

Statement of Verification

sBREG EN EPD No.: 000482

Issue 01

This is to verify that the

Environmental Product Declaration

provided by:

CCL Stressing Systems Ltd

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

1kg of XV post tensioning anchor

**BRE Global
Verified
EPD**

Company Address

CCL Stressing Systems Ltd,
Unit 8,
Millennium Drive,
Leeds,
LS115BP



Emma Baker

Signed for BRE Global Ltd

Emma Baker

Operator

21 April 2023

Date of this Issue

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20 April 2028

Expiry Date



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Environmental Product Declaration

EPD Number: 000482

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	LCA consultant/Tool
CCL Stressing Systems Ltd, Unit 8, Millennium Drive, Leeds, LS115BP	LCA Consultant: Bala Subramanian LCA Tool: BRE LINA 2.0
Declared Unit	Applicability/Coverage
1kg of XV post tensioning anchor	Product Average
EPD Type	Background database
Cradle to Gate	Ecoinvent 3.2
Demonstration of Verification	
CEN standard EN 15804 serves as the core PCR ^a	
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐ Internal ☒ External	
(Where appropriate ^b) Third party verifier: Nigel Jones	
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)	
Comparability	
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A1:2013 for further guidance	

Information modules covered

Product			Construction		Use stage								End-of-life				Benefits and loads beyond the system boundary
A1	A2	A3	A4	A5	Related to the building fabric				Related to the building				C1	C2	C3	C4	D
Raw materials supply	Transport	Manufacturing	Transport to site	Construction – Installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction demolition	Transport	Waste processing	Disposal		Reuse, Recovery and/or Recycling potential
☒	☒	☒	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Note: Ticks indicate the Information Modules declared.

Manufacturing site

CCL Stressing Systems Ltd,
Unit 8,
Millennium Drive,
Leeds,
LS115BP

Construction Product

Product Description

The XV anchorage is a patented post-tensioning anchor that works like a bond anchorage using CCL proprietary anchorage and proprietary high strength grout. It is mostly used in vertical applications (such as walls, columns, piers, etc.) in cast-in-place and precast concrete elements. The anchorage system can be used in buildings, bridges, containment, and civil structures, as well as repair and strengthening.

The XV anchor is designed to be compatible with the equivalent XM anchor designation for 15mm strands (15.2 and 15.7mm), with the XM anchor acting as the live stressing end usually placed on the opposite side of the concrete element. The XV system includes sizes XV10 to XV60.

Anchor Assembly and Description	No. of strands	Anchor Assembly Weight (Kg)
XV range (XV10 to XV60)	4T15 - 19T15	11-42

This is an average EPD covering anchor sizes produced over the course of 1 year.

Technical Information

The XV meets the requirements of EAD 160004-00-0301 and the strand used is as per prEN10138. The XV System follows the same characteristics of XM Anchorage system under ETA-07/0035. Strand Characteristics is in accordance with prEN 10138-3: 2006.

Designation	d mm	As mm ²	Ms g/m	f _{pk} MPa	F _{pk} kN	F _{p0.1} kN	F _{0s} kN
Y1770-15.7	15.7	150	1172	1770	266	234	211
Y1860-15.7	15.7	150	1172	1860	279	246	221
Anchorage	n	A _p mm ²	M _p kg/m	F _{pk} kN	F ₀ kN	F _{pk} kN	F ₀ kN
XV-20	4	600	4.69	1062	842	1116	886
XV-30	7	1050	8.20	1859	1474	1953	1550
XV-40	12	1800	14.06	3186	2527	3348	2657
XV-50	15	2250	17.58	3983	3159	4185	3321
XV-60	19	2850	22.27	5045	4001	5301	4207

Maximum Allowable Prestressing Force of Tendons with Ø15.7mm Strand



Main Product Contents

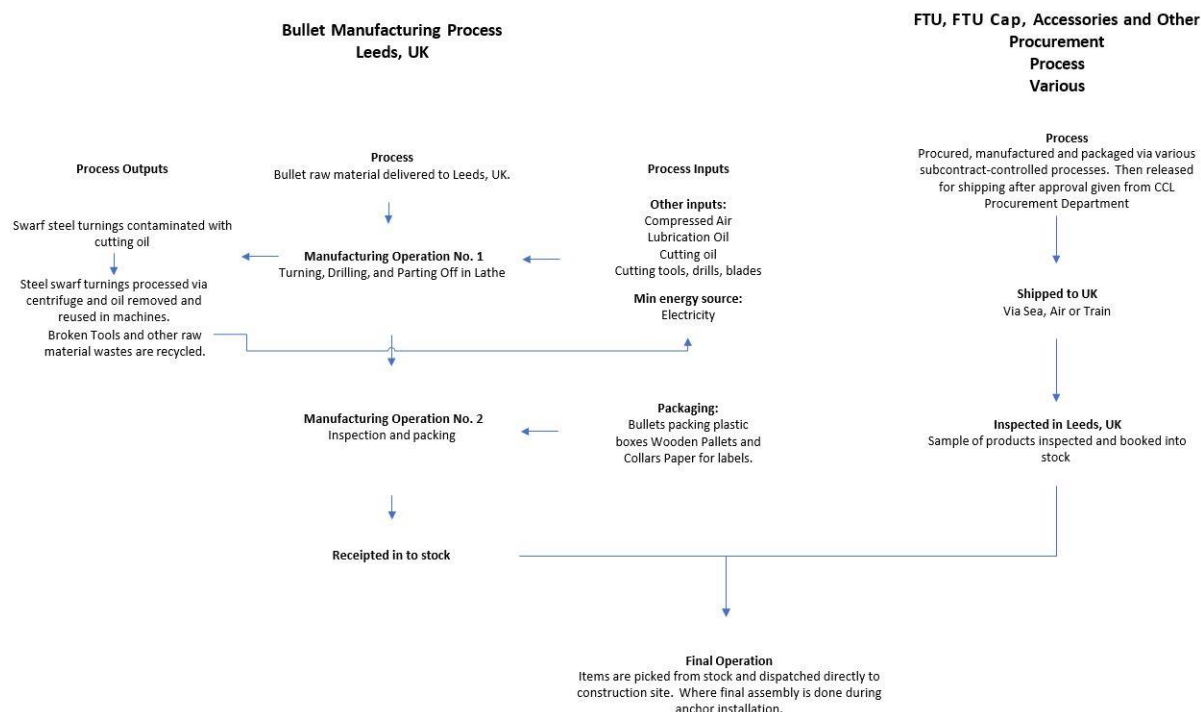
Material composition of all products assessed within this average EPD

Material/Chemical Input	%
Steel	100

Manufacturing Process

XV FTU and End Cap are manufactured by foundries under CCL's quality control procedures. XV bullets are machined from steel barstock purchased by CCL. Raw bullets material is delivered to the factory in Leeds where it undergoes turning, drilling, and parting off in a lathe. Steel Swarf waste is processed and input back into the system. The bullets are then inspected before packaging and receipted into stock ready for dispatch.

Process flow diagram



Life Cycle Assessment Calculation Rules

Declared unit description

1 kg of XV Anchor as used in post tensioning concrete

System boundary

This is a cradle to gate EPD, reporting all production life cycle stages of modules from A1 to A3 inclusive in accordance with EN 15804:2012+A1:2013.

Data sources, quality and allocation

The datasets are derived from Ecoinvent v3.2 (2015), and the LCA tool used was BRE LINA v2.0. The LCA models and reports the production stage modules, A1 to A3. The quantity used in the data collection for this EPD is therefore an average value based on the total quantity of XV Post-Tensioning Anchor Systems produced during the data collection period (01/01/20-31/12/20) manufactured at CCL Stressing Systems Ltd.

CCL manufactures other products along with the XV Post-tensioning anchor system therefore allocation of fuel consumption, water consumption & discharge, and waste emissions was required, and this has been done according to the provisions of the BRE PCR PN514 and EN 15804. The original data collection form has been used while doing an LCA analysis, there was a no uplift in the given data.

Electricity consumption was determined by measuring the consumption on the manufacturing site for all production lines and weighted proportionally by production of the anchors. The consumption of water is calculated based on the factual consumption.

The specific grid electricity UK dataset has been used for the LCA modelling. Secondary data has been drawn from the BRE LINA database v2.1.21. The background LCI datasets are based on ecoinvent v3.2 (2015) which was used for all other material energy and waste data requirements.

Cut-off criteria

All inputs or outputs have been included and all raw materials, packaging and transport, energy, water use and wastes, are included, except for direct emissions to air, water and soil, which are not measured. Upstream extraction and/or processing of inputs are included within the use of the background datasets within LINA.

LCA Results for 1kg of XV post tensioning anchor

Parameters describing environmental impacts

			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO2 equiv.	kg CFC 11 equiv.	kg SO2 equiv.	kg (PO4)3- equiv.	kg C2H4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	1.61E+00	1.04E-07	7.08E-03	2.68E-03	2.05E-03	2.34E-06	2.18E+01
	Transport	A2	4.15E-01	7.09E-08	5.88E-03	7.30E-04	4.66E-04	5.11E-07	6.05E+00
	Manufacturing	A3	-4.32E-02	6.85E-09	4.81E-04	1.17E-04	4.26E-05	1.32E-07	1.42E+00
	Total	A1-3	1.98E+00	1.82E-07	1.34E-02	3.53E-03	2.55E-03	2.99E-06	2.93E+01

GWP = Global Warming Potential;
 ODP = Ozone Depletion Potential;
 AP = Acidification Potential for Soil and Water;
 EP = Eutrophication Potential;

POCP = Formation potential of tropospheric Ozone;
 ADPE = Abiotic Depletion Potential – Elements;
 ADPF = Abiotic Depletion Potential – Fossil Fuels;

Parameters describing resource use, primary energy

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	1.02E+00	4.92E-06	1.02E+00	2.41E+01	0.00E+00	2.41E+01
	Transport	A2	1.23E-01	2.22E-07	1.23E-01	6.12E+00	0.00E+00	6.12E+00
	Manufacturing	A3	1.69E+00	2.51E-07	1.69E+00	1.87E+00	0.00E+00	1.87E+00
	Total	A1-3	2.83E+00	5.39E-06	2.83E+00	3.21E+01	0.00E+00	3.21E+01

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
 PERM = Use of renewable primary energy resources used as raw materials;
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
 PENRM = Use of non-renewable primary energy resources used as raw materials;
 PENRT = Total use of non-renewable primary energy resource

Parameters describing resource use, secondary materials and fuels, use of water

			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m ³
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	2.72E-02
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	1.41E-03
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	5.80E-04
	Total	A1-A3	0.00E+00	0.00E+00	0.00E+00	2.92E-02

SM = Use of secondary material;
 RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;
 FW = Net use of fresh water

Other environmental information describing waste categories

			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	1.21E-01	8.99E-02	5.66E-05
	Transport	A2	2.58E-03	1.16E-01	4.14E-05
	Manufacturing	A3	3.39E-04	3.55E-03	1.02E-05
	Total	A1-A3	1.24E-01	2.10E-01	1.08E-04

HWD = Hazardous waste disposed;

NHWD = Non-hazardous waste disposed;

RWD = Radioactive waste disposed

Other environmental information describing output flows – at end of life

			CRU	MFR	MER	EE
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	5.06E-02	0.00E+00	0.00E+00
	Total (of product stage)	A1-A3	0.00E+00	5.06E-02	0.00E+00	0.00E+00

CRU = Components for reuse;

MFR = Materials for recycling

MER = Materials for energy recovery;

EE = Exported Energy

Individual product calculations

The LCA results listed in the tables above are for XV post tensioning anchor which is for the processing of 1 kg. The end-user of this EPD can therefore use these results to calculate impact profiles for each anchor product with different weights. The example results table for 42kg weight as follows,

LCA Results for 42 kg of XV post tensioning anchor:

Parameters describing environmental impacts

			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO2 equiv.	kg CFC 11 equiv.	kg SO2 equiv.	kg (PO4)3- equiv.	kg C2H4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	6.76E+01	4.37E-06	2.97E-01	1.13E-01	8.61E-02	9.83E-05	9.16E+02
	Transport	A2	1.74E+01	2.98E-06	2.47E-01	3.07E-02	1.96E-02	2.15E-05	2.54E+02
	Manufacturing	A3	-1.81E+00	2.88E-07	2.02E-02	4.91E-03	1.79E-03	5.54E-06	5.96E+01
	Total	A1-3	8.32E+01	7.64E-06	5.63E-01	1.48E-01	1.07E-01	1.26E-04	1.23E+03

GWP = Global Warming Potential;
 ODP = Ozone Depletion Potential;
 AP = Acidification Potential for Soil and Water;
 EP = Eutrophication Potential;

POCP = Formation potential of tropospheric Ozone;
 ADPE = Abiotic Depletion Potential – Elements;
 ADPF = Abiotic Depletion Potential – Fossil Fuels;

Parameters describing resource use, primary energy

			PERE	PERM	PERT	PENRE	PENRM	PENRT
			MJ	MJ	MJ	MJ	MJ	MJ
Product stage	Raw material supply	A1	4.28E+01	2.07E-04	4.28E+01	1.01E+03	0.00E+00	1.01E+03
	Transport	A2	5.17E+00	9.32E-06	5.17E+00	2.57E+02	0.00E+00	2.57E+02
	Manufacturing	A3	7.10E+01	1.05E-05	7.10E+01	7.85E+01	0.00E+00	7.85E+01
	Total	A1-3	1.19E+02	2.26E-04	1.19E+02	1.35E+03	0.00E+00	1.35E+03

PERE = Use of renewable primary energy excluding renewable primary energy used as raw materials;
 PERM = Use of renewable primary energy resources used as raw materials;
 PERT = Total use of renewable primary energy resources;

PENRE = Use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials;
 PENRM = Use of non-renewable primary energy resources used as raw materials;
 PENRT = Total use of non-renewable primary energy resource

Parameters describing resource use, secondary materials and fuels, use of water

			SM	RSF	NRSF	FW
			kg	MJ net calorific value	MJ net calorific value	m³
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	1.14E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	5.92E-02
	Manufacturing	A3	0.00E+00	0.00E+00	0.00E+00	2.44E-02
	Total	A1-A3	0.00E+00	0.00E+00	0.00E+00	1.23E+00

SM = Use of secondary material;
 RSF = Use of renewable secondary fuels;

NRSF = Use of non-renewable secondary fuels;
 FW = Net use of fresh water

LCA Results (continued)

Other environmental information describing waste categories					
			HWD	NHWD	RWD
			kg	kg	kg
Product stage	Raw material supply	A1	5.08E+00	3.78E+00	2.38E-03
	Transport	A2	1.08E-01	4.87E+00	1.74E-03
	Manufacturing	A3	1.42E-02	1.49E-01	4.28E-04
	Total	A1-A3	5.21E+00	8.82E+00	4.54E-03

HWD = Hazardous waste disposed;

NHWD = Non-hazardous waste disposed;

RWD = Radioactive waste disposed

Other environmental information describing output flows – at end of life						
			CRU	MFR	MER	EE
			kg	kg	kg	MJ per energy carrier
Product stage	Raw material supply	A1	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Transport	A2	0.00E+00	0.00E+00	0.00E+00	0.00E+00
	Manufacturing	A3	0.00E+00	2.13E+00	0.00E+00	0.00E+00
	Total (of product stage)	A1-A3	0.00E+00	2.13E+00	0.00E+00	0.00E+00

CRU = Components for reuse;

MFR = Materials for recycling

MER = Materials for energy recovery;

EE = Exported Energy

Interpretation of Results

The bulk of the environmental impacts and primary energy demand are attributed to the upstream manufacturing process of the XV post tensioning anchor, covered by information modules A1-A3 of EN15804:2012+A1:2013.

References

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