

## **Nominated for bauma Innovation Award 2025: ROTHO ProCarbonCure - Innovative system technology for storing CO<sub>2</sub> in concrete products**



**With the ProCarbonCure process, large quantities of CO<sub>2</sub> can be stored in products made from concrete or steel slag. The process has now been successfully implemented on an industrial scale and has recently been nominated for the BAUMA Innovation Award 2025. The ROTHO ProCarbonCure technology gives concrete products a significantly lower carbon footprint by storing CO<sub>2</sub> sustainably and permanently.**

The construction industry, including the cement and concrete industry, faces major challenges on the road to greenhouse gas neutrality. In cement production alone, around two-thirds of CO<sub>2</sub> emissions are attributable to non-reducible, raw material-related process emissions and one-third to fuel emissions. In order to offset the irreducible process emissions, these emissions must be sequestered by CCS / CCUS (capture, utilization and storage of CO<sub>2</sub>). This is precisely where the innovation comes in, as the ProCarbonCure process allows almost all of the carbon dioxide added to the curing process to be absorbed by the concrete. The process therefore makes an important contribution to making concrete products greener in the future.

The construction of such a plant in the vicinity of CO<sub>2</sub> emission sources where the carbon dioxide is filtered out of combustion processes is particularly interesting. In this way, sequestration can be achieved without the energy-intensive liquefaction of CO<sub>2</sub>, which would be necessary to transport CO<sub>2</sub> over long distances and store it underground in geological sites, for example.

To realize the process, it was necessary to develop a completely new concrete curing process. The specialized disciplines of hardening and drying had to be combined in order to be able to store large quantities of carbon dioxide in the concrete. The result was a closed process that gives the CO<sub>2</sub> time to penetrate deep into the concrete without a significant proportion being emitted back into the atmosphere.

### **Sophisticated CO<sub>2</sub> feed system**

A central element in the carbonization of concrete is the CO<sub>2</sub> supply. The precise dosing of carbon dioxide is a decisive factor for the realization of a stable process. A closed process reacts to too much or too little CO<sub>2</sub> by rapid and high-pressure fluctuations, which in turn can trigger safety chains and lead to a process that is difficult to control. At the end of the development, a CO<sub>2</sub> supply was achieved that provides the process with the required amount of carbon dioxide largely automatically.

In addition, for the carbonization of concrete products based on steel slag, a uniform supply of CO<sub>2</sub> in the batch is essential to achieve a uniform concrete strength. For this reason, specially designed nozzle walls for chamber aeration have been developed to ensure this.

### **High safety**

As high concentrations of CO<sub>2</sub> are harmful to the human organism, high demands are placed on the tightness of the structure and the process engineering equipment. Here, ROTHO can rely on a self-developed and patented structure that fulfils the highest tightness class according to DIN EN 1507.

The harmful effects of carbon dioxide required a so-called HAZOP analysis in advance. During the analysis, both hazards and the operational capability of the system are systematically analyzed in order to achieve a high level of safety for personnel, equipment, the environment and functionality. Based on this risk analysis, ROTHO developed various safety devices, such as a leakage-measuring device and a multi-stage pressure monitoring system. The realization of a safe system is the central focus of the ProCarbonCure process.

The ROTHO ProCarbonCure technology thus provides a process that can make an important contribution to storing large quantities of CO<sub>2</sub>.

## Pictures



Front of the ProCarbonCure --system for CO<sub>2</sub>-negative facing bricks



Chamber top with the process technology of the ProCarbonCure - system for CO<sub>2</sub>-negative facing bricks

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## About ROTHO

ROTHO is a plant manufacturer and part of the Robert Thomas Metall- und Elektrowerke GmbH & Co KG in Neunkirchen / Siegerland.

ROTHO offers solutions for the curing technology of concrete block plants and for the drying technology of brick plants