

Mobile: +44(0)7868 732305
E-mail: Omega_qa@hotmail.co.uk
majek@majek.fsbusiness.co.uk
Website: omegaqa.co.uk

Omega Quality Assurance Ltd
18 Sorrel Drive
Boughton Vale
Rugby
CV23 0TL

Technical Data Sheet - Cold Weather Concreting

Concrete sets and hardens due to a chemical reaction between cement and water known as hydration. This reaction also produces heat.

Early strength gain and the rate of set is affected by the following:

- The temperature of the concrete.
- Ambient temperature
- Cement content
- Added water
- Volume of the concrete
- Surface area
- Lack of adequate precautions, e.g.
 - Containing heat generated by hydration
 - Protecting from frost and cold weather.

During cold weather the chemical reaction slows to the extent that at 5°C the process almost stops and as it freezes it stops altogether. Concrete that has not gained strength will be damaged if the water within it is allowed to freeze. Ice approximately 10% larger than the same volume of water. If immature concrete freezes, the Expansion of the water as it turns into ice disrupts the concrete from within and causes permanent damage.

Cold weather can be divided into three categories and suggested precautions are listed below:

Conditions Precautions to Take

Cold - below 5°C

- Keep formwork in place longer
- Cover the concrete
- Consider using CEM 1 (OPC) only

Slight frost at night

All the above, plus:

- Make sure concrete is not placed on frozen ground or in formwork covered in snow or ice
- Cover the concrete with insulating material
- Consider using a set accelerating admixture

Severe frost day and night

All the above, plus:

- Insulate formwork
- Place concrete quickly then cover and insulate
- Consider using hot concrete
- Consider heating the area around the concrete or the building

Notes:

1. Concrete is delivered at temperatures above 5°C and the object of the above precautions are to prevent cooling until the concrete has gained some early strength.
2. Cement replacements reduce the initial setting and hardening processes of concrete and the heat of hydration. Additional precautions may be required when they are used in cold weather.

This information and guidance is not definitive and is not intended as a substitute for taking specific advice. The guidance given is based on general principles and does not deal with every complication and eventuality. Accordingly we will not be liable in any way whatsoever for any loss, complaint or damage arising from the use of this advice