



# THERMOCEM®

Naturally good – the backfill material  
with outstanding thermal conductivity

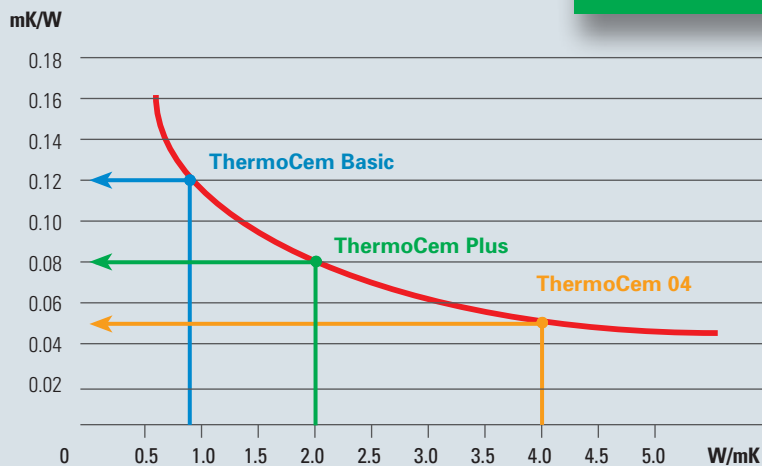
HEIDELBERGCEMENT



## NATURALLY GOOD

- Backfill material with outstanding thermal conductivity
- Cavity-free backfilling
- Reliable and permanent sealing
- Optimum processing characteristics
- Tested and confirmed quality
- High system tightness

## BOREHOLE RESISTANCE



↑ Exemplary representation from the product range.

# QUALITY

THERMAL BOREHOLE RESISTANCE  
DEPENDENT ON THE THERMAL  
CONDUCTIVITY OF THE BACKFILL MATERIAL

# SERVICE.

## THE RIGHT PRODUCT FOR EVERY REQUIREMENT

Due to our years of experience in the field of backfill materials for geothermal energy, we are in a position to produce materials individually tailored to your planned projects. In addition to our well established ThermoCem *PLUS* for the field of near-surface geothermal energy, we have already successfully deployed modifications of this material in projects for medium-depth and deep geothermal energy down to a drilling depth of 2800m.

Of course, we ensure that the rheology is superbly adapted to the application as well as providing a targeted strength development and optimum thermal conductivity with a comparatively low suspension density.

## NEAR-SURFACE GEOTHERMAL ENERGY

ThermoCem			
Type	Thermal conductivity	High chemical resistance	High freeze-thaw resistance
Basic	≥ 0.8	o	+
Light	≥ 1.0	+	+
Plus	≥ 2.0	+	+
Plus 3.0	≥ 3.0	+	+

+ = Highly suitable

o = Suitable with restrictions

## THE ADVANTAGES AT A GLANCE

- Thermal conductivity of  $\lambda \approx 0.8-3.0$  W/mK
- Optimum binding of probes to the ground
- Easy processing
- Low quantity requirements (approx. 810 kg/m<sup>3</sup>)
- Permanent sealing function
- Without grain, i.e. no friction, no material wear
- System reliability of geothermal system



Installation of geothermal probe incl. injection pipe. →



## MEDIUM-DEPTH AND DEEP GEOTHERMAL ENERGY

Based on ThermoCem, the modifications ThermoCem 02 or ThermoCem 04 are adapted to the requirements for higher depths. Extremely good rheological properties with low suspension density thus allow backfilling at great depths, without building up excess suspension pressure. Good early strength characteristics minimise the collapse pressure of the development. The relatively high final pressure strength are able to adsorb the enormous rock pressures at great depths.

ThermoCem		
Type	Thermal conductivity	High chemical resistance
ThermoCem 02	2.0	+
ThermoCem 04	4.0	+



### THE ADVANTAGES AT A GLANCE

- Thermal conductivity of  $\lambda \approx 2.0-4.0$  W/mK
- Adapted strength developments
- High final strength
- Relatively low suspension density

← Drillhole for medium-depth geothermal energy.



## Permanent sealing

ThermoCem is aligned to the special requirements of a geothermal probe. In particular the permanent sealing function of the backfilling is required for safe operation of a geothermal system, and is defined through:

### → FREEZE-THAW RESISTANCE

Internal tests on pure materials have confirmed, under extreme load cycles and permanent water storage, a durable sealing function ( $k_f$ -value  $\leq 10^{-10}$  m/s).

In the same way, the verification of permanent sealing has been carried out by an independent institute. In contrast to the internal tests, the construction of a system observation probe with the backfill material in clamped condition – approximating the in-situ conditions even more closely. The investigations carried out with this setup proofed a low system permeability.



### → RESISTANCE AGAINST CONCRETE-DAMAGING GROUNDWATER

The severity of a chemical attack from in situ groundwater can be estimated with the aid of DIN EN 206-1. This standard states water ingredients and pH values liable to attack concrete.

The results of storage tests in water containing sulphates and water containing a high proportion of lime-dissolving carbonic acid reflect the high chemical resistance of our ThermoCem against these water ingredients. As a general rule, we select the individual components taking this property into consideration. For example, we only use special hydraulic binding agents with SR properties.

← Internal freeze-thaw alternation test in a water bath.

WWW.HEIDELBERGCEMENT.DE

**HEIDELBERGCEMENT**

#### DELIVERY FORM

- bulk
- bags, 25 kg
- big bags

#### **HeidelbergCement AG**

Zur Anneliese 7

D-59320 Ennigerloh

Phone +49 2524 29-51700

Fax +49 2524 29-51715

E-Mail [spezialtiefbau@heidelbergcement.com](mailto:spezialtiefbau@heidelbergcement.com)

**[www.heidelbergcement.de/spezialtiefbau](http://www.heidelbergcement.de/spezialtiefbau)**



We would like to stress that achieving the mentioned properties require a suitable production and processing of the building material as well as a proper, state-of-the art preparation on the construction site.