# RHEOCEM® 650/650SR

**Superfine portland cements for injection of rock and soil**

## Description

RHEOCEM® 650 and 650SR are superfine Portland cements for rock and soil injection. RHEOCEM® 650 / 650 SR have higher strength and faster setting than normal cements. Because of a small particle size and specially adapted admixture system, they penetrate very well into small cracks and fissures and give a good sealing effect against ground water flow.

RHEOCEM® 650 and RHEOCEM® 650 SR are two different cement types. RHEOCEM® 650 is a well graded cement milled from pure Portland cement clinker to become a microfine cement with a blain value of 650m²/kg. RHEOCEM® 650 SR is a micro cement with a blain value of 650m²/kg which is milled from sulphate resistant Portland cement with a low $C_3A$ and low alkali content. RHEOCEM® 650 SR complies with BS 4027 sulphate resisting Portland cement.

Both products are quality assured by the Cement Industry Quality Assurance Scheme, independently monitored by the British Standards Institution (BSI QAS 2420/47).

## Typical uses

- Rock injection: tunnels, caverns, etc., as pre- or post-stabilisation injection. Ground water sealing and ground stabilisation.
- Soil injection: Ground stabilisation, ground water sealing.

RHEOCEM® 650 and RHEOCEM® 650 SR show improved penetration capacity into microcracks, compared to normal fine cement and many other microfine cements.

RHEOCEM® 800 and RHEOCEM® 900 have further reduced particle size and may be chosen when requirements on penetration cannot be met by RHEOCEM® 650.

RHEOCEM® 650 has an open time of about 1½ hours, and a very short setting time. The grout has final set after about 2½ hours, and this will reduce the waiting time for the next activity to start to a minimum.
RHEOCEM® 650 SR has the same open time as normal fine cements.

- Standard cement injection technology and equipment can be used.
- Better penetration in small cracks and fissures and improved sealing.
- Fast setting.
- Better working environment and no hazardous components.
- No frost problems.
- Good durability.
- Economical solution.

***Adding Value to Concrete***

## Packaging

RHEOCEM® 650 and 650SR are supplied in either 25kg or 1000kg bags.

## Technical data*

* Properties listed are only for guidance and are not a guarantee of performance.

| | RHEOCEM® 650 | RHEOCEM® 650SR |
|---|---|---|
| Blaine | 694m²/kg | 685m²/kg |
| Particle size | | |
| <40 micron | 100% | 100% |
| <30 micron | 99% | 99% |
| <20 micron | 98% | 97% |
| <15 micron | 94% | 93% |
| <10 micron | 77% | 79% |
| <5 micron | 44% | 47% |
| <2 micron | 16% | 18% |

## RHEOCEM® 650:

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|---|---|
| Initial setting (measured by Vicat needle) | 60-120 mins |
| Final setting: (1mm penetration by Vicat needle) | 120-150 mins |

## RHEOCEM® 650 SR:

Has the same setting as normal fine cement

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|---|---|
| Alkali (Eq $Na_2O$) | 0.3-0.5% |
| Tricalcium aluminte ($C_3A$) | 0.5-2.5% |

Injection grout properties indicated below relate to a mix containing 1.5% Rheobuild 2000PF:

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|---|---|
| Mud Balance | 1.48-1.50kg/l |
| Water / cement ratio | 1.0 |
| Flow cone | 32-34 sec. |
| Bleeding maximum | 1% |

## Application procedure

**Mixing:**

RHEOCEM® 650 and 650SR shall always be used with the RHEOBUILD 2000PF as admixture (1.0-3.0% by weight of cement). Water / cement ratio should normally be between 0.5-1.0.

1. Fill water in the mixer, and add cement. Mix for 2 minutes.
2. Add Rheobuild 2000PF and mix for another minute.

It is very important to use an efficient mixer. Colloidal mixers are the best, but also high speed paddle mixers are acceptable, when using sufficient mixing time.

| | |
|---|---|
| Minimum rpm for colloidal mixers | 1500 rpm. |
| Minimum rpm for paddle mixers | 400 rpm. |

NB: Do not mix for too long. Too long mixing time may cause temperature increase which itself can cause setting in the pump and hoses.

## Pot life

Immediately after mixing is finished, the grout shall be transferred to the agitator. In the agitator, the mix shall be kept in constant movement.

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## Injection

High-pressure piston pumps are normally used to pump the suspension into the rock. To make sure that the suspension keeps on penetrating into the fissures, the mix should be used within 30-40 minutes after mixing. If a longer open time is required, this can be achieved by using Delvocrete Stabiliser Hydration Control Admixture. An alternative in such a case is to use RHEOCEM® 650 SR, which gives longer open time.

## Hardening

RHEOCEM® 650 has normally set sufficiently to allow start of control hole drilling or blast drilling after 2-2½ hours.

## Storage

Stored in original closed bags and in ventilated dry areas, RHEOCEM® has a shelf life of 6 months.
The reason for this relatively short shelf life is that micro cements are hygroscopic and will flocculate due to air humidity. Flocculation will reduce the penetrability normally achieved with a fresh cement. This is common property of all micro cements.

## Safety precautions

Any physical contact (e.g. through sweat or eye fluid), made with RHEOCEM® concrete or mortar should be avoided, as it may cause irritation, dermatitis or burns.

If such contact occurs, the affected area should be washed with plenty of clean water. In case of eye contact, seek immediate medical advice.

## Quality

All products produced by Degussa certified manufacturing facilities, are produced to conform to systems designed to meet internationally recognised quality standards.

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