

## Statement of Verification

BREG EN EPD No.: 000209

Issue 01

This is to verify that the  
**Environmental Product Declaration**  
provided by:  
**Addagrip Terraco Ltd**



is in accordance with the requirements of:  
**EN 15804:2012+A1:2013**  
and  
**BRE Global Scheme Document SD207**

This declaration is for:  
**Addagrip Resin Bound Decorative Surfacing System**

### Company Address

Addagrip House  
Bell Lane Industrial Estate  
Uckfield  
East Sussex  
TN22 1QL



Signed for BRE Global Ltd

Emma Baker  
Operator

27 July 2018  
Date of this Issue

27 July 2018  
Date of First Issue

26 July 2023  
Expiry Date



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## Environmental Product Declaration

EPD Number: 000209

### 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
Addagrip Terraco Ltd Addagrip House Bell Lane Industrial Estate Uckfield East Sussex TN22 1QL	BRE LINA tool
Declared/Functional Unit	Applicability/Coverage
Declared Unit: 1 m <sup>2</sup> of Addagrip Resin Bound Decorative Surfacing Systems (Addaset, Addabound, Terrabound and Terrabase)	Product Average.
EPD Type	Background database
Cradle to Gate	ecoinvent
Demonstration of Verification	
CEN standard EN 15804 serves as the core PCR <sup>a</sup>	
Independent verification of the declaration and data according to EN ISO 14025:2010 <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External	
(Where appropriate <sup>b</sup> ) 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
					Related to the building fabric					Related to the building						
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	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
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Note: Ticks indicate the Information Modules declared.

## Manufacturing site(s)

Addagrip Terraco Ltd  
 Addagrip House  
 Bell Lane Industrial Estate  
 Uckfield  
 East Sussex  
 TN22 1QL

## Construction Product:

### Product Description

Addagrip Resin Bound Decorative Surfacing Systems (Addaset, Addabound, Terrabound and Terrabase) are resin bound surface course systems comprising a two-component, solvent-free, cold applied polyurethane binder, and fine and coarse 3 mm, 6 mm or 10 mm sized aggregates. They provide a smooth, hard wearing and low maintenance porous/semi porous surface using a range of aggregates. The finished surface is a seamless bound paving system which is flexible and resistant to cracking and can be applied onto asphalt and concrete or other stable substrates.

### Technical Information

Property	Value, Unit
Resistance to permanent deformation	The 3 mm, 6 mm and 10 mm aggregate based systems have a resistance to rut rate and rut depth that is classified as Type 2 in accordance with PD 6691:2015, Appendix D, Table D.2.
Tensile bond strength	Laboratory testing to TRL Report 176, Appendix J confirmed satisfactory tensile bond strength to both asphalt and concrete when installed in accordance with the provisions of BBA Certificate 16/5288.
Erosion index	Laboratory testing in accordance with the BBA HAPAS Guidelines for Assessment and Certification of High Friction Surfacing for scuffing at 45°C resulted in an erosion index of less than 3.0.
Chemical resistance	When tested in accordance with BS 903-26:1995, ISO 48 : 1994, the systems have a good resistance to chemicals likely to be spilt on road surfaces or parking areas, such as oil or petrol.

Property	Value, Unit
Skid and slip resistance	The initial skid resistance (prior to trafficking) measured in accordance with TRL Report 176, Appendix E (pendulum test using sliders applicable to both vehicular and foot traffic), indicates that initial measurements of greater than 50 can be achieved. The systems are considered suitable in applications where this is required.
Surface texture	The initial texture depth measured in accordance with BS EN 13036-1 : 2010 indicates that texture depth is dependent on the aggregate size of the mix. The texture depth for 3 mm aggregate is $\geq 0.7$ mm, for 6 mm is $\geq 1.2$ mm, and for 10 mm is $\geq 1.5$ mm.
Rainwater drainage	Results of vertical and horizontal permeability tests conducted in accordance with BS EN 12697-19:2004 indicate that the water will drain through the surface course into the pavement substrate thereby reducing or eliminating surface ponding. Vertical and horizontal flow rate is affected by the aggregate size used in the mix.



Image Credit: Royal Botanic Gardens Kew

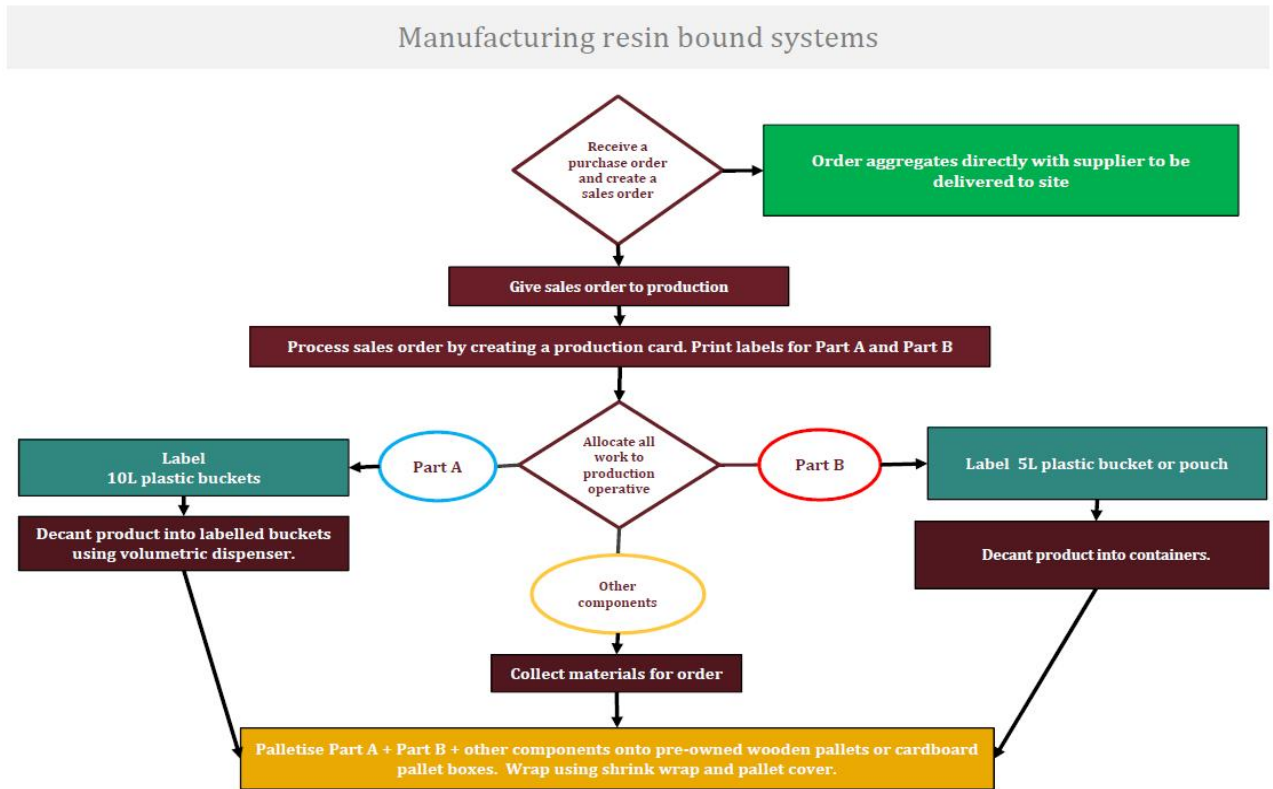
### Main Product Contents

Material Input of Terrabase	%
Castor Polyol	3.0
Aggregates	93.0
MDI	1.0
Terram fibre	1.0
HDPE grid	2.0

### Manufacturing Process

Raw resin materials are mixed on site and potted off. Aggregates are bagged at suppliers and delivered directly to customer.

## Process flow diagram



## Life Cycle Assessment Calculation Rules

### Declared / Functional unit description

Declared Unit: 1 m<sup>2</sup> of Addagrip Resin Bound Decorative Surfacing Systems (Addaset, Addabound, Terrabound and Terrabase).

### System boundary

This is a cradle to gate EPD (i.e. processes covered in the extraction and processing in modules A1 to A3).

### Data sources, quality and allocation

Manufacturer-specific data from Addagrip Terraco Ltd covering a production period of 1 year [01/01/2017 to 31/12/2017] from the Uckfield site has been used for this EPD. There are no significant differences in the composition of all four products, therefore the EPD is derived from the Terrabase product data as it has the highest weight per m<sup>2</sup>.

Materials, water and energy inputs are based on the Terrabase product as it has the highest weight per m<sup>2</sup> and was chosen to represent the other three products as will have the highest impact. This is because the composition of each product is broadly similar. Energy, water and waste have been allocated on a mass basis for the Terrabase product.

### Cut-off criteria

Data collected at the Uckfield manufacturing site was used. The inventory process in this LCA includes all data related to raw material, packaging material and consumable items, and the associated transport to the manufacturing site. Process energy and water use and direct production waste are included.

## LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO <sub>2</sub> equiv.	kg CFC 11 equiv.	kg SO <sub>2</sub> equiv.	kg (PO <sub>4</sub> ) <sup>3-</sup> equiv.	kg C <sub>2</sub> H <sub>4</sub> equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	8.66	9.14E-07	0.0704	0.0258	0.0105	0.0000331	270

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	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	68.9	0.0105	68.9	282	0	282

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 <sup>3</sup>
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0	0	0	2.16

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	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG
	Total (of product stage)	A1-3	0.319	3.12	0.000495

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	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	0	0	0.0111	0

CRU = Components for reuse;  
MFR = Materials for recycling

MER = Materials for energy recovery;  
EE = Exported Energy

## References

- BSI. Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products. BS EN 15804:2012+A1:2013. London, BSI, 2013.
- BSI. Environmental labels and declarations – Type III Environmental declarations – Principles and procedures. BS EN ISO 14025:2010 (exactly identical to ISO 14025:2006). London, BSI, 2010.
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- BSI. PD 6691:2015+A1:2016 Guidance on the use of BS EN 13108, Bituminous mixtures. Material specifications. London, BSI, 2016.
- Transport Research Laboratory (TRL) Report 176 Appendix J. Procedure for tensile adhesion. Wokingham, 1997.
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- BSI. BS EN 13036-1:2010 Road and airfield surface characteristics. Test methods. Measurement of pavement surface macrotexture depth using a volumetric patch technique. London, BSI, 2010.
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