CCA Europe

LIFE CYCLE ANALYSIS FOR CALCIUM CARBONATE

PRODUCT:
GCC-DRY COARSE

2021
EDITION
VERSION #1

WHAT IS AN LCA?

Life Cycle Analysis (LCA) is a method for identifying the environmental impacts of a product, process, or activity over its entire lifespan. The objective of this LCA was to develop an average Life Cycle Inventory (LCI) of Calcium Carbonate products extracted and processed in EU + UK+Norway + Turkey.

SUSTAINABLE BENEFITS OF CALCIUM CARBONATE

Extraction: European (EU-27+UK) annual consumption of calcium carbonate is estimated at around 20 million tonnes. Calcium carbonate is an exceptional mineral. The chemical formula $CaCO_3$ covers a raw material, which is widespread throughout nature. However, although the deposits are plentiful, only a few are of sufficiently high quality to be worked, and even a fewer number of deposits will provide raw materials for industrial and agricultural uses other than the construction and road building industry. Only if the purity, whiteness, thickness, homogeneity of the deposit are acceptable, the commercial extraction is worthwhile.

Processing: After extraction further treatment is required to process natural calcium carbonates of the highest quality, known generically as Ground Calcium Carbonate (GCC). Precipitated Calcium Carbonate (PCC) is a synthetic calcium carbonate produced industrially by means of a process known as carbonation. Both GCC and/or PCC can be used in a wide range of applications. For each end-use, there exists a tailor-made product, where fineness and particle size distribution are optimally balanced to meet the technical demands of that particular application.

Main applications of calcium carbonate products:
Paper, plastics, paints, coatings, adhesives, flue gas treatment, container glass, soil improver (liming materials), and construction/architecture materials.

ISO-COMPLIANT LCA:

CCA's Calcium Carbonate LCA has been critically reviewed by a third party, ensuring the accuracy and validity of the data.

This review determined:

- The methods used to carry out the LCA were consistent with the applicable international standards and methodologies such as ISO 14040-14044 series.
- The methods used to carry out the LCA were scientifically and technically valid,
- The data used were appropriate and reasonable in relation to the goal of the study,

CALCIUM CARBONATE'S IMPORTANT ROLE IN OUR DAY-TO-DAY LIFE

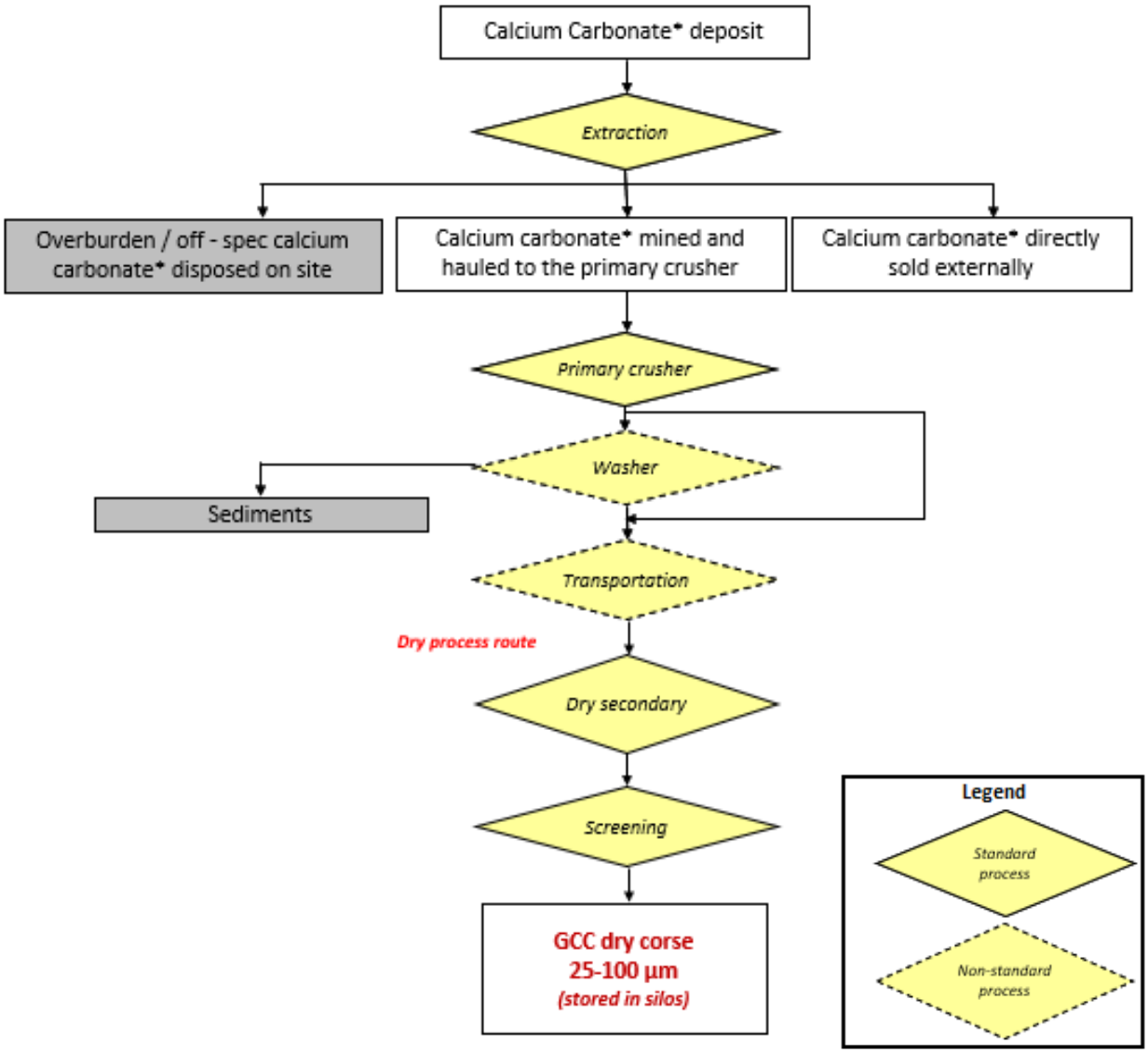
Calcium carbonate is the most widely used mineral in the paper, plastics, paints and coatings industries both as a filler and as a coating pigment. Calcium carbonate is used in personal health and food production industries as an effective dietary calcium supplement, antacid, phosphate binder, or base material for medicinal tablets. In addition to the above industries, because of its antacid properties, calcium carbonate is also used in industrial settings to neutralize acidic conditions in both soil and water.

For more information on these industries and others, visit:
www.ima-europe.eu

CALCIUM CARBONATE
A SUSTAINABLE MATERIAL

Name	Purity	Particle size d_{50}	Form of delivery
GCC-Dry Coarse	Typically, > 95% CaCO	Typically, 25-100 µm	Dry

System Boundaries: Cradle (Extraction) to Gate (GCC plant)
System Functional Unit: 1000 Kg GCC as defined in product definition
Geographical Scope: EU-27 + UK + Turkey + Norway



*Calcium carbonate ($CaCO_3$) deposit
Refers to marble, limestone and chalk raw materials

ENVIRONMENTAL IMPACT

The following explains the process flow of each calcium carbonate product analysed in this study, as well as the boundaries used in the LCA study.

Environmental impact indicator	[Unit]	GCC-Dry coarse
Climate Change	[kg CO2 eq.]	28,40
Climate Change (fossil)	[kg CO2 eq.]	28,20
Climate Change (biogenic)	[kg CO2 eq.]	0,46
Climate Change (land use change)	[kg CO2 eq.]	0,09
Ozone depletion	[kg CFC-11 eq.]	3,96 -13
Acidification terrestrial and freshwater	[Mole of H+ eq.]	0,16
Eutrophication freshwater	[kg P eq.]	7,31 -05
Eutrophication marine	[kg N eq.]	0,06
Eutrophication terrestrial	[Mole of N eq.]	0,62
Photochemical ozone formation - human health	[kg NMVOC eq.]	0,16
Resource use, mineral and metals	[kg Sb eq.]	5,93 -06
Resource use, energy carriers	[MJ]	450
Water scarcity	[m^3 world equiv.]	5,69
Hazardous waste disposed (HWD)	[kg]	5,08 -06
Non-hazardous waste disposed (NHWD)	[kg]	0,25
Radioactive waste disposed (RWD)*	[kg]	0,05
Other waste impacts**	[kg]	0

* Radioactive waste is due to the use of nuclear as part of the EU + UK + Turkey + Norway Energy Mix.

** Other Waste Environmental Impacts (e.g. Components for re-use (CRU) [kg]; Materials for recycling (MFR) [kg]; Materials for energy recovery (MER) [kg]; Exported electrical energy (EEE) [MJ]; Exported thermal energy (EET) [MJ]) are zero, due to the boundaries of the system (cradle to gate). These impacts should be considered by the users of this Life Cycle Inventory (LCI) if applicable.

LCA CONTRIBUTORS

14 MEMBERS
CCA-EUROPE MEMBERSHIPS

EU + EFTA
REGIONAL COVERAGE

>95% OF THE PCC AND GCC VOLUME PLACED ON THE EU & EFTA MARKET
MARKET COVERAGE

To access data in the Life Cycle Assessment LCA Software - GaBi
www.gabi.sphera.com/international

IMA-Europe: Our role is promoting Industrial Minerals

IMA-Europe is the decisive EU voice of industrial minerals producers and importers. Our mission is to contribute to the development of a thriving industrial minerals industry at the heart of a sustainable Europe.

IMA-Europe supports the industrial minerals sector to continuously improve its performance and enhance its reputation by tackling issues relating to the properties and safe use of minerals, from their extraction and processing through to the entire value chain.

Competitiveness, health and safety at the workplace, environmental performance, product safety, and awareness about the importance of industrial minerals for society are at the core of IMA-Europe's priorities.

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