

PRODUCT INFORMATION SHEET

AALBORG RECOVER™

Premixed Ultra-High Performance Fibre Reinforced Concrete

AALBORG RECOVER™ is a cast in place Ultra High-Performance Concrete intended to be used as overlay of bridges. The formulation of AALBORG RECOVER™ results in an impervious material to chemical agents, which makes it extremely durable even under harsh condition. Based on FUTURECEM® patented technology, with improved packing and shrinkage compensation, it is also resistant to carbonation and alkali reaction, preventing rebars corrosion.

AALBORG RECOVER™ is formulated to resist long freeze-thaw cycles even under the action of de-icing agents, and withstand the stresses caused by heavy traffic.

Applications

- The product is designed to be used as overlay of bridges, both, new ones, and rehabilitation of old ones. Further applications can be explored by the user with Cementir's support.

auto-control for benchmark against selected technical properties listed in "Technical properties of the product".

The recommended mixing sequence is:

- Empty the bag of RECOVER into the mixer.
- Add the water and the superplasticizer at the same time.
- Mix for 9 minutes.
- Add the steel fibres and mix for 1 minute.

Mixing Instructions

A mixing time of 10 minutes, in a planetary-type mortar or pan-type concrete mixer, is preferred. This may be reduced in high efficiency mixers upon

Technical Properties of the Product with a lab reference mix

(Water dosage 2.2 kg per 25 kg premix, 0,7%W of PCE superplasticizer and 200kg/m³ of 13/0.20 steel fibres)

Property and Test Method		
	Units	Typical Value
Fresh State		
• Flow		
ASTM C 230/ C 1437-15 ¹⁾ (initial/30 min/45min)	cm	11,5 / 11,5 / 11,5
ASTM C 230/ C 1437-15 ¹⁾ (initial/30 min/45min) – 20 strokes	cm	17,0 / 17,0 / 17,0
• Air content, EN 1015-7	Vol%	3,0
• Fresh mortar density, EN 1015-7	kg/m ³	2,450
• Aggregate size	mm	3
Hardening State		
• Hydraulic shrinkage, EN 12617-(40x40x160mm) – 90 days	µm/m	420
Mechanical Properties		
• Mean compressive Strength, EN 196-1, 40x40x160mm		
28 days	MPa	200
• Mean compressive Strength, diam. 100/200 cylinder		
28 days	MPa	130
• Mean compressive Strength, diam. 100/100 cubes		
28 days	MPa	150
• E-modulus, EN 12390-13		
28 days	GPa	40
• Flexural strength, EN 12390-5, 100x100x500 mm		
28 days	MPa	24
• Splitting Tensile Strength, EN 12390-6		
28 days	MPa	19
• Flexural tensile strength, EN 14651, 150x150x600 mm		
LOP	MPa	17
f _{R,1}	MPa	26
f _{R,2}	MPa	23
f _{R,3}	MPa	18
f _{R,4}	MPa	14
Durability Properties		
• Chloride content, excl. chloride from mixing water	Wt.% to cement	<0.09%
• Water soluble equivalent alkali content (Na ₂ O+0.658xK ₂ O), excluding contribution from mixing water	kg/m ³	< 3.4 (NO alkali silica reactive aggregate is used)
• Chloride Migration, NT Build 492,		
28 days	x 10 ⁻¹² m ² /s	0.0
56 days		0.0
• Freeze/Thaw Resistance – Scaling, EN 12390-9 (56 cycles)	kg/m ²	0.0
	Frost resistance	Very good
• Water absorption, EN 1015-18	kg/(m ² · min ^{0.5})	0,035 (W _c 2)

1. **No shock or agitation applied to the flow table**

Recommendations for its use:

Fit to project

AALBORG RECOVER™ is a versatile product, where the dosage of superplasticizer and fibres can be adjusted by the user to fulfil the specific fresh and mechanical properties needed for each rehabilitation project.

It is the user responsibility to target the material properties for each application. Therefore, an initial test program, replicating the intended use of the product (initial flow, open time, mechanical properties) before the actual casting of the overlay is always recommended.

Such test program should consider the real conditions that the product must withstand (inclination of the bridge, bonding with the layer below, open time, slump, flow under vibration).

Auto-control

The user of AALBORG RECOVER™ is expected to implement a quality control testing for monitoring the quality of the mixed concrete against as a link to the data mentioned in the table "Technical Properties of the Product", and should at least include:

- Control of water and superplasticizer dosage
- Flow and density
- 28 days compressive and flexural strength

Curing

Due to the low water content in high and ultra-high-performance concretes, it is recommended to protect the concrete from evaporation (e.g. plastic sheet) immediately after casting.

The concrete should be protected from evaporation and kept sheltered from rain, wind, and dew during the first 4 to 7 days after casting.

No heat curing is needed.

Technology:

In the 1980ies, the laboratories of AALBORG PORTLAND A/S, in Denmark, conducted pioneering research to develop very dense cement based binder-matrices, in order to fully exploit the performance of concrete. These efforts resulted in the first ever patented ultra-high performance steel fiber reinforced concrete – bearing the name Compact Reinforced Composite, CRC®. This technology was, and is still today, based on the AALBORG WHITE® white cement, which offers perfectly suited chemistry and purity, as well as superior mechanical performance.

Cementir Group's Innovation Team within Aalborg INWHITE SOLUTION®, synergising together expertise from the Research & Quality Centre in Aalborg, Denmark, and market/customer driven trends and insights from global Sales Team, is again taking the lead in further developing the very complex binder technology behind high and ultra-high performance in concrete.

AALBORG RECOVER™ is based on a further refinement of Cementir Group's recently patented binder technology, FUTURECEM®, which still offers highly advantageous pozzolanic reactions, but without being constrained by the availability and quality of by-products from other industries.

Storage of the product:

AALBORG RECOVER™ pre-mix in 25 kg bags, stowed on pallets can be stored up to 6 months in total from production date without the dry-mix quality being affected (provided the plastic foil and the bags unbroken).

After the pallets are unwrapped and the plastic foil is broken AALBORG RECOVER™ in 25 kg bags can be stored up to 3 months without the dry-mix quality being affected.

Max total shelf life for AALBORG RECOVER™ in 25 kg bags:

6 months + 3 months = 9 months

AALBORG RECOVER™ pre-mix in 1MT big bags, can be stored up to 12 months in total from production date without the dry-mix quality being affected.

Packaging:

AALBORG RECOVER™ is available in 25 kg bags and 1.0Mt big bags.

Health & Safety:

UFI: EE5T-A1WP-TR05-PF9S

AALBORG RECOVER™ a cement-based material, thus, no extra precautions other than the ones related to handling Portland cement must be considered.

AALBORG WHITE® is the cement used in AALBORG RECOVER™. This cement is neutral in terms of meeting the EU requirements for a maximum soluble chromium (VI) in cement of 2 mg/kg with no time limits on storage time.



Contains: Portland Cement. Danger.

H315 – Causes skin irritation.

H318 – Causes serious eye damage.

H335 – May cause respiratory irritation.

P102 – Keep out of reach of children.

P260 – Do not breathe dust.

P280 – Wear protective gloves, eyes and face protection.

P305/351/338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P310 – Immediately call POISON CENTER or doctor/physician.

P501 – Dispose of contents/container in accordance with local regulations.

Contains: Calcium oxide. When mixed with water it will form calcium hydroxide which has a corrosive effect on skin and eyes.

Quality Control Assessment:

AALBORG RECOVER™ is produced under the strict quality control procedures defined and audited by Cementir Group in order to guarantee the highest quality standards.

Disclaimer:

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Sustainability:

In our effort to limit the use of scarce materials, AALBORG RECOVER[™] is manufactured with raw materials from sources vastly available in nature. Therefore, it is not constrained by the availability and quality of by-products from other industries.

Global Contacts:

For technical matters related to the product, please address your request to:

inwhitesolution@cementirholding.it

For commercial inquiries, please find your nearest sales office of AALBORG WHITE[®], at

www.aalborgwhite.com