

REFERENCIA	COD. MUESTRA O ACTIVIDAD	NÚMERO DE INFORME	CÓDIGO TARIFA
107353	4994/2022	10615/2022	10601035

PETICIONARIO / OBRA

1195: KRYSTALINE TECHNOLOGY, S.A., C/NICOLÁS DE BUSSI, Nº52
ELCHE PARQUE INDUSTRIAL, 03203-ELCHE, ALICANTE
OBRA: ENSAYOS SOBRE HORMIGÓN CON ADITIVOS - ELCHE PARQUE INDUSTRIAL, 03203 - ELCHE

DIRECCIÓN DE ENVÍO

KRYSTALINE TECHNOLOGY, S.A.
C/NICOLÁS DE BUSSI, Nº52
ELCHE PARQUE INDUSTRIAL
03203-ELCHE
ALICANTE

Toma de muestras de hormigón fresco, incluyendo muestreo, medida del asiento en cono, fabricación de 6 probetas cúbicas de 15x15 cm, curado desbastado y rotura a compresión (UNE-EN 12350-1; UNE-EN 12350-2; UNE-EN 12390-2; UNE-EN 12390-3), s/norma UNE-EN 12350-1; UNE-EN 12350-2; UNE-EN 12390-2; UNE-EN 12390-3

DATOS DEL SUMINISTRO

SUMINISTRADOR: IMASALAB	DESIGNACIÓN:
SU ALBARÁN:	CONTENIDO EN CEMENTO: 350 kg/m3
TIPO DE VEHÍCULO: hormigonera	TIPO DE CEMENTO: CEM I/52.5R
MATRÍCULA:	RELACIÓN AGUA/CEMENTO: 0.36
HORA DE ENTREGA: ---	ADITIVOS: FOSROC AURAMIX 310
HORA LÍMITE DE USO: 17:30	ADICIONES:

TOMA DE MUESTRAS SEGÚN UNE 12350-1 Y ENSAYO DE CONSISTENCIA DEL CONO DE ABRAMS SEGÚN UNE 12350-2

FECHA DE TOMA: 18/07/2022	ANALISTA: EMILIO PEÑALVER	TIPO MUESTREO: Puntual	Nº DE TOMA: 1
INICIO DE TOMA: 16:00	FIN DE TOMA: 16:15	TEMP. TOMA:	HUMEDAD TOMA:
CONO 1: 220 mm.	CONO 2: 0 mm.	CONO MEDIO: 220 mm.	
ALBARÁN: 24801	TIEMPO: Despejado	VIENTO: Calma	FORMA COMPACTACIÓN: Picado

FABRICACIÓN Y CONSERVACIÓN DE LAS PROBETAS SEGÚN UNE-EN 12390-2

PROBETAS: 12 (cúbicas de 15x15 cm.)	CURADO EN OBRA: Protegido	TIEMPO EN OBRA: horas.
FECHA RECOGIDA:	HORA RECOGIDA: ---	TEMP. RECOGIDA:
CURADO EN CÁMARA HÚMEDA DESDE:		PREPARACIÓN PROBETAS: Sin ajuste

PREPARACIÓN Y ENSAYO DE ROTURA SEGÚN UNE-EN 12390-3:2009/AC:2011

PRENSA: Clase 1

Probeta número	Edad hormigón (días)	Fecha de ensayo	Carga de rotura (kN)	Tensión de rotura (N/mm ²)	Tensión media (N/mm ²)	Notas
1	15 h	19/07/2022	313.60	12.5	12.7	
2	15 h	19/07/2022	321.40	12.9		
3	24 h	19/07/2022	475.80	19.0		18.8
4	24 h	19/07/2022	465.40	18.6		
5	3	21/07/2022	571.80	22.9	22.3	
6	3	21/07/2022	542.20	21.7		
9	28	15/08/2022	621.90	24.9	25.2	
10	28	15/08/2022	639.20	25.6		

DESTINO DEL HORMIGÓN

AMASADA DE CONTROL

OBSERVACIONES

Tensión de rotura y Tensión media calculadas para probetas cilíndricas (diámetro 15 cm, altura 30 cm) aplicando el factor de corrección F = 0.9 según Apartado 86.3.2 de la EHE 08.

COPIAS ENVIADAS A:

KRYSTALINE TECHNOLOGY, S.A.

En Alicante a 18 de agosto de 2022

Documento firmado electrónicamente por:

RESPONSABLE TÉCNICO

DIRECTOR DEPARTAMENTO

LAURA CAMPOS MUÑOZ
INGENIERA GEÓLOGA

JOSÉ GONZÁLEZ FERNÁNDEZ
GEÓLOGO

REFERENCIA	COD. MUESTRA O ACTIVIDAD	NÚMERO DE INFORME	CÓDIGO TARIFA
107353	4996/2022	10617/2022	10601035

PETICIONARIO / OBRA

1195: KRYSTALINE TECHNOLOGY, S.A., C/NICOLÁS DE BUSSI, Nº52
ELCHE PARQUE INDUSTRIAL, 03203-ELCHE, ALICANTE
OBRA: ENSAYOS SOBRE HORMIGÓN CON ADITIVOS - ELCHE PARQUE INDUSTRIAL, 03203 - ELCHE

DIRECCIÓN DE ENVÍO

KRYSTALINE TECHNOLOGY, S.A.
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DATOS DEL SUMINISTRO

SUMINISTRADOR: IMASALAB	DESIGNACIÓN:
SU ALBARÁN:	CONTENIDO EN CEMENTO: 350 kg/m3
TIPO DE VEHÍCULO: hormigonera	TIPO DE CEMENTO: CEM I/52.5R
MATRÍCULA:	RELACIÓN AGUA/CEMENTO: 0.33
HORA DE ENTREGA: ---	ADITIVOS: FOSROC AURAMIX 310/KRYSTALINE ULTRA
HORA LÍMITE DE USO: ---	ADICIONES:

TOMA DE MUESTRAS SEGÚN UNE 12350-1 Y ENSAYO DE CONSISTENCIA DEL CONO DE ABRAMS SEGÚN UNE 12350-2

FECHA DE TOMA: 18/07/2022	ANALISTA: EMILIO PEÑALVER	TIPO MUESTREO: Puntual	Nº DE TOMA: 3
INICIO DE TOMA: 16:30	FIN DE TOMA: 16:45	TEMP. TOMA:	HUMEDAD TOMA:
CONO 1: 200 mm.	CONO 2: 0 mm.	CONO MEDIO: 200 mm.	
ALBARÁN: 24803	TIEMPO: Despejado	VIENTO: Calma	FORMA COMPACTACIÓN: Picado

FABRICACIÓN Y CONSERVACIÓN DE LAS PROBETAS SEGÚN UNE-EN 12390-2

PROBETAS: 11 (cúbicas de 15x15 cm.)	CURADO EN OBRA: Protegido	TIEMPO EN OBRA: horas.
FECHA RECOGIDA:	HORA RECOGIDA: ---	TEMP. RECOGIDA:
CURADO EN CÁMARA HÚMEDA DESDE:		PREPARACIÓN PROBETAS: Sin ajuste

PREPARACIÓN Y ENSAYO DE ROTURA SEGÚN UNE-EN 12390-3:2009/AC:2011

PRENSA: Clase 1

Probeta número	Edad hormigón (días)	Fecha de ensayo	Carga de rotura (kN)	Tensión de rotura (N/mm ²)	Tensión media (N/mm ²)	Notas
1	15 h	19/07/2022	830.20	33.2	33.0	
2	15 h	19/07/2022	817.90	32.7		
3	24 h	19/07/2022	1090.20	43.6	43.7	
4	24 h	19/07/2022	1092.80	43.7		
5	3	21/07/2022	1286.40	51.5	52.3	
6	3	21/07/2022	1327.10	53.1		
9	28	15/08/2022	1393.90	55.8	55.1	
10	28	15/08/2022	1358.20	54.3		

DESTINO DEL HORMIGÓN

AMASADA DE KRYSTALINE ULTRA

OBSERVACIONES

Tensión de rotura y Tensión media calculadas para probetas cilíndricas (diámetro 15 cm, altura 30 cm) aplicando el factor de corrección F = 0.9 según Apartado 86.3.2 de la EHE 08.

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Krystaline C-S-H Technology Overview

Krystaline Technology S.A., manufacturer of waterproofing admixtures for concrete and surface applied solutions, uses a unique proprietary C-S-H technology to provide the next generation of integral waterproofing systems.

The Krystaline “C-S-H technology” base provides a new and exceptional manufacturing component that allows Krystaline to enhance the hydration process of concrete/mortar. The improvement to the hydration process allows significantly improved development of calcium silicate hydrate within the micropore structure of the concrete/mortar while slowing down the development of calcium hydroxide, providing long term solutions and allowing the increased durability and sustainability of concrete.



What are the advantages of C-S-H Technology over traditional crystalline?

The optimized calcium silicate hydrate development when using Krystaline’s C-S-H technology allows many advantages compared to traditional crystalline technologies such as:

- Dramatically better waterproofing capabilities in both short and long term
- Outstanding ability to perform in high hydrostatic environments and conditions
- Notable increases to concrete compressive, flexural, and tensile strengths
- Verifiable 28-day reductions in specific surface area, total pore volume, and average pore size diameter
- Remarkable and proven ability to self-heal cracks up to 0.5 mm
- Certification and approval as a replacement for waterproofing membranes
- Certification and approval as a replacement for waterproofing coatings
- Extraordinary increases in the durability and the sustainability of concrete

The reduced development of calcium hydroxide development in the concrete when using Krystaline C-S-H technology allows the following advantages compared to traditional crystalline technologies:

- Prevents leaching, thereby avoiding strength loss and increased porosity over time
- Reduces the risk of carbonation, a process which promotes corrosion
- Reduces risk of deterioration due to the formation of gypsum and ettringite
- Increases the durability and sustainability of concrete

The advantages are plentiful for each of the Krystaline products manufactured with C-S-H technology, but they all share the overall single greatest common advantage as follows:

Lower Cost

(compared to quality competitors)



Better Results

(compared to ALL competitors)



Best Cost To Quality Ratio in the Industry

How does C-S-H technology work?

Krystaline C-S-H technology functions through catalysis to improve hydration between cement particles and water. This helps to boost the development of calcium silicate hydrate while decreasing the rate of calcium hydroxide production in the concrete. The enhanced C-S-H gels and crystals are bigger, longer, thicker and there are many more of them to fill the pores and capillaries.

The increased development of the strong, non-soluble, C-S-H gels and crystals within the micropore structure continually develop in the presence of water or humidity, even many years later. Since concrete may hydrate for many years in the presence of moisture, C-S-H treated concrete will continue to develop for many years until the moisture has been stopped.

What does C-S-H technology require to function well?

Krystaline C-S-H technology requires 3 basic components to function properly, they are:



1. Cement

A reasonable cement content must be present within the concrete/mortars for Krystaline's C-S-H technology to properly function.



2. Water

The enhanced hydration process required for the development of calcium silicate hydrate within the concrete/mortar needs water.



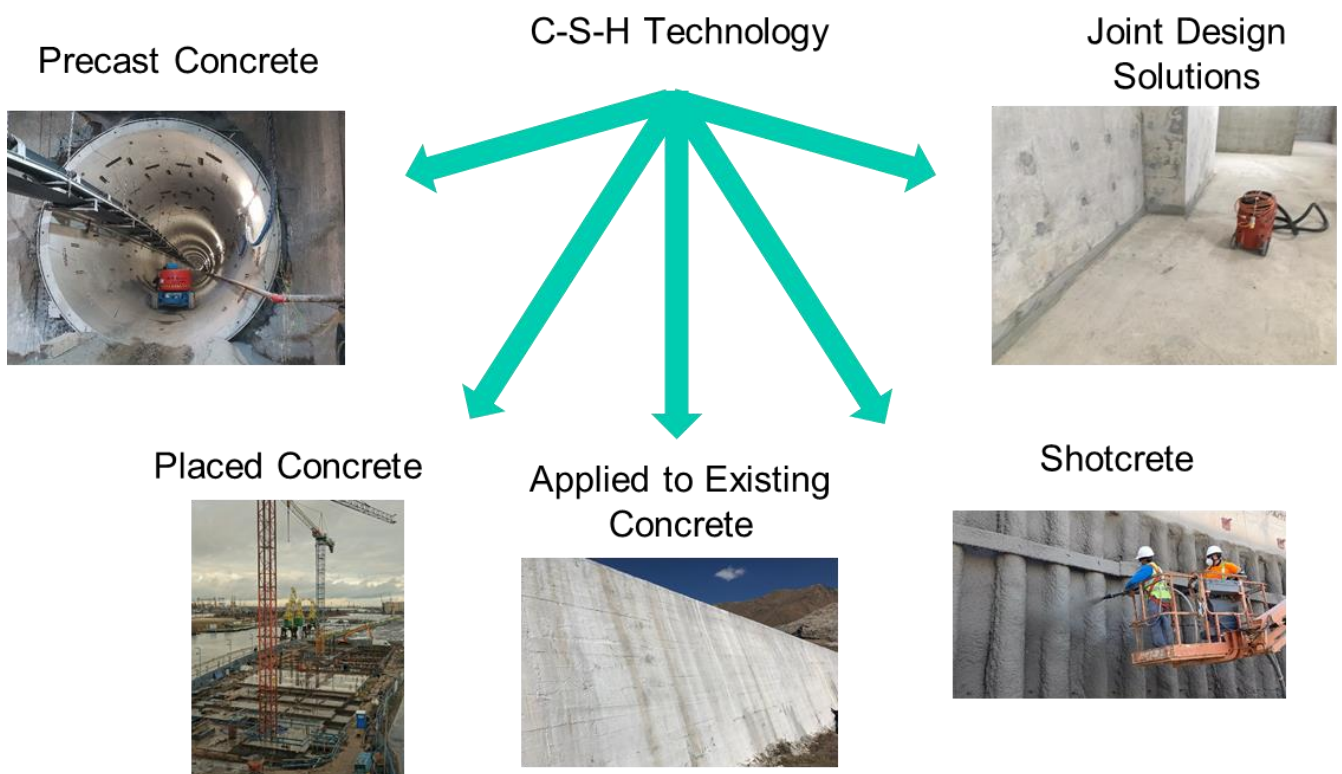
3. Time

The hydration of the concrete/mortar requires time. As the hydration process continues the calcium silicate hydrate enhancement will continue. The concrete/mortar will continually become stronger and less permeable.

How does the C-S-H technology transfer through the concrete?

Krystaline's C-S-H products rely on adsorption to move the C-S-H technology through the concrete. As Krystaline's C-S-H technology develops enhanced gels and crystals within the micropore structure, these enlarged gels and crystals encounter additional un-hydrated cement particles and in the presence of water continue the enhanced hydration process. This process follows the path of water eventually leading back to the source of the ingress. Since C-S-H technology promotes the enhanced reaction between the cement and the water using catalysis the process is never used up.

Where can C-S-H technology be used?



WATERPROOFING THE WORLD

Important Facts

Portland Cement facts

- Calcium silicates compose approximately 75% of the weight of Portland cement.
- When reacted with water (hydration) Portland cement results in 2 new components calcium silicate hydrate and calcium hydroxide.
- The calcium silicate hydrate is the most important concrete binder and is considered the glue that hold concrete together.

Calcium Silicate Hydrate facts

- Calcium silicate hydrate = calcium oxide (CaO) + Silicon Dioxide (SiO₂) + Water (H₂O) and is formed during the concrete hydration process
- The creation of calcium silicate hydrate occurs during both the short term and long term hydration process.
- Calcium silicate hydrate determines the physical and mechanical properties of the concrete including setting conditions, tensile and compressive strength, and the dimensional stability of the concrete.
- Calcium silicate hydrate occurs at the nano level.
- Calcium silicate hydrate is non soluble binder
- Calcium silicate hydrate is considered a hybrid as its structure shares both crystalline and gel-like characteristics.
- Increased calcium silicate hydrate will result in a reduced micropore structure.

Calcium Hydroxide facts:

- Ca(OH)₂ (calcium hydroxide) also known as Portlandite and referred to as CH in cement chemistry notation, grows within the capillary pore space
- Calcium hydroxide will only grow in free space, when it encounters another calcium hydroxide crystal it will grow in another direction.
- Calcium hydroxide is the weakest and most soluble of the hydration products.
- Calcium hydroxide will leach out of the concrete increasing the permeability of the concrete.
- Calcium hydroxide combined with carbon dioxide and moisture will lead to carbonation of the concrete.
- Calcium hydroxide can have deterioration effects in sulphate rich environments, where sulphate ions react with Ca(OH)₂ to form gypsum which then reacts with the hydration products of C3A to form ettringite

Important Definitions

Catalysis - a modification and especially increase in the rate of a chemical reaction induced by material unchanged chemically at the end of the reaction.

<https://www.merriam-webster.com/dictionary/catalysis>

Adsorption - the adhesion in an extremely thin layer of molecules (as of gases, solutes, or liquids) to the surfaces of solid bodies or liquids with which they are in contact.

<https://www.merriam-webster.com/dictionary/adsorption>

Krystaline 1 Slurry Overview

What is Krystaline 1?

Krystaline 1 is a penetrating crystalline waterproofing slurry based on C-S-H technology and used to waterproof existing concrete by reacting with the un-hydrated cement particles increasing and enhancing the Calcium Silicate Hydrate (C-S-H) gels and crystals **deep** in the concrete mass. Over a period of weeks and months, enhanced C-S-H gels and crystals grow, filling the naturally occurring pores and voids in the concrete, and permanently blocking the pathways for water and waterborne contaminants. Later, if cracks form or water becomes present again, the incoming water re-triggers the C-S-H crystallization process and additional gels and crystals begin to grow, filling cracks and ensuring that the structure's waterproofing barrier is maintained and protected.



Krystaline 1 Requires Cement, Water and Time!



Cement: Krystaline technology is designed specifically for waterproofing concrete and cement-based applications. Use it only on applications that have a cement base.



Water: While most waterproofing products require a dry surface for application Krystaline 1 requires water as part of the crystalline development process. Pre-soaking the concrete is important. Wet curing after application is also important.

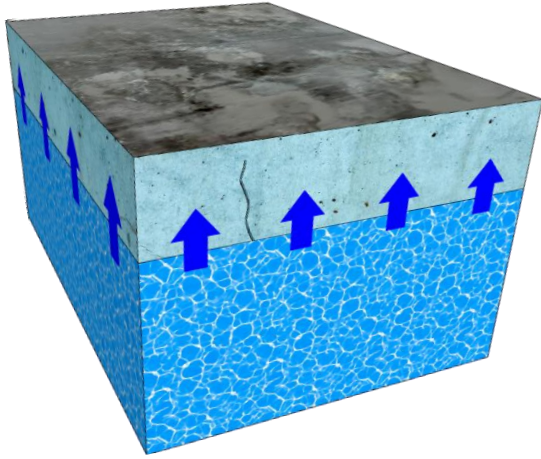


Time: Developing C-S-H crystalline growth within the concrete requires time for the process to activate and grow. Over time the gels and the crystals continue to form and expand the Calcium Silicate Hydrate within the concrete. Once waterproofed the concrete application will automatically regenerate crystalline growth upon the presence of water.

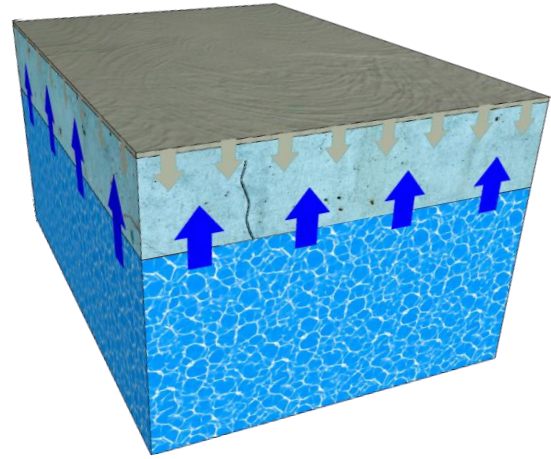
Krystaline 1 Slurry Overview

How does it Work?

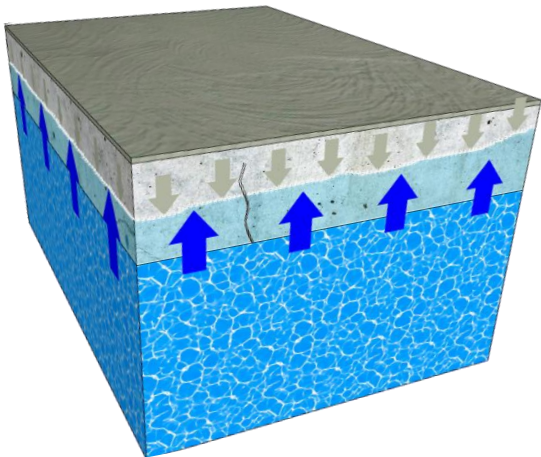
1. Wet untreated concrete



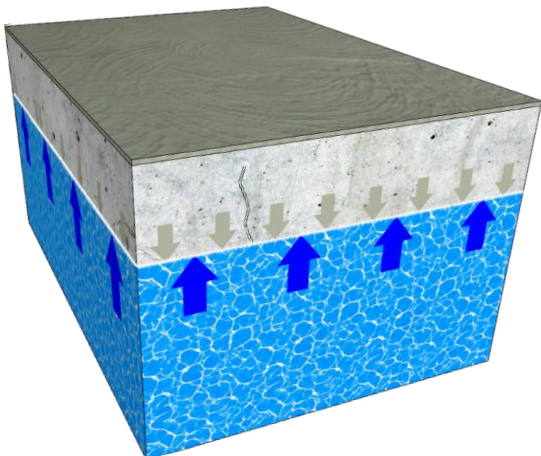
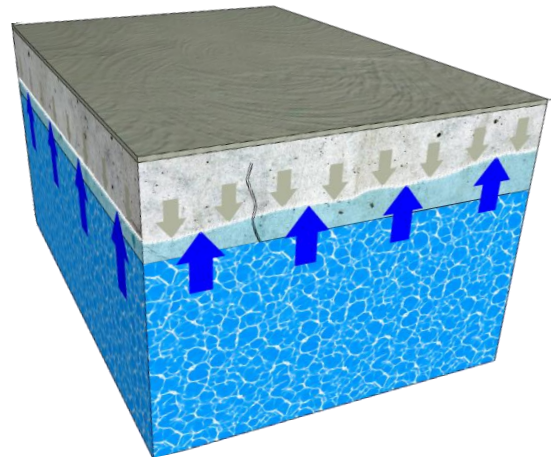
2. Cleaned and treated surface application



3. Penetration into Concrete Begins



4. Penetration into Concrete Continues



5. Penetration only stops when there is no more water or concrete

The process will continue as long as water and cement particles are present.

The penetration depth is subject only to the availability of water and cement particles.

Krystaline 1 Slurry Overview

Practical Examples

Example 1:

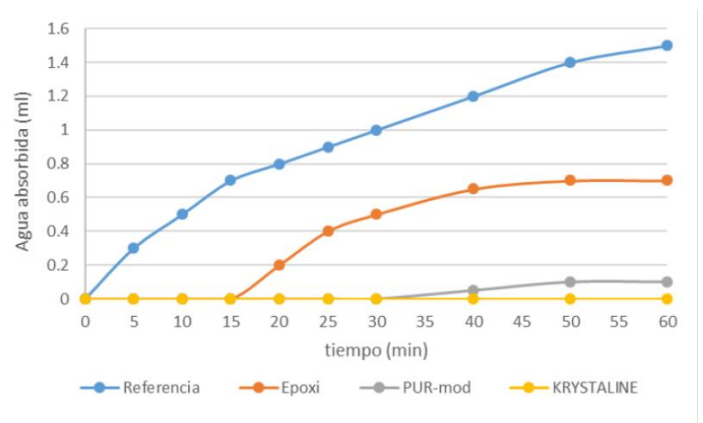
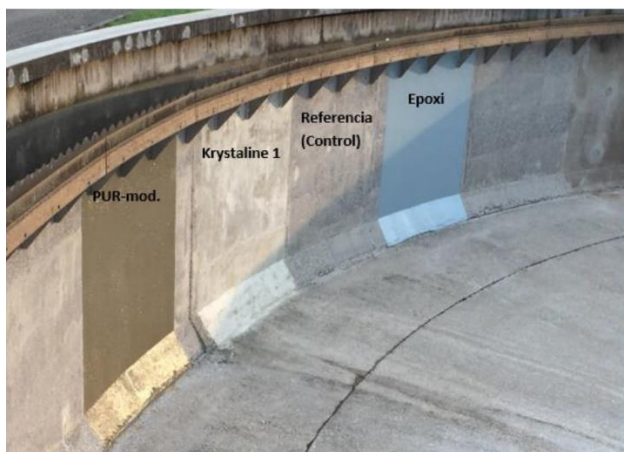
The core samples below are part of a repair project from a parking garage in the Netherlands. The Krystaline 1 was applied to the surface area of a leaking parking garage floor. After six weeks, core samples were taken. As can be easily seen with the naked eye, Krystaline 1 has penetrated and C-S-H crystals have filled the area of the crack to the depth of 6 cm.



Core samples from slab treated with Krystaline 1 demonstrating penetration and crack self-healing six weeks after application

Example 2:

The photos and data presented here are from the 2020 report "Increasing wastewater treatment infrastructure durability with advanced coatings". The study compared the long-term effectiveness of a PU system, an Epoxy system and Krystaline 1 for use inside a sludge tank. The application was made and the tank was in operation for 2 years, after which it was drained and the 3 systems were checked for water penetration.



Test area of inside of waste water clarifier tank and permeability test results after two years of use

Krystaline's C-S-H technology was the only application to completely stop water penetration. Over time, the PU and epoxy systems will continue to deteriorate while the Krystaline 1 system will continue to improve.

Krystaline 1 Slurry Overview

A Few Types of Krystaline 1 Projects

Water treatment plants in Slovakia



Dams in the Peruvian mountains



Below Grade in India



Water reservoirs in Ireland



Swimming pools in Kenya



Underground car parks in Hong Kong



KRYSTALINE 1

C-S-H CRYSTALLINE WATERPROOFING SLURRY

DESCRIPTION

Krystaline 1 stimulates concrete's natural hydration abilities by enhancing the C-S-H crystal and amorphous gel development within the concrete matrix. Over a period of weeks and months, the amorphous gels and crystals expand to naturally fill the pores and voids in the concrete micropore structure, permanently blocking the pathways for water and waterborne contaminants. Later, if cracks form due to settling or shrinkage, incoming water triggers the enhancement process and additional crystals and gels begin to grow, filling cracks and ensuring that the structure's waterproofing barrier is maintained and protected.

Krystaline 1 replaces surface coatings as the concrete itself becomes the waterproof layer and the surface treatment is not required to remain intact for the system to be effective. **Krystaline 1** is supplied in powder form and needs only to be mixed with water prior to application.

FEATURES & KEY BENEFITS

- Stops water ingress in concrete
- Replaces unreliable exterior membranes, liners and coatings
- Reaches well below the surface and is not affected by surface wear or abrasion
- Self-seals hairline cracks
- Reactivates in the presence of moisture
- Waterproofing increases with time
- Waterproofs from any direction (i.e., positive or negative side)
- Treatment may be applied to old or new concrete
- Safe for contact with potable water
- Resistant to the freeze-thaw cycle
- Protects reinforcing steel against corrosion
- Increased durability decreases building maintenance and repair costs

TYPICAL APPLICATIONS

- Foundations
- Basement
- Tunnels
- Pipes
- Elevator pits
- Concrete walls and slabs
- Construction joints
- Marine structures
- Swimming pools
- Water treatment plants
- Potable water tanks
- Parking structures

PACKAGING

Krystaline 1 is supplied in 20 kg pails.

APPLICATION GUIDELINES

All concrete to be treated with **Krystaline 1** must be clean and have an "open" capillary system. Remove laitance, dirt, grease, etc. by means of high-pressure water jetting, wet sandblasting or wire brushing.

Surfaces must be thoroughly saturated prior to the **Krystaline 1** application (remove any free-standing water from the surface before application). **Krystaline 1** must be applied to saturated concrete.

Pour water into a clean suitable mixing vessel, then gradually add the **Krystaline 1** powder into the water while mixing with a low-speed paddle mixer until a consistency of thick oil paint is obtained. Only mix suitable quantities that can be applied within 20 minutes and stir mixture frequently. If the mixture starts to set, do not remix with additional liquid, simply re-stir to restore workability.

Brush Applied Mixing Ratio: Use 5 parts of **Krystaline 1** powder to 2 parts water by volume for slurry consistency.

Spray Applied Mixing Ratio: Use 4 parts of **Krystaline 1** powder to 2 parts water by volume for spray applications. Ensure that the area sprayed is followed by brushing the applied area into the pores and capillaries.

Slurry Consistency: Apply one or two coats (according to specification) of **Krystaline 1** using a masonry brush or appropriate power spray equipment. When two coats are specified, apply the second coat whilst the first coat is still "green".

Post Treatment - Once the **Krystaline 1** treatment has reached initial set, moist cure with a fine mist spray of water 2 - 3 times per day for three days. In hot or windy conditions, it should be cured more frequently. Alternative methods can be employed such as covering the application with wet burlap. During the curing period the **Krystaline 1** treatment must be protected from rainfall, frost and water puddles.

Krystaline 1 is an effective waterproofing system for rigid concrete structures only and may not reliably seal cracks and joints that experience constant or repeated movement.

COVERAGE

- 1 kg/m² applied as a slurry in only one coat
- 0.8 kg/m² when used as a first coat
- 0.7 kg/m² when used as a second coat

The coverages are theoretical and depend on local conditions. On-site testing should be done before application.

STORAGE

Krystaline 1 should be stored at room temperature min 5°C and max 35°C, kept dry and out of direct sunlight. If these conditions are maintained and the product packaging is unopened, then a shelf life of 2 years can be expected.

KRYSTALINE 1

C-S-H CRYSTALLINE WATERPROOFING SLURRY

HEALTH & SAFETY

This product becomes caustic when mixed with water or perspiration.

Hazard statements

H315 Causes skin irritation.

H318 Causes serious eye damage.

H335 May cause respiratory irritation.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

For more information, please check the safety data sheet for this product.


TECHNICAL DATA

Color	Grey, white or blue
Appearance	Powder
Density	1.10 g/cm ³
pH (Mixed with water)	13
Adhesion strength by pull-off	2.82 MPa
Initial set time at 25°C	60 minutes
Water penetration	≥ 5 mm
Mix ratio (Slurry)	5:2 (By volume)
Capillary absorption and permeability to water	W < 0.1 kg/(m ² x h ^{0.5})
Solids content	100%

DISCLAIMER

Whilst any information and/or specification contained herein is to the best of our knowledge, true and accurate, we always recommend that a trial be carried out to confirm suitability of the product, as no warranty is given or implied in connection with any recommendations or suggestions made by us or our representatives, agents or distributors. The information in this data sheet is effective from the date shown and supersedes all previous.

Document version: (2023/03/27)

	
Krystaline Technology, S.A. c/ Nicolás de Bussi nº 52 03203 Elche (Alicante) 17 1170/CPR/ER.03608	
KRYSTALINE 1 Principle 1 (PI): Protection against ingress Method 1.2 Impregnation (I)	
EN 1504-2 PRODUCTS FOR PROTECTION AND REPAIR OF CONCRETE STRUCTURES. SURFACE PROTECTION SYSTEMS FOR CONCRETE. Tables 1 & 4 Impregnation	
Essential characteristics	Performance
Water vapor permeability (where relevant)	NPD*
Capillary absorption and permeability to water (according to EN 1062/3)	W < 0,1 kg/ (m ² x h ^{0.5})
Resistance to chemicals (where relevant)	NPD*
Thermal compatibility (where relevant)	NPD*
Adhesion strength by pull-off test (where relevant)	NPD*
Reaction to fire	Class A1
Slip/skid resistance (where relevant)	NPD*
Penetration depth measured on concrete cubes (according to EN 14630)	≥5 mm
Dangerous substances	NPD*

NPD*. No Performance Determined

KRYSTALINE Add1

C-S-H CRYSTALLINE WATERPROOFING ADMIXTURE - DOSAGE 1 kg/m³

DESCRIPTION

Krystaline Add1 is a next generation, C-S-H technology, waterproofing admixture. It has been designed to waterproof and improve the durability of concrete using hydrophilic, C-S-H hydration enhancing, crystalline technology.

Krystaline Add1 is added to fresh concrete easily at the batch plant or directly into ready mix trucks. It works continuously by enhancing the hydration of cement, increasing the beneficial C-S-H within the micropore structure of the concrete thereby preventing moisture from penetrating through. The enhanced hydration process not only provides waterproofing characteristics to the concrete, but it also allows for an increased ability to self-heal micro cracking upon the presence of moisture.

FEATURES & KEY BENEFITS

- Stop water leaks in concrete
- Seal and waterproofs cracks up to 0.5 mm
- Protects reinforcing steel against corrosion
- Total and permanent waterproofing
- Waterproofing increases with time
- Gives concrete excellent resistance to attack by sulphates and chloride
- Not affected by surface wear or abrasion
- Effective against hydrostatic pressure up to 12 bar
- Waterproofs from any direction (positive or negative)
- Water vapor permeable
- Safe for contact with potable water
- Replaces unreliable exterior membranes, liners and coatings
- Reduces shrinkage cracks by up to 60%
- Reduces water demand by approximately 5%
- Eliminates the use of a waterproofing sub-trade
- Continually improves impermeability benefits with time
- Will reactivate should water be present in the future
- Will increase the durability of the concrete

TYPICAL APPLICATIONS

- Foundations
- Basement
- Tunnels
- Pipes
- Maritime projects
- Elevator pits
- Concrete walls
- Concrete slabs
- Construction joints
- Swimming pools
- Water treatment plants
- Potable water tanks
- Parking structures

DOSAGE

- 1 kg of **Krystaline Add1** per m³ of concrete.

TECHNICAL DATA

Color	White
Appearance	Granular Powder
Density	1.4 g/cm ³
pH (Mixed with water)	13
Solids content	100%
Hydrostatic resistance	Up to 20 bar
Dosage	1 kg/m ³
Crack self-sealing	up to 0.5 mm
Particle size	40 - 150 microns

APPLICATION GUIDELINES

Krystaline Add1 acts by hydrophilic crystallization. Through a catalytic process it creates a chemical reaction between the unhydrated cement particles and water, creating additional insoluble crystalline hydration which fill the concrete's capillary network. The resulting concrete has a greater ability to autogenously heal cracks and resist the penetration of water under hydrostatic pressure.

Krystaline Add1 is a dry powder that is added directly to the concrete during mixing. The dosage rate is 1 kg per cubic meter of concrete. Reduce the water component by approximately 5% to achieve equal slumps on most mix designs (subject to mix design and raw material components). Even though the concrete will look less wet than most concrete mixes, it will provide an increased workability resulting in increased productivity. Add **Krystaline Add1** directly during mixing. Prior testing is recommended.

CONSIDERATIONS FOR BATCHING

- Eliminate all variables such as recycled water or recycled aggregate.
- When adding multiple admixtures to a concrete batch, do not add other admixtures at the same time as **Krystaline Add1**. Add **Krystaline Add1** first and premix before adding other admixtures to eliminate intermixing and interference of the other admixtures.

BATCH PLANT - DRY BATCH ADDITION INSTRUCTIONS

Krystaline Add1 may be added directly to the ready-mix truck at dry batch operations.

1. Prepare a separate silo and addition system for **Krystaline Add1** and add it directly to the ready-mix vehicle after the cement has been added or add **Krystaline Add1** directly to the mixer or ready-mix vehicle manually after the cement has been added.
2. Allow 10 minutes at high speed for mixing.
3. If slump is lower than required add a water reducer or plasticizer to increase slump to the required slump.

BATCH PLANT - CENTRAL MIX OPERATION INSTRUCTIONS

1. Prepare a separate silo and addition system for **Krystaline Add1** and add it directly to the mixer after the cement has been added or add **Krystaline Add1**

KRYSTALINE Add1

C-S-H CRYSTALLINE WATERPROOFING ADMIXTURE - DOSAGE 1 kg/m³

directly to the mixer manually after the cement has been added.

- Mix as per mixer specification and standard practices.
- If slump is lower than required add a water reducer or plasticizer to increase slump to the required slump.

JOB SITE ADDITION INSTRUCTIONS

Krystaline Add1 may be added directly at the job site. Please note the following instructions:

- Add **Krystaline Add1** directly to the ready-mix vehicle manually at the job.
- Allow 10 minutes at high speed for mixing before the concrete is to be placed.
- If slump is lower than required add a water reducer or plasticizer to increase slump.

In general, **Krystaline Add1** is recommended for concretes using 300 kg or more of total cementitious materials.

HEALTH & SAFETY

This product becomes caustic when mixed with water or perspiration.

Hazard statements

H315 Causes skin irritation.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.


For more information, please check the safety data sheet for this product.

PACKAGING & STORAGE

Krystaline Add1 is supplied in 20 kg pails.

Available in 1 kg water soluble bags to be added directly to the concrete mix for easy on-site dosage and handling.

Krystaline Add1 should be stored at room temperature min 5°C and max 35°C, kept dry and out of direct sunlight. If these conditions are maintained and the product packaging is unopened, then a shelf life of 2 years can be expected.

		
KRYSTALINE TECHNOLOGY, S.A. c/ Nicolás de Bussi nº 52 03203 Elche (Alicante) 17 1170/CPR/AT.04078		
Krystaline Add1		
SPECIFIC REQUERIMENTS FOR WATER RESISTING ADMIXTURES (at equal consistence) according table 9 of the standard EN 934-2:2010+A1:2012		
Essential requirement	Performance	Harmonized technical specification
Chloride ion content	≤ 0,1%	UNE EN 934-2:2009+A1:2012
Alkali content	≤ 40%	
Corrosion behavior	Contains only approved substances according to EN 934-1:2008 Annex A1	
Capillary absorption (g/mm ²)	At 7 days: ≤ 50% At 28 days ≤ 60%	
Compressive strength at 28 days	At 28 days: ≥ 85%	
Air content	≤ 2%	
Dangerous substances	Anexo ZA de EN 934-2	

DISCLAIMER

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KRYSTALINE BLOCK

HIGH-STRENGTH WATERPROOF REPAIR MORTAR

DESCRIPTION

Krystaline BLOCK is a fast setting, high-strength waterproof mortar that is designed to repair leaking cracks, holes and joints. It functions as a replacement for Krystaline Dry when a faster set is required. It is specially formulated to increase the calcium silicate hydrate in the concrete using C-S-H crystalline technology which enhances the hydration of the mortar to stimulate increased amorphous gel and crystal growth within the micropore structure. The gels and crystals grow in all directions to fill any capillary pores of the mortar to block the passage of water and to self-heal microcracking.

FEATURES & KEY BENEFITS

- High early strength
- Superior bonding ability
- Will self-heal microcracks over time
- Very high compressive and flexural strength
- Withstands hydrostatic pressure
- Contains no corrosive chemicals or metals
- Safe for contact with potable water
- Can be painted after curing
- Fast and easy to use
- Permanently waterproof
- Increased durability decreases maintenance and repair costs
- Superior performance enhancing your reputation for high quality work
- Contains C-S-H hydration enhancing crystalline technology

TYPICAL APPLICATIONS

- Repair leaking cracks, joints and holes
- Waterproof tie holes in concrete walls
- Repair spalled or honeycombed concrete
- Use as a waterproof plaster on masonry walls
- Can be used over stone and non-concrete substrates
- Can be used as a replacement for Krystaline Dry or Krystaline M60 subject to area of placement

PACKAGING

Krystaline BLOCK is supplied in 20 kg pails.

COVERAGE

- 1.7 kg/l
- 1.5 kg per lineal meter to fill cracks up to 25x35 mm
- As a coating - 1.7 kg/m² per mm

The coverages are theoretical and depend on local conditions. On-site testing should be done before application.

APPLICATION GUIDELINES

Krystaline BLOCK is mixed to a suitable putty consistency (approximately 3.5 parts powder to 1-part clean water by volume) and applied to the prepared surface using a trowel. Do not mix more than can be applied within 15 minutes.

For deep patches or overlay applications thicker than 15. mix **Krystaline BLOCK** with clean 10-12mm. pea gravel (approximately 3.5 parts powder to 1.5 parts gravel to 1-part clean water by volume).

TECHNICAL DATA

Color	Dark Grey
Appearance	Powder
Powder density	1.4 g/cm
pH (Mixed with water)	12
Wet density	2.14 g/cm
Compressive strength	51 MPa
Pot life	10 minutes
Initial set time at 25°C	30 minutes
Adhesion strength by pull-off	4.51 MPa
Mix ratio	3.5:1 (By volume)
Solids content	100%

HEALTH & SAFETY

This product becomes caustic when mixed with water or perspiration.

Hazard statements

H315 Causes skin irritation.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

For more information, please check the safety data sheet for this product.

STORAGE

Krystaline BLOCK should be stored at room temperature (min 5°C and max 35°C), kept dry and out of direct sunlight. If these conditions are maintained and the product packaging is unopened, then a shelf life of 2 years can be expected.

KRYSTALINE BLOCK

HIGH-STRENGTH WATERPROOF REPAIR MORTAR

DISCLAIMER

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Document version: (2023/02/09)

	
Krystaline Technology, S.A. c/ Nicolás de Bussi nº 52 03203 Elche (Alicante)	
17 1170/CPR/ER.03608	
KRYSTALINE BLOCK Principle 3 Concrete restoration Method 3.1 Applying mortar by hand	
EN 1504-3 Products and systems for the protection and repair of concrete structures	
Essential characteristics	Performance
Compressive strength	Class R2 ≥ 25 MPa
Chloride content	Class R2 $\leq 0,05$ %
Adhesive bond	Class R2 ≥ 1.5 MPa
Restrained shrinkage / expansion (dimensional stability) where required. Not required if thermal cycling is carried out	NPD*
Carbonation resistance (For durability of corrosion, protection, or inhibition) where relevant	NPD*
Elastic modulus, where relevant	NPD*
Thermal compatibility. Freeze/thaw cycles	Class R2 $\geq 0,8$ MPa
Skid resistance, where relevant	NPD*
Coefficient of thermal expansion (only for polymer concretes) where relevant	NPD*
Capillary Absorption	Class R2 ≤ 0.5 kg/(m ² x h ^{0.5})
Reaction to fire	Class A1
Dangerous substances	NPD*

KRYSTALINE BLOCK F

HIGH-STRENGTH FIBRE-REINFORCED C-S-H WATERPROOF MORTAR

DESCRIPTION

Krystaline BLOCK F is a high-strength waterproof fiber-reinforced shrinkage compensating mortar with C-S-H Krystaline technology that is specially designed to repair leaking cracks, holes and joints.

Krystaline BLOCK F is a fast setting, higher strength replacement for Krystaline Dry for use when a rapid set is required to protect the repairs being made. It is specially formulated to increase the calcium silicate hydrate in the concrete using C-S-H Krystaline technology to enhance the concrete's hydration. The enhanced calcium silicate hydrate gels and crystals formed using C-S-H crystalline technology will increase the hydration abilities of the mortar in both the short term and over time resulting in more durable and sustainable mortar. The gels and crystals grow in all directions to fill any capillary pores of the mortar to block the passage of water and to self-heal microcracking.

FEATURES & KEY BENEFITS

- High early strength
- Superior bonding ability
- Very high compressive and flexural strength
- Withstands hydrostatic pressure
- Contains no corrosive chemicals or metals
- Safe for contact with potable water
- Can be painted after curing
- Will self-heal microcracks over time
- Fast and easy to use
- Permanently waterproof
- Increased durability decreases maintenance and repair costs
- Superior performance enhancing your reputation for high quality work
- Contains C-S-H hydration enhancing crystalline technology

TYPICAL APPLICATIONS

- Repair leaking cracks, joints and holes
- Waterproof tie holes in concrete walls
- Repair spalled or honeycombed concrete
- As a replacement for Krystaline Dry or Krystaline M60 subject to area of placement
- Can be used over stone and non-concrete substrates

COVERAGE

- 1.7 kg/l
- 1.5 kg per linear meter to fill a 25 mm x 35 mm chase.
- As coating - 1.7 kg/m² per mm

The coverages are theoretical and depend on local conditions. On-site testing should be done previous to application.

STORAGE

Krystaline BLOCK F should be stored at room temperature min 5°C and max 35°C, kept dry and out of direct sunlight. If these conditions are maintained and the product packaging is unopened, then a shelf life of 2 years can be expected.

PACKAGING

Krystaline BLOCK F is supplied in 20 kg pails.

APPLICATION GUIDELINES

Krystaline BLOCK F is mixed (3.5 parts powder to 1 art clean water by volume), and applied to the prepared substrate using a trowel. Do not mix more than can be applied within 10 minutes.

For deep patches or overlay applications thicker than 13 mm mix **Krystaline BLOCK F** with clean 10 mm pea gravel (approximately 3.5 parts powder to 1.5 parts gravel to 1 part clean water by volume).

TECHNICAL DATA

Color	Dark Grey
Appearance	Powder
Powder density	1.2 g/cm ³
Wet density	2.14 g/cm ³
pH (Mixed with water)	12
Compressive strength	51 MPa
Pot life	10 minutes
Initial set time at 25°C	30 minutes
Adhesion strength by pull-off	4,51 MPa
Mix ratio	3.5:1 (By volume)
Solids content	100%

HEALTH & SAFETY

This product becomes caustic when mixed with water or perspiration.

Hazard statements

H315 Causes skin irritation.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

For more information, please check the safety data sheet for this product.

KRYSTALINE BLOCK F

HIGH-STRENGTH FIBRE-REINFORCED C-S-H WATERPROOF MORTAR

DISCLAIMER

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Document version: (2023/03/23)

	
Krystaline Technology, S.A. c/ Nicolás de Bussi nº 52 03203 Elche (Alicante)	
17 1170/CPR/ER.03608	
KRYSTALINE BLOCK F Principle 3 Concrete restoration Method 3.1 Applying mortar by hand	
EN 1504-3 Products and systems for the protection and repair of concrete structures	
Essential characteristics	Performance
Compressive strength	Class R2 ≥ 25 MPa
Chloride content	Class R2 $\leq 0,05$ %
Adhesive bond	Class R2 ≥ 1.5 MPa
Restrained shrinkage / expansion (dimensional stability) where required. Not required if thermal cycling is carried out	NPD*
Carbonation resistance (For durability of corrosion, protection or inhibition) where relevant	NPD*
Elastic modulus, where relevant	NPD*
Thermal compatibility. Freeze/thaw cycles	Class R2 $\geq 0,8$ MPa
Skid resistance, where relevant	NPD*
Coefficient of thermal expansion (only for polymer concretes) where relevant	NPD*
Capillary Absorption	Class R2 ≤ 0.5 kg/(m ² x h ^{0.5})
Reaction to fire	Class A1
Dangerous substances	NPD*

KRYSTALINE DRY

CRYSTALLINE WATERPROOFING GROUT

DESCRIPTION

Krystaline Dry is a specially formulated C-S-H type hydration enhancing crystalline mortar with fiber designed to be used for filling tie holes, honeycombs and as part of the Krystaline joints design system. **Krystaline Dry** is a multipurpose mortar that can be used in a variety of situations and places. The enhanced hydration promoted by the C-S-H technology used increases the amount of calcium silicate hydrate amorphous gels and crystals within the concrete micropore matrix. It fills the pores and capillaries whenever water becomes present (even in the future) by stimulating dramatically better hydration and increasing the non-soluble calcium silicate hydrate binders within the mortar.

Over a period of days, the gels and crystals will expand and increase, filling any pores and voids in the mortar to permanently block the pathways for water and waterborne contaminants. If cracks should form in the mortared areas due to settling or shrinkage, incoming water triggers the enhanced hydration process and additional calcium silicate hydrate gels and crystals will self-heal any micro cracks ensuring that the structure's waterproofing barrier is maintained and protected.

FEATURES & KEY BENEFITS

- Stops water ingress through tie holes, and construction joints
- Can be used as a replacement or together with expanding water bar as part of the joint design system
- Self-seals hairline cracks
- Reactivates in the presence of moisture
- Waterproofing increases with time
- Waterproofs from any direction (i.e., positive or negative side)
- Designed specifically for use in new construction as part of a complete tanking system but may be used on old concrete as well.
- Safe for contact with potable water
- Resistant to the freeze-thaw cycle
- Protects reinforcing steel against corrosion
- Increased durability decreases building maintenance and repair costs

TYPICAL APPLICATIONS

- Foundations
- Basement
- Tunnels
- Pipes
- Elevator pits
- Concrete walls and slabs
- Construction joints
- Marine structures
- Swimming pools
- Water treatment plants
- Potable water tanks
- Parking structures

PACKAGING

Krystaline DRY is supplied in 20 kg pails.

APPLICATION GUIDELINES

Krystaline Dry is supplied in powder form and needs only to be mixed with water prior to application.

All concrete to be treated with **Krystaline DRY** must be clean and have an "open" capillary system. Remove laitance, dirt, grease, etc. by means of high-pressure water jetting, wet sandblasting or wire brushing.

Surfaces must be roughened and thoroughly saturated prior to the **Krystaline DRY** application (remove any free-standing water from the surface before application). **Krystaline DRY** must be applied to saturated concrete.

Pour water into a clean suitable mixing vessel, then gradually add the **Krystaline DRY** powder into the water while mixing with a low-speed paddle mixer. Only mix suitable quantities that can be applied within 30 minutes. If the mixture starts to set, do not remix with additional liquid, simply re-stir to restore workability.

Mixing Ratio: Use 4 parts of **Krystaline Dry** powder to 1 part water by volume for thick plastic moldable grout consistency.

When applying honeycombs deeper than 1.5 cm, use 0.6 to 1 cm pea gravel at 1.5 parts pea gravel to 4 parts **Krystaline DRY**.

Post Treatment - Once the **Krystaline DRY** treatment has reached initial set, moist cure with a fine mist spray of water 2 - 3 times per day for three days. In hot or windy conditions, it should be cured more frequently and protected. Alternative methods can be employed such as covering the application with wet burlap. During the curing period the **Krystaline DRY** treatment must be protected from rainfall, frost, and water puddles.

Contact a Krystaline representative for more detailed application instructions.

Krystaline DRY is an effective waterproofing system for rigid concrete structures only and may not reliably seal cracks and joints that experience constant or repeated movement.

COVERAGES

- 1.6 kg/l
- 1.4 kg per linear meter to fill a 25 x 35 mm chase

The coverage is theoretical and depends on local conditions. On-site testing should be done before application.

KRYSTALINE DRY

CRYSTALLINE WATERPROOFING GROUT

HEALTH & SAFETY

This product becomes caustic when mixed with water or perspiration.

Hazard statements

H315 Causes skin irritation.

H318 Causes serious eye damage.

H335 May cause respiratory irritation.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

For more information, please check the safety data sheet for this product.

STORAGE

Krystaline DRY should be stored at room temperature min 5°C and max 35°C, kept dry and out of direct sunlight. If these conditions are maintained and the


product packaging is unopened, then a shelf life of 2 years can be expected

TECHNICAL DATA

Color	Grey
Appearance	Powder
Powder density	1.0 g/cm ³
Wet density	1.94 g/cm
pH (Mixed with water)	13
Compressive strength	34.5 N/mm ²
Adhesion strength by pull-off	2.82 MPa
Pot Life	30 minutes
Initial set time at 25°C	60 minutes
Mix ratio	4:1 (By volume)
Capillary absorption and permeability to water	$W < 0,1 \text{ kg}/(\text{m}^2 \times \text{h}^{0,5})$
Solids content	100%

DISCLAIMER

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Krystaline Technology, S.A. c/ Nicolás de Bussi nº 52 03203 Elche (Alicante) 17 1170/CPR/ER.03608	
KRYSTALINE DRY Principle 1 (PI): Protection against ingress Method 1.2 Impregnation (I)	
EN 1504-2 PRODUCTS FOR PROTECTION AND REPAIR OF CONCRETE STRUCTURES. SURFACE PROTECTION SYSTEMS FOR CONCRETE. Tables 1 & 4 Impregnation	
Essential characteristics	Performance
Water vapour permeability (where relevant)	NPD*
Capillary absorption and permeability to water (according to EN 1062/3)	$W < 0,1 \text{ kg}/(\text{m}^2 \times \text{h}^{0,5})$
Resistance to chemicals (where relevant)	NPD*
Thermal compatibility (where relevant)	NPD*
Adhesion strength by pull-off test (where relevant)	NPD*
Reaction to fire	Class A1
Slip/skid resistance (where relevant)	NPD*
Penetration depth measured on concrete cubes (According to EN 14630)	≥5 mm
Dangerous substances	NPD*

KRYSTALINE Dry-Shake

DRY-SHAKE POWDER WATERPROOFING FOR CONCRETE SLABS

DESCRIPTION

Krystaline Dry-Shake is a dry shake crystalline waterproofing treatment for concrete. It is specifically designed to create a reaction between the un-hydrated cement particles and water to increase and enhance the C-S-H crystals in the concrete. Krystaline Dry-Shake is applied as a dry shake powder to horizontal concrete applications that are to be power troweled during the final finishing process. This method produces a smooth finish without the scaling, dusting, flaking, and delamination. Krystaline Dry-Shake allows the application of all common floor finishes and eliminates the need for all other waterproofing systems including membranes and waterproofing coatings.

Over a period of weeks and months, the enhanced C-S-H crystals created by the use of Krystaline Dry-Shake continue to develop, filling the naturally occurring pores and capillaries in the concrete, permanently blocking the pathways for water and waterborne contaminants. Later, if cracks form due to settling or shrinkage, incoming water triggers the crystallization process and additional crystals begin to grow, filling cracks and ensuring that the structure's waterproofing barrier is maintained and protected.

FEATURES & KEY BENEFITS

- Withstands extreme hydrostatic pressure from both positive and negative side of the concrete slab
- Self-heals cracks up to 0.5 mm.
- Penetrates deeply into the concrete
- Provides excellent cost to quality waterproofing capabilities
- Eliminates membranes, liners and coatings
- Highly resistant to aggressive chemicals
- Contains no corrosive chemicals or metals
- Safe for contact with potable water
- Does not change the appearance of the concrete
- Can be painted after curing
- Fast and easy to use
- May be used as a wear surface
- Increased durability decreases maintenance and repair costs
- Superior performance enhancing your reputation for high quality work
- Contains C-S-H hydration enhancing crystalline technology.

TYPICAL APPLICATIONS

Use as a dry powder shake for waterproofing in horizontal concrete surfaces including:

- All below grade or on grade slabs
- Bridge decks
- Reservoirs and water treatment facilities
- Below grade or on grade parking structures
- Marine environments

APPLICATION GUIDELINES

Please see Application Instructions AP 23.02 for additional details regarding application of Krystaline Dry-Shake.

STEP 1: SURFACE PREPARATION

Place concrete as per proper concrete placing procedures.

Wait until concrete has reached initial set — this can be determined after the bleed water has disappeared and the concrete leaves an indentation of 6 mm to 9 mm when walked on. The concrete should be able to support the weight of a power trowel (helicopter trowel).

STEP 2: SPREAD Krystaline Dry-Shake

Spread Krystaline Dry-Shake evenly over the concrete surface at the recommended rate of coverage of 1 kg/m². The white color will enable the installer to ensure uniform distribution of the product.

STEP 3: FINISHING

Work the product completely into the surface using a power trowel. Initially the surface may appear dry and difficult to trowel however the Krystaline Dry-Shake will react with the surface and create a plasticizing effect allowing easier troweling. Do not add water.

STEP 4: CURING

Wet cure the concrete with a fog mist spray, sprinkler or wet burlap ensuring the surface is kept damp for a minimum of 48 hours. If conditions allow extend the wetting for 7 days.

Proper curing is necessary to ensure the performance and benefits of Krystaline Dry-Shake.

COVERAGE

- 1 kg/m²

The coverages are theoretical and depend on other conditions.

PACKAGING

Krystaline Dry-Shake is supplied in 20 kg pails.

TECHNICAL DATA

Colour	White
Appearance	Powder
Density	1.2 g/cm ³
pH (Mixed with water)	13
Solids content	100%

KRYSTALINE Dry-Shake

DRY-SHAKE POWDER WATERPROOFING FOR CONCRETE SLABS

STORAGE

Krystaline Dry-Shake should be stored at room temperature (min 5°C and max 35°C), kept dry and out of direct sunlight. If these conditions are maintained and the product packaging is unopened, then a shelf life of 2 years can be expected.

HEALTH & SAFETY

This product becomes caustic when mixed with water or perspiration.

Hazard statements

H315 Causes skin irritation.

H318 Causes serious eye damage.

H335 May cause respiratory irritation.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

For more information, please check the safety data sheet for this product.

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Krystaline Technology, S.A. c/ Nicolás de Bussi nº 52 03203 Elche (Alicante) 17 1170/CPR/ER.03608	
KRYSTALINE Dry-Shake Principle 1 (PI): Protection against ingress Method 1.2 Impregnation (I)	
EN 1504-2 PRODUCTS FOR PROTECTION AND REPAIR OF CONCRETE STRUCTURES. SURFACE PROTECTION SYSTEMS FOR CONCRETE. Tables 1 & 4 Impregnation	
Essential characteristics	Performance
Water vapor permeability (where relevant)	NPD*
Capillary absorption and permeability to water (according to EN 1062/3)	$W < 0,1 \text{ kg}/(\text{m}^2 \times \text{h}^{0,5})$
Resistance to chemicals (where relevant)	NPD*
Thermal compatibility (where relevant)	NPD*
Adhesion strength by pull-off test (where relevant)	NPD*
Reaction to fire	Class A1
Slip/skid resistance (where relevant)	NPD*
Water penetration depth measured on concrete cubes (according to EN 14630)	≥5 mm
Dangerous substances	NPD*

NPD*. No Performance Determined

Krystaline K-BAR SW

HYDROPHILIC WATER-STOP BASED ON SYNTHETIC RUBBER

DESCRIPTION

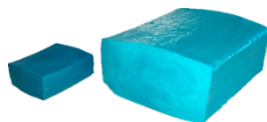
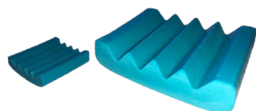
Krystaline K-BAR SW is a ribbed hydrophilic water-stop based on synthetic rubber with excellent swelling capabilities providing an effective watertight seal for construction joints. It possesses the ability retain its own shape after multiple wet-dry cycles ensures superior performance. K-Bar SW will provide superior protection against ground water intrusion even in environments contaminated water environments and works effectively win water with high concentrates of salt (sea water, manure, and slurry). It possesses excellent overall chemical resistance.

FEATURES & USE

- **Krystaline K-BAR SW** effective against ground water intrusion to 6 bar.
- **Krystaline K-BAR SW** will not deteriorate in repeated wet and dry cycles.
- **Krystaline K-BAR SW** has controlled swelling, minimizing the risk of damage to concrete.
- **Krystaline K-BAR SW** very effective for sealing in contact with high concentrates of salt (sea water, manure, and slurry).
- **Krystaline K-BAR SW** can be applied both vertically and horizontally.

DIMENSIONS

- 5 mm x 20 mm for use as a secondary system with the Krystaline joint designs with rebate systems
- 10 mm x 20 mm non-ribbed - For use as a secondary system with the Krystaline joint designs without rebate systems



PACKAGING

Krystaline K-BAR SW 5 mm x 20 mm –15 m rolls is packed 5 rolls per box. Each pallet contains 60 boxes totaling 4500 m of product.

Krystaline K-BAR SW 10 mm x 20 mm in 10 m rolls is packed 7 rolls per box. Each pallet contains 30 boxes totaling 2100 m of product.

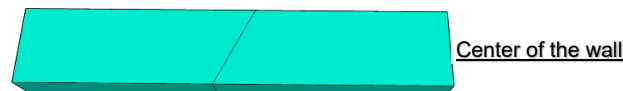


APPLICATION GUIDELINES

Krystaline K-BAR SW can be adhered to concrete using an adhesive or by nailing approximately every 300 mm. It may also be adhered to steel and PVC pipe penetrations with adhesive & tying wire. When using together with Krystaline joint designs and the rebate system, place the water bar between the rebate and the reinforcing steel.

Krystaline K-BAR SW should in all instances be square butted and tight to ensure a continuous section with a minimum of 80 mm of concrete cover. Do not use Krystaline K-BAR SW in expansion joints add movement.

OVERLAPS



Contact our technical department for detailed specific information.

TECHNICAL DATA

Form	Rectangular section strips
Size	10 mm x 20 mm 5 mm x 20 mm
Volume expansion in rainwater	1000%
Volume expansion in concrete water	700%
Volume expansion in 3% saltwater (by weight)	250%
Colour	Turquoise
Hardness Shore A	25
Tensile strength	>2 MPa
Elongation	>400%
Density	1,22 +/- 0,03
Temperature range	-20 +75°C
Weather resistance	Excellent

* indicative values – no specifications

DISCLAIMER

Whilst any information and/or specification contained herein is to the best of our knowledge, true and accurate, we always recommend that a trial be carried out to confirm suitability of the product, as no warranty is given or implied in connection with any recommendations or suggestions made by us or our representatives, agents, or distributors. The information in this data sheet is effective from the date shown and supersedes all previous. Please check with your office to confirm that this is current issue: 2023/03/01

KRYSTALINE M60

HIGH-STRENGTH THIXOTROPIC WATERPROOF GROUT

DESCRIPTION

Krystaline M60 is a high-strength, waterproof, thixotropic, C-S-H technology enhanced grout with self-healing capabilities, especially designed for situations where compressive strengths in excess of 60 MPa are required. Krystaline M60 is recommended as a high strength, low shrinkage alternative for Krystaline Dry. It is specially formulated with Krystaline's proven technology combining self-healing capabilities with a highly compacted superior strength grout.

FEATURES & KEY BENEFITS

- High early strength
- Superior bonding ability
- Very high compressive and flexural strength
- Withstands hydrostatic pressure
- Contains no corrosive chemicals or metals
- Safe for contact with potable water
- Can be painted after curing
- Fast and easy to use
- Permanently waterproof
- Increased durability decreases maintenance and repair costs
- Superior performance enhancing your reputation for high quality work
- Contains C-S-H hydration enhancing crystalline technology

TYPICAL APPLICATIONS

- Repair of cracks, joints and holes
- Waterproof tie holes in concrete walls
- Repair spalled or honeycombed concrete
- Can be used over stone and non-concrete substrates
- Can be applied as a surface grout over large areas without cracking

COVERAGE

- 1.3 kg per linear meter to fill a 25 mm x 35 mm chase.
- As coating - 1.9 kg/m² per mm

The coverages are theoretical and depend on local conditions. On-site testing should be done previous to application.

STORAGE

Krystaline M60 should be stored at room temperature min 5°C and max 35°C, kept dry and out of direct sunlight. If these conditions are maintained and the product packaging is unopened, then a shelf life of 2 years can be expected.

PACKAGING

Krystaline M60 is supplied in 25 kg pails.

APPLICATION GUIDELINES

Krystaline M60 is mixed (5.5 parts powder to 1 part clean water by volume), and applied to the prepared substrate using a trowel.

For deep patches or overlay applications Krystaline M60 can be applied at between 7 to 60 mm thickness in one layer. In overhead applications, 7 to 40 mm thickness. Roughen up the surface if additional materials are to be applied over the Krystaline M60.

TECHNICAL DATA

Color	Grey
Appearance	Powder
Powder density	1.4 g/cm ³
Wet density	2.2 g/cm ³
Compressive strength	1 day – 18.9 MPa
	7 days – 57.9 MPa
	28 days – 81.1 MPa
Flexural strength	1 day – 4.3 MPa
	7 days – 9.7 MPa
	28 days – 10.3 MPa
Initial set time at 25°C	40 minutes
Final set time at 25°C	90 minutes
Mix ratio by volume	5.5:1
Mix ratio by weight	0,135 (3,375 l / 25 kg)
Solids content	100%

HEALTH & SAFETY

This product becomes caustic when mixed with water or perspiration.

Hazard statements

H315 Causes skin irritation.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

For more information, please check the safety data sheet for this product.

KRYSTALINE M60

HIGH-STRENGTH THIXOTROPIC WATERPROOF GROUT

DISCLAIMER

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Krystaline Technology, S.A. c/ Nicolás de Bussi nº 52 03203 Elche (Alicante)	
17	
1170/CPR/ER.03608	
KRYSTALINE M60 Principle 3 Concrete restoration Method 3.1 Applying mortar by hand	
EN 1504-3 Products and systems for the protection and repair of concrete structures	
Essential characteristics	Performance
Compressive strength	≥45 MPa
Chloride content	Class R2 ≤0,05 %
Adhesive bond	≥ 2 MPa
Restrained shrinkage / expansion (dimensional stability) where required. Not required if thermal cycling is carried out	NPD*
Carbonation resistance (For durability of corrosion, protection or inhibition) where relevant	Dk<control concrete type MC(0,45)
Elastic modulus, where relevant	NPD*
Thermal compatibility. Freeze/thaw cycles	Class R2 ≥ 0,8 MPa
Skid resistance, where relevant	NPD*
Coefficient of thermal expansion (only for polymer concretes) where relevant	NPD*
Capillary Absorption	Class R2 ≤0.5 kg/(m ² x h ^{0.5})
Reaction to fire	Class A1
Dangerous substances	NPD*

KRYSTALINE PLUG

FAST SETTING MORTAR USED TO STOP FLOWING WATER

DESCRIPTION

Krystaline PLUG is a fast setting grout that, when mixed to a stiff-dough consistency with water, may be used to immediately arrest the seepage or flow of water through concrete voids.

Krystaline PLUG is used to stop flowing water, allowing waterproofing repair to be installed in leaking cracks, holes, joints or any place where water is penetrating a concrete structure.

FEATURES & KEY BENEFITS

- Stops flowing water immediately
- Sets fast, in one to two minutes
- Easy to mix and apply
- Will set and harden under water
- Has exceptional strength
- Does not contain any chlorides
- Safe for drinking water applications
- Can stop extreme leaks
- Works where all other products fail
- Lasts as long as the structure to which it is applied
- Exceptional durability
- Non-shrink, non-metallic

TYPICAL APPLICATIONS

- Foundations
- Basement
- Tunnels and Pipes
- Maritime projects
- Elevator pits
- Concrete walls
- Concrete slabs
- Construction joints
- Swimming pools
- Water treatment plants
- Potable water tanks
- Parking structures

COVERAGE

- 1.7 kg/l
- 1.5 kg per linear meter to fill a 25 mm x 35 mm chase.

The coverages are theoretical and depend on other conditions.

STORAGE

Krystaline PLUG should be stored at room temperature min 5°C and max 35°C, kept dry and out of direct sunlight. If these conditions are maintained and the product packaging is unopened, then a shelf life of 2 years can be expected.

APPLICATION GUIDELINES

The crack or hole to be treated should be cut away to a minimum width of 25 mm and depth of 35 mm by undercutting or square cutting (not by v cut). The concrete in which the repair is to be made must be physically sound and in good condition. Flush away all cuttings and dirt to form a clean washed surface

Mix **Krystaline PLUG** with clean water only. Add approximately 3.5 parts powder to 1 part clean water by volume, just enough water to form a putty consistency.

Do not use more **Krystaline PLUG** than can be placed in 1 minute, whilst allowing for only a 30 second mixing period. Place with minimum working or rubbing. Force Krystaline Plug into the crack or hole by pushing firmly, using maximum pressure. Keep damp for at least 15 minutes to help curing.

PACKAGING

Krystaline PLUG is supplied in 20 kg pails.

TECHNICAL DATA

Color	Dark Grey
Appearance	Powder
Powder density	1.20 g/cm ³
Wet density	2.10 g/cm ³
Particle size	0-0.5 mm
Initial set time at 25°C	1 minute
Compressive strength	37 MPa
Mix ratio	3.5:1 by volume
Adhesion	1.7 MPa
Flexural strength	9 MPa

HEALTH & SAFETY

This product becomes caustic when mixed with water or perspiration.

Hazard statements

H315 Causes skin irritation.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.

Precautionary statements

P280 Wear protective gloves/protective clothing/eye protection/face protection.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

For more information, please check the safety data sheet for this product.

KRYSTALINE PLUG

FAST SETTING MORTAR USED TO STOP FLOWING WATER

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Krystaline Technology, S.A. c/ Nicolás de Bussi nº52 03203 Elche (Alicante)	
17	
1170/CPR/ER.03608	
KRYSTALINE PLUG Principle 3 Concrete restoration Method 3.1 Applying mortar by hand	
EN 1504-3 Products and systems for the protection and repair of concrete structures	
Essential characteristics	Performance
Compressive strength	Class R2 ≥ 25 MPa
Chloride content	Class R2 $\leq 0,05$ %
Adhesive bond	Class R2 ≥ 1.5 MPa
Restrained shrinkage / expansion (dimensional stability) where required. Not required if thermal cycling is carried out	NPD*
Carbonation resistance (For durability of corrosion, protection or inhibition) where relevant	NPD*
Elastic modulus, where relevant	NPD*
Thermal compatibility. Freeze/thaw cycles	Class R2 $\geq 0,8$ MPa
Skid resistance, where relevant	NPD*
Coefficient of thermal expansion (only for polymer concretes) where relevant	NPD*
Capillary Absorption	Class R2 ≤ 0.5 kg/(m ² x h ^{0.5})
Reaction to fire	Class A1
Dangerous substances	NPD*

NPD*. No Performance Determined

Krystaline ULTRA

C-S-H CRYSTALLINE WATERPROOFING ADMIXTURE FOR PRECAST AND UHPC CONCRETE, DOSAGE 1 kg/m³

DESCRIPTION

Krystaline ULTRA is a unique C-S-H technology admixture specifically designed for precast and UHPC applications. It has been designed to improve strength gain, reduced permeability and increases the durability of specialty concrete.

Krystaline ULTRA is added to the fresh concrete easily at the batch plant of the precast factory. It works to increase the C-S-H gels in the concrete while lowering the portlandite creating a stronger waterproof concrete that continuously enhances the C-S-H growth over time. The ability of **Krystaline ULTRA** to enhance the hydration process also provides it with an increased ability to self-heal micro cracking upon the presence of moisture.

FEATURES & KEY BENEFITS

- lowers carbon emissions
- enhances durability
- notable increases in waterproofing abilities
- seal and waterproof cracks up to 0.5 mm
- protects reinforcing steel against corrosion
- resistance to sulphates and chloride attack
- durability is not affected by surface wear or abrasion
- replaces unreliable exterior membranes, liners and coatings

TYPICAL APPLICATIONS

Krystaline ULTRA applications include all precast and UHPC concrete applications that should/must be protected against water ingress and may require future self-healing capabilities. It is also used to augment concrete strength reducing the need for extra concrete and providing a greener solution for UHPC This may include the structural components of:

- Culverts
- Bridge Beams
- Tunnels
- Pipes
- Water treatment plants
- Potable water tanks
- Concrete Walls
- Concrete Towers
- Concrete slabs

APPLICATION GUIDELINES

Krystaline Ultra provides extreme strength gain and even further water reductions for Precast and UHPC applications.

Krystaline ULTRA is a dry powder that is added directly to the concrete during mixing. The dosage rate is 1 kg/m³ of concrete. Add **Krystaline ULTRA** directly to the dry powders during mixing. Prior testing is highly recommended.

Considerations for adding to batching

- Eliminate all variables such as recycled water or recycled aggregate.

- Krystaline Ultra will accelerate the mix concrete, consider time for placement to ensure sufficient slump.
- When adding multiple admixtures to a concrete batch, do not add other admixtures at the same time as **Krystaline ULTRA**. Add **Krystaline ULTRA** first to the dry mix and premix the full dry mix with water before adding other admixtures to eliminate intermixing and interference of the other admixtures.
- Krystaline Ultra packed in 1kg water soluble bag may be added directly to the mix.
- Krystaline Ultra may be supplied in specialty water soluble bag sizes by pre-order.

Batch plant – Central mix operation instructions

1. Prepare a separate silo and addition system for **Krystaline ULTRA** and add it directly to the mixer after the cement has been added or add **Krystaline ULTRA** directly to the mixer manually after the cement has been added. Krystaline Ultra may also be added to the aggregate conveyor belt during loading of the mixer.
2. Mix as per mixer specification and standard practices.

DOSAGE

- Dosage is 1 kg of **Krystaline ULTRA** per m³ of concrete.

PACKAGING

Krystaline ULTRA is supplied in 16 kg pails each pail containing 1 kg water soluble bags to be added directly to the concrete mix for easy on-site dosage and handling.

TECHNICAL DATA

Color	White
Appearance	Granular Powder
Density	1,2 g/ cm ³
Solids content	100%
Dosage	1 kg/m ³ of concrete
Crack self-sealing	0.5 mm
Particle size	40-150 microns

STORAGE

Krystaline ULTRA should be stored at room temperature (min 5°C and max 35°C), kept dry and out of direct sunlight. If these conditions are maintained and the product packaging is unopened, then a shelf life of 2 years can be expected.

HEALTH & SAFETY

This product becomes caustic when mixed with water or perspiration.

Hazard statements

- H315 Causes skin irritation.
- H318 Causes serious eye damage.
- H335 May cause respiratory irritation.

Krystaline ULTRA

C-S-H CRYSTALLINE WATERPROOFING ADMIXTURE FOR PRECAST AND UHPC CONCRETE, DOSAGE 1 kg/m³

For more information, please check the safety data sheet for this product. **Precautionary statements**

P280 Wear protective gloves/protective clothing/eye protection/face protection.


P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

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KRYSTALINE TECHNOLOGY, S.A. c/ Nicolás de Bussi nº 52 03203 Elche (Alicante) 17 1170/CPR/AT.04078		
Krystaline ULTRA		
SPECIFIC REQUERIMENTS FOR WATER RESISTING ADMIXTURES (at equal consistence) according table 9 of the standard EN 934-2:2010+A1:2012		
Essential requirement	Performance	Harmonized technical specification
Chloride ion content	≤ 0,1%	UNE EN 934-2:2009+A1:2012
Alkali content	≤ 40%	
Corrosion behavior	Contains only approved substances according to EN 934-1:2008 Annex A1	
Capillary absorption (g/mm ²)	At 7 days: ≤ 50% At 28 days ≤ 60%	
Compressive strength at 28 days	At 28 days: ≥ 85%	
Air content	≤ 2%	
Dangerous substances	Anexo ZA de EN 934-2	