EGE ORMAN VAKFI

Version 1.0
02-01-2017

PRODUCT CATEGORY RULES

General

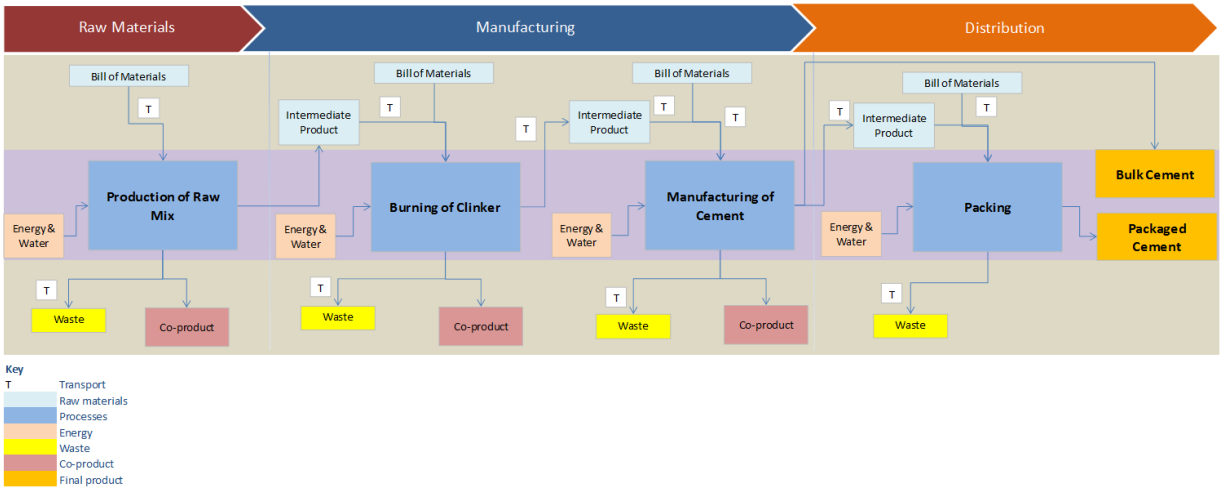
Name of PCR:	Cement				
Scope of products this PCR covers:	Bulk and bagged cement to cement factory gate Clinker for third parties				
Product industrial classification: (ISIC-CPC classification)	Division:	37	Glass and glass products and other non-metallic products		
	Group:	374	Plaster, lime and cement		
	Class:	3744	Portland cement, aluminous cement, slag cement and similar hydraulic cements, except in the form of clinkers		
Environmental criteria:	Carbon				
Boundaries included: [7.4.2]	Cradle-to-gate:	Yes		Cradle-to-grave:	No
Validity of this PCR:	This PCR is designed to be used in conjunction with the Scheme Footprinting Requirements of the Carbon Trust, Brazil, Hong Kong and Turkey carbon labelling schemes and should not be used without these or similar requirements.				
Scheme operator:	EOV				
Publication date:	02/01/2017			Valid until:	02/01/2022

Criteria for comparing like-with-like

Technical criteria that shall be disclosed:	Strength Bulk or bagged, and size of bag.
Intended use(s) that shall be disclosed:	None.
Unit of Analysis(es): [7.3.4] [8.6 for requirements for Functional Units].	Tonne of cement (bulk or bagged*). *Net mass of cement excluding packaging. Tonne of clinker
SKU grouping requirements: [7.3.3.1]	*No further requirements additional to the SFR.*
Time period for data: [7.4.5]	Annual. Preferably January – December, but can be any 12 consecutive months.
Additional product performance information that shall be disclosed for cradle-to-gate footprints:	*No further requirements additional to the SFR.*

Generic process map

Generic process map	
Scope:	All emissions cradle-to-gate. No capital equipment is included within scope.



Additional category-specific methodological requirements

Allocation: [7.4.8]	*No further requirements additional to the SFR.*
Materiality: [7.4.3.2, 7.5.3]	*No further requirements additional to the SFR.*
Process/fugitive emissions: [7.5.6]	The fugitive emissions arising from calcination in clinker production represent the single largest source of emissions in cement production. These emissions can be calculated by one of two methods, which are in line with the Cement Sustainability Initiative's protocol and the 2006 IPCC guidelines and the EU ETS methodology. Method B is the preferred approach. <u>*Method A: Kiln Inputs*</u> In this approach, the CO2 emissions are calculated based on the carbonate content of kiln inputs. Non-carbonate content of inputs other than fuel shall be considered where it is material to the overall footprint. The following formula shall be applied: $CO2\ emissions_{clinker} = \Sigma\ \{Carbonate_i * stoichiometric\ ratio_i\}$ The following stoichiometric ratios shall be applied:

Substance	Stoichiometric ratios [tCO2/t carbonate]
$CaCO_3$	0.440
$MgCO_3$	0.522
$FeCO_3$	0.380
C	3.664

Unless better data is available, it shall be assumed that all carbonate inputs are fully calcined in the process. Where data is available, and partial calcination of cement kiln dust (CKD) makes a material difference, this can be calculated separately from the kiln inputs method.

Method B: Clinker Output

In this approach, the CO2 emissions are calculated based on the volume and composition of the clinker output from the kiln. Under this method, emissions associated with CKD and, if material, non-carbonate carbon content of kiln inputs shall be considered separately.

The emissions from the clinker output shall be calculated as follows:

*$CO2\ emissions_{clinker}$ = Clinker output * Emission factor*

Where the clinker output is not directly weighed, it may be calculated in the following way:

clinker produced [t] = ((cement deliveries [t] - cement stock variation [t]) clinker/cement ratio [t clinker/t cement]) - (clinker supplied [t]) + (clinker dispatched [t]) - (clinker stock variation [t])*

The emission factor shall, where possible, be determined on the basis of the measured CaO and MgO content in the clinker by applying the following stoichiometric ratios:

Oxide	Stoichiometric ratios [tCO2/t *earth alkali oxide*]
CaO	0.785
MgO	1.092

Where the precise composition of the clinker is not known, the country-specific emission factor as published in the National Inventory Report (NIR) submitted to the UN Framework Convention on Climate Change may be used. If the country where the plant is based has not reported a specific factor, the default emission factor of 0.525 tCO_2/t clinker shall be used.

Emissions associated with CKD and bypass dust leaving the kiln system shall be calculated as follows:

*$CO_2\ emissions_{dust}$ = Dust discarded * Emission factor*

As bypass dust is typically fully calcined, the clinker emission factor shall be used. Although CKD is usually only partially calcined, it is also acceptable to use the clinker emission factor as a conservative approach.

Alternatively, where the composition and degree of calcination has been determined for the plant, the following formula may be used to determine the emission factor:

$$EF_{CKD} = \frac{\frac{EF_{cli}}{1+EF_{cli}} \times d}{1 - \frac{EF_{cli}}{1+EF_{cli}} \times d}$$

where

⇒ EF_{CKD} = Emission factor for the dust leaving the kiln system

⇒ EF_{Cli} = Emission factor applied to clinker

	⇒ d = degree of CKD calcination (released CO_2 as percentage of total carbonate CO_2 in raw meal, as determined by regular measurement) Emissions arising from non-carbonate carbon in raw meal shall be assessed in relation to materiality and included where appropriate. The choice of method for calculating process emissions from calcination shall be based on availability of the data with the lowest degree of uncertainty.
Sampling: [7.5.4.1]	No sampling shall be permitted – data must be collected for all manufacturing sites.
Incoming transport:	*No further requirements additional to the SFR.*
Links to other PCRs:	http://environdec.com/en/PCR/Detail/pcr2010-09
Emissions factors:	Carbon Trust, Ecoinvent
Water regional specificity:	*Not applicable.*

Processes information for the Footprinting Tool Template

				Default allocation (%)					
Utility (Energy and Water)	Units:	Default Value:	Default DQI: (1 - 10)	Process 1: Crushing	Process 2: Milling	Process 3: Mixing	Process 4: Pre-curıng/cuttı ng	Process 5: Autoclaving	Process 6: Packaging
Electricity Raw mix	kWh	NA	8	100%	0%	0%	0%	Electricity Raw mix	kWh
Electricity Clinker	kWh	NA	8	0%	100%	0%	0%	Electricity Clinker	kWh
Electricity Manufacturing	kWh	NA	8	0%	0%	100%	0%	Electricity Manufacturin g	kWh
Electrlclty Packing	kWh	NA	8	0%	0%	0%	100%	Electrlclty Packing	kWh
Electricity from Waste Heat Recovery(Produc ed)	kWh	NA	8	24%	41%	32%	2%	Electricity from Waste Heat Recovery(Pro duced)	kWh
Diesel	litre	NA	8	20%	40%	20%	20%	Diesel	litre
Fuel oil for cement	tonnes	NA	8	0%	0%	100%	0%	Fuel oil for cement	tonnes
Steam Coal	tonnes	NA	8	0%	100%	0%	0%	Steam Coal	tonnes
Local Lignite	tonne s	NA	8	0%	100%	0%	0%	Local Lignite	tonnes

Waste	tonnes	NA	8	0%	100%	0%	0%	Waste	tonnes
Diesel For Internal transportation	litre	NA	8	33%	45%	22%	0%	Diesel For Internal transportation	litre
fuel oil for clinker	tonnes	NA	8	0%	100%	0%	0%	fuel oil for clinker	tonnes

Process 1:	Production of raw mix	Reference flow:	Per year (entire site)
Outputs:	Raw mix (tonnes)	Products split by:	*Not applicable. Only 1 output*
Co-products:	*None*	Default allocation:	*Not applicable*
Waste:	*None*	Default allocation:	*Not applicable*

Material Input:	Unit:	Default value:	Default value:
Chalk (external)	Tonnes		
Clay (internal)	Tonnes		
Sand	Tonnes		
Iron	Tonnes		
Limestone	Tonnes		

Process 2:	Burning of clinker	Reference flow:	Per year (entire site)
Outputs:	Clinker (internal) (tonnes) Clinker (external) Clinker (to stock)	Products split by:	*Weight*
Co-products:	*None*	Default allocation:	*Not applicable*
Waste:	*None*	Default allocation:	*Not applicable*

Material Input:	Unit:	Default value:	Default value:
Raw mix	Tonnes		

Process 3:	Manufacturing of cement	Reference flow:	Per year (entire site)
Outputs:	Cement Type 1 [CemI 42,5R] (for bulk sales) Cement Type 2 [CemII/A-M (P-L) 42,5R] (for bulk sales) Cement Type 3 [CemII/B-M(L-W) 42,5R] (for bulk sales) Cement Type 4 [CemIV/B (P-W)	Products split by:	*Weight*

	32,5R] (for bulk sales) Cement Type 1 [CemI 42,5R] (for packing) Cement Type 2 [CemII/A-M (P-L) 42,5R] (for packing) Cement Type 5 [CemII/A-M (P-L) 42,5N] (for packing) Cement Type 4 [CemIV/B (P-W) 32,5R] (for packing)		
Co-products:	*None*	Default allocation:	*Not applicable*
Waste:	*None*	Default allocation:	*Not applicable*

Material Input:	Unit:	Default value:	Default value:
Clinker (internal)	Tonnes		
Clinker (to stock)	Tonnes		
Limestone	Tonnes		
Gypsum	Tonnes		
Clinker (from 3rd parties- for cement production)	Tonnes		
Fly Ash	Tonnes		
Pozzolan	Tonnes		

Process 4:	Packing	Reference flow:	Per year (entire site)
Outputs:	Cement Type 1 in 50kg bags. (62*50*11 cm) Cement Type 2 in 50kg bags (65*50*11 cm) Cement Type 5 in 50kg bags (65*50*11 cm) Cement Type 4 in 50kg bags (70*50*11 cm) Cement Type 1 in Sling bags. (120*115*130 cm)	Products split by:	Strength, Bag size
Co-products:	*None*	Default allocation:	*Not applicable*
Waste:	*None*	Default allocation:	*Not applicable*

Material Input:	Unit:	Default value:	Default value:
Cement Type 1 [CemI 42,5R] (for packing)	Tonnes		
Cement Type 2 [CemII/A-M (P-L) 42,5R]	Tonnes		

(for packing)			
Cement Type 5 [CemII/A-M (P-L) 42,5N] (for packing)	Tonnes		
Cement Type 4 [CemIV/B (P-W) 32,5R] (for packing)	Tonnes		
Bags. (pp bags)	kg		
Bags. (kraft bags)	kg		
Bags. (Sling bags) (120 x 115 x 130 cm)	kg		
Bags. (Big Bags) (90 x 90 x 153 cm)	g		

Labels

Carbon label:	
Water label:	*Not applicable*

Created by

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