Environmental Product Declaration

BREG EN EPD No.: 000122 Issue 02
ECO EPD Ref. No. 0000390

This is to certify that this verified Environmental Product Declaration provided by:

Saint-Gobain PAM UK

Is in accordance with the requirements of:

EN 15804:2012+A1:2013

This declaration is for:

Surface boxes

Company Address

Saint-Gobain PAM UK
Lows Lane
Stanton by Dale
Ilkeston
Derbyshire
DE7 4QU

		02 August 2016
Signed for BRE Global Ltd	Operator	Date of this Issue
15 July 2016		14 July 2021
Date of First Issue		Expiry Date

This verified Environmental Product Declaration is issued subject to terms and conditions (for details visit www.greenbooklive.com/terms).

To check the validity of this EPD please, visit www.greenbooklive.com/check or contact us.

BRE Global Ltd., Garston, Watford WD25 9XX.
T: +44 (0)333 321 8811 F: +44 (0)1923 664603 E: Enquiries@breglobal.com

EPD verification and LCA details

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 o Internal þ External
Third party verifier[b]: **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)

LCA Consultant	Verifier
Yves Coquelet Saint-Gobain PAM Registered Office: Saint-Gobain PAM Route de Blenod 54704 Maidieres BP 109 France	Nigel Jones BRE Global Bucknalls Lane Watford Hertfordshire WD25 9XX United Kingdom www.bre.co.uk

Commissioner of LCA study	
Saint-Gobain Limited Registered Office: Saint-Gobain House Binley Business Park Coventry CV3 2TT United Kingdom	SAINT-GOBAIN

General Information

Summary

This environmental product declaration is for Surface boxes produced by Saint-Gobain PAM UK at the following manufacturing facilities:

Saint Gobain PAM UK
Holwell Works
Asfordby Hill
Melton Mowbray
Leicestershire
UK
LE14 3RE

This is a Cradle to gate with options EPD. The life cycle stages included are as shown below (X = included, MND = module not declared):

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
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x		x

Programme Operator

BRE Global, Watford, Herts, WD25 9XX, United Kingdom.
This declaration is based on the BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013.

Comparability

Environmental declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the product category rules used and the source of the data, e.g. the database. See EN 15804:2012+A1:2013 for further guidance.

Construction Product

Product Description

The product is a municipal casting piece designed to cover and to provide a safe access to underground assets and networks.
During its life, the product will be opened and closed and must able to withstand the dynamic loads and stresses when trafficked by all types of loads
This declaration covers all Surface boxes of Saint-Gobain PAM UK in Europe

Technical Information

Characteristic	Unit	Value
BS 5834		Grade A PART 3
Clear Opening	mm	380 x 230
Over Base	mm	505 x 355
Depth	mm	125

All the above mentioned product fully complies with the European Standard EN 124
The product is composed of a grating and a frame in ductile iron.
The product doesn't contain any substances mentioned on the REACH-list.
The reference service life time is 30 years

Product Contents

Material/Chemical Input	Percentage (%)
Ductile Iron	>99.8
Coating	<0.2
Ductile Iron composition	Fe > 95 % Si + C ~ 5% others metals (trace)

Construction/Installation

Surface boxes are embedded onto the road with a mortar resin

Use Information

During its life, the product will be opened and closed and must able to withstand the dynamic loads and stresses when trafficked by all vehicle types

Reference Service Life

The assumed life of the product has been limited to 30 years. This is the typical life span of a road.

End of Life

During the refurbishment of the road, the product is sorted and carried to a scrap merchant and need no more treatment. The product can be melted again without any further operation.

LCA – Calculation Rules

DECLARED UNIT	The declared unit is defined as one kilogram of a municipal casting piece designed to cover and to provide a safe access to underground assets and networks.
SYSTEM BOUNDARIES	In accordance with the modular approach as defined in EN 15804, this cradle to gate with options EPD includes the following: Product Stage A1- A3 (aggregated) Construction Stage A4- A5 Use Stage B1-B7 End of life State C1 - C4 Benefits and Loads Module D
REFERENCE SERVICE LIFE	30 years (average road span life)
CUT-OFF RULES	In the assessment, all significant data parameters from gathered production data are considered, i.e. raw material, ancillary materials, used thermal energy, internal fuel and electric consumption, direct production waste. This study also takes into account some materials flows of less than 1%. It is assumed that the total sum of omitted processes does not exceed 1% of the GWP or energy impact. Machines and facilities (capital goods) required for and during production are excluded, as is transportation of employees
ALLOCATIONS	All production data has been calculated on a mass basis
DATA QUALITY	The data is representative of the UK production and the manufacturing processes of 2012
BACKGROUND DATA	All primary data was provided by Saint-Gobain PAM UK. All secondary data was retrieved using TEAM software ,using Ecoinvent 2.2and DEAM databases

Life cycle stages

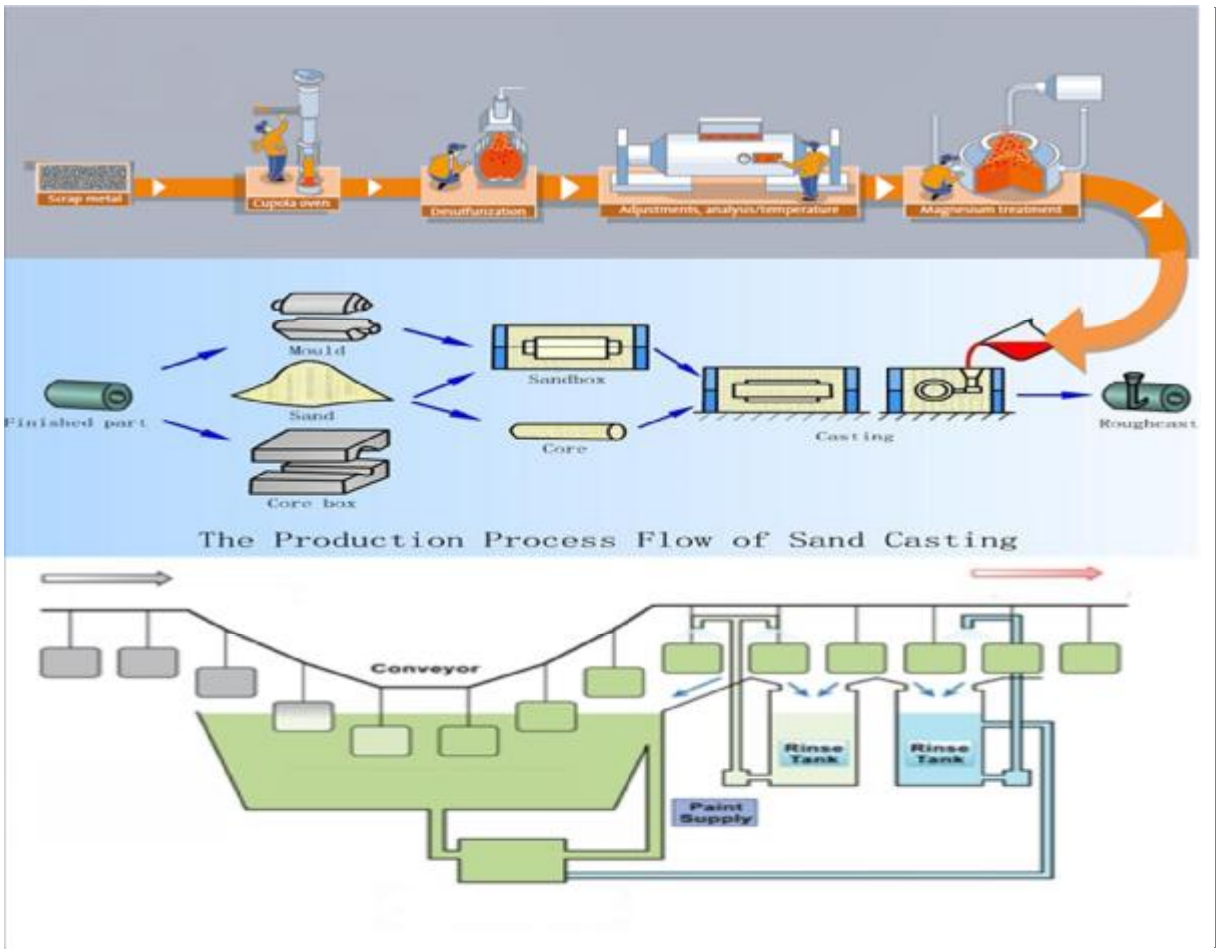
Product stage, A1-A3

Description of the stage:

A1, raw material extraction and processing, processing of secondary material input (e.g. recycling processes), This includes the extraction and processing of all raw materials and energy which occur upstream from the Surface boxes manufacturing process.

A2, transport to the manufacturer, the raw materials are transported to the manufacturing site. The modeling includes road, boat and/or train transportations of each raw material.

A3, manufacturing, including provision of all materials, products and energy, as well as waste processing up to the end-of waste state or disposal of final residues during the product stage. 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.



Manufacture:

The melted pig iron is obtained in a cupola. The main raw materials are metallurgical coke and iron scraps.
The liquid iron is treated by a modularizing agent (Mg or others) and poured into the mold
After deburring and/or grinding, the cast iron piece is painted by soaking into water based paint

Construction process stage, A4-A5

Description of the stage:

A4, transport to the building site

A5, installation into the road or building;, including provision of all materials, products and energy, as well as waste processing up to the end-of-waste state or disposal of final residues during the construction process stage. These information modules also include all impacts and aspects related to any losses during this construction process stage (i.e. production, transport, and waste processing and disposal of the lost products and materials).

Transport to the building site

PARAMETER	VALUE per kg of municipal casting
Fuel type and consumption of vehicle or vehicle type used for transport e.g. long distance truck, boat, etc.	0.38 liter per km Truck max load 24t – real load 16 t (diesel oil)
Distance	320 (km)
Capacity utilisation (including empty returns)	30 %
Bulk density of transported products	7000 kg/ m³
Volume capacity utilisation factor	1

Installation in the building

PARAMETER	VALUE per kg of municipal casting
Ancillary materials for installation (specified by materials)	Mortar – 0.68 kg
Water use	(included in mortar)
Other resource use	(none)
Quantitative description of energy type (regional mix) and consumption during the installation process	1.0 MJ - Fuel used
Wastage of materials on the building site before waste processing, generated by the product's installation (specified by type)	None
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)	0.54 kg of soils (inert waste) / kg of cast iron
Direct emissions to ambient air, soil and water	0.15 kg eq CO2

Use stage (excluding potential savings), B1-B7

The use stage, related to the building fabric includes:

B1, use or application of the installed product.
The municipal castings are opened and closed manually to give access to the underground network.and therefore does not have any impact during their life span for these operation
B2, maintenance;
There is no maintenance.
B3, repair;
Depending of the traffic, Municipal casting need to be embedded in the road. For this study an average frequency rate of 2.5 times during the life cycle has been assessed
B4, replacement;
There is no replacement.
B5, refurbishment;
It is considered that the end of life of the product correspond of the refurbishment of the road (30 years)

Maintenance

PARAMETER	VALUE per kg of municipal casting
Maintenance process	None required during MC lifetime

Repair

PARAMETER	VALUE per kg of municipal casting
Repair process	Embed municipal casting on the road (same as A5 stage – table 4)
Inspection process	None required during MC lifetime
Repair cycle	2.5 times / 30 years
Ancillary materials (e.g. lubricant, specify materials)	Mortar (1.7 kg)
Wastage material during repair (specify materials)	1.7 (old mortar landfilled)
Net fresh water consumption during repair	Include in mortar
Energy input during repair (e.g. crane activity), energy carrier type, e.g. electricity, and amount if applicable and relevant	2.54 MJ Crane activity 2.5 min

Replacement

PARAMETER	VALUE per kg of municipal casting
Replacement cycle	None required during MC lifetime

Refurbishment

PARAMETER	VALUE per kg of municipal casting
Refurbishment process	None required during MC lifetime

Use of energy and water

PARAMETER	VALUE per kg of municipal casting
Net fresh water or energy consumption	None required during MC lifetime

End-of-life stage C1-C4

As most of metals, pig iron is re-usable without loss of properties. Therefore all municipals castings are collected and re-use at the end of their life-cycle. The cast iron is introduced into the scraps merchant network which is well established.

C1, de-construction, demolition: As Surface boxes are withdrawn during the refurbishment of the road, there no impacts for this step

C2, transport to waste processing; For this study, a journey of 10 km with a small truck is accounted

C3, waste processing for reuse, recovery and/or recycling. For this study, a journey of 10 km with a small truck is accounted

C4, disposal; including provision and all transport, provision of all materials, products and related energy and water use .As municipal casting are totally recycled there is nothing put into landfill during this step

End of life

PARAMETER	VALUE per kg of municipal casting
Collection process specified by type	1 kg
Recovery system specified by type	0.99 kg iron scrap
Disposal specified by type	0 kg landfilled

PARAMETER	VALUE per kg of municipal casting
Assumptions for scenario development (e.g. transportation)	On average, cast iron is transported 10 km by road from construction or demolition sites to scraps merchant.

Reuse/recovery/recycling potential, Module D

Module D includes:
As municipal castings from the Holwell plant are made with scrap iron which is considered as 100% recyclable. There is no benefit associated with the output of scrap iron, in this study scrap iron is considered as an available stock for metal industry.
Thus, the D modules will be considered as not relevant.

LCA results

This section covers the LCA results of Surface boxes.
MNR : Module not relevant

Environmental impacts

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				
	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	D Reuse, recovery, recycling
Global Warming Potential (GWP) - *kg CO_2 equiv/DU*	1.64E+00	2.56E-02	1.48E-01	0	0	3.72E-01	0	0	0	0	0	3.19E-03	3.85E-03	0	MNR
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/DU*	2.47E-08	1.78E-08	3.86E-08	0	0	9.76E-08	0	0	0	0	0	2.22E-09	6.10E-10	0	MNR
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/DU*	6.08E-03	1.54E-04	7.21E-04	0	0	1.82E-03	0	0	0	0	0	1.91E-05	2.11E-05	0	MNR
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/DU*	4.10E-04	3.79E-05	1.06E-04	0	0	2.69E-04	0	0	0	0	0	4.71E-06	6.26E-06	0	MNR
Excessive enrichment of waters and continental surfaces with nutrients, and the associated adverse biological effects.															
Photochemical ozone creation (POPC) *kg Ethene equiv/DU*	8.25E-04	1.13E-05	4.95E-05	0	0	1.26E-04	0	0	0	0	0	1.41E-06	6.45E-06	0	MNR
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/DU*	8.01E-09	1.92E-11	2.90E-09	0	0	8.48E-09	0	0	0	0	0	2.39E-12	7.15E-09	0	MNR
Abiotic depletion potential for fossil resources (ADP-fossil fuels) *MJ/DU*	2.38E+01	3.17E-01	1.08E+00	0	0	2.72E+00	0	0	0	0	0	3.94E-02	5.83E-02	0	MNR
Consumption of non-renewable resources, thereby lowering their availability for future generations.															

Resource use

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 excluding renewable primary energy resources used as raw materials - *MJ/DU*	2.43E-01	1.02E-04	7.59E-03	0	0	1.96E-02	0	0	0	0	0	1.27E-05	3.98E-03	0	MNR
Use of renewable primary energy excluding renewable primary energy resources used as raw materials - *MJ/DU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MNR
Total use of renewable primary energy resources (primary energy and primary energy resources used as raw materials) *MJ/DU*	2.43E-01	1.02E-04	7.59E-03	0	0	1.96E-02	0	0	0	0	0	1.27E-05	3.98E-03	0	MNR
Use of non-renewable primary energy excluding non-renewable primary	1.97E+01	3.19E-01	1.00E+00	0	0	2.54E+00	0	0	0	0	0	3.96E-02	7.26E-02	0	MNR
Use of non-renewable primary energy excluding non-renewable primary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MNR
Total use of non-renewable primary energy resources (primary energy and primary energy resources used as raw materials) - *MJ/DU*	1.97E+01	3.19E-01	1.00E+00	0	0	2.54E+00	0	0	0	0	0	3.96E-02	7.26E-02	0	MNR
Use of secondary material *kg/DU*	9.91E-06	0.00E+00	0.00E+00	0	0	0.00E+00	0	0	0	0	0	0.00E+00	0.00E+00	0	MNR
Use of renewable secondary fuels- *MJ/DU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MNR
Use of non-renewable secondary fuels *MJ/DU*	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MNR
Use of net fresh water m^3/DU	4.56E-02	3.03E-05	1.63E-04	0	0	4.24E-04	0	0	0	0	0	3.77E-06	2.74E-05	0	MNR

Waste categories

Parameters	Product stage	Construction process stage		Use stage							End-of-life stage				
	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	D Reuse, recovery, recycling
Hazardous waste disposed *(kg/DU)*	5.97E-04	7.16E-06	1.64E-05	0	0	4.14E-05	0	0	0	0	0	8.90E-07	0	0	MNR
Non-hazardous(excluding inert) waste disposed *(kg/DU)*	4.05E-01	4.31E-05	5.36E-01	0	0	1.73E+00	0	0	0	0	0	5.36E-06	0	0	MNR
Radioactive waste disposed (*kg/DU)*	2.22E-05	5.08E-06	1.13E-05	0	0	2.86E-05	0	0	0	0	0	6.32E-07	0	0	MNR
Radioactive waste (high level waste) (*kg/DU)*	4.40E-07	6.39E-11	5.59E-09	0	0	1.49E-08	0	0	0	0	0	7.94E-12	0	0	MNR

Output flows

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	
Components for re-use (*kg/DU*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MNR
Materials for recycling (*kg/DU*)	1.10E-01	2.09E-07	3.31E-05	0	0	9.38E-05	0	0	0	0	0	2.59E-08	0	0	MNR
Materials for energy recovery (*kg/DU*)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MNR
Exported energy, detailed by energy carrier (*MJ/DU*)	8.97E-04	2.80E-10	1.88E-08	0	0	4.69E-08	0	0	0	0	0	3.48E-11	0	0	MNR

LCA results interpretation

Surface boxes - environmental impacts

[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.

With the graphic view, it is possible to assess which steps of the LCA are the most impacting for the chosen indicators. For instance, it appears for Surface boxes, that the product stage is the most impacting for Global warming, Non-renewable resources consumption, Energy consumption and Water consumption. For each indicator, this step is responsible for over 70% of the impact. On other hand and as expected, waste production, is mainly generated (over 60 %) during the use stage.

Environmental positive contribution & comments

Being part of Saint-Gobain Group, global leaders in the habitat and construction market and one of the world's top one-hundred leading industrial corporations, we share the objective of providing innovative solutions to the global challenges of population growth and limited natural resources, whilst ensuring we minimise our operational impact on the environment.

We can greatly influence the sustainability of our business and our customer projects by carefully managing how our products are manufactured, transported, used and disposed of – their lifecycle. Different sustainability issues affect different stages of this lifecycle. Our long term objective is to achieve a closed loop – where products are created using only recycled materials and disposed of by being turned into raw materials for new products.

To this end in 2014 we set the benchmark for UK manufactured products by completing Life Cycle Assessments (LCA) and Environmental Product Declarations (EPD) for our entire Access Cover and Gratings range. These assessments allow our current and future customers to understand, in detail, what the environmental impacts of our products are.

We have on-going carbon emission reduction targets for each of our individual manufacturing plants. In 2010 we were audited and accredited to the CEMARS reduction plan and committed to decrease carbon emissions (by turnover) to 7% by 2016. We achieved this target three years early, and currently our emissions are 22% lower than our starting benchmark of 2010.

Our new target going forward is for an additional 12% reduction in carbon emissions (per tonne of material produced) by 2020.

References

BRE Global. BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013. PN 514. Watford, BRE, 2014.

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.

BSI. Environmental management – Life cycle assessment – Principles and framework. BS EN ISO 14040:2006. London, BSI, 2006.

BSI. Environmental management – Life cycle assessment – Requirements and guidelines. BS EN ISO 14044:2006. London, BSI, 2006.

Saint-gobain Methodological Guide for Construction Products (VER 3.0.1 04/2013)

Weidema, B.P., Wesnaes, M.S. (1996) « Data quality management for life cycle inventories – an example of using data quality indicators." Journal of cleaner production 4, 167-174.

"Life cycle analysis of road structure" www.infociments.fr/telecharger/CT-T88.1-11.pdf

Recycling of steel and Iron :
http://www.eurofer.org/Sustainable%20Steel/Steel%20Recycling.fhtml