



# CEMENT ADDITIVES ENABLING SUSTAINABLE CALCINED CLAY CEMENTS

TAKING THE LEAD TO REDUCE CO<sub>2</sub> EMISSIONS

# LIMESTONE CALCINED CLAY CEMENTS

Technology reducing CO<sub>2</sub> Emissions

**CEMENT IS ONE OF THE LARGEST** manufactured products on earth, by mass, with over 4.0 billion tons of cement produced yearly worldwide. As cement production accounts for up to 7% of global CO<sub>2</sub> emissions, it needs to play its part in achieving a carbon neutral industry.

CC stands for Calcined Clay in cement, and together with the well-known Limestone Calcined Clay Cement (LC<sup>3</sup>), are two of the promising new technologies that will help the cement industry reduce emissions and work towards a more sustainable environment. CC and LC<sup>3</sup> offer similar performances to 100% Portland Cement, with a reduced CO<sub>2</sub> footprint, and are composed of widely abundant materials.





LC<sup>3</sup> is typically made up of 50% clinker, 30% calcined clay, 15% limestone and 5% gypsum, e.g. CEM II/B (Q-LL); Q=CC. It substantially reduces the amount of clinker and lowers the CO<sub>2</sub> emissions during production. It uses alternative materials during cement production which may be cheap and more accessible than traditional components, reducing also the production costs.

The calcination of the new added clay requires lower burning temperature than the traditional process to produce clinker. Additionally, the limestone is not calcined and there is a considerable reduction of CO<sub>2</sub> emissions for this type of cement.

The Swiss Federal Institute of Technology in Lausanne, together with other key players in the construction materials industry, are targeting the reduction of CO<sub>2</sub> produced by cement with the LC<sup>3</sup> technology by replacing up to 50% of clinker in cement production.

The new CC and LC<sup>3</sup> technologies are envisaged to play a significant and growing role in the cement and concrete industry. Sika is playing our part by developing innovative additives to enable it.



Around 7% of the world's CO<sub>2</sub> emissions are caused by cement manufacturing.



Clinker production contributes to high CO<sub>2</sub> emission during cement manufacturing.



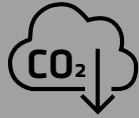
Scientists developed the calcined clay technology to reduce up to 50% of clinker in cement and up to 40% CO<sub>2</sub> emissions during cement manufacturing.



Sika's innovative SikaGrind® CC additives enable cement producers to manufacture limestone calcined clay cement, reducing CO<sub>2</sub>.

# CC AND LC<sup>3</sup> TECHNOLOGY FOR SUSTAINABLE CEMENTS

Advantages and benefits



## LOW CARBON

CC and LC<sup>3</sup> can save 30 – 40% of CO<sub>2</sub> compared to Ordinary Portland Cement (OPC).



## READY TO BE IMPLEMENTED

CC and LC<sup>3</sup> are used similar to ordinary Portland cement (OPC), yet they are better in performance.



## RESOURCE SAVING

CC and LC<sup>3</sup> use abundantly available materials and can save scarce resources.



## COST EFFECTIVE

CC and LC<sup>3</sup> technologies reduce cement production costs.



## GLOBAL SCALABLE

Suitable clays for CC and LC<sup>3</sup> are sufficiently available all over the world.



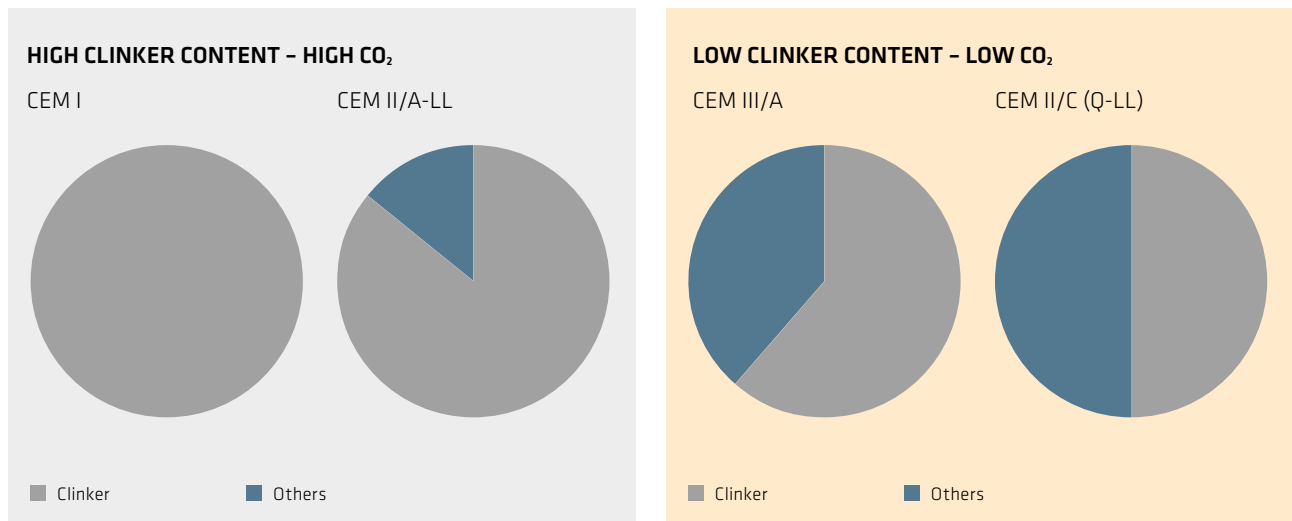
## DURABILITY

Performance can be adapted to specific requirements.





## TRADITIONAL CEMENT VS CALCINED CLAY TECHNOLOGY



# SikaGrind® CC RANGE

Sika's additives to enable calcined clay technology



## CC AND LC<sup>3</sup> TECHNOLOGIES ALLOW SIGNIFICANT REDUCTION OF CLINKER AND CO<sub>2</sub>.

Compared to existing cements, CC and LC<sup>3</sup> show some challenges in cement and concrete: namely they have a higher water demand and sometimes results in a reduced early strength development. Performance strongly depends on the type of clay and clinker, as well as on the requirements from the industry.

Sika solutions help reduce water consumption, increase strength while maintaining workability, hardening and extending durability of concrete. SikaGrind® CC are liquid grinding aids specifically developed for the production of Calcined Clay Cement improving specific characteristics of the new types of cements compared to traditional formulations.

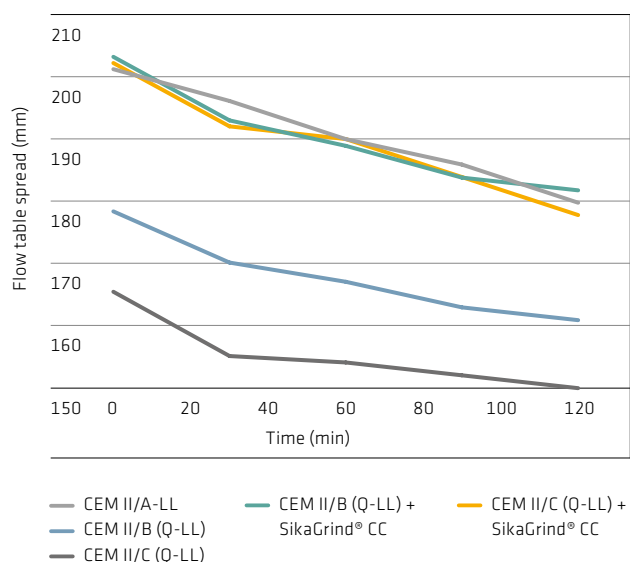


SikaGrind® CC PRODUCTS MITIGATE THE WATER DEMAND INCREASE DUE TO CALCINED CLAYS AND IMPROVE THE WORKABILITY OF THE CONCRETE.

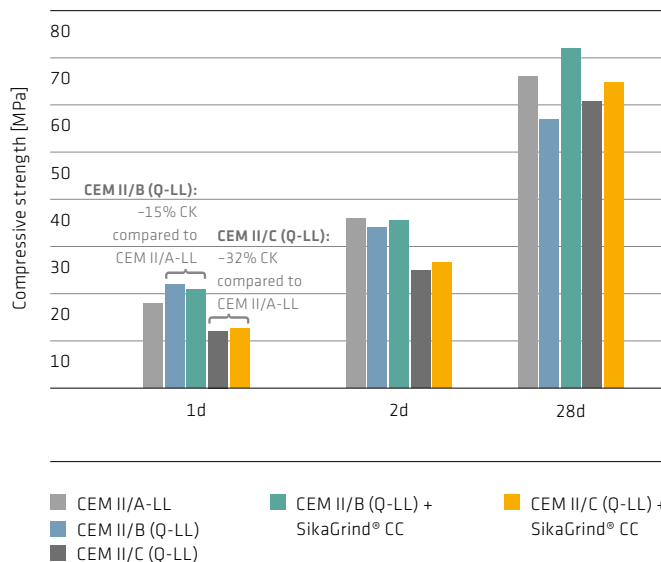


## CHALLENGES ADDRESSED BY SIKA

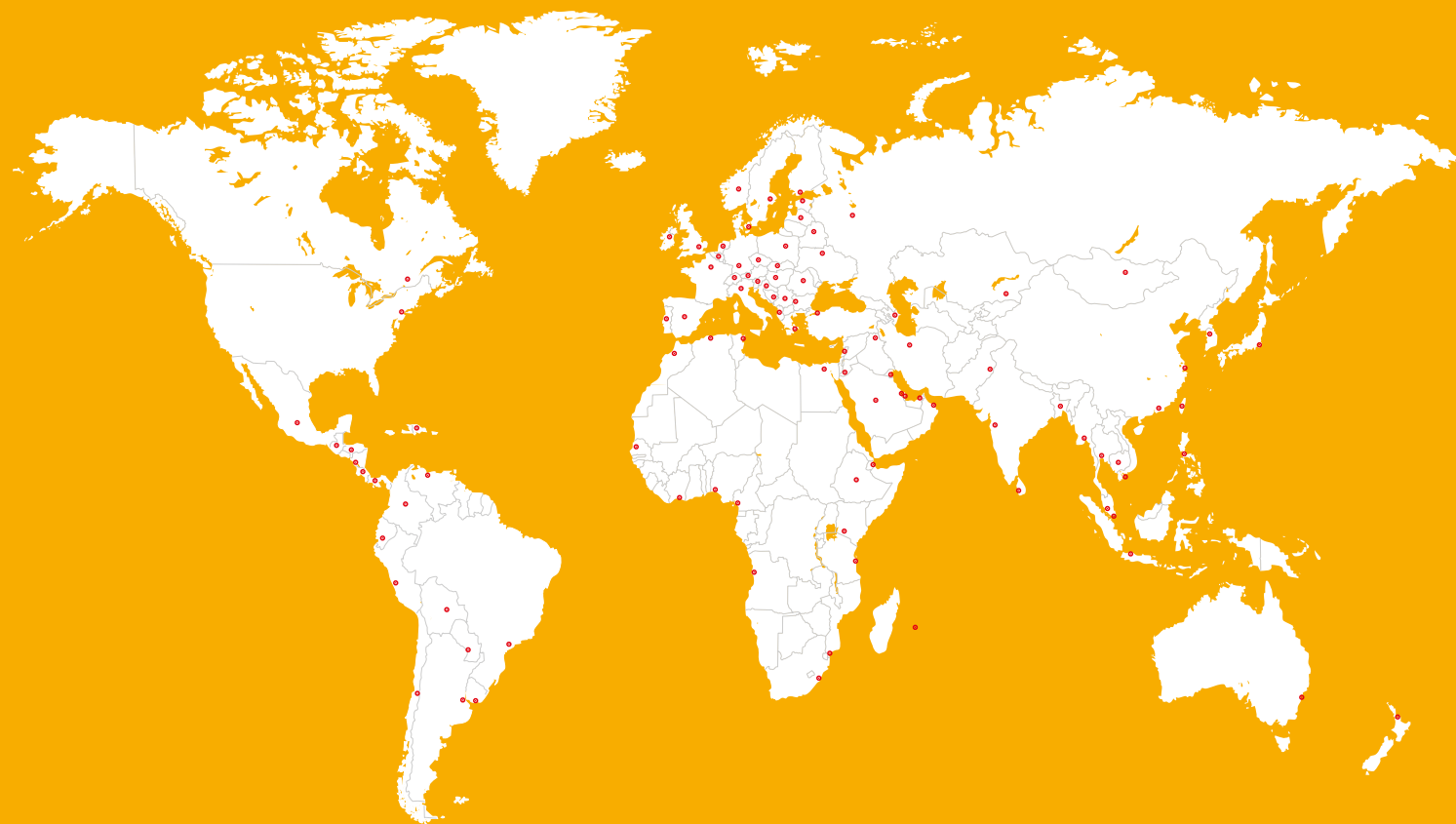
Flow table spread



Compressive strength



# GLOBAL BUT LOCAL PARTNERSHIP



## FOR MORE INFORMATION ON CALCINED CLAY CEMENTS:



### WHO WE ARE

Sika is a specialty chemicals company with a leading position in the development and production of systems and products for bonding, sealing, damping, reinforcing and protecting in the building sector and the motor vehicle industry. Sika's product lines feature concrete admixtures, mortars, sealants and adhesives, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.



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