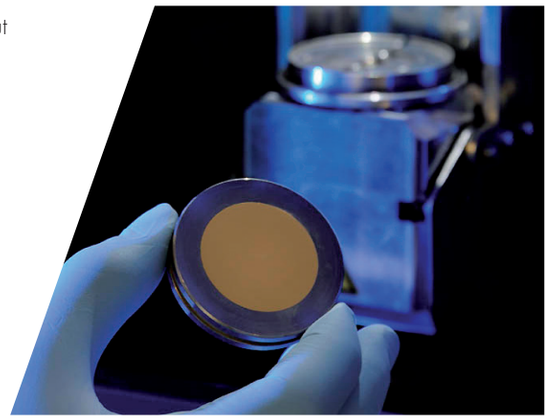
n°1 SUCCESSFUL COMPLETION OF AETHER® INDUSTRIAL TRIALS

Lafarge has successfully completed two industrial trials for Aether®, its new generation clinker formulated for lower carbon cements. These trials have confirmed the feasibility of industrial-scale production of Aether® cements, in existing installations and using traditional raw materials, for a lower overall environmental footprint.

25-30% reduction in CO_2 emissions

with Aether® cements compared to Ordinary Portland Cement



Thanks to support from the EU's LIFE+ environmental funding program, Lafarge has carried out trials at two of its French cement plants, the first in February 2011 and the second in December 2012. Following pilot tests at ICiMB facilities in Poland, these two industrial trials confirmed that Aether® clinkers for cement can be produced in kilns designed for Portland cement clinker production and using similar process parameters and fuels. Conventional raw materials can be used; it is simply the proportion of each that changes in comparison to Ordinary Portland Cement (OPC).

The trials were also very encouraging in terms of environmental performance, confirming that Aether® clinkers can be produced at lower temperatures (1225-1300°C) than Portland cement clinkers (1400-1500°C) and using significantly lower energy (~15%). Furthermore, Aether® cement grinding requires lower energy than OPC.
Overall, this means that the expected objective of a 25-30% reduction in CO_2 emissions per ton of cement was met.

Interesting lessons on industrial process

While Aether® clinker production is similar to Portland clinker production, the industrial trials showed that a higher level of control is needed for each process step.

In particular, **a very narrow temperature range is required in the clinkering zone of the kiln,** to ensure that the clinker is neither under nor over burnt, as in either case this reduces the overall amount of ye'elimite and therefore the early strength gain of Aether® cements. Furthermore, under burnt clinker leaves an uncompleted combination of the different elements present in the raw meal, while over burnt clinker generates higher SOx emissions, due to a decomposition of the ye'elimite phase (C4A3$). Too high a temperature in the clinkering zone also leads to a risk of ring formation or melting that can force a kiln stop and the over burnt clinker is harder to grind.

Nitrogen oxide (NOx) emissions are lower than with OPC production, due to the lower temperature at which Aether® clinkers are produced. If the raw mix is correctly designed and the clinkering temperature well monitored, Aether® clinker production generates the same level of SOx emissions as OPC.