# ENVIRONMENTAL PRODUCT DECLARATION

***In accordance with EN 15804 and ISO 14025***

## 25kg

## Thistle Universal OneCoat

**Date of issue : December 2014**
**Valid until : December 2019**


EPD VERIFIED

The environmental impacts of this product have been assessed over its whole life cycle. Its Environmental Product Declaration has been verified by an independent third party.

**DECLARATION NUMBER**

**S-P-00610**

British Gypsum
SAINT-GOBAIN

# 1. General information

## Manufacturer: BPB United Kingdom Limited trading as British Gypsum

**Programme used:** The International EPD® System. For more information see www.environdec.com

**EPD registration number/declaration number:** S-P-00610

**PCR identification:** EN 15804 as the core PCR + The International EPD® System PCR 2012:01 version 1.2 for Construction Products and CPC 54 construction services. And with reference to Institut Bauen und Umwelt e.V. PCR Guidance-Texts for Building-Related Products and Services, Part B: Requirements on the EPD for Mineral factory-made mortar version 1.5.

**Product / product family name and manufacturer represented:** 25kg bagged Thistle Universal OneCoat

**Declaration issued:** December 2014**, valid until:** December 2019

**Owner of the declaration:** BPB United Kingdom Limited trading as British Gypsum, Saint-Gobain House, Binley Business Park, Coventry. CV3 2TT

**EPD Prepared by**: Rachel Morris, LCA Analyst, British Gypsum

**Scope:** The LCA is based on 2013 production data for one site in the United Kingdom 25kg bagged Thistle Universal OneCoat for use in Great Britain. The production site is Kirkby Thore, Cumbria. This EPD covers information modules A1 to C4 (cradle to grave) as defined in EN 15804:2012.

The declared unit is 1kg of 25kg bagged Thistle Universal OneCoat applied to a depth of 13mm, covering 0.09m$^2$ area. Therefore, 1m$^2$ area of Thistle Universal OneCoat applied to a depth of 13mm would require 11.2kg of plaster.

EPD of construction products may not be comparable if they do not comply with EN15804.

EPD®

| |
|---|
| **CEN standard EN 15804 serves as the core PCR[a]** |
| **Independent verification of the declaration, according to EN ISO 14025:2010**<br>☐ **Internal** ☒ **External** |
| **Third party verifier[b]:**<br>**Dr Andrew Norton, Renuables** |
| **[a] Product Category Rules**<br>**[b] Optional for business-to-business communication; mandatory for business to consumer communication (see EN ISO 14025:2010, 9.4)** |

# 2. Product description

### 2.1 Product description

Thistle Universal OneCoat is a gypsum-based plaster, suitable for hand or machine application to most internal backgrounds, and is characterised by its white appearance and good impact strength. It is gypsum hemihydrate formulated with special additives to control working and setting characteristics. It includes lightweight aggregate to improve the plasters handling, workability and application, and dries to provide a white, smooth, matt finish. This plaster is one of our products within our plasters range that is certified to BES 6001, achieving a rating of 'Excellent'.

### 2.2 Application

Thistle plasters have been formulated to suit a wide variety of background types including concrete, brick, blockwork, sand/cement, expanded metal lath and plasterboard. They are resilient and scuff-resistant for general purposes and are free from inherent shrinkage cracking. Due to the design flexibility of British Gypsum plaster systems, they can be tailored to meet the requirements of a wide range of applications, from office and commercial space to education, healthcare and industrial.

Thistle Universal OneCoat can be used in one coat at thicknesses suitable for all normal purposes, on backgrounds which include brick, block, concrete, Gyproc plasterboard and expanded metal lath. Its versatility makes it ideal for patching and other small jobs and for work on mixed backgrounds.

### 2.3 Technical data

Thistle Universal OneCoat conforms to EN 13279-1:2008 Gypsum binders and gypsum plasters. Definitions and requirements.

Type B4/20/2: Gypsum building plaster for plasterwork with enhanced surface hardness with an initial setting time > 20 minutes and a compressive strength ≥ 2.0 N/mm$^2$.
Type C3/20: Acoustic plaster with an initial setting time > 20 minutes.

| | |
|---|---|
| **EN CLASSIFICATION** | B4/20/2, C3/20 |
| **GROSS DENSITY** | 861.5 kg/m$^3$ |
| **CLASS OF REACTION TO FIRE PERFORMANCE** | A1 |

**Certifications:**

**ISO 9001:2008** Quality Management System
**ISO 14001:2004** Environmental Management System
**BES 6001:Issue 2** Responsible Sourcing of Construction Products
**BS OHSAS 18001:2007** Occupational Health and Safety Management

### 2.4 Placing on the market/Application rules

Thistle Universal OneCoat conforms to EN 13279-1:2008 Gypsum binders and gypsum plasters. Definitions and requirements.

### 2.5 Delivery status

The EPD refers to a 25kg bag of Thistle Universal OneCoat.

### 2.6 Base materials/Ancillary materials

| PARAMETER | PART | QUANTITY (kg/FU) |
|---|---|---|
| **GYPSUM** | 94.6% | 0.946 |
| **ADDITIVES** | 5.4% | 0.054 |
| **TOTAL** | **100%** | **1** |
| ***PACKAGING: PLASTER BAGS*** | 0.0041kg per kg plaster | 0.0041 |
| ***PACKAGING: PALLET LINER*** | 0.0005kg per kg plaster | 0.0005 |
| ***PACKAGING: WOODEN PALLET*** | 0.0101kg per kg plaster | 0.0101 |

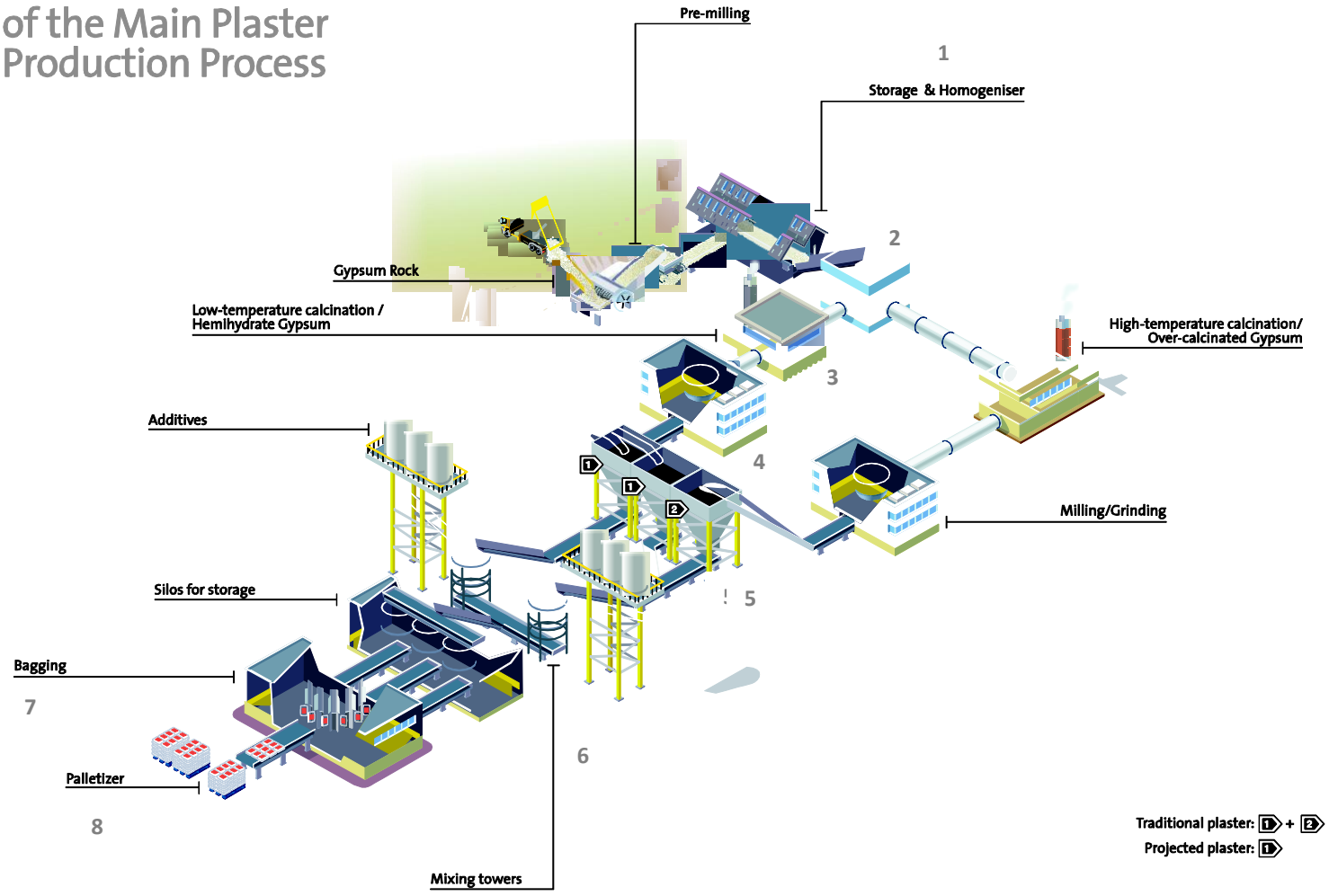
Thistle Universal OneCoat contains 94.6% gypsum as natural gypsum.

No additives used are classed as substances of concern, but as proprietary information they are not listed specifically.

## 2.7 Manufacture

Thistle Universal OneCoat is manufactured using a batch production process.

Illustration of the Main Plaster Production Process




1. Natural gypsum rock and, at some production sites, DSG are stored in a layer formation in the homogeniser via the stacker conveyor. The reclaimer takes a cross section of the face and feeds this into the plant to reduce gypsum purity variation in the final product. The homogenised gypsum is conveyed to the process stream.
2. The Lopulco Mill crushes the gypsum so that 75 – 79% passes through a 150µm mesh.
3. The natural and synthetic gypsums are dehydrated in the kettle at around 150°C to produce the plaster powder.
4. The plaster powder is further milled in the tube mills to a specific surface area within a range of 390 – 840$m^2$/kg dependent upon the finish plaster required.
5. After the tube mill, the plaster powder passes through a screen to remove any particles larger than 750µm.
6. Minor additives are weighed, added and blended with the plaster powder in the mixing tower.
7. The finished product is packed into product specific bags. The plaster sacks are weighed and printed with unique codes detailing location, date, time of manufacture and use by date.
8. Each layer of plaster sacks is stacked in a 7 bag pattern, and a pallet stabilising glue is applied between each layer for stabilisation.

British Gypsum plants are managed through ISO9001:2008 certified Quality Management Systems.

## 2.8 Environment and health during manufacture

At British Gypsum, Health and Safety is our core value. The Company's aim is always to be injury-free. A target of zero accidents at work for employees, visitors and contractors is set by the business.

In all aspects of the Company's activities, the Health and Safety at Work Act and relevant Regulations and Codes of Practice are complied with. In addition there are a number of definitive Company Safety Procedures and together these determine the minimum standards expected by the Company. In order to achieve this, close co-operation with representatives of the relevant enforcement agencies is ensured.

British Gypsum plants are managed through BS OHSAS 18001:2007 Occupational Health and Safety Management Systems. To ensure that the Company's objectives are achieved, documented safety management systems are employed at each operational site and within the central functions. These include a systematic identification of hazards, assessment of the risks and the development of safe systems of work to eliminate or reduce any risks to an acceptable level. Audits and inspections are used to monitor standards of safety management, adherence to the law and company procedures.

British Gypsum plants are managed through ISO 14001:2004 certified Environmental Management Systems.

British Gypsum has energy, water, waste and recycling targets: based on 2013 levels, by the end of 2014 a 1% reduction in the Energy Performance Index (carbon reduction) and a 5% reduction per tonne of product in water usage and waste creation are aimed for. A target of zero non-recovered waste by 2015 at production sites is also set by the business. Saint-Gobain launched a Group-wide Water Policy in 2011. The aim of the policy is to extract minimum resources and work towards 'zero discharge' of industrial process water in liquid form, while avoiding the creation of new impacts on other environments or stakeholders.

## 2.9 Product processing/Installation

**Mixing**
Thistle plasters should be mixed by adding to clean water using clean mixing equipment. Contamination from previous mixes can adversely affect the setting time and strength. Fresh contamination has more effect than old, so equipment should be washed immediately after mixing.
Thistle plasters are suitable for mixing by hand or mechanical whisk of a slow speed, high torque type.

While mechanical mixing speeds the process up, there is no need to continue mixing after dispersing lumps and achieving the right consistency. Over-mixing wastes time and energy, can affect setting times, lead to deterioration in workability and create difficulty in achieving a flat finish.

## 2.10 Packaging

Thistle Universal OneCoat is supplied on returnable 100% recyclable pallets. All pallets are FSC certified. The pallet is supplied with a 100% recyclable pallet liner which the bags of plaster sit upon. The plaster bags are composed of bleached virgin and recycled paper fibres with an inner plastic film containing the plaster.

## 2.11 Condition of use

Thistle Universal OneCoat provides a plastering system suitable for moderate impact and wear areas. If the plaster is correctly applied, it should not require any form of maintenance.

## 2.12 Environment and health during use

Thistle Universal OneCoat is not classified as hazardous according to CLP.

Plaster may form an alkaline solution on contact with body moistures or when mixed with water.

### 2.13 Reference service life

Thistle Universal OneCoat is expected to last the service life of a building (60 years), as documented in Mortars applied to a surface.

### 2.14 Extraordinary effects

**Fire**
Gypsum plasters provide good fire protection due to the unique behaviour of gypsum in fire. When gypsum protected building elements are exposed to fire, dehydration by heat (calcination) occurs at the exposed surface and proceeds gradually through the gypsum layer. Calcined gypsum on the exposed face adheres tenaciously to uncalcined material, retarding further calcination which slows as the thickness of calcined material increases. While this continues, materials adjacent to the unexposed side will not exceed 100°C – below the temperature at which most materials will ignite and far below the critical temperatures for structural components. Once the gypsum layer is fully calcined, the residue acts as an insulating layer while it remains intact. Thistle Universal OneCoat is designated A1 in accordance with BS EN 13279-1:2008.

**Water**
Thistle Universal OneCoat should be protected from continuous exposure to moisture. Prolonged or repeated exposure to moisture may cause a loss of strength and/or adhesion.

**Mechanical destruction**
Thistle Universal OneCoat is intended for commercial applications and is a stable product with no significant adverse environmental effects. The products should be installed according to British Gypsum's installation guidelines.

Also refer to section 2.3 Technical data.

### 2.15 Re-use phase

Thistle Universal OneCoat can be recycled. Please refer to British Gypsum's dedicated Plasterboard Recycling service: 0800 6335040, bgprs@saint-gobain.com

### 2.16 Disposal

Waste from gypsum plasters is normally classified as 'non-hazardous, non-inert' and is fully recyclable. Please refer to the British Gypsum Plasterboard Recycling service literature or contact the Plasterboard Recycling Customer Service Centre for details. Other methods of disposal are available. If a container of gypsum is sent to landfill, it must be deposited in a separate Monocell. The European waste catalog code is 17 08 02. Always seek the advice of a trained and competent professional.

### 2.17 Further information

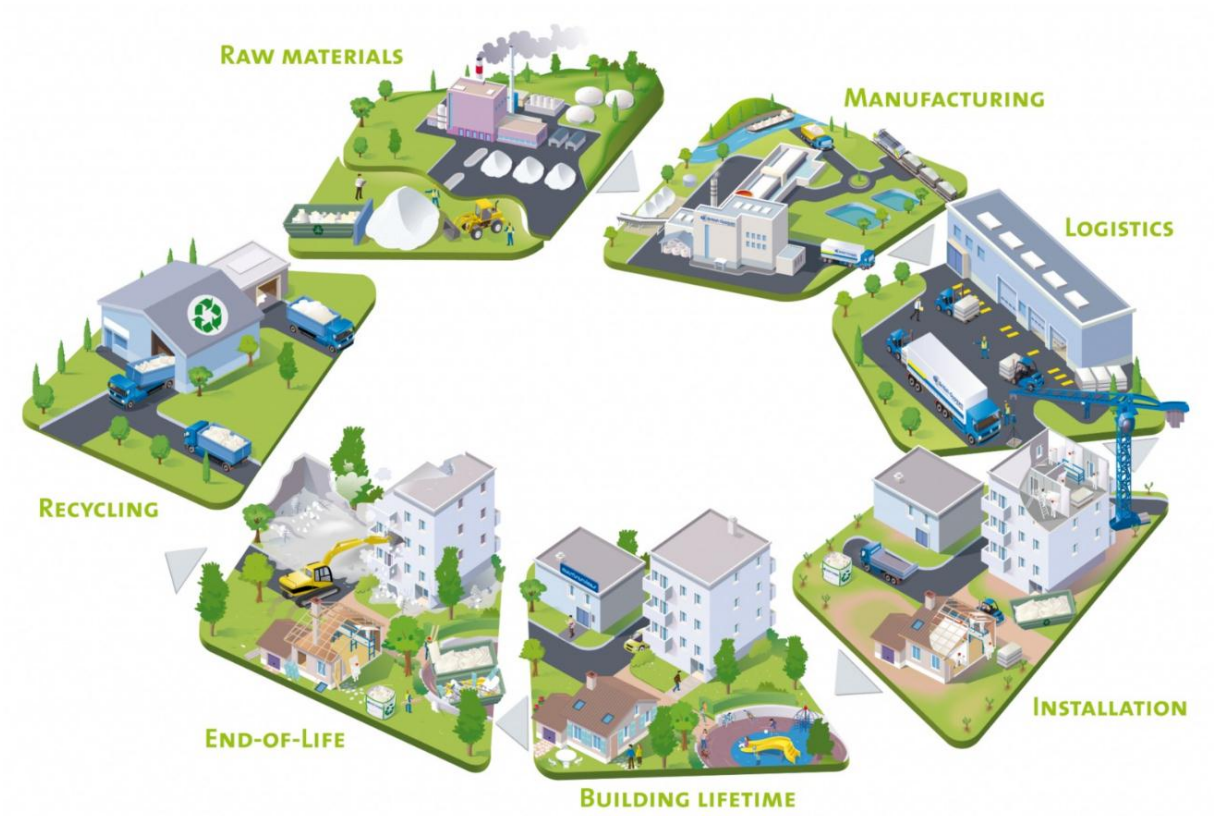
British Gypsum, East Leake, Loughborough, Leicestershire. LE12 6HX
0115 945 1000
http://www.british-gypsum.com

# 3. LCA calculation rules

| | | |
|---|---|---|
| 3.1 | FUNCTIONAL UNIT / DECLARED UNIT | The declared unit is 1kg of 25kg bagged Thistle Universal OneCoat applied to a depth of 13mm, covering 0.09$m^2$ area. Therefore, 1$m^2$ area of Thistle Universal OneCoat applied to a depth of 11mm would require 11.2kg of plaster. The gross density is 861.5kg/$m^3$. This is an indoor plaster mortar product. |
| 3.2 | SYSTEM BOUNDARIES | Cradle to Grave: Mandatory stages = A1-3, A4-5, B1-7, C1-4. |
| 3.3 | ESTIMATES AND ASSUMPTIONS | Primary data was gathered from the only production site in the UK. The distance to a waste disposal site is assumed to be 32km from all waste generating sites included in the LCA. . The end of life and installation waste handling is taken from the Environment Agency's draft report 'An investigation into the disposal and recovery of gypsum waste'. |
| 3.4 | CUT-OFF RULES | Data for recycled waste (waste that isn't landfilled or incinerated) is not included in this model, only the transport to the waste recycling centre. This is due to recycled waste being considered as the start of a future products manufacture. |
| 3.5 | BACKGROUND DATA | All primary product data was provided by British Gypsum. All secondary data was retrieved using TEAM software using Ecoinvent 2.2 (2010) and DEAM (2006) databases. |
| 3.6 | DATA QUALITY | Primary data was gathered from British Gypsum production figures for one site in the United Kingdom during the 2013 calendar year. A 2011 fuel mix for electricity usage in the UK was assumed for the production site. |
| 3.7 | PERIOD UNDER REVIEW | The data is representative of the manufacturing processes of 2013. |
| 3.8 | ALLOCATIONS | All production data has been calculated on a mass basis. DSG is allocated by economics. |
| 3.9 | COMPARABILITY | A comparison or an evaluation of EPD data is only possible where EN 15804 has been followed and the same building context and product-specific characteristics of performance are taken into account and the same stages have been included in the system boundary. According to EN 15804, EPD of construction products may not be comparable if they do not comply with this standard. According to ISO 21930, EPDs might not be comparable if they are from different programmes. |

# 4. LCA: Scenarios and additional technical information

*Flow diagram of the Life Cycle*




* Recycling is not included in the modelled LCA

## Product stage, A1-A3

**Description of the stage:**

The product stage of the specialist board products is subdivided into three modules: A1, A2 and A3 respectively “raw material supply”, “transport” and “manufacturing”.

**Description of scenarios and additional technical information**:

**A1, raw material supply**
This includes the extraction and processing of all raw materials and energy which occur upstream from the Thistle Universal OneCoat manufacturing process.

**A2, transport to the manufacturer**
The raw materials are transported to the manufacturing site. The modelling includes road, boat and/or train transportations (average values) of each raw material.

**A3, manufacturing**
This module includes the manufacture of products and the manufacture of packaging. The production of packaging material is taken into account at this stage. The processing of any waste arising from this stage is also included.

## Construction process stage, A4-A5

**Description of the stage:**

The construction process stage is divided into two modules: A4, transport to the building site and A5, installation of Thistle Universal OneCoat in the building.

**A4, transport to the building site:**
The table below quantifies the parameters for transporting Thistle Universal OneCoat from production gate to the building site. The distance quoted is a weighted average for transport of Thistle Universal OneCoat in Great Britain in 2013, from the production site to building sites, calculated using postcodes of our customers and quantity of product transported to each.

| PARAMETER | VALUE (expressed per functional/declared unit) |
|---|---|
| **Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.** | 44 tonne articulated large goods vehicle (including average payload of 24.8 tonnes)<br>Diesel consumption 34.6 litres per 100 km travelled |
| **Distance** | 292 km |
| **Capacity utilisation (including empty returns)** | 100% volume capacity<br>88.2% empty returns |
| **Bulk density of transported products** | 861.5kg/$m^3$ |
| **Volume capacity utilisation factor** | 1 |

**A5, installation in the building:**
The table overleaf quantifies the parameters for installing Thistle Universal OneCoat at the building site. All installation materials and their waste processing are included.

Figures quoted in the table are based on the Environment Agency's draft report 'An investigation into the disposal and recovery of gypsum waste'. This states that 83% of construction and demolition waste is sent to landfill with the remaining 17% recycled.

| PARAMETER | VALUE (expressed per functional/declared unit) |
|---|---|
| **Ancillary materials for installation (specified by materials)** | None |
| **Water use** | 0.0006 $m^3$ |
| **Other resource use** | None |
| **Quantitative description of energy type (regional mix) and consumption during the installation process** | 0 energy use at installation |
| **Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)** | Thistle Universal OneCoat: 0.1 kg<br>Plaster Sack: 0.00412 kg<br>Pallet Liner: 0.000451 kg<br>Pallet: 0.0101 kg |
| **Output materials (specified by type) as results of waste processing at the building site e.g. of collection for recycling, for energy recovering, disposal (specified by route)** | Thistle Universal OneCoat: 0.017 kg to recycling<br>Thistle Universal OneCoat: 0.083 kg to landfill<br>Plaster Sack: 0.00412 kg to landfill<br>Pallet Liner: 0.000451 kg to recycling<br>Pallet: 0.0101 kg to recycling |

## Use stage (excluding potential savings), B1-B7

**Description of the stage:**

The use stage is divided into the following stages:

**B1, use or application of the installed product**
**B2, maintenance**
**B3, repair**
**B4, replacement**
**B5, refurbishment**
**B6, operational energy use**
**B7, operational water use**

**Description of scenarios and additional technical information:**

The product has a reference service life of 60 years. This assumes that the product will last in situ with no requirements for maintenance, repair, replacement or refurbishment throughout this period. Thistle Universal OneCoat is a passive building product; therefore it has no impact on this stage.

## End-of-life stage C1-C4

**Description of the stage:**

This includes the following stages:

**C1, de-construction, demolition**
**C2, transport to waste processing**
**C3, waste processing for reuse, recovery and/or recycling**
**C4, disposal**

**Description of scenarios and additional technical information:**

The end of life scenarios have been taken from the Environment Agency's 'An investigation into the disposal and recovery of gypsum waste' draft report.

**End-of-life:**

| PARAMETER | VALUE (expressed per functional/declared unit) / DESCRIPTION |
|---|---|
| **Collection process specified by type** | 0.17 kg collected separately and down-cycled<br>0.83 kg collected with mixed de-construction and demolition waste to landfill |
| **Recovery system specified by type** | 0.17 kg for recycling |
| **Disposal specified by type** | 0.83 kg to landfill |
| **Assumptions for scenario development (e.g. transportation)** | 44 tonne articulated large goods vehicle (including payload of 26 tonnes)<br>Diesel consumption 38 litres per 100 km travelled<br>32 km from construction/demolition site to waste handler |

# 5. LCA: Results per kg of Thistle Universal OneCoat

**Description of the system boundary (X = Included in LCA, MND = Module Not Declared)**

| PRODUCT STAGE | | | CONSTRUCTION STAGE | | USE STAGE | | | | | | | END OF LIFE STAGE | | | | BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Raw material supply | Transport | Manufacturing | Transport | Construction-Installation process | Use | Maintenance | Repair | Replacement | Refurbishment | Operational energy use | Operational water use | De-construction demolition | Transport | Waste processing | Disposal | Reuse-recovery |
| 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 | MND |

## RESULTS OF THE LCA - ENVIRONMENTAL IMPACT: per kg of 25kg bagged Thistle Universal OneCoat

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse, recovery, recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Global Warming Potential (GWP) - *kg $CO_2$ equiv/FU* | 2.6E-01 | 2.1E-02 | 1.0E-05 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.4E-03 | 2.2E-03 | 0 | MND |
| | The global warming potential of a gas refers to the total contribution to global warming resulting from the emission of one unit of that gas relative to one unit of the reference gas, carbon dioxide, which is assigned a value of 1. | | | | | | | | | | | | | | |
| Ozone Depletion (ODP) *kg CFC 11 equiv/FU* | 1.5E-08 | 1.5E-08 | 6.9E-12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.7E-09 | 4.4E-11 | 0 | MND |
| | Destruction of the stratospheric ozone layer which shields the earth from ultraviolet radiation harmful to life. This destruction of ozone is caused by the breakdown of certain chlorine and/or bromine containing compounds (chlorofluorocarbons or halons), which break down when they reach the stratosphere and then catalytically destroy ozone molecules. | | | | | | | | | | | | | | |
| Acidification potential (AP) *kg $SO_2$ equiv/FU* | 1.8E-03 | 1.3E-04 | 6.0E-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.5E-05 | 1.6E-05 | 0 | MND |
| | Acid depositions have negative impacts on natural ecosystems and the man-made environment incl. buildings. The main sources for emissions of acidifying substances are agriculture and fossil fuel combustion used for electricity production, heating and transport. | | | | | | | | | | | | | | |
| Eutrophication potential (EP) *kg $(PO_4)^{3-}$ equiv/FU* | 9.9E-05 | 3.2E-05 | 2.8E-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.6E-06 | 7.0E-07 | 5.4E-05 | MND |
| | Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects. | | | | | | | | | | | | | | |
| Photochemical ozone creation (POPC) *kg Ethene equiv/FU* | 9.7E-05 | 2.9E-06 | 1.3E-09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.2E-07 | 8.5E-07 | 0 | MND |
| | Chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction. | | | | | | | | | | | | | | |
| Abiotic depletion potential for non-fossil resources (ADP-elements) - *kg Sb equiv/FU* | 3.1E-08 | 1.5E-11 | 1.4E-15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1.7E-12 | 2.5E-10 | 0 | MND |
| Abiotic depletion potential for fossil resources (ADP-fossil resources) - *MJ/FU* | 3.5E+00 | 2.6E-01 | 1.2E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.0E-02 | 3.4E-02 | 0 | MND |
| | Consumption of non-renewable resources, thereby lowering their availability for future generations. | | | | | | | | | | | | | | |

## RESULTS OF THE LCA - RESOURCE USE: per kg of 25kg bagged Thistle Universal OneCoat

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse, recovery, recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Use of renewable primary energy as energy carrier (PERE) - *MJ/FU* | 4.5E-01 | 8.6E-05 | 6.0E-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.6E-06 | 1.7E-03 | 0 | MND |
| Use of renewable primary energy resources as material utilisation (PERM) - *MJ/FU* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | MND |
| Total use of renewable primary energy resources (PERT) - *MJ/FU* | 4.5E-01 | 8.6E-05 | 6.0E-08 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 9.6E-06 | 1.7E-03 | 0 | MND |
| Use of non-renewable primary energy as energy carrier (PENRE) - *MJ/FU* | 3.9E+00 | 2.7E-01 | 1.2E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.0E-02 | 3.7E-02 | 0 | MND |
| Use of non-renewable primary energy as material utilisation (PENRM) - *MJ/FU* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | MND |
| Total use of non-renewable primary energy (PENRT) - *MJ/FU* | 3.9E+00 | 2.7E-01 | 1.2E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3.0E-02 | 3.7E-02 | 0 | MND |
| Use of secondary material (SM) - *kg/FU* | 8.5E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MND |
| Use of renewable secondary fuels (RSF) - *MJ/FU* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | MND |
| Use of non-renewable secondary fuels (NRSF) - *MJ/FU* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | MND |
| Use of net fresh water (FW) - $m^3$/FU | 1.7E-03 | 2.5E-05 | 6.0E-04 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.9E-06 | 6.8E-06 | 0 | MND |

## RESULTS OF THE LCA – OUTPUT FLOWS AND WASTE CATEGORIES: per kg of 25kg bagged Thistle Universal OneCoat

| Parameters | Product stage | Construction process stage | | Use stage | | | | | | | End-of-life stage | | | | D Reuse, recovery, recycling |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A1 / A2 / A3 | A4 Transport | A5 Installation | B1 Use | B2 Maintenance | B3 Repair | B4 Replacement | B5 Refurbishment | B6 Operational energy use | B7 Operational water use | C1 Deconstruction / demolition | C2 Transport | C3 Waste processing | C4 Disposal | |
| Hazardous waste disposed (HWD) - *kg/FU* | 1.7E-03 | 6.0E-06 | 2.8E-09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6.7E-07 | 2.7E-08 | 0 | MND |
| Non-hazardous(including inert) waste disposed (NHWD) - *kg/FU* | 1.3E-02 | 3.6E-05 | 1.2E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.1E-06 | 4.3E-04 | 8.3E-01 | MND |
| Radioactive waste disposed (RWD) - *kg/FU* | 4.9E-06 | 4.3E-06 | 2.0E-09 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 4.8E-07 | 5.9E-08 | 0 | MND |
| Components for re-use (CRU) - *kg/FU* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | MND |
| Materials for recycling (MFR) - *kg/FU* | 3.7E-02 | 1.7E-07 | 1.0E-02 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.0E-08 | 2.1E-06 | 0 | MND |
| Materials for energy recovery (MER) -*kg/FU* | - | - | - | - | - | - | - | - | - | - | - | - | - | - | MND |
| Exported electrical energy (EEE) - *MJ/FU* | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | MND |
| Exported thermal energy (EET) - *MJ/FU* | 1.8E-03 | 2.3E-10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2.6E-11 | 4.8E-09 | 0 | MND |

# 6. LCA results interpretation

The Product stage (A1-A3) is responsible for over 89% of Thistle Universal OneCoat in its lifetime for the following impacts: Global warming, Non-renewable resources consumption and Energy consumption. Water consumption is mainly shared between the Product stage (A1-A3) and the Installation stage (A5). Waste production is primarily attributed to the End-of-life stage. This is due to 83% of Thistle Universal OneCoat modelled as being landfilled at the end of its life.

4.31MJ of the total primary energy comes from the Product stage of the life cycle. The main fuel used on British Gypsum sites is natural gas. It accounts for over 80% of energy usage.

British Gypsum send zero gypsum waste to landfill and encourages recycling waste.


*[1] This indicator corresponds to the abiotic depletion potential of fossil resources.*
*[2] This indicator corresponds to the total use of primary energy.*
*[3] This indicator corresponds to the use of net fresh water.*
*[4] This indicator corresponds to the sum of hazardous, non-hazardous and radioactive waste disposed.*

# 7. Requisite evidence

**VOC emissions**

None of the ingredients contained in the Thistle range of undercoat, one coat and finishing plaster contain VOCs which exceed the requirements of European voluntary labelling schemes connected to indoor air quality.

# 8. References


**General principles**
The International EPD® System PCR 2012:01 version 1.2 for Construction Products and CPC 54 construction services.

**PCR**
Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Building-Related Products and Services from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part A: Calculation Rules for the Life Cycle Assessment and Requirements on the Background Report, 1.2, April 2013.
Institut Bauen und Umwelt e.V., Königswinter (pub.): Product Category Rules for Building-Related Products and Services from the range of Environmental Product Declarations of Institut Bauen und Umwelt (IBU), Part B: Requirements on the EPD for Mineral factory-made mortar version 1.5.

**Standards:**

**BES 6001: Issue 3:2014**
Framework Standard for Responsible Sourcing.

**BS:OHSAS 18001:2007**
Occupational Health and Safety Management.

**EA 2012 Draft Report**
An investigation into the disposal and recovery of gypsum waste. Environment Agency.

**EN 13279-1:2008**
Gypsum binders and gypsum plasters - Definitions and requirements.

**EN 15804:2012-04**
Sustainability of construction works – Environmental Product Declarations – Core rules for the product category of construction products.

**ISO 9001:2008**
Quality management systems - Requirements.

**ISO 14001:2004**
Environmental management systems – Requirements with guidance for use.

**ISO 14025:2011-10**
Environmental labels and declarations – Type III environmental declarations – Principles and procedures.

**ISO 50001:2011**
Energy management systems – Requirements with guidance for use.

**Mortars applied to a surface (Construction Product)**
Appendix to PCR 2012:01 Construction products and construction services, Version 1.2.