

Ecological Sound Cement Manufacture in Switzerland

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Introduction

Cement production is an energy-intensive process which causes significant emissions of CO₂. In a cement kiln raw materials are heated with fuels up to temperatures of 1450 °C to manufacture cement clinker. Afterwards the clinker is ground with gypsum to obtain cement with an adequate workability (fig. 1). In order to produce 1 kg of portland cement clinker approximately 3.6 MJ of energy are required. Around 500 kg of CO₂ per tonne of clinker produced originates from the raw material (release of CO₂ from limestone). Up to 400 kg/t cement is generated by the fuels [1]. In the last years the substitution of ordinary fuels and raw materials with alternative materials became more and more important. Alternative materials can be e.g. ground limestone, by-products from industrial processes and many types of waste. From an economically point of view the production costs can be lowered. This is due to the partial substitution of fuels by cheaper alternative fuels. Ecologically the use of alternative materials and fuels contributes to a lesser use of the natural resources. Because the production of cement contributes to about 8 % of the CO₂-emissions in Switzerland [1] the cement industry was an important partner of an energy programme of the Swiss government, which intended to stabilise/reduce the energy consumption and the production of CO₂. In the beginning of the use of alternative fuels the public and the customer were concerned about the product quality. Due to an open information it was possible to convince the broad public that the use of alternative materials does not harm the cement quality and is environmentally sound.

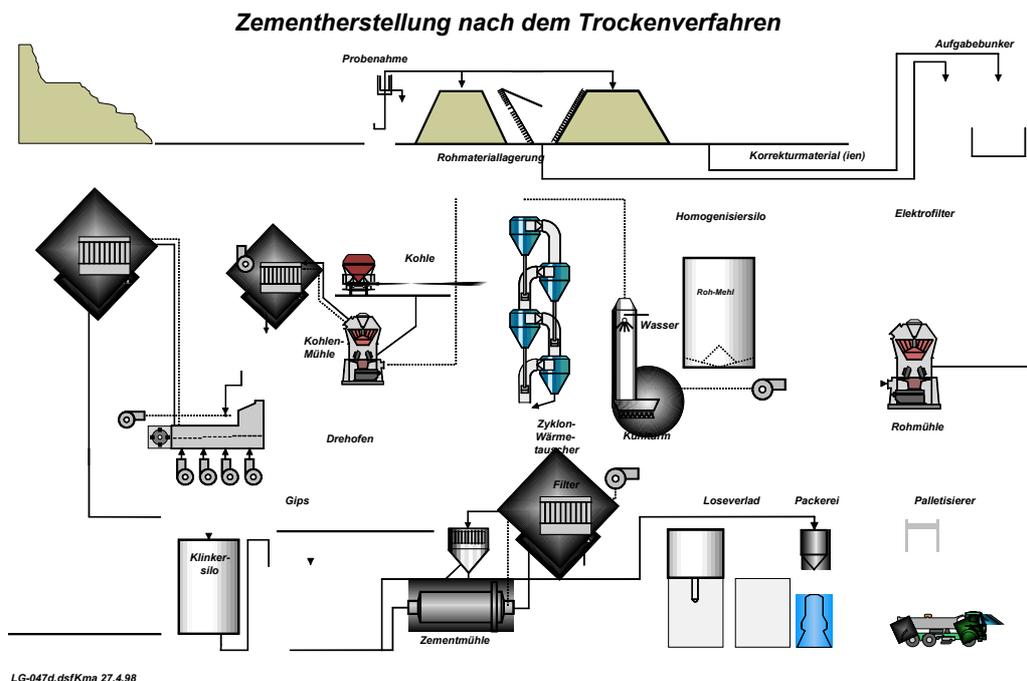


Fig. 1: Clinker and cement manufacture