14, 2020		
Manufacturer Name and Address	Global Integrated Flooring Solutions (Global IFS) 3700 32 nd Street SE, Kentwood Michigan 49512 USA		
Declaration Number	EPD10354		
Declared Product and Functional Unit	1 m2 of the flooring with a building service life of 75 years		
Reference PCR and Version Number	Part A: Life Cycle Assessment Calculation Rules and Report Requirements, Version 3.2 [1] Part B: Flooring EPD Requirements. UL 10010-7, September 28, 2018 [2]		
Product's intended application and Use	Flooring		
Product RSL	75 years		
Markets of applicability	North America		
Date of Issue	05/07/2020		
Period of Validity	05/07/2020-11/30/2025		
EPD Type	Product Specific		
Range of Dataset Variability	N/A		
EPD Scope	Cradle to Grave		
Year of reported manufacturer primary data	2019		
LCA Software and Version Number	Simapro v8.5		
LCI database and version Number	Ecoinvent v3.4 [3] and DATASmart [4] (Previously US EI 2.2)		
LCIA Methodology and Version Number	TRACI 2.1 [5] and CML Baseline, Version 3.1 [6] (CML-IA)		
The Sub- Category PCR review conducted by;	Jack Geibig, Chair Thomas Gloria, PhD Thaddeus Owen		
This declaration was independently verified in accordance with ISO 14025:2006. The UL Environment "Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Project Report," v3.2 (September 2018), based on ISO 21930:2017 and CEN Norm EN 15804 (2012), serves as the core PCR, with additional considerations from the USGBC/UL Environment Part A Enhancement (2017) <input type="checkbox"/> INTERNAL <input checked="" type="checkbox"/> EXTERNAL	 Jenny Oorbeck joorbeck@nsf.org		

<p>This life cycle assessment was conducted in accordance with ISO 14044 and the reference PCR by:</p>	<p>Intertek Health Sciences Inc. 2233 Argentia Road, Suite 201 Mississauga, Ontario, Canada L5N 2X7 www.intertek.com</p> 
<p>This life cycle assessment was independently verified in accordance with ISO 14044 and the reference PCR by:</p>	 Angela Fisher, LCA CP Aspire Sustainability Consultancy
<p>LIMITATIONS Environmental declarations from different programs (ISO 14025) may not be comparable.</p> <p>Comparison of the environmental performance of Flooring Products using EPD information shall be based on the product's use and impacts at the building level, and therefore EPDs may not be used for comparability purposes when not considering the building energy use phase as instructed under this PCR.</p> <p>Full conformance with the PCR for Products allows EPD comparability only when all stages of a life cycle have been considered. However, variations and deviations are possible". Example of variations: Different LCA software and background LCI datasets may lead to differences results for upstream or downstream of the life cycle stages declared.</p>	

GENERAL INFORMATION

Company Information

This cradle to grave environmental product declaration is for TecCrete Raised Access Floor produced from the location fully owned and operated by *Global Integrated Flooring Solutions (Global IFS)* in USA, as follows:

GIFS is an industry leader in providing products for fully integrated raised floor, modular power and underfloor air distribution solutions. TecCrete, the original concrete surface panel, has been available in the market for more than 30 years. The unique concrete-and-steel composite structure makes TecCrete amazingly quiet and solid underfoot—ideal for any application – office, computer rooms, mass timber, renovations, casinos, residential, institutions, learning environments, retail, government, medical, industrial, restaurant, hospitality and temporary spaces. The Global IFS weldless floor system stands up to heavy rolling and impact loads that occur during the construction, move-in and reconfiguration.

Further information regarding *Global Integrated Flooring Solutions (Global IFS)* can be accessed at:
<https://www.globalifs.com>



Product Information

TecCrete access floor panels consist of a pan made of steel in which the concrete mixture is filled. The Panels are manufactured to exact tolerances, these solid panels deliver the ultimate in design, performance, service, and usability. There are 5 panel grades and an extensive selection of under structure supports to meet specific performance requirements.



In this study, the 5 panel grades include TecCrete 1250, TecCrete 1500, TecCrete 1500 SL, TecCrete 2000, and TecCrete 2500. the various grades of TecCrete are available to meet different application and performance requirements (e.g., weight bearing loads). The Panel comes in 2 thickness (1 1/8th Inch and 1 1/2th Inch), the under structure supports included in this

study include Stringer, HD Stringer and Cornerlock. The panel and under structure combinations used to represent each access flooring system product in this study are based on 2019 sales data that were provided by Global IFS and are shown in Table 1 below, the material composition and amounts for each TecCrete under structure is calculated by a weighted average using the percentages provided in Table 1. The results developed in this LCA study therefore represent the typical characteristics of each access floor system product on the market.

TABLE 1. TECCRETE PANEL AND UNDERSTRUCTURE SALES PERCENTAGE

Product	Thickness (in)	Under Structure	Sales (%)
TecCrete 1250	1 1/8	Cornerlock	94.00%
TecCrete 1500	1 1/8	Stringer	3.20%
TecCrete 1500SL	1 1/2	Cornerlock	0.70%
TecCrete 2000	1 1/2	Stringer	1.05%
TecCrete 2500	1 1/2	HD Stringer	1.05%

TABLE 2. ADDITIONAL SYSTEM PERFORMANCE FOR TECCRETE - FLAMMABILITY

Method	Bare Panel Top Surface Concrete	Bare Panel Bottom Surface Film
ASTM E841	Class A	Class A
CAN/ULC S1022	Flame Spread 25 Smoke Developed 50	Flame Spread 25 Smoke Developed 50

TABLE 3. ADDITIONAL SYSTEM PERFORMANCE FOR TECCRETE - COMBUSTIBILITY

Test Parameter	ASTM E136		CAN/ULC S114	
	Acceptance Level	Result	Acceptance Level	Result
Temperature Rise	<30°C	Pass	<36°C	Pass
Flaming after 30 s	None	Pass	None	Pass
Weight Loss	<50%	Pass	<20%	Pass

Product Application

TecCrete access floor systems can be used for any application – office, computer rooms, mass timber, renovations, casinos, residential, institutions, learning environments, retail, industrial, government, medical, industrial, restaurant, hospitality and temporary spaces. They are expected to last 75 years after the initial installation. TecCrete access floor systems can be used with a variety of finishes, including high pressure laminate, Vinyl, Carpet or Special finishes like Rubber. TecCrete product can be used as it is, and the finishes and the materials required for their installation are not included in this EPD.

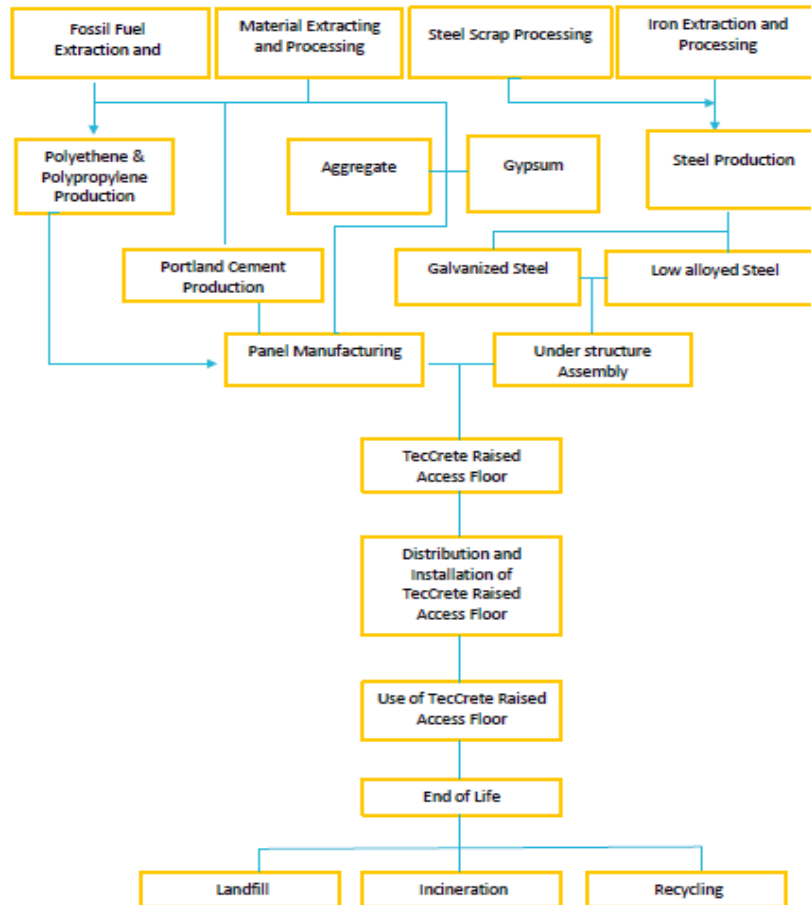
Study Application

This study was conducted to provide GIFS with the cradle-to-grave environmental impacts associated with the TecCrete flooring system and to create the EPD for the product. The LCA study evaluates the environmental impacts at various stages of the lifecycle of TecCrete. The results are intended to inform the creation of this EPD and may be used internally to assist new product designers in future designs and re-designs of this and similar products. This assessment is not intended to be used for comparative assertion. The intended audience of this study is both internal to GIFS and outside GIFS via this EPD document.

Declaration of Methodological Framework

This EPD is considered a Cradle-to-Grave study. A summary of the life cycle stages included in this EPD is presented in Table 13. The Allocation (Page-13) and Cut-off rules (Page -11) applied to this study have been discussed in detail further in the report. The LCA Study followed an attributional approach and no known flows are deliberately excluded from this EPD.

Flow Diagram



Technical Data

TABLE 4 TECHNICAL DATA FOR TECCRETE FLOORING SYSTEM

Name	Value	
Core Type	Concrete	
Thickness (inch)	1.125 & 1.5	
Load (lbs)	1.125 Inch	1250 and 1500
	1.5 Inch	2000 and 2500
Panel Size (Inch)	24 X 24	

TABLE 5. TECCRETE SYSTEM PERFORMANCE CRITERIA FOR DIFFERENT LOAD SYSTEM

Material Properties	TC 1250	TC 1500	TC 1500SL	TC 2000	TC2500
Concentrated Load (min)	1250 lbs (567 Kg)	1500 lbs (680 Kg)	1500 lbs (680 Kg)	2000 lbs (907 Kg)	2500 lbs (1134Kg)
Uniform Load (min)	600 lbs (272 Kg)	700 lbs (318 Kg)	700 lbs (318 Kg)	800 lbs (363 Kg)	900 lbs (408 Kg)
Rolling Load (10/10000 Pass)	1300 lbs/900 lbs (590 Kg/408 Kg)	1500 lbs/1250 lbs (680Kg/567Kg)	1500 lbs/1250 lbs lbs(680Kg/567Kg)	1750 lbs/2000 lbs (794Kg/907Kg)	2000 lbs/2000 lbs (907Kg/907Kg)

Manufacturing Process

The Manufacturing of TecCrete Access floor is done at the GIFS, Kentwood facility. First the Galvanized steel comes in large coils which are fed into a press. The steel is cut and punched, then the pans are formed after which the tabs are pressed into the pan. The bottom of the pan is covered in a thin piece of clear plastic. Finally, the corner inserts are attached into the bottom of the pan. The pan is carried over to the concrete line on an overhead conveyor. The pan is placed onto a caul which will carry it through the filling line. The pan moves under the mixing station to be filled with concrete which is delivered from the above. The pan moves to a vibration table which makes sure the concrete mixture gets to the edge of the pan. Next it is carried down the production line where it rests to come to a green hardness. It travels on to the grinder where it goes under three sets of grinding heads to level the top surface of the panel. Next, it moves to a cleaning station where the edges of the panels are cleaned. The panel moves on to an oven where it spends 48 hours to remove the moisture from the concrete. The panel then moves to the packing station where it is skidded and banded for shipment.

Material Composition

Product

The steel used in the Understructure for TecCrete is sourced specially by GIFS who have provided documentation to support the high recycled content (80% Post-Consumer and 7% Pre-Consumer) percentage in the steel manufactured using the electric arc furnace for the financial year of 2019, whereas, the galvanized steel is the 'market steel' that inherently contains 15.6% of Pre-consumer and 56.1% of Post-Consumer recycled content percentage sold in the US as per the American Steel Galvanizers association [7] . Additionally, the Portland Cement and the Aggregate has pre-consumer recycled content at 9.30% & 100% respectively, this was confirmed by the suppliers from whom GIFS source the Portland cement and Aggregate. The TecCrete product contains no regulated substances and the following show the product composition for TecCrete products.

TABLE 6. TECCRETE 1250 PANEL WITH 1 1/8" PANEL PLUS PED HEADS WITH CORNERLOCK

Material Type	Weight (Kg/m2)	Percent of Total Weight	Pre-Consumer Recycled Content (PIR)	Post-Consumer Recycled Content (PCR)
Steel	3.15	6%	7%	80%
Steel Galvanized	5.46	10%	16%	56%
Portland	6.64	12%	9%	0%
Gypsum	12.89	24%	0%	0%
Aggregate	25.63	47%	100%	0%
Plastic	0.32	1%	0%	0%
Total	54.10	100%	51%	10%

TABLE 7. TECCRETE 1500 PANEL WITH 1 1/8" PANEL PLUS PED HEADS WITH STANDARD STRINGER

Material Type	Weight (Kg/m ²)	Percent of total weight	Pre-Consumer Recycled Content (PIR)	Post-Consumer Recycled Content (PCR)
Steel	4.70	8%	7%	80%
Steel Galvanized	5.46	10%	16%	56%
Portland	6.64	12%	9%	0%
Gypsum	12.89	23%	0%	0%
Aggregate	25.63	46%	100%	0%
Plastic	0.32	1%	0%	0%
Total	55.65	100%	49%	12%

TABLE 8. TECCRETE 1500 SL PANEL WITH 1 1/2" PANEL PLUS PED HEADS WITH CORNERLOCK

Material Type	Weight (Kg/m ²)	Percent of total weight	Pre-Consumer Recycled Content (PIR)	Post-Consumer Recycled Content (PCR)
Steel	3.28	5%	7%	80%
Steel Galvanized	7.01	10%	16%	56%
Portland	8.50	12%	9%	0%
Gypsum	16.41	24%	0%	0%
Aggregate	32.84	48%	100%	0%
Plastic	0.35	1%	0%	0%
Total	68.39	100%	51%	10%

TABLE 9. TECCRETE 2000 PANEL WITH 1 1/2" PANEL PLUS PED HEADS WITH STANDARD STRINGER

Material Type	Weight (Kg/m ²)	Percent of total weight	Pre-Consumer Recycled Content (PIR)	Post-Consumer Recycled Content (PCR)
Steel	4.83	7%	7%	80%
Steel Galvanized	7.01	10%	16%	56%
Portland	8.50	12%	9%	0%
Gypsum	16.41	23%	0%	0%
Aggregate	32.84	47%	100%	0%
Plastic	0.35	0%	0%	0%
Total	69.94	100%	50%	11%

TABLE 10. TECCRETE 2500 PANEL WITH 1 1/2" PANEL PLUS PED HEADS WITH HEAVY-DUTY STRINGER

Material Type	Weight (Kg/m ²)	Percent of total weight	Pre-Consumer Recycled Content (PIR)	Post-Consumer Recycled Content (PCR)
Steel	5.77	8%	7%	80%
Steel Galvanized	7.01	10%	16%	56%
Portland	8.50	12%	9%	0%
Gypsum	16.41	23%	0%	0%
Aggregate	32.84	46%	100%	0%
Plastic	0.35	0%	0%	0%
Total	70.87	100%	50%	12%

Packaging

The following are the packaging composition for TecCrete product packaging, The TecCrete product packaging contains no regulated substances.

TABLE 11. PACKAGING FOR THE TECCRETE PANEL

Material Type	Weight (Kg/m ²)	Percent of total weight	Pre-Consumer Recycled Content (PIR)	Post-Consumer Recycled Content (PCR)
Paper	4.30E-04	0%	0%	0%
Polyester	3.23E-03	0%	0%	0%
Wood	0.73	100%	0%	0%
Total	0.74	100%	0%	0%

TABLE 12. PACKAGING FOR THE TECCRETE UNDERSTRUCTURE

Material Type	Weight (Kg/m ²)	Percent of total weight	Pre-Consumer Recycled Content (PIR)	Post-Consumer Recycled Content (PCR)
Paper	2.93E-04	0%	0%	0%
Corrugate Board	0.20	99%	9%	39%
Polyester	1.61E-03	1%	0%	0%
Total	0.20	100%	9%	39%

Product Installation

The installation of TecCrete does not require any resources (e.g. electricity, water etc.) and are installed using manual labor with hand tools.

Use Conditions

No special conditions of use are noted. The maintenance of the floor during the use phase are outlined in Table 17.

Reference Service Life and Building Service Life

According to Part A: Life Cycle Assessment Calculation Rules and Report Requirements, UL Environment, V3.2, 2018 [1], the Estimated Service Life (ESL) of the building is assumed to be 75 years. The Reference Service Life (RSL) of the TecCrete access floor system is 75 years as they are built to last the life of a building.

Re-Use Phase

TecCrete access floor systems are not typically reused at end-of-life; however, the system can be uninstalled in their original location and be reused in other buildings.

Disposal

The PCR provided disposal assumption for packaging and product which is based on Resource Conservation and Recovery Act (RCRA) laws and regulations assumes any material other than metal goes to 100% landfill during product disposal and do not provide a breakdown for other materials which would be generated as waste during the final disposal of the product.

Hence the practitioner decided to use publicly published data for products disposal in US according to the US EPA [8] and Construction and Demolition recycling association [9] in the LCA study. For Packaging disposal, as per the PCR the US EPA 2014 fact sheet were used to make the packaging assumption but since a newer version of the US EPA Fact Sheet was available , the study utilized this latest US EPA fact sheet , 2017 [8].The recycling, landfill and incineration rates used in the study are explained further below;

TABLE 13. RECYCLING, LANDFILL AND INCINERATION RATES

Waste: Stage/ Source	Type of Waste	Landfill	Incineration	Recycled
Production Waste: Disposal	Wood	82.0%	18.0%	0.0%
	Concrete	63.0%	0.0%	38.0%
	MSW	100.0%	0.0%	0.0%
Packaging Disposal	Steel	73.1%	5.0%	21.9%
	Paper & Paperboard	73.3%	5.3%	21.5%
	Plastics	13.0%	17.0%	69.9%
	Wood	26.3%	14.5%	59.2%
End of Life: Disposal	Steel	27.8%	13.0%	59.2%
	C&D	37.5%	0.0%	62.5%
	Plastics	6.0%	13.0%	80.9%

LCA CALCULATION RULES

Functional Unit

The functional unit is defined as (1) m² of floor covering following the UL PCR Part B: Flooring (September 28, 2018) [2] for 75 years (RSL).

TABLE 14. REFERENCE FLOW FOR ALL TECCRETE FLOORING SYSTEM

TecCrete Access Flooring System	Weight
TecCrete 1250, 1 1/8 th inch with Cornerlock	54.10 Kg/m ²
TecCrete 1500, 1 1/8 th inch with Stringer	55.65 Kg/m ²
TecCrete 1500SL, 1 1/2 inch with Cornerlock	68.39 Kg/m ²
TecCrete 2000, 1 1/2 inch with Stringer	69.94 Kg/m ²
TecCrete 2500, 1 1/2 inch with HD Stringer	70.87 Kg/m ²

System Boundary

The LCA system boundary for TecCrete includes cradle-to-grave life cycle stages. This boundary considers product stage (raw material extraction and processing, transport to the manufacturer, and manufacturing), construction (transport for use and installation), use (cleaning/maintenance, repair, replacement, and refurbishment), and end-of-life (demolition, transport, waste processing, and disposal). The benefits and loads beyond the system boundary for reuse, recovery, and recycling potential (module D), are not included in this study. The cradle-to-grave system boundary includes all unit processes contributing measurably to the category indicator results. As per the sensitivity analysis performed the system boundary does not need any refining and all the stages included in the initial system boundary stays the same.

Other elements that are excluded from the system boundary are the manufacture, maintenance, and decommissioning of capital equipment (e.g. buildings, machines, and vehicles), as well as the background infrastructure for secondary data is included in the system boundary of this study. Alternatively, manufacture, maintenance and decommissioning of capital equipment associated with primary data is excluded, that is the equipment at GIFS production facility. The deletion of these processes and inputs is permitted since it is not expected to significantly change the overall conclusions of the study. A description of each life cycle stage, in accordance with the PCR, is provided below.

The study avoids the value choices such as normalization or grouping of indicator results and the LCA study is conducted with the best of the knowledge.

TABLE 15 TECCRETE SYSTEMS SYSTEM BOUNDARY

Upstream			Core		Downstream											Other Environmental Information	
Product Stage			Construction Process Stage		Use Stage							End of Life Stage				Benefits and Loads Beyond the System Boundary	
Raw material supply	Transport	Manufacturing	Transport	Construction	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Demolition	Transport	Water Processing	Disposal	Future reuse, recycling, or energy recovery potential	
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D	
X	X	X	X	x	X	x	x	x	x	x	x	x	x	x	x	x	MND

X – Included in the study
MND – Module not declared

Estimates and Assumptions

The Ecoinvent 3.4 database is one of the most comprehensive and reliable resources for LCA data available globally. The inputs for manufacturing, packaging and transporting TecCrete was provided by GIFS.

While raw material and sub-component data sets within the Ecoinvent 3.4 database [3] typically include raw material extraction, transport, infrastructure, emissions, waste and energy use, they do not include any packaging and/or palletizing that is applied to sub-components in their transport to the finished product manufacturer.

- A dummy dataset was used to represent the processing additives.
- The final products are shipped to distributors within North America via truck except the west coast (rail) and Hawaii (sea).
- All input information is assumed to be as accurate as possible at the time of the study (2019/2020).
- Inventory data for packaging, and ancillary materials were modelled with unit process data taken from Ecoinvent.
- The cleaning agent added to Tap water during maintenance stage for cleaning the floor is assumed to be sodium percarbonate detergent in the study.
- The Manufacturing waste was categorised as wood, C&D and plant trash. The plant trash was considered to be 100% landfill, the wood waste is going to landfill and incineration as per US EPA MSW 2017 Fact sheet [8]. The C&D waste are assigned using the construction and demolition recycling association [9] value where any mixed C&D is 37.5% recycled, the rest is going to landfill.

- The Packaging waste and End-of-Life disposal scenarios are modelled using the recycling, landfill and incineration rates, as per US EPA 2017 Fact Sheet [8] and Construction and Demolition recycling association [9].

Cut-Off Rules

The following cut-off criteria was considered;

- The mass and energy flow that consist of less than 1% may be omitted from the inventory analysis and the total omitted mass or energy flows shall not exceed 5%.

A sensitivity analysis was performed to determine the environmental significance of this cut-off criteria, which showed no significant impact to the outcome of the study.

Data Sources

TABLE 16. LCI DATASETS AND ASSOCIATED DATABASES USED TO MODEL THE TECRETE FLOORING SYSTEM

Flow	Dataset	Data Source	Geography	Publication Date
Panel Materials				
Portland Cement*	Cement, Portland {US} production Cut-off, U	ecoinvent	US	2018
Gypsum	Gypsum, mineral {RoW} gypsum quarry operation Cut-off, U	ecoinvent	Global	2018
Aggregate*	Gravel, crushed {RoW} market for gravel, crushed Cut-off, U	ecoinvent	Global	2018
Galvanized Steel	Steel, low-alloyed {GLO} market for Cut-off, U	ecoinvent	Global	2018
	Zinc coat, pieces {RoW} zinc coating, pieces Cut-off, U			
	Metal working, average for steel product manufacturing {GLO} market for Cut-off, U			
Polyethylene	Packaging film, low density polyethylene {GLO} market for Cut-off, U	ecoinvent	Global	2018
Polypropylene	Polypropylene, granulate {GLO} market for Cut-off, U	ecoinvent	Global	2018
Packaging Panel				
Polyester	Polyester resin, unsaturated {GLO} market for Cut-off, U	ecoinvent	Global	2018
	Injection moulding {GLO} market for Cut-off, U			
Wood	Pallet (22kg)/US- US-EI U	DATASMART	US	2017
Paper	Printed paper {GLO} market for Cut-off, U	ecoinvent	Global	2018
Understructure Materials				
Steel*	Steel, low-alloyed {GLO} market for Cut-off, U	ecoinvent	Global	2018
	Metal working, average for steel product manufacturing {GLO} market for Cut-off, U	ecoinvent	Global	2018
Packaging - Understructure				
Polyester	Polyester resin, unsaturated {GLO} market for Cut-off, U	ecoinvent	Global	2018
	Injection moulding {GLO} market for Cut-off, U			
Corrugated	Corrugated board box {RoW} production Alloc Rec, U	ecoinvent	Global	2018
Paper	Printed paper {GLO} market for Cut-off, U	ecoinvent	Global	2018
Resource				
Electricity	Electricity, medium voltage, at grid, Michigan/US US-EI U	DATASMART	US	2017
Natural Gas	Heat, district or industrial, natural gas {GLO} market group for Cut-off, U	ecoinvent	Global	2018
Water	Tap water {GLO} market group for Cut-off, U	ecoinvent	Global	2018
Transportation				
Road	Transport, freight, lorry 16-32 metric ton, EURO4 {GLO} market for Alloc Rec, U	ecoinvent	Global	2016
Rail	Transport, freight, rail/US- US-EI U	DATASMART	US	2017

Flow	Dataset	Data Source	Geography	Publication Date
Ship	Transport, freight, sea, transoceanic ship {GLO} market for Alloc Rec, U	ecoinvent	Global	2016
Cleaning				
Water	Tap water {GLO} market group for Cut-off, U	ecoinvent	Global	2018
Synthetic Detergent	Sodium percarbonate, powder {GLO} market for Cut-off, U	ecoinvent	Global	2018
Waste				
C&D	Disposal, building, concrete, not reinforced, to final disposal	DATASMART	US	2017
Incineration	Disposal, municipal solid waste, 0% water, to municipal incineration/US*	DATASMART	US	2017
Landfill	Disposal, Municipal solid waste, to US sanitary landfill/US US-EI U	DATASMART	US	2017
Process				
Crusher	Rock crushing {RoW} processing Cut-off, U	ecoinvent	Global	2018
Wastewater Treatment				
-	Treatment, sewage, to wastewater treatment, class 3/US US-EI U	DATASMART	US	2017

* The dataset for Portland cement, Aggregate and Steel used in the Understructure were modified to account for the recycled content by removing the amount of recycled content in the raw materials and further no credits for “avoided burden” were given to any of these materials.

Data Quality

TABLE 17.DATA QUALITY ASSESSMENT - TECCRETE FLOORING SYSTEM

Requirement	Assessment
Time Related Coverage: age of data and the minimum length of time over which data should be collected	The material and energy inputs provided by GIFS are from the manufacturer based on measured primary data in 2019 for their products. Data for the Life Cycle Inventory (LCI) was obtained primarily from Ecoinvent 3.4 datasets and in some cases from LTS DATSMART, the most up-to-date version available at the time of the study. Many of the parameters included in the study, reference data from 2018 and 2017 are used. Thus, it is considered high quality data.
Geographical Coverage: geographical area from which data for unit processes should be collected to satisfy the goal of the study	The Ecoinvent 3.4 database, typically base their research and measurement on specific producers, usually in Europe and adjust for global energy and transport considerations. The electricity grid selected for the production phase was specific to the USA, where the manufacturers are located. Thus, the data is considered high quality
Technology Coverage: specific technology or technology mix	GIFS provided the primary material and energy input data, based on their sales data and composition of TecCrete and its transport packaging. TecCrete production and materials do not evolve quickly and thus analysis is based on current technologies for the product. Technology, materials and processes used in the Ecoinvent 3.4 and LTS DATSMART are mostly current and typically reference data from 2018 and 2017. Thus, it is considered medium quality.
Precision: measure of the variability of the data values for each data expressed	GIFS provided the primary material and energy input data, based on sales data and composition and density. Given the simplicity of this data, it is anticipated that there are few opportunities for variability in data. Thus, the data is considered high quality Additionally, an uncertainty analysis was performed and reported in the uncertainty section of the report.

Requirement	Assessment
Completeness: percentage of flow that is measured or estimated	GIFS provided the primary material and energy input data, based on sales data and composition. All materials reported in the data were included in the raw materials phase of the LCA. Energy data was provided by the manufacturer and was measured in a current year on for the product; thus, this is considered 100% measured. Background or secondary data provided by the Ecoinvent 3.4 database, are globally regarded as high quality and researched data. At the time of the study, version 3.4 is the most up-to-date dataset available in Ecoinvent. Thus, it is considered medium quality.
Representativeness: qualitative assessment of the degree to which the data set reflects the true population of interest	GIFS provided the primary material and energy input data, based on sales data, material composition and measured energy consumption. Given GIFS expertise and in-depth knowledge of their products, it is anticipated that primary data is representative of actual data. Thus, considered high quality.
Consistency: qualitative assessment of whether the study methodology is applied uniformly to the various components of the analysis	The same methodology was applied consistently to all the studies. Thus, considered high quality.
Reproducibility: qualitative assessment of the extent to which information about the methodology and data values would allow an independent practitioner to reproduce the results reported in the study	Provided the practitioner has access to the same data sources described in the report, the results would be reproducible. It is considered high quality.
Data Sources: Description of data sources	GIFS provided the primary material and energy input data, based on sales data, material composition and measured energy consumption. Thus, the data is considered high quality. Secondary data was derived from open sources, such as Ecoinvent 3.4, research and literature review.
Uncertainty: Description of known sources of potential uncertainty	Key uncertainty assumptions are stated in the report and evaluated by the pedigree matrix method.

Period Under Review

The period of review is calendar year 2019.

Allocation

Based on the information provided by GIFS, Intertek had applied physical allocation by mass, the primary data for resource use (electricity, natural gas, water, etc.) and waste are allocated on a mass basis as a fraction of total annual production (January 2019 to December 2019).

The under structure includes amount of recycled content, which is allocated using the recycled content allocation method, in which the system inputs do not receive any burden from the previous life other than reprocessing of the waste material.

Additionally, ISO 14044 addresses allocation procedures for reuse and recycling situations. Several allocation scenarios and procedures are addressed by the standard, including consideration of both closed-loop and open-loop recovery systems. For this LCA study there are no closed or open loop system.

Comparability & Benchmarking

The PCR this EPD was based on was not written to support comparative assertions. EPDs based on different PCRs, or different calculation models, may not be comparable. When attempting to compare EPDs or life cycle impacts of products from different companies, the user should be aware of the uncertainty in the results, due to and not limited to, the practitioner’s assumptions, the source of the data used in the study, and the specifics of the product modelled.

SCENARIOS & ADDITIONAL TECHNICAL INFORMATION

Transport to Installation (A4)

The downstream transportation (A4) was calculated based on the average distance travelled by 1m² of TecCrete product by road, sea and rail based on the actual sales data and therefore the PCR scenario distance was not used in this study, the data is reported accordingly.

TABLE 18. TRANSPORT TO THE BUILDING SITE (A4)

Name	Value		Unit
Fuel Type	Truck: Diesel		-
	Rail: Diesel & Electricity		
	Ship: Diesel		
Litres of Fuel	41		l/100km
Vehicle type	Truck, Freight transport 16-32 MT		-
	Rail freight 1000 GT		
	Ship, transoceanic freight ship 50,000 dwt		
Transport distance	Road	1,217	Km
	Rail	435	
	Sea	95	
Weight of product transported	TecCrete 1250	55.04	Kg/m ²
	TecCrete 1500	56.59	
	TecCrete 1500SL	71.40	
	TecCrete 2000	72.95	
	TecCrete 2500	73.88	
Capacity Utilization Volume Factor	1		-

Installation (A5)

During Installation there is no product loss due to cutting for size etc. For Packaging disposal, as per the PCR the US EPA 2014 fact sheet were used to make the packaging assumption but since a newer version of the US EPA Fact Sheet was available , the study utilized the recycling , landfill and incineration rates as per this latest US EPA fact sheet , 2017 [8].

TABLE 19. INSTALLATION INTO THE BUILDING (A5)

Name	Value		Unit
Ancillary Material*	0.023		Kg/m2
Packaging Waste	Cardboard	0.20	Kg/m ²
	Wood	0.73	
	Plastic	0.004	

* Chemtool incorporated CT 502 and CT 3430

TABLE 20. REFERENCE SERVICE LIFE

Name	Value		Unit
RSL	75		Years
Declared product properties (at the gate)	Refer Table 4		-
Design application	Installation per recommendation by manufacturer		-
Indoor environment (if relevant for indoor applications)	Normal building operating conditions		-
Use conditions	Normal building operating conditions		-
Maintenance	As per Tile Council of North America [10]		
	Dust Mop	365 times/ Year	
	Damp Mop	36 times/ Year	
	Tap Water	0.783 l/m2/Year	
	Synthetic Detergent	0.022 kg/m2/Year	

Use Stage (B1)

The use stage includes environmental aspects and impacts arising from normal product use over the 75-year time period. There are no releases of substances to indoor air, soil, and water from product use and results for this stage are reported as *zero*.

Maintenance Stage (B2)

TABLE 21. MAINTENANCE (B2)

Name	Value		Unit
Maintenance process information	Based on desktop research, NA Tile Council [10]		
Dust Mop	27,375	Cycles/ RSL & ESL	
Damp Mop	2700	Cycles/ RSL & ESL	
Net freshwater Consumption with source and fate	0.05 tap water, disposed to sewer		m ³ / RSL & ESL

Repair/Replacement/Refurbishment Stage (B3 - B5)

Neither the panel nor under structure are expected to need any replacement or refurbishing during normal use over the 75-year product period.

Building Operation Stage (B6 – B7)

There is no operational energy or water use associated with the use of the product and the results for these modules are reported as zero.

Disposal Stage (C1 - C4)

For the TecCrete access floor systems, no emissions are generated during de-construction since they are manually disassembled, and results are reported as zero. Transportation of waste material assumes a 161km distance to disposal as per PCR. The PCR provided disposal assumption for product which is based on Resource Conservation and Recovery Act (RCRA) laws and regulations assumes any material other than metal goes to 100% landfill during product disposal and do not provide a breakdown for other materials which would be generated as waste during the final disposal of the product. Hence the publicly published data for product disposal in US according to the US EPA [8] and Construction and Demolition recycling association [9] were used in the LCA study.

TABLE 22. DISPOSAL (C1-C4)

Name		Value		Unit
Assumptions for Scenario Development		The Product is Manually Removed for Disposal		
Collection Process	Collected Separately	0.00		Kg
	Collected with Mixed Construction Waste	TecCrete 1250	54.10	Kg
		TecCrete 1500	55.65	
		TecCrete 1500SL	68.39	
		TecCrete 2000	69.94	
		TecCrete 2500	70.87	
Recovery	Reuse	0.00		Kg
	Recycling	TecCrete 1250	19.35	Kg
		TecCrete 1500	19.78	
		TecCrete 1500SL	24.54	
		TecCrete 2000	24.97	
		TecCrete 2500	25.23	
	Landfill	TecCrete 1250	33.58	Kg
		TecCrete 1500	34.50	
		TecCrete 1500SL	42.46	
		TecCrete 2000	43.38	
		TecCrete 2500	43.94	
	Incineration	TecCrete 1250	1.16	Kg
		TecCrete 1500	1.36	
		TecCrete 1500SL	1.38	

		TecCrete 2000	1.58	
		TecCrete 2500	1.70	
	Incineration with Energy Recovery	0.00		Kg
Disposal	Product or Material for Final Deposition	TecCrete 1250	54.10	Kg
		TecCrete 1500	55.65	
		TecCrete 1500SL	68.39	
		TecCrete 2000	69.94	
		TecCrete 2500	70.87	

ENVIRONMENTAL PERFORMANCE

Life Cycle Impact Assessment

The impact categories are based on TRACI 2.1 [5] and CML Baseline , Version 3.1 (CML-IA) method [6] as per the PCR. All the results are given per functional unit, which is 1m² of flooring over a building life of 75 years. Life Cycle Impact Assessment (LCIA) results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks. The TRACI 2.1 [5] LCIA method reports on 6 categories; Global Warming Potential (GWP), Ozone Depletion Potential (ODP), Acidification Potential (AP), Eutrophication Potential (EP), Smog Formation Potential (SFP) and Abiotic Fossil Fuel Depletion (ADP fossil). These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined and LCA should continue making advances in their development, however the EPD users shall not use additional measures for comparative purposes.

The biogenic carbon emissions and removals are not included as the product does not contain 10% of biogenic carbon and biogenic carbon is not included in the reported GWP calculation as per *Pre* document [11] Simapro Database manual methods library all biogenic sources were removed from every method with effects on climate change from Simapro.

TABLE 23. LIST OF IMPACT CATEGORY, UNITS AND ACRONYM FOR TRACI METHOD

Impact Category	Unit	Acronym
Global Warming Potential	kg CO2 equiv.	GWP
Ozone Depletion Potential	kg CFC11	ODP
Acidification Potential	kg SO2 equiv.	AP
Eutrophication Potential	kg N -equiv.	EP
Smog Formation Potential	kg O3 equiv.	SFP
Abiotic Resource Depletion Potential of Non-Renewable (fossil) Energy Resources	MJ	ADP Fossil

TABLE 24. LIST OF INVENTORY INDICATORS, UNITS AND ACRONYM

Inventory Indicators	Unit	Acronym
Renewable Primary Energy	MJ	PERE
Renewable Energy Raw Materials		PERM
Total Renewable Primary Energy		PERT
Non-Renewable Primary Energy		PENRE
Non-Renewable Energy Raw Materials		PENRM
Total Non-Renewable Energy		PENRT

Inventory Indicators	Unit	Acronym
Use of Secondary Material	kg	SM
Use of Renewable Secondary Fuel	MJ	RSF
Use of Non-Renewable Secondary Fuel		NRSF
Recovered Energy		RE
Net Use of Fresh Water	m3	FW
Hazardous Waste	kg	HWD
Non-Hazardous Waste		NHWD
High- Level Radioactive Waste, Conditioned, to Final Repository		HLRW
Intermediate and Low-Level Radioactive Waste, Conditioned, to Final Repository		ILLRW
Components for Reuse		CRU
Materials for Recycling		MFR
Materials for Energy Recovery		MER
Export Energy		MJ

TABLE 25. LIST OF IMPACT CATEGORY, UNITS AND ACRONYM FOR CML METHOD

Impact Category	Unit	Acronym
Global Warming Potential	kg CO2 equiv.	GWP
Ozone Depletion Potential	kg CFC-11 eq.	ODP
Acidification Potential	kg SO2 equiv.	AP
Eutrophication Potential	kg (PO4)3 eq.	EP
Photochemical Ozone Creation Potential	kg C2H4 eq.	POCP
Abiotic depletion Potential for Non-Fossil Resources	kg Sb equiv.	ADPE
Abiotic Depletion Potential for Fossil Resources	MJ	ADPF

LCIA Results: TRACI Method

TABLE 26.TECCRETE 1250 PANEL WITH 1 1/8” PANEL PLUS PED HEADS WITH CORNERLOCK

Module	GWP kg CO2 eq.	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	SFP kg O3 eq.	ADP Fossil MJ
Total	7.46E+01	6.82E-06	3.51E-01	7.80E-02	4.63E+00	7.47E+01
A1 - Raw Material Extraction and Processing	4.13E+01	2.55E-06	2.06E-01	4.08E-02	2.30E+00	3.39E+01
A2- Transport to Prod.	5.13E-01	1.24E-07	2.34E-03	3.16E-04	5.54E-02	1.12E+00
A3 - Production	1.07E+01	5.42E-07	5.47E-02	8.96E-03	4.68E-01	4.63E+00
A4 - Transport to Install.	1.24E+01	2.79E-06	5.87E-02	7.59E-03	1.34E+00	2.58E+01
A5 - Installation	1.36E-01	2.61E-09	3.00E-04	1.41E-04	8.15E-03	8.67E-02
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.42E+00	3.23E-07	1.81E-02	9.28E-03	1.78E-01	4.49E+00
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.45E+00	3.51E-07	6.63E-03	8.95E-04	1.57E-01	3.16E+00
C3 - Waste processing	3.33E-02	1.65E-09	1.47E-04	1.67E-05	1.64E-03	2.18E-02
C4 - Disposal	4.64E+00	1.33E-07	4.60E-03	9.99E-03	1.17E-01	1.42E+00

TABLE 27.TECCRETE 1500 PANEL WITH 1 1/8” PANEL PLUS PED HEADS PLUS STANDARD STRINGER

Module	GWP kg CO2 eq.	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	SFP kg O3 eq.	ADP Fossil MJ
Total	7.96E+01	7.18E-06	3.71E-01	8.34E-02	4.88E+00	7.90E+01
A1 - Raw Material Extraction and Processing	4.58E+01	2.85E-06	2.27E-01	4.48E-02	2.53E+00	3.76E+01
A2- Transport to Prod.	5.16E-01	1.25E-07	2.36E-03	3.18E-04	5.57E-02	1.12E+00
A3 - Production	1.01E+01	5.09E-07	5.13E-02	8.42E-03	4.39E-01	4.34E+00
A4 - Transport to Install.	1.27E+01	2.87E-06	6.04E-02	7.80E-03	1.38E+00	2.66E+01
A5 - Installation	1.36E-01	2.61E-09	3.00E-04	1.41E-04	8.15E-03	8.67E-02
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.42E+00	3.23E-07	1.81E-02	9.28E-03	1.78E-01	4.49E+00
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.49E+00	3.61E-07	6.82E-03	9.20E-04	1.61E-01	3.25E+00
C3 - Waste processing	3.42E-02	1.69E-09	1.51E-04	1.72E-05	1.68E-03	2.24E-02
C4 - Disposal	5.38E+00	1.39E-07	4.93E-03	1.17E-02	1.24E-01	1.49E+00

TABLE 28.TECRETE 1500SL PANEL WITH 1 1/2” PANEL PLUS PED HEADS WITH CORNERLOCK

Module	GWP kg CO2 eq.	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	SFP kg O3 eq.	ADP Fossil MJ
Total	8.58E+01	8.10E-06	3.96E-01	8.70E-02	5.38E+00	8.78E+01
A1 - Raw Material Extraction and Processing	4.82E+01	2.96E-06	2.33E-01	4.59E-02	2.63E+00	3.90E+01
A2- Transport to Prod.	6.51E-01	1.57E-07	2.97E-03	4.01E-04	7.03E-02	1.42E+00
A3 - Production	1.04E+01	5.25E-07	5.30E-02	8.69E-03	4.53E-01	4.48E+00
A4 - Transport to Install.	1.56E+01	3.52E-06	7.40E-02	9.56E-03	1.69E+00	3.25E+01
A5 - Installation	1.36E-01	2.61E-09	3.00E-04	1.41E-04	8.15E-03	8.67E-02
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.42E+00	3.23E-07	1.81E-02	9.28E-03	1.78E-01	4.49E+00
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.84E+00	4.44E-07	8.39E-03	1.13E-03	1.98E-01	3.99E+00
C3 - Waste processing	4.21E-02	2.08E-09	1.86E-04	2.11E-05	2.07E-03	2.75E-02
C4 - Disposal	5.54E+00	1.67E-07	5.70E-03	1.19E-02	1.46E-01	1.78E+00

TABLE 29.TECRETE 2000 PANEL WITH 1 1/2” PANEL PLUS PED HEADS WITH STANDARD STRINGER

Module	GWP kg CO2 eq	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	SFP kg O3 eq.	ADP Fossil MJ
Total	9.18E+01	8.45E-06	4.15E-01	9.57E-02	5.63E+00	9.21E+01
A1 - Raw Material Extraction and Processing	5.26E+01	3.25E-06	2.54E-01	4.99E-02	2.87E+00	4.26E+01
A2- Transport to Prod.	6.54E-01	1.58E-07	2.99E-03	4.03E-04	7.06E-02	1.42E+00
A3 - Production	1.08E+01	4.92E-07	4.89E-02	1.15E-02	4.22E-01	4.22E+00
A4 - Transport to Install.	1.59E+01	3.60E-06	7.56E-02	9.77E-03	1.73E+00	3.33E+01
A5 - Installation	1.36E-01	2.61E-09	3.00E-04	1.41E-04	8.15E-03	8.67E-02
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.42E+00	3.23E-07	1.81E-02	9.28E-03	1.78E-01	4.49E+00
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.88E+00	4.54E-07	8.58E-03	1.16E-03	2.03E-01	4.09E+00
C3 - Waste processing	4.30E-02	2.13E-09	1.90E-04	2.16E-05	2.12E-03	2.81E-02
C4 - Disposal	6.28E+00	1.73E-07	6.04E-03	1.36E-02	1.53E-01	1.85E+00

TABLE 30.TECRETE 2500 PANEL WITH 1 1/2” PANEL PLUS PED HEADS WITH HEAVY-DUTY STRINGER

Module	GWP kg CO2 eq	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	SFP kg O3 eq.	ADP Fossil MJ
Total	9.52E+01	8.74E-06	4.35E-01	9.68E-02	5.85E+00	9.53E+01
A1 - Raw Material Extraction and Processing	5.54E+01	3.43E-06	2.67E-01	5.23E-02	3.01E+00	4.49E+01
A2- Transport to Prod.	6.56E-01	1.58E-07	2.99E-03	4.04E-04	7.08E-02	1.43E+00
A3 - Production	1.08E+01	5.45E-07	5.50E-02	9.02E-03	4.70E-01	4.65E+00
A4 - Transport to Install.	1.62E+01	3.64E-06	7.66E-02	9.90E-03	1.75E+00	3.37E+01
A5 - Installation	1.36E-01	2.61E-09	3.00E-04	1.41E-04	8.15E-03	8.67E-02
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.42E+00	3.23E-07	1.81E-02	9.28E-03	1.78E-01	4.49E+00
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.90E+00	4.60E-07	8.69E-03	1.17E-03	2.05E-01	4.14E+00
C3 - Waste processing	4.36E-02	2.16E-09	1.93E-04	2.18E-05	2.14E-03	2.85E-02
C4 - Disposal	6.73E+00	1.77E-07	6.24E-03	1.46E-02	1.57E-01	1.89E+00

Resource Use, Waste & Output Flow Results

The following are the results for parameters describing resource use, primary energy, secondary materials, waste, and output flows for all the TecCrete Access flooring systems.

TABLE 31.TECRETE 1250 PANEL WITH 1 1/8” PANEL PLUS PED HEADS WITH CORNERLOCK - 1

#	PERE	PERM	PERT	PENRE	PENRM	PENRT	SM	RSF	NRSF	FW
Total	6.83E+01	2.36E+01	9.19E+01	1.05E+03	0.00E+00	1.05E+03	2.88E+01	0.00E+00	0.00E+00	1.35E+01
A1	5.60E+01	1.95E+01	7.55E+01	5.63E+02	0.00E+00	5.63E+02	2.88E+01	0.00E+00	0.00E+00	7.17E-01
A2	9.38E-02	2.38E-02	1.18E-01	7.76E+00	0.00E+00	7.76E+00	0.00E+00	0.00E+00	0.00E+00	1.39E-03
A3	5.97E+00	2.45E+00	8.43E+00	2.01E+02	0.00E+00	2.01E+02	0.00E+00	0.00E+00	0.00E+00	8.61E+00
A4	2.69E+00	5.64E-01	3.26E+00	1.90E+02	0.00E+00	1.90E+02	0.00E+00	0.00E+00	0.00E+00	3.40E+00
A5	2.33E-03	1.98E-04	2.53E-03	5.94E-01	0.00E+00	5.94E-01	0.00E+00	0.00E+00	0.00E+00	1.21E-02
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	3.18E+00	9.11E-01	4.09E+00	5.36E+01	0.00E+00	5.36E+01	0.00E+00	0.00E+00	0.00E+00	2.97E-01
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	2.65E-01	6.73E-02	3.33E-01	2.20E+01	0.00E+00	2.20E+01	0.00E+00	0.00E+00	0.00E+00	3.94E-03
C3	3.70E-02	2.36E-03	3.94E-02	5.15E-01	0.00E+00	5.15E-01	0.00E+00	0.00E+00	0.00E+00	1.72E-04
C4	9.33E-02	7.33E-03	1.01E-01	1.05E+01	0.00E+00	1.05E+01	0.00E+00	0.00E+00	0.00E+00	4.75E-01

TABLE 32.TECRETE 1250 PANEL WITH 1 1/8” PANEL PLUS PED HEADS WITH CORNERLOCK – 2

#	HWD	NHWD	HLRW	ILLRW	CRU	MFR	MER	EE	RE
Total	7.55E-03	8.13E+01	1.75E-04	2.86E-03	0.00E+00	2.18E+01	0.00E+00	0.00E+00	0.00E+00
A1	4.97E-03	6.43E+00	1.63E-04	8.94E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A2	5.73E-05	3.69E-01	4.10E-07	5.19E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A3	8.22E-04	8.81E+00	7.39E-08	5.74E-04	0.00E+00	2.07E+00	0.00E+00	0.00E+00	0.00E+00
A4	1.33E-03	8.16E+00	9.06E-06	1.17E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A5	3.14E-07	9.41E-01	0.00E+00	1.08E-07	0.00E+00	3.40E-01	0.00E+00	0.00E+00	0.00E+00
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	1.89E-04	7.15E-01	5.40E-07	1.65E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	1.62E-04	1.04E+00	1.16E-06	1.47E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C3	1.57E-06	2.02E-03	2.25E-07	7.24E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	1.91E-05	5.49E+01	0.00E+00	4.74E-06	0.00E+00	1.93E+01	0.00E+00	0.00E+00	0.00E+00

TABLE 33.TECRETE 1500 PANEL WITH 1 1/8” PANEL PLUS PED HEADS PLUS STANDARD STRINGER – 1

#	PERE	PERM	PERT	PENRE	PENRM	PENRT	SM	RSF	NRSF	FW
Total	7.28E+01	2.43E+01	9.72E+01	1.11E+03	0.00E+00	1.11E+03	3.00E+01	0.00E+00	0.00E+00	1.32E+01
A1	6.08E+01	2.04E+01	8.12E+01	6.29E+02	0.00E+00	6.29E+02	3.00E+01	0.00E+00	0.00E+00	7.51E-01
A2	9.43E-02	2.39E-02	1.18E-01	7.80E+00	0.00E+00	7.80E+00	0.00E+00	0.00E+00	0.00E+00	1.40E-03
A3	5.60E+00	2.30E+00	7.90E+00	1.89E+02	0.00E+00	1.89E+02	0.00E+00	0.00E+00	0.00E+00	8.08E+00
A4	2.77E+00	5.80E-01	3.35E+00	1.95E+02	0.00E+00	1.95E+02	0.00E+00	0.00E+00	0.00E+00	3.50E+00
A5	2.33E-03	1.98E-04	2.53E-03	5.94E-01	0.00E+00	5.94E-01	0.00E+00	0.00E+00	0.00E+00	1.21E-02
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	3.18E+00	9.11E-01	4.09E+00	5.36E+01	0.00E+00	5.36E+01	0.00E+00	0.00E+00	0.00E+00	2.97E-01
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	2.73E-01	6.93E-02	3.42E-01	2.26E+01	0.00E+00	2.26E+01	0.00E+00	0.00E+00	0.00E+00	4.06E-03
C3	3.81E-02	2.42E-03	4.05E-02	5.29E-01	0.00E+00	5.29E-01	0.00E+00	0.00E+00	0.00E+00	1.77E-04
C4	1.04E-01	8.14E-03	1.13E-01	1.11E+01	0.00E+00	1.11E+01	0.00E+00	0.00E+00	0.00E+00	5.32E-01

TABLE 34.TECRETE 1500 PANEL WITH 1 1/8” PANEL PLUS PED HEADS PLUS STANDARD STRINGER – 2

#	HWD	NHWD	HLRW	ILLRW	CRU	MFR	MER	EE	RE
Total	7.78E-03	8.37E+01	1.99E-04	2.97E-03	0.00E+00	2.21E+01	0.00E+00	0.00E+00	0.00E+00
A1	5.21E-03	7.37E+00	1.87E-04	1.00E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A2	5.76E-05	3.71E-01	4.12E-07	5.22E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A3	7.72E-04	8.27E+00	6.94E-08	5.38E-04	0.00E+00	1.94E+00	0.00E+00	0.00E+00	0.00E+00
A4	1.36E-03	8.39E+00	9.32E-06	1.20E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A5	3.14E-07	9.41E-01	0.00E+00	1.08E-07	0.00E+00	3.40E-01	0.00E+00	0.00E+00	0.00E+00
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	1.89E-04	7.15E-01	5.40E-07	1.65E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	1.67E-04	1.07E+00	1.19E-06	1.51E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C3	1.61E-06	2.08E-03	2.32E-07	7.44E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	2.16E-05	5.66E+01	0.00E+00	5.33E-06	0.00E+00	1.98E+01	0.00E+00	0.00E+00	0.00E+00

TABLE 35.TECRETE 1500SL PANEL WITH 1 1/2” PANEL PLUS PED HEADS WITH CORNERLOCK – 1

#	PERE	PERM	PERT	PENRE	PENRM	PENRT	SM	RSF	NRSF	FW
Total	7.47E+01	2.47E+01	9.95E+01	1.19E+03	0.00E+00	1.19E+03	3.63E+01	0.00E+00	0.00E+00	1.43E+01
A1	6.18E+01	2.06E+01	8.24E+01	6.49E+02	0.00E+00	6.49E+02	3.63E+01	0.00E+00	0.00E+00	7.53E-01
A2	1.19E-01	3.02E-02	1.49E-01	9.85E+00	0.00E+00	9.85E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-03
A3	5.79E+00	2.37E+00	8.16E+00	1.95E+02	0.00E+00	1.95E+02	0.00E+00	0.00E+00	0.00E+00	8.34E+00
A4	3.39E+00	7.10E-01	4.10E+00	2.39E+02	0.00E+00	2.39E+02	0.00E+00	0.00E+00	0.00E+00	4.29E+00
A5	2.33E-03	1.98E-04	2.53E-03	5.94E-01	0.00E+00	5.94E-01	0.00E+00	0.00E+00	0.00E+00	1.21E-02
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	3.18E+00	9.11E-01	4.09E+00	5.36E+01	0.00E+00	5.36E+01	0.00E+00	0.00E+00	0.00E+00	2.97E-01
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	3.35E-01	8.51E-02	4.21E-01	2.78E+01	0.00E+00	2.78E+01	0.00E+00	0.00E+00	0.00E+00	4.98E-03
C3	4.68E-02	2.98E-03	4.98E-02	6.51E-01	0.00E+00	6.51E-01	0.00E+00	0.00E+00	0.00E+00	2.18E-04
C4	1.13E-01	8.95E-03	1.22E-01	1.31E+01	0.00E+00	1.31E+01	0.00E+00	0.00E+00	0.00E+00	5.77E-01

TABLE 36.TECCRETE 1500SL PANEL WITH 1 1/2” PANEL PLUS PED HEADS WITH CORNERLOCK – 2

#	HWD	NHWD	HLRW	ILLRW	CRU	MFR	MER	EE	RE
Total	8.24E-03	9.91E+01	2.07E-04	3.36E-03	0.00E+00	2.69E+01	0.00E+00	0.00E+00	0.00E+00
A1	5.28E-03	7.52E+00	1.92E-04	1.05E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A2	7.26E-05	4.68E-01	5.20E-07	6.59E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A3	7.97E-04	8.53E+00	7.37E-08	5.56E-04	0.00E+00	2.01E+00	0.00E+00	0.00E+00	0.00E+00
A4	1.67E-03	1.03E+01	1.14E-05	1.47E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A5	3.14E-07	9.41E-01	0.00E+00	1.08E-07	0.00E+00	3.40E-01	0.00E+00	0.00E+00	0.00E+00
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	1.89E-04	7.15E-01	5.40E-07	1.65E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	2.05E-04	1.32E+00	1.47E-06	1.86E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C3	1.98E-06	2.56E-03	2.85E-07	9.15E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	2.31E-05	6.93E+01	0.00E+00	5.75E-06	0.00E+00	2.45E+01	0.00E+00	0.00E+00	0.00E+00

TABLE 37.TECCRETE 2000 PANEL WITH 1 1/2” PANEL PLUS PED HEADS WITH STANDARD STRINGER -1

#	PERE	PERM	PERT	PENRE	PENRM	PENRT	SM	RSF	NRSF	FW
Total	7.91E+01	2.54E+01	1.05E+02	1.25E+03	0.00E+00	1.25E+03	3.75E+01	0.00E+00	0.00E+00	1.38E+01
A1	6.65E+01	2.15E+01	8.80E+01	7.16E+02	0.00E+00	7.16E+02	3.75E+01	0.00E+00	0.00E+00	7.86E-01
A2	1.19E-01	3.03E-02	1.50E-01	9.89E+00	0.00E+00	9.89E+00	0.00E+00	0.00E+00	0.00E+00	1.77E-03
A3	5.31E+00	2.17E+00	7.48E+00	1.79E+02	0.00E+00	1.79E+02	0.00E+00	0.00E+00	0.00E+00	7.72E+00
A4	3.47E+00	7.26E-01	4.19E+00	2.45E+02	0.00E+00	2.45E+02	0.00E+00	0.00E+00	0.00E+00	4.38E+00
A5	2.33E-03	1.98E-04	2.53E-03	5.94E-01	0.00E+00	5.94E-01	0.00E+00	0.00E+00	0.00E+00	1.21E-02
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	3.18E+00	9.11E-01	4.09E+00	5.36E+01	0.00E+00	5.36E+01	0.00E+00	0.00E+00	0.00E+00	2.97E-01
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	3.43E-01	8.71E-02	4.30E-01	2.84E+01	0.00E+00	2.84E+01	0.00E+00	0.00E+00	0.00E+00	5.10E-03
C3	4.79E-02	3.05E-03	5.09E-02	6.65E-01	0.00E+00	6.65E-01	0.00E+00	0.00E+00	0.00E+00	2.23E-04
C4	1.25E-01	9.76E-03	1.34E-01	1.37E+01	0.00E+00	1.37E+01	0.00E+00	0.00E+00	0.00E+00	6.34E-01

TABLE 38.TECRETE 2000 PANEL WITH 1 1/2" PANEL PLUS PED HEADS WITH STANDARD STRINGER – 2

#	HWD	NHWD	HLRW	ILLRW	CRU	MFR	MER	EE	RE
Total	8.46E-03	1.04E+02	2.30E-04	3.46E-03	0.00E+00	2.71E+01	0.00E+00	0.00E+00	0.00E+00
A1	5.52E-03	8.46E+00	2.16E-04	1.16E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A2	7.29E-05	4.70E-01	5.22E-07	6.62E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A3	7.32E-04	1.04E+01	6.54E-08	5.09E-04	0.00E+00	1.83E+00	0.00E+00	0.00E+00	0.00E+00
A4	1.71E-03	1.05E+01	1.17E-05	1.51E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A5	3.14E-07	9.41E-01	0.00E+00	1.08E-07	0.00E+00	3.40E-01	0.00E+00	0.00E+00	0.00E+00
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	1.89E-04	7.15E-01	5.40E-07	1.65E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	2.09E-04	1.35E+00	1.50E-06	1.90E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C3	2.03E-06	2.62E-03	2.91E-07	9.35E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	2.56E-05	7.10E+01	0.00E+00	6.34E-06	0.00E+00	2.50E+01	0.00E+00	0.00E+00	0.00E+00

TABLE 39.TECRETE 2500 PANEL WITH 1 1/2" PANEL PLUS PED HEADS WITH HEAVY-DUTY STRINGER -1

#	PERE	PERM	PERT	PENRE	PENRM	PENRT	SM	RSF	NRSF	FW
Total	8.28E+01	2.63E+01	1.09E+02	1.31E+03	0.00E+00	1.31E+03	3.82E+01	0.00E+00	0.00E+00	1.49E+01
A1	6.95E+01	2.21E+01	9.16E+01	7.57E+02	0.00E+00	7.57E+02	3.82E+01	0.00E+00	0.00E+00	8.07E-01
A2	1.20E-01	3.04E-02	1.50E-01	9.91E+00	0.00E+00	9.91E+00	0.00E+00	0.00E+00	0.00E+00	1.78E-03
A3	6.00E+00	2.46E+00	8.47E+00	2.02E+02	0.00E+00	2.02E+02	0.00E+00	0.00E+00	0.00E+00	8.66E+00
A4	3.51E+00	7.36E-01	4.25E+00	2.48E+02	0.00E+00	2.48E+02	0.00E+00	0.00E+00	0.00E+00	4.44E+00
A5	2.33E-03	1.98E-04	2.53E-03	5.94E-01	0.00E+00	5.94E-01	0.00E+00	0.00E+00	0.00E+00	1.21E-02
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	3.18E+00	9.11E-01	4.09E+00	5.36E+01	0.00E+00	5.36E+01	0.00E+00	0.00E+00	0.00E+00	2.97E-01
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	3.48E-01	8.82E-02	4.36E-01	2.88E+01	0.00E+00	2.88E+01	0.00E+00	0.00E+00	0.00E+00	5.17E-03
C3	4.85E-02	3.09E-03	5.16E-02	6.74E-01	0.00E+00	6.74E-01	0.00E+00	0.00E+00	0.00E+00	2.26E-04
C4	1.31E-01	1.02E-02	1.42E-01	1.41E+01	0.00E+00	1.41E+01	0.00E+00	0.00E+00	0.00E+00	6.69E-01

TABLE 40.TECCRETE 2500 PANEL WITH 1 1/2” PANEL PLUS PED HEADS WITH HEAVY-DUTY STRINGER -2

#	HWD	NHWD	HLRW	ILLRW	CRU	MFR	MER	EE	RE
Total	8.72E-03	1.04E+02	2.45E-04	3.61E-03	0.00E+00	2.76E+01	0.00E+00	0.00E+00	0.00E+00
A1	5.66E-03	9.03E+00	2.30E-04	1.23E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A2	7.31E-05	4.71E-01	5.23E-07	6.63E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A3	8.27E-04	8.86E+00	7.42E-08	5.77E-04	0.00E+00	2.08E+00	0.00E+00	0.00E+00	0.00E+00
A4	1.73E-03	1.07E+01	1.18E-05	1.53E-03	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
A5	3.14E-07	9.41E-01	0.00E+00	1.08E-07	0.00E+00	3.40E-01	0.00E+00	0.00E+00	0.00E+00
B1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2	1.89E-04	7.15E-01	5.40E-07	1.65E-05	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B3	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2	2.12E-04	1.37E+00	1.52E-06	1.93E-04	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C3	2.05E-06	2.65E-03	2.95E-07	9.48E-07	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C4	2.71E-05	7.20E+01	0.00E+00	6.70E-06	0.00E+00	2.52E+01	0.00E+00	0.00E+00	0.00E+00

LCIA Results: CML Method

TABLE 41.TECCRETE 1250 PANEL WITH 1 1/8” PANEL PLUS PED HEADS WITH CORNERLOCK

Module	GWP kg CO2 eq.	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	POCP kg O3 eq.	ADPE kg Sb eq.	ADPF MJ
Total	7.68E+01	5.19E-06	3.42E-01	5.48E-02	1.80E-02	7.29E-03	7.69E+02
A1 - Raw Material Extraction and Processing	4.20E+01	2.02E-06	2.05E-01	2.89E-02	1.11E-02	7.22E-03	4.07E+02
A2- Transport to Prod.	5.15E-01	9.33E-08	2.03E-03	3.56E-04	8.64E-05	1.53E-06	7.73E+00
A3 - Production	1.11E+01	3.59E-07	5.65E-02	6.03E-03	2.53E-03	2.40E-06	9.70E+01
A4 - Transport to Install.	1.24E+01	2.10E-06	5.14E-02	8.66E-03	2.19E-03	3.44E-05	1.83E+02
A5 - Installation	1.60E-01	1.95E-09	2.35E-04	9.55E-05	3.49E-05	1.22E-08	5.92E-01
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.48E+00	2.58E-07	1.79E-02	5.00E-03	7.89E-04	2.40E-05	4.20E+01
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.46E+00	2.64E-07	5.75E-03	1.01E-03	2.44E-04	4.33E-06	2.19E+01
C3 - Waste processing	3.39E-02	1.22E-09	1.47E-04	1.48E-05	6.30E-06	9.33E-09	3.45E-01
C4 - Disposal	5.50E+00	9.98E-08	3.66E-03	4.72E-03	1.03E-03	4.87E-07	9.87E+00

TABLE 42.TECRETE 15000 PANEL WITH 1 1/8” PANEL PLUS PED HEADS WITH STANDARD STRINGER

Module	GWP kg CO2 eq.	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	POCP kg O3 eq.	ADPE kg Sb eq.	ADPF MJ
Total	8.19E+01	5.47E-06	3.62E-01	5.82E-02	1.94E-02	7.30E-03	8.16E+02
A1 - Raw Material Extraction and Processing	4.66E+01	2.25E-06	2.25E-01	3.17E-02	1.24E-02	7.24E-03	4.54E+02
A2- Transport to Prod.	5.18E-01	9.38E-08	2.04E-03	3.58E-04	8.68E-05	1.54E-06	7.77E+00
A3 - Production	1.05E+01	3.37E-07	5.30E-02	5.66E-03	2.38E-03	2.25E-06	9.10E+01
A4 - Transport to Install.	1.28E+01	2.16E-06	5.28E-02	8.90E-03	2.25E-03	3.54E-05	1.88E+02
A5 - Installation	1.60E-01	1.95E-09	2.35E-04	9.55E-05	3.49E-05	1.22E-08	5.92E-01
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.48E+00	2.58E-07	1.79E-02	5.00E-03	7.89E-04	2.40E-05	4.20E+01
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.50E+00	2.72E-07	5.91E-03	1.04E-03	2.51E-04	4.46E-06	2.25E+01
C3 - Waste processing	3.49E-02	1.25E-09	1.51E-04	1.52E-05	6.48E-06	9.60E-09	3.55E-01
C4 - Disposal	6.39E+00	1.04E-07	3.92E-03	5.46E-03	1.19E-03	5.30E-07	1.04E+01

TABLE 43.TECRETE 1500SL PANEL WITH 1 1/2” PANEL PLUS PED HEADS WITH CORNERLOCK

Module	GWP kg CO2 eq.	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	POCP kg O3 eq.	ADPE kg Sb eq.	ADPF MJ
Total	8.82E+01	6.16E-06	3.84E-01	6.19E-02	2.04E-02	7.32E-03	8.85E+02
A1 - Raw Material Extraction and Processing	4.90E+01	2.33E-06	2.32E-01	3.27E-02	1.27E-02	7.24E-03	4.68E+02
A2- Transport to Prod.	6.54E-01	1.18E-07	2.58E-03	4.52E-04	1.10E-04	1.94E-06	9.80E+00
A3 - Production	1.08E+01	3.48E-07	5.48E-02	5.84E-03	2.45E-03	2.32E-06	9.40E+01
A4 - Transport to Install.	1.57E+01	2.64E-06	6.47E-02	1.09E-02	2.76E-03	4.34E-05	2.30E+02
A5 - Installation	1.60E-01	1.95E-09	2.35E-04	9.55E-05	3.49E-05	1.22E-08	5.92E-01
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.48E+00	2.58E-07	1.79E-02	5.00E-03	7.89E-04	2.40E-05	4.20E+01
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.84E+00	3.34E-07	7.27E-03	1.27E-03	3.09E-04	5.48E-06	2.76E+01
C3 - Waste processing	4.28E-02	1.54E-09	1.85E-04	1.87E-05	7.96E-06	1.18E-08	4.36E-01
C4 - Disposal	6.57E+00	1.25E-07	4.54E-03	5.65E-03	1.23E-03	6.00E-07	1.23E+01

TABLE 44. TECCRETE 2000 PANEL WITH 1 1/2" PANEL PLUS PED HEADS WITH STANDARD STRINGER

Module	GWP kg CO2 eq.	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	POCP kg O3 eq.	ADPE kg Sb eq.	ADPF MJ
Total	9.47E+01	6.44E-06	4.02E-01	6.67E-02	2.21E-02	7.34E-03	9.31E+02
A1 - Raw Material Extraction and Processing	5.35E+01	2.56E-06	2.52E-01	3.55E-02	1.40E-02	7.26E-03	5.15E+02
A2- Transport to Prod.	6.57E-01	1.19E-07	2.59E-03	4.54E-04	1.10E-04	1.95E-06	9.84E+00
A3 - Production	1.15E+01	3.27E-07	5.04E-02	6.86E-03	2.59E-03	2.18E-06	8.68E+01
A4 - Transport to Install.	1.60E+01	2.70E-06	6.62E-02	1.11E-02	2.82E-03	4.44E-05	2.35E+02
A5 - Installation	1.60E-01	1.95E-09	2.35E-04	9.55E-05	3.49E-05	1.22E-08	5.92E-01
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.48E+00	2.58E-07	1.79E-02	5.00E-03	7.89E-04	2.40E-05	4.20E+01
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.89E+00	3.41E-07	7.43E-03	1.30E-03	3.16E-04	5.60E-06	2.83E+01
C3 - Waste processing	4.38E-02	1.58E-09	1.90E-04	1.91E-05	8.14E-06	1.21E-08	4.46E-01
C4 - Disposal	7.45E+00	1.30E-07	4.80E-03	6.39E-03	1.39E-03	6.43E-07	1.29E+01

TABLE 45. TECCRETE 2500 PANEL WITH 1 1/2" PANEL PLUS PED HEADS WITH HEAVY DUTY STRINGER

Module	GWP kg CO2 eq.	ODP kg CFC11	AP kg SO2 eq.	EP kg N -eq.	POCP kg O3 eq.	ADPE kg Sb eq.	ADPF MJ
Total	9.80E+01	6.66E-06	4.22E-01	6.83E-02	2.30E-02	7.35E-03	9.75E+02
A1 - Raw Material Extraction and Processing	5.63E+01	2.70E-06	2.65E-01	3.72E-02	1.48E-02	7.27E-03	5.44E+02
A2- Transport to Prod.	6.58E-01	1.19E-07	2.59E-03	4.55E-04	1.10E-04	1.96E-06	9.87E+00
A3 - Production	1.12E+01	3.61E-07	5.68E-02	6.06E-03	2.54E-03	2.41E-06	9.75E+01
A4 - Transport to Install.	1.62E+01	2.74E-06	6.71E-02	1.13E-02	2.85E-03	4.49E-05	2.38E+02
A5 - Installation	1.60E-01	1.95E-09	2.35E-04	9.55E-05	3.49E-05	1.22E-08	5.92E-01
B1 - Use	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B2 - Maintenance	3.48E+00	2.58E-07	1.79E-02	5.00E-03	7.89E-04	2.40E-05	4.20E+01
B3 - Repair	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B4 - Replacement	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B5 - Refurbishment	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B6 - Operational energy	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
B7 - Operational water	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C1 - Deconstruction	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
C2 - Transport to disposal	1.91E+00	3.46E-07	7.53E-03	1.32E-03	3.20E-04	5.68E-06	2.86E+01
C3 - Waste processing	4.44E-02	1.60E-09	1.92E-04	1.94E-05	8.25E-06	1.22E-08	4.52E-01
C4 - Disposal	7.99E+00	1.32E-07	4.96E-03	6.83E-03	1.49E-03	6.69E-07	1.32E+01

INTERPRETATION

The interpretation included the use of evaluation and sensitivity checks to steer the iterative process during the assessment, and a final evaluation including completeness, sensitivity, and consistency checks, at the end of the study [12].

The results of the cradle-to-grave LCA for TecCrete 1250 panel system has a global warming impact of 74.6 kgCO₂eq. for the TecCrete Flooring system per 1 m². Similarly, TecCrete 1500 has a global warming potential of 79.6 kgCO₂eq., TecCrete 1500SL has 85.7 KgCO₂eq., TecCrete 2000 has 91.7 KgCO₂eq. and TecCrete 2500 has 95.2 KgCO₂eq. per 1m².

The results show that the Raw material stage contributes the most towards all the module of product life cycle except for Ozone depletion where the downstream transportation to installation (A4) in the life cycle contributes the most to the environmental impacts for all TecCrete system, and it is due to the burning of diesel fuel during transportation.

TABLE 46. TABLE SHOWING EACH TECCRETE SYSTEMS HIGHEST IMPACT MODULE

TecCrete System	GWP (kg CO ₂ eq.)	ODP (kg CFC11)	AP (kg SO ₂ eq.)	EP (kg N -eq.)	SFP (kg O ₃ eq.)	ADP (MJ)
1250	A1 – Raw Material Extraction & Processing	A4 - Transport to Installation/ Downstream	A1 – Raw Material Extraction & Processing	A1 – Raw Material Extraction & Processing	A1 – Raw Material Extraction & Processing	A1 – Raw Material Extraction & Processing
1500						
1500SL						
2000						
2500						

The TecCrete 1250 access flooring system cover the majority of product sold in FY2019, the following graph shows the impact at each module for TecCrete 1250 flooring system, a similar trend was seen in all the TecCrete products modelled in the study.

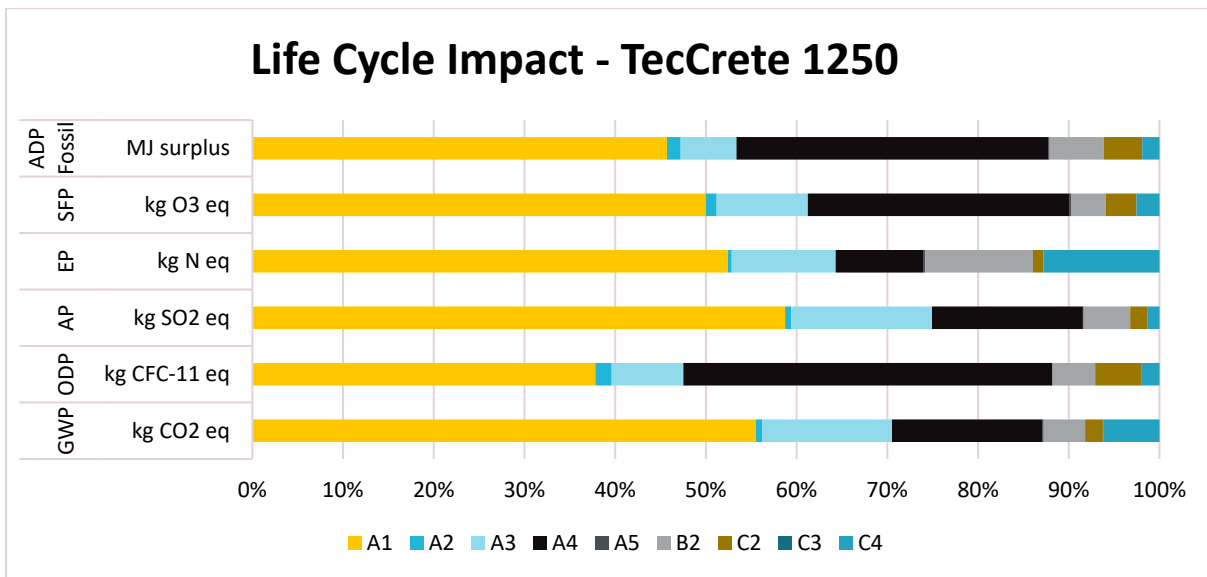


FIGURE 1. LIFE CYCLE IMPACT OF TECCRETE- 1250 PANEL SYSTEM

The TecCrete environmental impacts increases with increase in the load system, as the stringer or the change in thickness changes the material composition which increases the weight of the system. This increase in weight causes more weighted distance in the transportation section which further increases the environmental impacts.

In general, consideration should be taken to reduce energy consumption at the production stage, which can be achieved through efficiency and/or the use of renewable energy (on-site production or through the purchase of renewable energy credits). The downstream transportation contributes majorly towards all the environmental impacts as the downstream is mostly via truck, considering a substantial portion of this via rail could reduce the environmental impacts.

Limitations of Study

Due to the inherent limitations of LCA methodology, this study should not be used as the sole source of environmental data on the materials and processes modelled. This LCA has been performed according to best practices in modelling and allocation.

Resource use at the GIFS facility were allocated to each TecCrete flooring system product based on the mass of the product as a fraction of the total facility production (i.e., mass-based allocation).

Theecoinvent dataset used to represent polyester resin used in packaging is obsolete and there might be no environmental impacts accounting because of using this dataset, it is assumed their will not be a significant environmental impact as the weight of this component is very small. Additionally, a sensitivity analysis was performed to check if there would be any environmental impacts.

ADDITIONAL INFORMATION

- TecCrete is compliant with California department of public health CDHP/EHLP/Standard method version 1.2, 2017 as they have been tested to the criteria for VOC emission by Berkeley analytical. The test report can be found at <https://berkeleyanalytical.com/working-us/test-reports>
- Industry Leading 3-year standard structural warranty
- All under-structure are tested to Ceilings & Interior systems Construction association (CISCA) test standards.
- The TecCrete facility is ISO 14001:2015 [13] and ISO 9001:2015 [14] certified, demonstrating that they maintain an environmental management system and a quality management system.
- Environment and Health during use: No environmental or health impacts are expected from TecCrete access floor systems during its use.
- Extraordinary Effects: No environmental or health impacts are expected due to extraordinary effects including fire and/or water damage and product destruction.

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