

DELVO[®]CRETE

Cement hydration control system for wet and dry shotcrete, grouting and injection

Description

The DELVO[®]CRETE system is a unique non-chloride chemical system that controls the dynamics of cement hydration by suspending the hydration process and re-activating it hours or even days later without loss of quality of the hardened shotcrete.

The DELVO[®]CRETE system consists of two products: DELVO[®]CRETE Stabiliser and DELVO[®]CRETE Activator S. DELVO[®]CRETE Stabiliser is a liquid admixture. When dispensed into wet or dry mixes at the batching plant, it fully stabilises the hydration process by forming a protective barrier around the cement particles. Hydration control with DELVO[®]CRETE Stabiliser works with all types of cement minerals (C₃S, C₃A, C₂S, C₄AF and gypsum).

DELVO[®]CRETE Activator S is a liquid additive. In order to re-activate shotcrete mixes stabilised with DELVO[®]CRETE Stabiliser and to accelerate the hydration process, DELVO[®]CRETE Activator S is added at the spraying nozzle like a normal accelerator.

Uses

The DELVO[®]CRETE system is suitable for all wet and dry shotcrete applications:

- Tunnelling: temporary support and final linings for road, railway and metro tunnels, mines, hydropower projects, sewers.
- Temporary and final slope stabilisation.
- Repairs to concrete structures.
- Grouting systems.
- Injection suspensions.

Benefits

With the DELVO[®]CRETE system wet and dry shotcrete mixes remain fresh for any desired period of time, up to 3 days. This provides considerable benefits in batching and utilisation of shotcrete:

- Fully flexible delivery options for batched shotcrete.
- No cleaning of pumps or pipes during work interruptions.
- Complete use of wet and dry mixes.
- Reduced waste disposal.
- Simpler and lower risk construction programme thanks to better scheduling and easier planning.
- Time and cost saving allocation of material, equipment and manpower.
- Expensive bagged material can be replaced by economical jobsite mixes.
- Considerable savings of overall construction costs.
- Considerable reduction of rebound and dust.
- Higher early strengths.

Packaging

DELVO[®]CRETE Stabiliser is available in 25 litre pails and 210 litre drums.

DELVO[®]CRETE Activator S is available in 210 litre drums, in 1000 litre containers and in bulk.

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Technical data

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

DELVO[®]CRETE Activators

	DELVO [®] CRETE Stabiliser	S51	S61	S71
Form:	liquid	liquid	liquid	liquid
Colour:	red	blue	yellow	blue
Density at 25°C:	1.08	1.45 ± 0.02	1.35 ± 0.02	1.56 ± 0.02
pH value:	<2.0	13 ± 1	<11.5	13 ± 1
Solubility in water:	total	total	total	total
Thermal stability:	+1°C	+5°C	+5°C	-10°C
Chloride content:	<0.1%	<0.1%	<0.1%	<0.1%
Physiological effect:	caustic	caustic	caustic	caustic

Application procedure DELVO[®]crete Stabiliser

Mixing

Dry-mix Shotcrete

Premix aggregates with cement. The water content should be between 3 - 6% by weight of the mixture. If the humidity is lower than 3%, water must be added to reach the required percentage.

Slowly add - manually or with a dosing device - the necessary quantity of DELVO[®]CRETE Stabiliser under constant mixing and continue to mix for 2-3 minutes. If evenly distributed over dry-mix material (e.g. by spraying), mixing time can be reduced.

The addition of DELVO[®]CRETE Stabiliser to the freshly mixed concrete is ideal. However, until upto 30 minutes after mixing of the dry-mix material the addition of DELVO[®]CRETE Stabiliser presents no problems.

Wet-mix Shotcrete

Pre-mix aggregates with cement and one half of the mixing water. With the remaining half of the

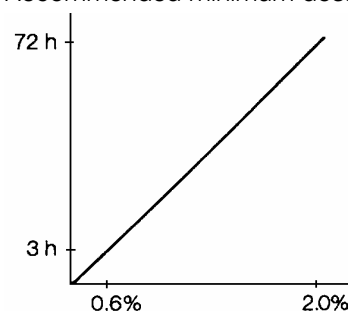
mixing water, pre-mix a high performance superplasticiser. The DELVO[®]CRETE Stabiliser should be added with continuous mixing. Normal mixing time is sufficient.

In the event of unexpected delays, a later addition of 0.6-1.0% of DELVO[®]CRETE Stabiliser is possible to prolong storage time for a few hours.

Consumption*

The recommended dosage of DELVO[®]CRETE Stabiliser for a stabilisation of 3 to 72 hours is 0.6 - 2.0% by weight of the binder (cement + microsilica). Normal cement content should be 400 - 460 kg/m³. Specific dosages depend on cement type, mix design, ambient temperature and required stabilisation time.

Recommended minimum dosages:



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Storage of stabilised mixes

In order to prevent water evaporation, both wet and dry mixes have to be protected against direct sunlight and frost and covered with plastic sheeting etc.

DELVO[®]CRETE Activator S

Types

Different types of DELVO[®]CRETE Activator S are available; the selection depends on the cement type used and the required early and final strengths. The suitable type of DELVO[®]CRETE Activator S has to be determined by tests with local cements. It is recommended that your local BASF representative be contacted.

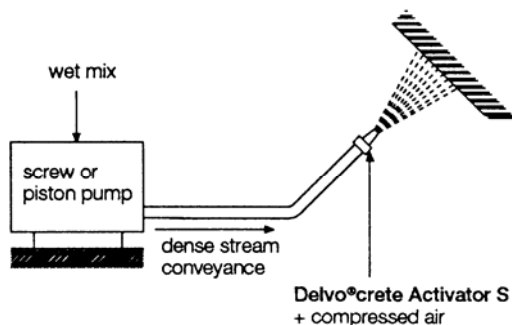
Mixing

Dry - mix Shotcrete

DELVO[®]CRETE Activator S is introduced with a proportioning pump into the mixing water which is added to the dry mix at the nozzle.

Wet - mix Shotcrete

DELVO[®]CRETE Activator S is introduced with a proportioning pump into the compressed air which is added at the nozzle.



Consumption*

The required setting time and hence the necessary dosage are determined by the type of substrate and its water run off, by the temperature of the substrate and of the gunned material and by the reactive properties of the cement. The dosage of DELVO[®]CRETE Activator S therefore ranges between 3 - 8%.

* Dosages indicated on this technical datasheet are to be used only as a guideline. To obtain accurate dosage rates, field tests have to be done with local cements, aggregates and conditions. It is recommended that your local BASF representative be consulted.

Storage

Minimum storage temperature for DELVO[®]CRETE Stabiliser is +1°C. Minimum storage temperatures for DELVO[®]CRETE Activator S51 and S61 are +5°C and -10°C for S71. If DELVO[®]CRETE Stabiliser and Activators have frozen, thaw at +1°C (Stabiliser) and +20°C (Activators) or above, and completely reconstitute with a mild mechanical agitation. Do not use pressurised air for agitation.

It is recommended that your local representative be consulted prior to the use of any products that were frozen. Maximum storage temperatures for DELVO[®]CRETE Stabiliser and Activators is +60°C. Performance tests should always be carried out prior to use.

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If stored under the above conditions, DELVO[®]CRETE Stabiliser and DELVO[®]CRETE Activator S51 and S71 have a shelf life of at least 6 months, DELVO[®]CRETE Activator S61 has a shelf life of at least 12 months.

Safety precautions

DELVO[®]CRETE Stabiliser and DELVO[®]CRETE Activator S are irritant fluids; therefore any contact with skin and eyes must be avoided. It is essential that safety glasses and rubber gloves always be worn during handling. In case of contact with eyes or skin, flush immediately with plenty of water and seek medical advice.

Typical mix design for a open time of 6 - 10 hours.

	wet-mix spraying	dry-mix spraying
Ordinary Portland Cement	400kg/m ³	350kg/m ³
Microsilica	30kg/m ³	40kg/m ³ ◆
Aggregates	1710kg	1780kg
Aggregate size	0.8mm	0 - 12mm
DELVO [®] CRETE Stabiliser	2.6kg	2.8kg
Rheobuild Superplasticiser	4.3 - 6.5kg	
DELVO [®] CRETE Activator S	17 - 25kg	17 - 25kg
water / binder ratio	0.45	n/a

◆ slurry added at the nozzle

Note

Field service, where provided, does not constitute supervisory responsibility. For additional information contact your local BASF representative.

BASF reserves the right to have the true cause of any difficulty determined by accepted test methods.

Quality and care

All products originating from BASF's Dubai, UAE facility are manufactured under a management system independently certified to conform to the requirements of the quality, environmental and occupational health & safety standards ISO 9001, ISO 14001 and OHSAS 18001.

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