

DELVO®CRETE

delvocrete UGC 0897



Master Builders
Technologies

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

Description of product

Delvo®crete is a unique non-chloride chemical system which controls the dynamics of cement hydration by suspending the hydration process and re-activating it hours or even days later with no loss of quality of the hardened sprayed concrete .

The Delvo®crete system consists of two products: Delvo®crete Stabilizer and Delvo®crete Activator S.

Delvo®crete Stabilizer is a liquid admixture . When dispensed into wet or dry mixes at the batching plant it fully stabilizes the hydration process by forming a protective barrier around the cement particles. Hydration control with Delvo®crete Stabilizer works with all types of cement minerals (C₃S, C₃A, C₂S, C₄AF and gypsum)

DELVO®CRETE Activator S is added at the nozzle or injection point to reverse the stabilizing process.

Delvo®crete Activator S is a liquid admixture. In order to re-activate sprayed concrete mixes stabilized with Delvo®crete Stabilizer and to accelerate the hydration process , Delvo®crete Activator S is added at the spraying nozzle like a normal accelerator.

Fields of application

The Delvo®crete system is suitable for all wet -mix and dry-mix sprayed concrete applications in :

- Tunnelling and mining
 - temporary support
 - permanent support
 - final linings
- Temporary and final Slope Stabilization
- Repairs to Concrete structures

as well as for

- Tunnel Grouting (Backfilling)
- Injection systems using cement

Features and benefits

With the Delvo®crete system , wet and dry concrete mixes remain fresh for up to 3 days . This provides considerable benefits in the batching and utilization of the sprayed concrete.

- **Fully flexible delivery options for sprayed concrete mixes**
- **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

In addition to these benefits related to its function as a hydration control system, Delvo®crete also provides:

- **Considerable reduction of rebound and dust , and**
 - **Much higher early strengths**
- Compared to normal sprayed concrete (wet and dry)

Technical data

	Delvo®crete Stabilizer	Delvo®crete Activators		
		S51	S61	S71
Form	liquid	liquid	liquid	liquid
Colour	red	blue	yellow	blue
Density (at + 20°C)	1.10 ± 0.02	1.45 ± 0.02	1.35 ± 0.02	1.56± 0.02
pH value	<2	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	corrosive	caustic

Packaging

Delvo®crete Stabilizer is packaged in 25 litre plastic pails and 210 litre plastic drums .

Application procedure

Delvo®crete Stabilizer 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.

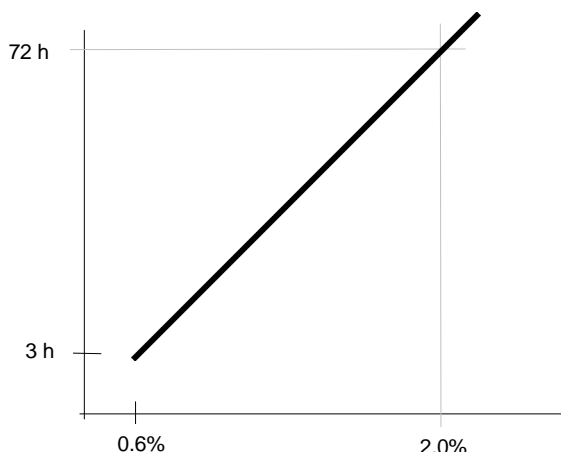
Slowly add -manually or with a dosing device- the necessary quantity of Delvo®crete Stabilizer under constant mixing and continue to mix for 2 - 3 minutes. If evenly distributed over dry-mix material (e.g. by spraying) ,mixing time can be reduced. The addition of Delvo®crete Stabilizer to the fresh mix is ideal. However, until up to 30 minutes after mixing of the dry-mix material the addition of Delvo®crete Stabilizer presents no problems.

Wet-mix shotcrete : Premix aggregates with cement and one half of the mixing water. Add - under continuous mixing - Delvo®crete Stabilizer and a high performance superplasticizer, premixed with the second half of the mixing water , or after all the water has been added. Normal mixing time is sufficient. To avoid slump loss , the recommended water content is 200 l/m³.

In the event of unexpected delays , a later addition of 0.6 - 1% of Delvo®crete Stabilizer is possible to prolong storage time for a few hours.

Consumption*

Recommended dosage range :



The recommended dosage of Delvo®crete Stabilizer for a stabilization of 3 - 72 hours is 0.6 - 2.0% by weight of the binder (cement + microsilica). The normal cement content should be 400 - 460 kg/m³. Specific dosages depend on cement type , mix design , ambient temperature and required stabilization time.

Storage of stabilized 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

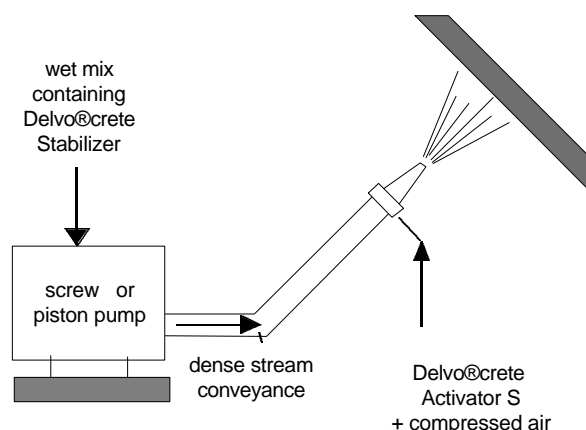
Types

Different types of Delvo®crete Activator S are available; the selection depends on the cement type to be 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 MBT representative be consulted.

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.



* Dosages indicated in this data sheet 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 MBT representative be consulted

Consumption *

The required setting time and hence the necessary dosage are determined by the type of substrate and of the sprayed material and by the reactive properties of the cement. The dosage of Delvo®crete Activator S therefore ranges between 3 - 10%.

Storage

Minimum storage temperature for Delvo®crete Stabilizer is +1°C. Minimum storage temperatures for Delvo®crete Activators are: S51 & S61 : +5°C ; S71:-10°C.

If Delvo®crete Stabilizer and Activators have frozen , thaw at +1°C (Stabilizer) and =20°C (Activators) or above , and completely reconstitute with a mild mechanical agitation. Do not use pressurized air for agitation.

It is recommended that your local MBT representative be consulted prior to the use of any products that were frozen.

The maximum storage temperature for Delvo®crete Stabilizer and Activator S is +60°C. Performance tests should always be carried out prior to use.

If stored in tightly closed original containers and under the abovementioned conditions , Delvo®crete Stabilize and Activator S51 and S71 have a shelf life of at least 6 months , whilst Delvo®crete Activator S61 has a shelf life of at least 12 months.

Safety precautions

Delvo®crete Stabilizer and Activator S61 is an irritant fluid whilst Delvo®crete Activator S51 and S71 are highly aggressive to skin.

Contact with skin and eyes must be avoided. It is essential that safety glasses and rubber gloves are worn during handling. In case of contact with eyes or skin , flush immediately with plenty of water and seek medical advice.

For further information , see the Material Safety Data Sheet.

Typical mix design for an open time of 6 - 10 hours

	wet mix spraying	dry mix spraying	
Ordinary Portland cement	400 kg/m ³	350 kg/m ³	
Microsilica	30 kg/m ³	40 kg/m ³ *	* slurry added at the nozzle
Aggregates size	0 - 8mm	0 - 12mm	
Aggregate	1710 kg/m ³	1780 kg/m ³	
Delvo®crete Stabilizer	2.6 kg	2.8 kg	
Rheobuild superplasticizer	4.3 - 6.5 kg	-	
Delvo®crete Activator S	17 - 25 kg	17 - 25 kg	
Water/binder ratio	0.45	n/a	

The information given here is true, represents our best knowledge and is based not only on laboratory work, but also on field experience. However, because of numerous factors affecting results, we offer this information without guarantee and no patent liability is assumed. For additional information or questions, contact your local MBT representative. For further Safety information, refer to product Material Safety Data Sheet.

MBT International
Underground Construction Group
Division of MBT(Switzerland) Ltd
Vulkanstrasse 110
CH-8048 Zurich
Phone +41 1 438 22 10
Fax +41 1 438 2248

Master Builders Inc
Shotcrete& Underground Systems
23700 Chagrin Boulevard
Cleveland, OH 44122-5554 / USA
Phone +1-216-831 55 00
Fax +1-216-831 69 33

MBT (Singapore) Pte. Ltd.
33 Tuas Avenue 11
Singapore 630909
Phone +65-861 67 66
Fax +65-863 09 51

MEYCO Equipment
Division of MBT (Switzerland) Ltd.
Hegmattenstrasse 24
CH-8404 Winterthur
Phone +41-52-243 06 66
Fax +41-52 242 2437

MBT Mexico, S.A. de C.V.
Blvd. M. Avila Camacho 80, 3er Piso
53390 Naucalpan Edo. de Mexico
Phone +52-5-557 72 22
+52-5-557 55 44
+52-5-557 10 15
Fax +52-5-395 79 03

NMB Co. Ltd.
Head Office
16-26 Roppongi 3-chrome
Minato-ku
Tokyo 106
Phone +81-3-35 82 88 14
Fax +81-3-35 83 38 00