

GLENIUM™ 51

Polycarboxylic ether (PCE) based, high range superplasticising admixture for concrete

Description

GLENIUM 51 is an admixture of a new generation based on modified polycarboxylic ether. The product has been primarily developed for applications in high performance concrete where the highest durability and performance is required.

GLENIUM 51 is free of chloride & low alkali. It is compatible with all types of cements.

Uses

- High early and ultimate strength concrete
- High performance concrete for durability
- Production of Rheodynamic concrete
- High workability without segregation or bleeding
- Precast & Pre-stressed concrete
- Concrete containing pozzolans such as microsilica, GGBFS, PFA including high volume fly ash concrete

Advantages

- Marked increase in early & ultimate strengths
- higher E modulus
- improved adhesion to reinforcing and stressing steel
- better resistance to carbonation and other aggressive atmospheric conditions
- lower permeability - increased durability
- reduced shrinkage and creep
- elimination of vibration and reduced labour cost in placing

Chemistry and mechanism of action

What differentiates GLENIUM 51 from the traditional superplasticisers is a new, unique mechanism of action that greatly improves the effectiveness of cement dispersion. Traditional superplasticisers based on melamine and naphthalene sulphonates are polymers which are absorbed by the cement granules. They wrap around the granules' surface areas at the very early stage of the concrete mixing process. The sulphonic groups of the polymer chains increase the negative charge of the cement particle surface and disperse these particles by electrical repulsion. This electrostatic mechanism causes the cement paste to disperse and has the positive consequence of requiring less mixing water to obtain a given concrete workability.

GLENIUM 51 has a different chemical structure from the traditional superplasticisers. It consists of a carboxylic ether polymer with long side chains. At the beginning of the mixing process it initiates the same electrostatic dispersion mechanism as the traditional superplasticisers, but the side chains

linked to the polymer backbone generates a steric hindrance which greatly stabilises the cement particles' ability to separate and disperse. Steric hindrance provides a physical barrier (alongside the electrostatic barrier) between the cement grains. With this process, flowable concrete with greatly reduced water content is obtained.

Typical Properties

Aspect	: Light brown liquid
Relative Density	: 1.08 ± 0.01 at 25°C
pH	: ≥ 6
Chloride ion content	: $< 0.2\%$

Standards

- ASTM C494 Types F
- EN 934-2 T3.1/3.2
- IS 9103: 1999

Specification Clause

The hyperplasticiser shall be GLENIUM 51, high range water reducing, Superplasticiser based on polycarboxylic ether formulation. The product shall have specific gravity of 1.08 & solid contents not less than 33% by weight. The product shall comply with ASTM C494 Type F and shall be free of lignosulphonates, naphthalene salts and melamine formaldehyde when subjected to IR Spectra.

Direction for use

GLENIUM 51 is a ready-to-use liquid which is dispensed into the concrete together with the mixing water. The plasticising effect and water reduction are higher if the admixture is added to the damp concrete after 50 to 70% of the mixing water has been added. The addition of GLENIUM 51 to dry aggregate or cement is not recommended.

Thorough mixing is essential and a minimum mixing cycle, after the addition of the GLENIUM 51, of 60 seconds for forced action mixers is recommended.

Dosage

Optimum dosage of GLENIUM 51 should be determined with trial mixes. As a guide, a dosage range of 500gm to 1500gm per 100kg of cementitious material is normally recommended. Because of variations in concrete materials, job site conditions, and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local BASF representative.

For addition information on GLENIUM 51 admixture or on its use in developing concrete mixes with special performance characteristics, contact your local BASF representative.

Effects of over dosage

A severe over-dosage of GLENIUM 51 can result in the following:

- Extension of initial and final set
- Bleed/segregation of mix, quick loss of workability
- Increased plastic shrinkage

A slight overdosing may not adversely affect the ultimate strength of the concrete and can achieve higher strengths than normal concrete, provided it is properly compacted and cured. Due allowance should be made for the effect of fluid concrete pressure on form work, and stripping times should be monitored.

In the event of over dosage, consult your local BASF representative immediately.

Compatibility

GLENIUM 51 is compatible with most of the POZZOLITH series products including POZZOLITH 55R. Use GLENIUM STREAM 2 as viscosity modifying agent in self compacting concrete. It must not be used in conjunction with any other admixture unless prior approval is received from BASF Technical Services Department.

Corrosivity – Non Corrosive

GLENIUM 51 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressed concrete or concrete placed on galvanized steel floor and roof systems. Neither calcium chloride nor any calcium chloride-based ingredients are used in the manufacture of GLENIUM 51 admixture. In all concrete application, GLENIUM 51 admixture will conform to the most stringent or minimum chloride ion limits currently suggested by construction industry standards and practices.

Workability

GLENIUM 51 ensures that rheoplastic concrete remains workable in excess of 30 minutes at +25°C. Workability loss is dependent on temperature, and on the type of cement, the nature of aggregates, the method of transport and initial workability. To achieve longer workability period please use POZZOLITH 55R as retarder or use GLENIUM SKY instead.

It is strongly recommended that concrete should be properly cured particularly in hot, windy and dry climates.

The use of MASTERKURE 111CF, evaporation reducer to prevent quick moisture loss from the surface of the flat works such as pavements in the dry, windy and hot climates is highly recommended.

Packaging

GLENIUM 51 is supplied in 225 kg drums or in bulk on request.

Storage and Shelf life

GLENIUM 51 must be stored where temperatures do not drop below +5°C. If product has frozen, thaw at +5°C or above and completely reconstitute using mild mechanical agitation. Do not use pressurized air for agitation. Store under cover, out of direct sunlight and protect from extremes of temperature.

Shelf life is 12 months when stored as above.

Failure to comply with the recommended storage conditions may result in premature deterioration of the product or packaging. For specific storage advice consult your local BASF representative.

Safety precautions

As with all chemical products, care should be taken during use and storage to avoid contact with eyes, mouth, skin and foodstuffs (which can also be tainted with vapour until product fully cured or dried). Treat splashes to eyes and skin immediately. If accidentally ingested, seek immediate medical attention. Keep away from children and animals. Reseal containers after use. Do not reuse containers for storage of consumable item. For further information refer to the material safety data sheet. MSDS available on demand or on BASF construction chemicals web site.

Note

All BASF Technical Data Sheets are updated on regular basis; it is the user's responsibility, to obtain the most recent issue.

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

Disclaimer

Whilst any information contained herein is true, accurate and represents our best knowledge and experience, no warranty is given or implied with any recommendations made by us, our representatives or distributors, as the conditions of use and the competence of any labour involved in the application are beyond our control.

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