



FuturZement C.1 | FuturBeton C.1

nanostructured cement/concrete

high strength ☀ CO₂-low ☀ super durability

all advantages for EUR 7,00 / ton of concrete

(additional full cost, CM900, Germany 2012-10)

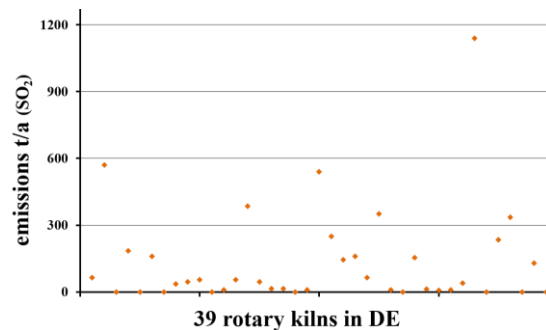
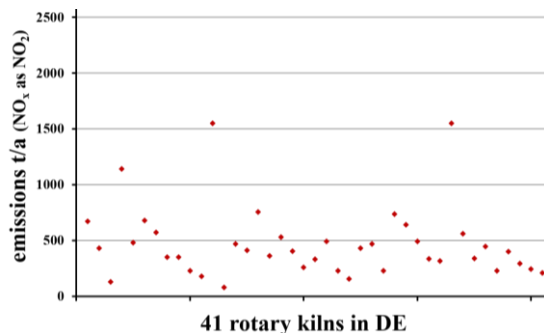


Emission Values NO_x, SO₂, Hg & dust

In cement manufacturing, nitrogen oxide and sulfur oxide emissions are relevant particularly during the clinker burning process in the rotary kiln. For achieving desired clinker quality, the thermo-process is operated under oxidizing conditions promoting the formation of NO in the ratio of about 95% NO to 5% NO₂. Sulfur dioxide is generated during the conversion of sulfur from raw material and fuel at clinker manufacturing. Emission control and reduction represent high-priority challenges in cement industry.

nitrogen and sulfur oxides

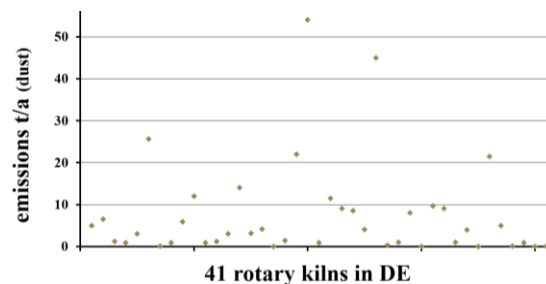
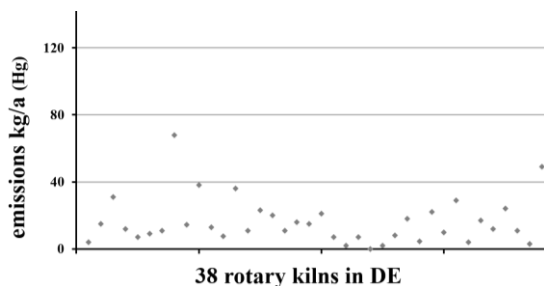
The following charts show the nitrogen oxide emissions from 41 rotary kilns on left and on right the sulfur dioxide emissions from 39 rotary kilns in Germany 2014 (source: VDZ, Umweltdaten 2014).



For the manufacturing of one ton of Portland cement about 1,5-1,7 t of raw materials, 0,15 t coal and 0,95 t clinker are processed to fine powder where the grinding of raw materials and cement emits most of the dusts. Dust emissions today can be limited to 10-20 mg/m³.

dust and mercury

Mercury and mercury compounds are separated in the furnace exhaust gas filter, emission values significantly change with the operating conditions. The following charts show the emission values of dust on left (41 rotary kilns) and on right mercury (38 rotary kilns) of German cement plants (source: VDZ, Umweltdaten 2014).



FuturZement C.1 contains Ground Granulated Blastfurnace Slag super-activated by High Kinetic Processing (HKP-GGBS) and cement supplied from German manufacturers. Referred to the data collected by VDZ (Verein Deutscher Zementwerke) and few variations over time, it can be concluded that the emitted nitrogen and sulfur oxides as well as dusts and mercury during cement manufacturing range within admissible limits.

HKP-GGBS, FuturBeton & CO₂

Utilizing GGBS saves clinker and reduces emissions relevant to the substituted fraction, particularly CO₂-emission. Within one year, a single CM900-Simoloyer® can super-activate **2.160 t** GGBS to HKP-GGBS good for **7.200 t** FuturZement or **43.200 t** FuturBeton C.1 at additional full cost of **7€/t FuturBeton** (2012, DE).

Compared to conventional OPC, this results in CO₂-savings of about **850 t p.a.** In 20 years equipment lifespan, **43.200 t** HKP-GGBS good for **144.000 t** FuturZement or **0.86 Mt** FuturBeton C.1 are processed, while about **17.000 t** CO₂-emission are saved. This does NOT take into account, that due to the higher concrete strength, less material for the same construction is required and due to the virtually endless durability, we would build less often. See OnePager "**Emission CO₂**".