

# ADIUM 150

## New-generation superplasticizer for precast concrete elements

### Description

ADIUM 150 is a new-generation, polycarboxylate-based superplasticizer, specially developed for the production of ready-mix concrete where high workability, excellent slump retention, high strength and durability are required. It offers the following advantages:

- When added during the preparation of concrete, it reduces the water demand up to 30% and the resulting water/cement ratio, thus significantly increasing both initial and final strength.
- When added to the ready-mixed concrete, it significantly improves its workability with a spread of more than 63 cm (self-compacting concrete), without need for additional water.
- It contributes to better hydration of cement.
- It facilitates compaction of concrete, reduces segregation and bleeding and significantly improves pumpability.
- It significantly reduces setting shrinkage (thus preventing cracks) and creep.
- It improves water impermeability.
- It improves resistance to carbonation and chloride ion penetration.
- It does not have air-entraining action.
- Free of chlorides and other corrosive constituents.
- Compatible with all kinds of Portland cement.

Certified according to EN 934-2: T3.1 and T3.2 and classified as a high-range water reducing - concrete superplasticizing admixture. Certificate number: 0906-CPR-02412007/01. CE marked.

### Working mechanism

ADIUM 150 is an innovative superplasticizer of the latest technology, based on modified polycarboxylate ether polymer. Compared to conventional superplasticizers, it predominates in performance, because it offers high water reduction or great flowability of high duration at a low dosage.

These properties are attributed to the specifically designed chemical structure, as well as the unique working mechanism of ADIUM 150, which significantly differs from the working mechanism of conventional superplasticizers based on polymer

chains of modified lignosulfonates, sulfonated naphthalene-based and melamine-based polycondensates.

The polymer chains of the conventional superplasticizers carrying a very high anionic charge are immediately adsorbed on the surface of the cement particles and render it a negative charge. Because of the repulsive electrostatic forces, the cement particles are dispersed; as a result, less mixing water is required to achieve the desired concrete workability. However, the adsorbed polymer chains are rapidly overlapped by crystals developed during the hydration of cement and this leads to an early loss of the superplasticizing action. Therefore, conventional superplasticizers must be added directly into the concrete on the construction site or at the concrete plant, in case it is close to the construction site.

On the contrary, new generation superplasticizers act by a very different working mechanism. They are copolymers consisting of an anionic backbone with carboxylic groups and long polyethylene oxide-side chains. After the addition of the superplasticizer to concrete, the anionic main chain is adsorbed on the positively charged surface of the cement particles, whereas the side chains induce a steric repulsion effect between the cement particles. Due to this repulsive force, maximum dispersion is reached and agglomeration can be avoided.

Furthermore, new polymer chains are continuously released and adsorbed on the crystals which are developed on the surface of the cement particles during the hydration and prevent the early setting of concrete.

Therefore, high workability of concrete and maximum hydration of cement at a low water/cement ratio are achieved, resulting in a very compact structure of high-strength concrete.

### Fields of application

ADIUM 150 is necessary for preparing high-strength concrete, exposed concrete, pumpable concrete, etc. It is suitable for any type of concrete elements, such as foundations, basements, water tanks, tunnels, canals, sewage and wastewater treatment tanks, swimming pools, screeds for underfloor heating systems, etc.

It is ideal for precast concrete elements.



# ADIUM 150

## Technical data

Color:	light brown
Density:	1.03 - 1.07 kg/l
pH:	5.0 ± 1.0
Maximum chloride content:	chloride-free
Maximum alkali content:	≤ 2.0% by weight

Increase of concrete spread, in proportion to the dose of ADIUM 150:

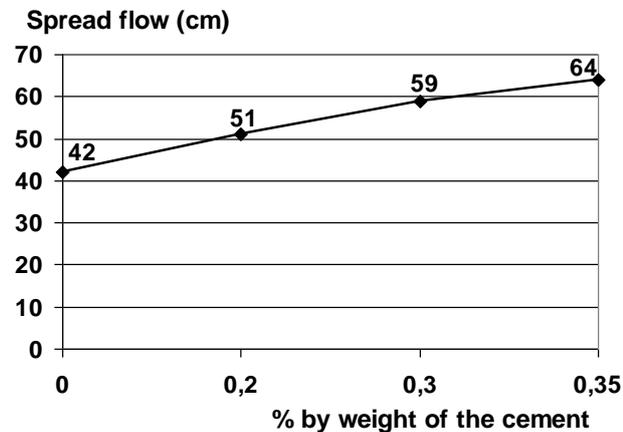


Table 1. Spread of reference concrete C20/25, CEM II/B 32.5 (320 kg/m<sup>3</sup>), w/c ratio = 0.59.

Increase of concrete slump, in proportion to the dose of ADIUM 150:

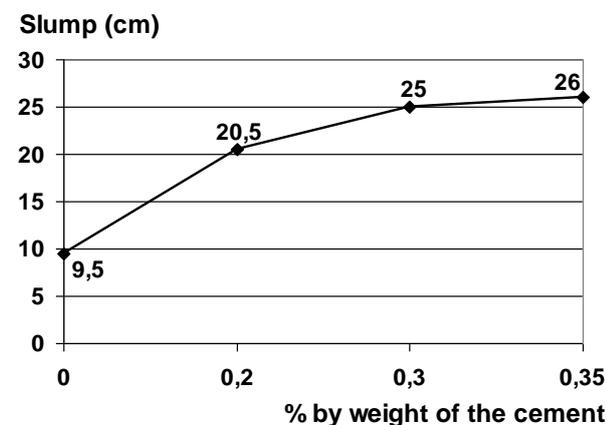


Table 2. Slump of reference concrete C20/25, CEM II/B 32.5 (320 kg/m<sup>3</sup>), w/c ratio = 0.59.

Increase of compressive strength of concrete in proportion to the dose of ADIUM 150, while reducing the mixing water and keeping the same spread as the reference concrete (42 cm):

## Compressive strength (N/mm<sup>2</sup>)

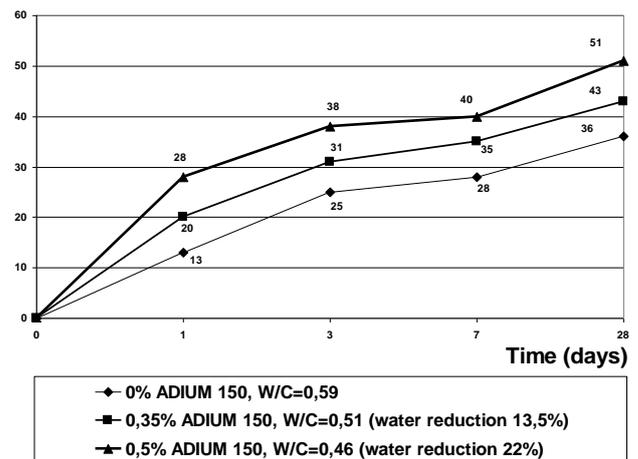


Table 3. Increase of compressive strength of reference concrete C20/25, CEM II/B 32.5 (320 kg/m<sup>3</sup>), w/c=0.59 and reduction of w/c ratio by 13.5% και 22%.

The results shown on the tables are indicative and may differ for different compositions of concrete and types of cement. In any case, it is recommended that trial mixes should be carried out to determine the most effective dosage. The optimal dosage is influenced by the composition of concrete (quantity and type of cement, quantity and aggregate gradation, and the w/c ratio).

## Directions for use

ADIUM 150 should be added to the concrete mix right after its preparation to achieve maximum effectiveness. It can also be added to the concrete mix just before use.

To achieve uniform dispersion into the concrete mass, the concrete mixer truck drum should rotate for an additional 4-5 minutes.

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## Consumption

0.20-0.50 kg per 100 kg of cement.

The consumption of ADIUM 150 depends on the initial and the desired slump at site.

Before application, it is recommended to check the action of ADIUM 150 in a laboratory, by mixing it with the concrete, according to the specific mix design and requirements.

## Packaging

- 20 kg plastic containers
- 220 kg drums
- 1000 kg tanks

## Shelf life – Storage

12 months from production date if stored in original, unopened packaging, at temperatures between +5°C and +35°C. Protect from direct sunlight and frost.

## Remarks

Overdosage could cause segregation or bleeding of concrete, thus reducing the final strength.



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EN 934-2:2009+A1:2012

DoP No.: ADIUM 150/1603-03

### ADIUM 150

High Range Water Reducing –  
Concrete Superplasticizing Admixture  
EN 934-2: T3.1/T3.2

Max chloride content: chloride free

Max alkali content: ≤ 2.0 % by weight

Corrosive behavior: contains components only  
from EN 934-1:2008, Annex A.1

Dangerous substances: compliance

### ISOMAT S.A.

BUILDING CHEMICALS AND MORTARS

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