

Construction Product Information: Soil stabilisation products

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This is a documentation of life cycle assessment data (LCA) published in the 'IVL environmental data for construction products'.

Soil stabilisation products are used to reduce subsidence and improve soil stability. Historically the most commonly used stabilising agent is a mixture of 50% lime and 50% cement. The stabilising product amount used is usually 80-100 kg/m³ of stabilised soil.

The alternatives mixture ingredients are; burnt lime (kalk, K) and cement (C) as well as different by-products with puzzolan properties (E). To use such by-product is environmentally the preferable choice especially since the main environmental burdens are allocated to the main products. A set of generic stabilisation mixtures are available in the environmental database. However, the quality of these mixtures depends on the raw material properties used by the different suppliers and as a result the quality cannot be viewed as to be wholly representative. Please confirm the amounts used and the actual quality with your current producers and suppliers (such as SMA Minerals, NORCEM, Nordkalk etc). Specific mixtures used on site could be produced on request.

Mixture/Blandning	Quicklime/ kalk (K)	Cement (C)	Puzzolan by-product/ kalkkrik biprodukt (E)
KCE 30/70/-	30	70	
KCE 50/50/-	50	50	
KCE 50/-/50	50		50
KCE 20/50/30	20	50	30
KCE 33/33/33	33	33	33

The burnt lime (quicklime) is produced in a rotary kiln and the name of the used quality is often called 'hard burnt'. This final lime product has a high percentage of calcium oxide (CaO), approximately 80-90 %. In comparison we find that 'the hard burnt' quality has a higher energy use and carbon dioxide emission than a lower quality or Quicklime from a pit furnace. The energy use of Quicklime from a pit furnace is 20 to 30% lower but it does not produce the same quality. We base the environmental inventory for the quicklime on 2011-2012 production figures from the manufacturing at Köping (Nordkalk).

The cement used is a standard Portland cement without any additives (like fly ash), see separate documentation on cement for further details. Sea transport is accounted for in this inventory as a means of facilitating a more generic value for lime from different producers. The same assumption is valid for cement.

The environmental data for by-products with puzzulan properties include a generic processing of the by-product. The information used is mainly found in unit processes from cement and quicklime production.

The inventory accounts for transport; to collect the by-product; to a site for further processing and to a mixture site. In spite of the rather conservative assumptions made for these by-products we found that its environmental performance is fairly low compared to lime and cement. The allocation approach used here follows the specifications given in the core PCR for building products EN15804. The transport needs to be calculated and added on by using a case-to-case distance from the central warehouse which delivers stabilisation products.