Issuance date: 28.10.2024
Validation: 29.11.2024
Validity date: 28.10.2029

Steel HelCor® pipes and ViaCon Stormwater Solutions

Document name – (Type III Environmental Product Declaration No. 685/2024)

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ViaCon UK
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Basic information

This declaration is the Type III Environmental Product Declaration (EPD) based on EN 15804+A2 and verified according to ISO 14025 by an external auditor. It contains the information on the impacts of the declared construction materials on the environment and their aspects verified by the independent body according.

to ISO 14025. Comparison or evaluation of EPD data is possible only if all the compared data were created according to EN 15804+A2.**Life cycle analysis (LCA):** [XXX]

The year of preparing the EPD: 2024

Product standards: EN 1090-1

Service Life: 120 years.

PCR: ITB-PCR A

Declared unit: 1 ton.

Reasons for performing LCA: B2B

Representativeness: United Kingdom, 2023

ITB is the verified member of The European Platform for EPD program operators and LCA practitioner
www.eco-platform.org

MANUFACTURER

ViaCon UK, with more than 35 years of civil engineering experience, provides specialized, world-class Stormwater management solutions & culverts solutions that are strong and durable, cost-efficient, and sustainable.

The manufacturing plant is in Sutton (UK, Figure 1).

Figure 1 The view of ViaCon UK manufacturing plant located in Sutton.

ViaCon UK is one of leading providers of Stormwater management solutions for a variety of applications. The range of products includes solutions for stormwater retention and infiltration, ensuring effective management of excess water during heavy rainfall. Additionally, ViaCon UK provides systems for fire-water retention, which not only enhances environmental safety but also contributes to sustainable infrastructure practices. Each solution is crafted to meet the specific needs of diverse projects, ensuring durability and adaptability.

PRODUCTS DESCRIPTION

HelCor® based products covered by this EPD are helically corrugated steel pipes that are a popular solution for Stormwater management solutions, bridges, culverts, and underpasses passages. They can be buried at depths of over 30 metres and withstand rough conditions for decades. Compared to its concrete alternatives, HelCor® is a lighter and more economical solution. The properties for Steel HelCor® pipes and ViaCon Stormwater Solutions manufactured by ViaCon UK are listed in Table 1. Steel pipes HelCor® and are helically corrugated steel products made of S250GD/S220GD/DX51D steel grade. Complete systems of helically corrugated pipes include interconnected runs of pipes, elbows or T-connections and additional elements such as manholes, inspection chambers etc. European

Standard EN 1991- 2 allows for the design of HelCor® pipes as engineering structures for every class of road and railway.

Table 1 Properties of manufactured products by ViaCon UK

Product	Dimension	Properties
HelCor® Pipes	D300mm-D3600mm	Galvanized, galvanized+ painted, PE coated. thickness 1.5mm-3.5mm
ViaCon Stormwater Solutions	D300mm-D3600mm	Galvanized, galvanized+ painted, PE coated. thickness 1.5mm-3.5mm

Dimensional tolerance: acc.to EN 1090-2, weldability: acc.to EN 10025-2, durability: surface preparation acc.to EN 1090-2, galvanizing acc.to EN 1461, EN 10346, surface coating: acc.to EN 12944-5, EN 10169, producing class till EXC3 acc.to EN-1090-2. More specific information (on products) is available on the producer website: www.viacon.co.uk.

LIFE CYCLE ASSESSMENT (LCA) – general rules applied.

Declared Unit

The declared unit is 1 ton of galvanized HelCor® pipes and ViaCon Stormwater Solutions 300mm diameter to 3600mm diameter, 1.5mm up to 3.5mm gauge.

System boundary

The life cycle analysis of the declared products covers “Product Stage” A1-A3, A4-A5, C1-C4+D modules in accordance with EN 15804+A2 and ITB PCR A (cradle to gate with options). Energy and water consumption, emissions as well as information on generated wastes were inventoried and were included in the calculation. It can be assumed that the total sum of omitted processes does not exceed 5% of all impact categories. In accordance with EN 15804+A2, machines and facilities (capital goods) required for the production as well as transportation of employees were not included in LCA.

Allocation

The allocation rules used for this EPD are based on general ITB PCR A (v1.6, 2023). Production of the Steel HelCor® pipes and ViaCon Stormwater Solutions is a line process conducted in the ViaCon UK, located in Sutton (United Kingdom). All impacts from raw materials extraction and processing are allocated in module A1 of the Life Cycle. Impacts from the global line production of ViaCon UK were inventoried and 100% was allocated to the production of the Steel HelCor® pipes and ViaCon Stormwater Solutions based on the

products mass basis. Water and energy consumption, associated emissions and generated wastes are allocated to module A3.

Modules A1 and A2: Raw materials supply and transport

Galvanized steel coils and sheets used to produce HelCor® pipes come from recognized international steel providers. Means of transport include trains and lorries. European standards for average combustion were used for calculations.

Module A3: Production

A scheme of the Steel HelCor® pipes and ViaCon Stormwater Solutions production is presented in Figure 2.

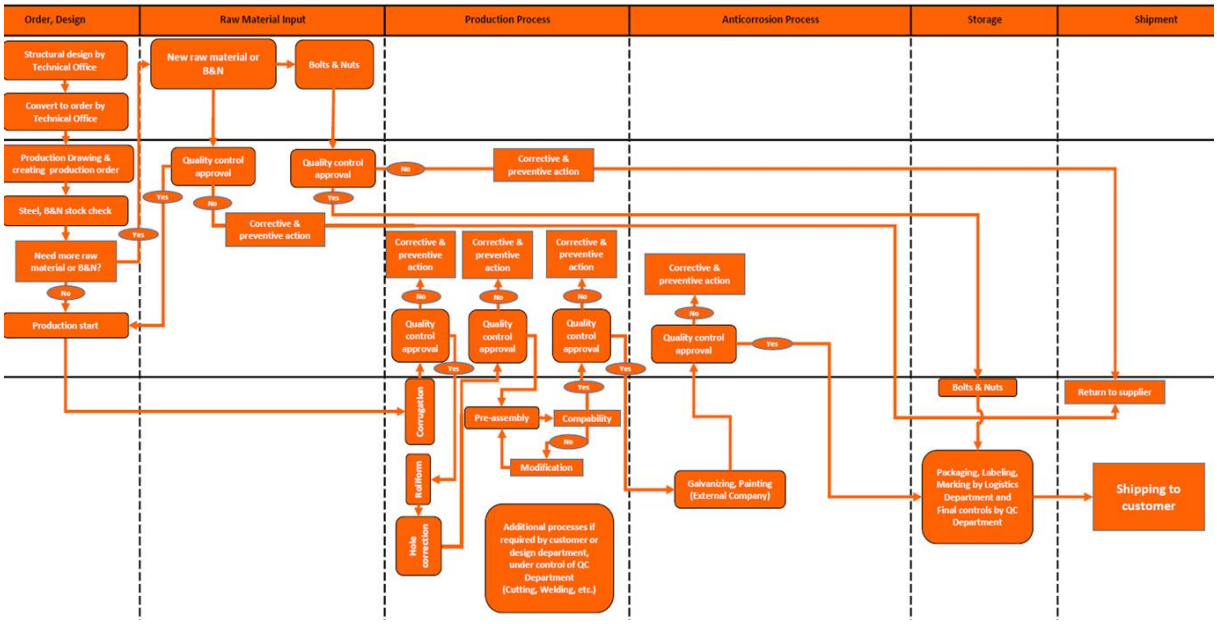

Figure 2 Manufacturing process scheme (A1-A3), with forming/assembly process in Sutton (A3)

Module A4: transport to consumer

Vehicle transport at 500 km is considered (emission standard: Euro 5) with 100% load capacity.

Modules C and D: End-of-life (EOL)

A precise modelling of impacts occurring at the deconstruction stage -the module C1 - is difficult but was estimated based on the existing literature (energy consumption on the standard deconstruction process). In the adapted end-of-life scenario, the deconstructed steel products (100%) are transported to a waste processing plant distant by 100 km on > 16t lorry EURO 5, where undergo shredding (C3). Landfill scenario is 2% of steel products (C4).

Module D presents credits resulting from the recycling of the primary steel scrap, calculated in accordance with the net scrap approach developed by the World Steel Association.

Table 2 Manufacturing process scheme (A1-A3), with forming/assembly process in Sutton (A3)

Material	Material recovery	Recycling	Landfilling
Steel scrap	100%	98%	2%

Electricity at end-of-life (module C) has been modelled using an average United Kingdom electricity mix as the location where the product reaches end-of-life is unknown.

Data collection period

The data for manufacture of the declared products refer to period between 01.01.2023 – 31.12.2023 (1 year). The life cycle assessments were prepared for United Kingdom as reference area.

Data quality

The data selected for LCA originate from ITB-LCI questionnaires completed by ViaCon UK and verified by data audit. No data collected is older than five years and no generic datasets used are older than ten years. The representativeness, completeness, reliability, and consistency are judged as good. The background data for the processes come from the following resources database Ecoinvent v.3.10 and specific EPD from steel suppliers.

Assumptions and estimates

The impacts of the representative products were aggregated using weighted average.

Calculation rules

LCA was performed using ITB-LCA tool developed in accordance with EN15804+A2. Emission of greenhouse gases was calculated using the IPCC 2013 GWP method with a 100-year horizon. Emission of acidifying substances, Emission of substances to water contributing to oxygen depletion, Emission of gases that contribute to the creation of ground-level ozone, Abiotic depletion, and ozone depletion emissions where all calculated with the CML-IA baseline method.

LIFE CYCLE ASSESSMENT (LCA) – Results

Declared unit.

The declaration refers to declared unit (DU) – 1 ton of Steel Helcor pipes and Helcor Tanks produced in the United Kingdom. The following life cycle modules (Table 3) were included in the analysis. The following tables 4-7 show the environmental impacts of the life cycle of selected modules (A1-A5+C1-C4+D).

Table 3 System boundaries for the environmental characteristic of the product.

Environmental assessment information (MD – Module Declared, MND – Module Not Declared, INA – Indicator Not Assessed)																
Product stage			Construction process		Use stage							End of life				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport to construction site	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal	Reuse-recovery-recycling potential
A1	**A2**	**A3**	**A4**	**A5**	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**C1**	**C2**	**C3**	**C4**	**D**
MD	**MD**	**MD**	**MD**	**MD**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MND**	**MD**	**MD**	**MD**	**MD**	**MD**

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Table 4 Life cycle assessment (LCA) results for specific product – environmental impacts of (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Global Warming Potential	eq. kg CO_2	2.48E+03	1.97E+01	3.90E+01	2.54E+03	1.52E+02	6.31E-01	1.17E+00	1.67E+01	2.25E+01	2.64E-01	-1.42E+03
Greenhouse potential - fossil	eq. kg CO_2	2.48E+03	1.96E+01	3.84E+01	2.54E+03	1.51E+02	6.29E-01	1.17E+00	1.66E+01	2.18E+01	2.63E-01	-1.43E+03
Greenhouse potential - biogenic	eq. kg CO_2	-2.37E+00	6.70E-02	5.36E-01	-1.76E+00	1.79E-01	1.31E-03	1.05E-03	5.68E-02	3.04E-01	6.71E-04	-3.17E+00
Global warming potential - land use and land use change	eq. kg CO_2	1.10E+00	7.70E-03	3.76E-02	1.14E+00	5.05E-01	7.60E-04	1.15E-04	6.52E-03	2.55E-01	2.49E-04	-1.84E-01
Stratospheric ozone depletion potential	eq. kg CFC 11	2.09E-05	4.54E-06	5.75E-06	3.11E-05	2.55E-06	3.20E-08	2.48E-07	3.85E-06	1.44E-07	1.07E-07	-5.32E-05
Soil and water acidification potential	eq. mol H+	1.83E+01	7.96E-02	1.22E-01	1.85E+01	6.92E-01	1.70E-03	6.96E-03	6.75E-02	1.50E-01	2.48E-03	-5.65E+00
Eutrophication potential - freshwater	eq. kg P	7.49E-01	1.32E-03	5.34E-03	7.56E-01	1.23E-02	6.07E-05	3.65E-05	1.12E-03	2.48E-02	2.45E-05	-6.24E-01
Eutrophication potential - seawater	eq. kg N	1.27E+00	2.40E-02	6.83E-02	1.37E+00	2.64E-01	4.75E-04	2.86E-03	2.04E-02	2.59E-02	8.62E-04	-1.24E+00
Eutrophication potential - terrestrial	eq. mol N	5.93E+01	2.62E-01	3.20E-01	5.99E+01	2.84E+00	5.45E-03	3.14E-02	2.22E-01	2.25E-01	9.43E-03	-1.35E+01
Potential for photochemical ozone synthesis	eq. kg NMVOC	3.73E+00	8.03E-02	9.44E-02	3.90E+00	9.83E-01	1.50E-03	8.57E-03	6.80E-02	1.43E-07	2.74E-03	-7.05E+00
Potential for depletion of abiotic resources - non-fossil resources	eq. kg Sb	6.27E-02	6.95E-05	1.08E-04	6.29E-02	4.88E-04	1.87E-06	5.87E-07	5.89E-05	2.37E-05	6.04E-07	-2.46E-02
Abiotic depletion potential - fossil fuels	MJ	2.38E+04	2.91E+02	1.13E+03	2.52E+04	2.16E+03	1.76E+01	1.56E+01	2.47E+02	2.34E+02	7.22E+00	-1.22E+04
Water deprivation potential	eq. m^3	5.05E+04	1.35E+00	1.64E+01	5.05E+04	1.06E+01	1.44E-01	4.19E-02	1.14E+00	9.75E+00	2.29E-02	-2.61E+02

Table 5 Life cycle assessment (LCA) results for specific product – additional impacts indicators (DU: 1 ton)

Indicator	Unit	A1-A3	A4-A5	C1-C4	D
Particulate matter	disease incidence	INA	INA	INA	INA
Potential human exposure efficiency relative to U235	eg. kBq U235	INA	INA	INA	INA
Potential comparative toxic unit for ecosystems	CTUe	INA	INA	INA	INA
Potential comparative toxic unit for humans (cancer effects)	CTUh	INA	INA	INA	INA
Potential comparative toxic unit for humans (non-cancer effects)	CTUh	INA	INA	INA	INA
Potential soil quality index	dimensionless	INA	INA	INA	INA

Table 6 Life cycle assessment (LCA) results for specific product - the resource use (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Consumption of renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	1.73E+03	4.18E+00	2.41E+02	1.98E+03	3.15E+01	5.14E+00	0.00E+00	3.54E+00	7.51E+01	6.27E-02	-1.00E+03
Consumption of renewable primary energy resources used as raw materials	MJ	1.24E+02	0.00E+00	0.00E+00	1.24E+02	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Total consumption of renewable primary energy resources	MJ	1.86E+03	4.18E+00	2.41E+02	2.10E+03	3.15E+01	5.14E+00	8.91E-02	3.54E+00	7.51E+01	6.27E-02	-1.00E+03
Consumption of non-renewable primary energy - excluding renewable primary energy sources used as raw materials	MJ	2.46E+04	2.91E+02	8.30E+02	2.57E+04	2.17E+03	1.76E+01	0.00E+00	2.47E+02	2.34E+02	7.22E+00	-1.19E+04
Consumption of non-renewable primary energy resources used as raw materials	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	0.00E+00	0.00E+00	0.00E+00
Total consumption of non-renewable primary energy resources	MJ	2.46E+04	2.91E+02	1.15E+03	2.61E+04	2.17E+03	1.76E+01	1.56E+01	2.47E+02	2.34E+02	7.22E+00	-1.19E+04
Consumption of secondary materials	kg	1.26E+02	9.76E-02	1.33E-01	1.26E+02	9.67E-01	2.01E-03	6.10E-03	8.27E-02	2.93E-02	1.52E-03	-1.82E+02
Consumption of renew. secondary fuels	MJ	9.78E-02	1.08E-03	4.06E-04	9.93E-02	1.22E-02	6.75E-06	1.99E-05	9.11E-04	1.35E-04	3.96E-05	-2.24E-01
Consumption of non-renewable secondary fuels	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	0.00E+00	0.00E+00	0.00E+00
Net consumption of freshwater	m^3	1.13E+01	3.66E-02	2.26E+00	1.36E+01	3.21E-01	3.35E-03	9.46E-04	3.10E-02	2.34E-01	7.90E-03	-9.89E+00

Table 7 Life cycle assessment (LCA) results for specific product – waste categories (DU: 1 ton)

Indicator	Unit	A1	A2	A3	A1-A3	A4	A5	C1	C2	C3	C4	D
Hazardous waste	kg	3.77E+00	3.27E-01	1.17E+00	5.27E+00	3.89E+00	2.19E-02	2.09E-02	2.77E-01	9.75E-01	7.67E-03	-1.39E-01
Non-hazardous waste	kg	2.42E+01	5.80E+00	1.83E+01	4.82E+01	7.26E+01	3.51E-01	1.47E-01	4.92E+00	1.19E+02	1.08E-01	-1.45E+02
Radioactive waste	kg	1.76E-04	2.17E-05	7.91E-03	8.11E-03	4.90E-04	1.37E-04	1.09E-04	1.84E-05	1.11E-05	4.79E-05	-1.55E-02
Components for re-use	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	0.00E+00	0.00E+00	0.00E+00
Materials for recycling	kg	2.61E-01	9.01E-04	7.96E-02	3.41E-01	1.67E-02	8.20E-04	2.08E-05	7.64E-04	1.13E-02	1.44E-05	0.00E+00
Materials for energy recovery	kg	4.67E-03	7.29E-06	1.02E+01	1.02E+01	1.32E-04	1.55E-07	3.32E-07	6.18E-06	3.75E-06	1.71E-07	0.00E+00
Exported Energy	MJ	9.95E+00	0.00E+00	5.43E+00	1.54E+01	5.08E-01	1.07E-01	0.00E+00	0.00E+00	1.50E-02	0.00E+00	0.00E+00

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Verification

The process of verification of this EPD is in accordance with ISO 14025 and ISO 21930. After verification, this EPD is valid for a 5-year-period. EPD does not have to be recalculated after 5 years if the underlying data have not changed significantly.

The basis for LCA analysis was EN 15804 + A2 and ITB PCR A
Independent verification corresponding to ISO 14025 (sub clause 8.1.3.) External ☒ Internal ☐
External verification of EPD: Halina Prejzner, PhD. Eng. LCI audit and verification: Michał Chwedaczuk, M.Sc. Eng. LCA, LCI audit and input data verification: Michał Piasecki, PhD., D.Sc., Eng.

Note 1: The declaration owner has the sole ownership, liability, and responsibility for the information provided and contained in EPD. Declarations of construction products may not be comparable if they do not comply with EN 15804+A2. For further information about comparability, see EN 15804+A2 and ISO 14025.

Note 2: ITB is a public Research Organization and Notified Body (EC Reg. no 1488) to the European Commission and to other Member States of the European Union designated for the tasks concerning the assessment of building products' performance. ITB acts as the independent, third-party verification organization (see ISO 17025/17065/17029). ITB-EPD program is recognized and registered member of The European Platform - Association of EPD program operators and ITB-EPD declarations are registered and stored in the international ECO-PORTAL.

Normative references

- ITB PCR A General Product Category Rules for Construction Products (v.1.6.,2023)
- ISO 14025:2006, Environmental labels and declarations – Type III environmental declarations – Principles and procedures
- ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services
- ISO 14044:2006 Environmental management – Life cycle assessment – Requirements and guidelines
- ISO 15686-1:2011 Buildings and constructed assets – Service life planning – Part 1: General principles and framework
- ISO 15686-8:2008 Buildings and constructed assets – Service life planning – Part 8: Reference service life and service-life estimation
- EN 15804:2012+A2:2019 Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products.
- ISO 14067:2018 Greenhouse gases — Carbon footprint of products — Requirements and guidelines for quantification
- PN-EN 15942:2012 Sustainability of construction works – Environmental product declarations – Communication format business-to-business.
- ISO 20915:2018 Life cycle inventory calculation methodology for steel products
- World Steel Association 2017 Life Cycle inventory methodology report for steel products

LCA, LCI, input data verification

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Certification

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CERTIFICATE № 685/2024
of TYPE III ENVIRONMENTAL DECLARATION

Products:

Steel HelCor pipes and ViaCon Stormwater Solutions

Manufacturer:

ViaCon UK

10 Sutton Fold Industrial Estate, Wa9 3GL, United Kingdom

confirms the correctness of the data included in the development of
Type III Environmental Declaration and accordance with the requirements of the standard

EN 15804+A2

Sustainability of construction works.
Environmental product declarations.
Core rules for the product category of construction products.

This certificate, issued on 28th October 2024 is valid for 5 years
or until amendment of mentioned Environmental Declaration

Head of the Thermal Physic, Acoustics and Environment Department
Agnieszka Winkler-Skalna, PhD

INSTYTUT TECHNIKI BUDOWLANEJ

Deputy Director for Research and Innovation
Krzysztof Kuczyński, PhD

Warsaw, October 2024