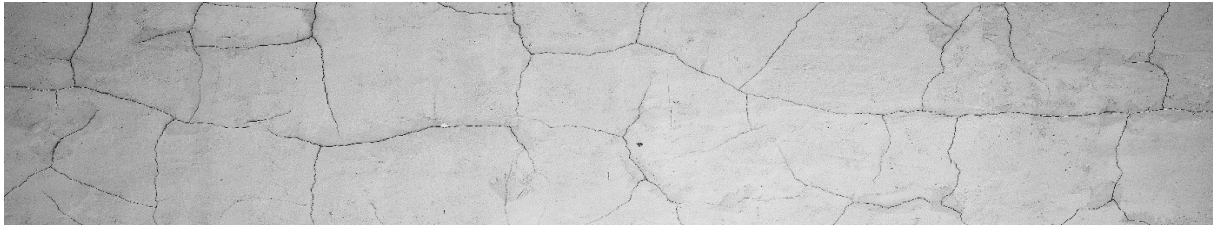


Our solutions to cracking

Concrete shrinks



Concrete shrinks during setting due to chemical, physical, and thermal processes. Cracks form due to the reduction in volume.

- Water ingress occurs via cracks, leading to deterioration of the building fabric.
- Cracks reduce the concrete strength. They are compensated for by steel.
- The use of steel contributes to the high CO₂ footprint.
- Cracks make costly maintenance measures necessary (coating, repair).

Expansive additives

The use of expansive additives can reduce cracking. As the concrete shrinks, the additives expand to compensate for the movement.

Newchem is conducting research on several forms of expansive additives, namely CaO, MgO and ettringite-forming systems. These have been used for many years for stable bases for machinery, in injection mortars, repair mortars and screeds.

Ettringite: Ettringite is a calcium sulphoaluminate (CSA) that is formed by calcium, aluminium, and sulphate components. When dissolved in water in the correct ratio, long ettringite needles form. These lead to expansion.

| **CSA#20** is a ready-to-use mixture. It has been in use in the EU for over 40 years.

CaO: Calcium oxide reacts with water to form calcium hydrate. These hydration products cause expansion. Normal CaO is highly reactive and reacts too quickly.

| **Namex XC** was developed as a delayed type because of the high reactivity of CaO. The low water requirement ideally corresponds to the low w/b ratio of today's construction.

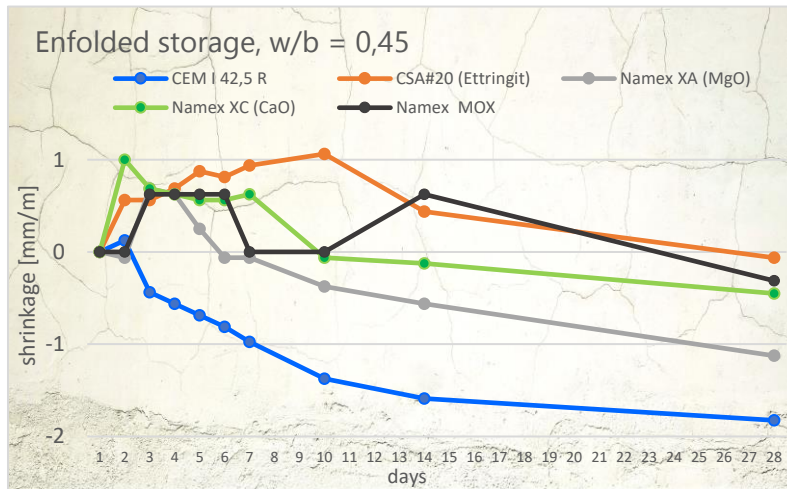
MgO: Magnesium oxide reacts with water to form magnesium hydrate. These hydration products cause expansion. Normal MgO reacts too late and slowly.

| With **Namex XA** we have developed a higher reactive MgO.

Mixed metal oxides

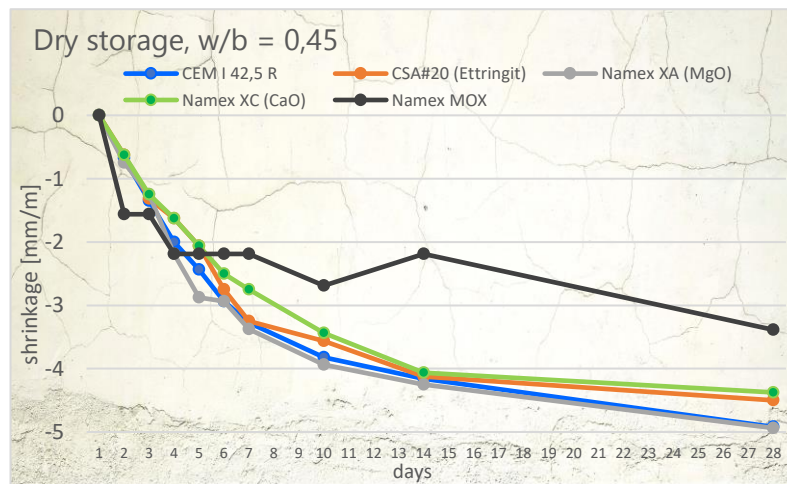
| With **Namex MOX**, a balanced expansion can be achieved by mixing selected metal oxides.

Expansion comparison



Several series of tests were carried out to determine the reaction of the respective products.¹

Enfolded storage, or hardening under humid conditions, usually corresponds to very well cured concrete.



When curing under dry conditions, especially Namex MOX shows good results.

The practical application is normally between dry and enfolded storage.

Advantages

- **Durability:** By reducing crack formation, structures are more durable.
- Maintenance and associated costs can be reduced.
- **Strength:** Since concrete strength is no longer weakened by cracking, the use of stabilizing steel structures can be reduced and thus CO₂ production.
- **Appearance:** The visual appearance is upgraded.

For detailed information, please visit www.anti-shrink.info

¹ For more information, see "Testing for anti-shrink properties" (Newchem information sheet).