



Conplast® PA21(K)

Water reducing air entraining agent

Uses

Improves the quality and long term durability of concrete exposed to severe weathering conditions. Increases the resistance of concrete to damage by sea water, frost and de-icing salts and also makes concrete structures less prone to cracking.

Reduces the permeability of low cement content concrete for mass pours such as dams and breakwaters.

Improves the cohesion and workability of concrete where poorly graded or harsh sands and aggregates have to be used and minimises bleeding.

Advantages

Improved quality : Increased workability and cohesion assist in producing a dense, uniform, close - textured surface, free from segregation, sand runs and surface water and improves impermeability of concrete structure and also makes it less prone to cracking.

Increased cohesion : Entrained micro-bubbles of air assist in producing cohesive concrete significantly reducing segregation and bleeding, even when poor aggregate or sand gradings have to be used.

Increased durability : Improved workability increases compaction whilst the controlled air entrainment considerable enhances resistance to attack by frost or salts by reduction of initial surface absorption of the hardened concrete.

Standards compliance

Conplast PA21(K) complies with IS-9103 - 1979.

Description

Conplast PA21(K) is supplied as a dark brown liquid based on selected sugar reduced lignosulphonates in combination with compatible surface active agents.

Conplast PA21(K) is a chloride free admixture used to entrain a controlled volume of air in a concrete mix whilst permitting, through its plasticising action, significant reduction in the free water content of the mix.

Conplast PA21(K) acts at the interface of the cement aggregate - particles and mixing water to be distributed throughout the concrete. The entrained air bubbles are of the optimum diameter and spacing to give durability under freeze-thaw or salt attack conditions whilst enhancing lubrication during placing.

Properties

Calcium chloride content : Nil

Specific gravity : 1.16 ± 0.02 at 30°C

Sand content : The quantity of air entrained will increase with increasing sand content - typically an increase in sand content from 35 to 45% will raise the air content from 4.5 to 6.0%.

Cement fineness and content : The amount of air entrained reduces with an increase in cement fineness or content. A 1% loss of air is characteristic of a cement content increase of 90 kg/m³.

Aggregate quality : Silt content variations can adversely affect the degree of air entrainment. This is particularly relevant to the use of crushed aggregate during inclement weather. Excessive silt content may render Conplast PA21(K) ineffective.

Organic impurities : Carbon can reduce the effectiveness of Conplast PA21(K). This does not normally create a problem, but caution should be exercised when using PFA or some pigments, where this type of material is to be used alternative admixtures are available.

Concrete temperature

A temperature increase will reduce air content. A rise from 10°C to 30°C may have the amount of air entrained. In practice, daily fluctuations are much smaller and do not cause significant variation.

Mixing and pumping : Air content will increase with increased time of mixing up to about two minutes in stationary mixers and about 15 minutes in transit mixers. Thereafter, the air content generally remains constant for a considerable period. Small losses of air may occur during pumping. With long pipelines, air content in excess of 5% may seriously reduce the efficiency of the pump.

Compaction of concrete : Prolonged vibration should be avoided.

For specific technical assistance and advice on any of the above aspects, please contact the technical department.

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Setting time : Negligible effect at normal dosage rate.

Compatibility : Conplast PA21(K) can be used with all types of Portland cements and is generally compatible with other admixtures. It is recommended that all admixtures be added to concrete separately.

Durability : The action reducing the water permeability of concrete offers increased resistance to weather exposure and attack in aggressive environments.

Frost resistance : The addition of Conplast PA21(K) produces controlled air space within the concrete to allow such free water as penetrates the capillary pores to freeze and thaw without imposing internal stresses.

Compressive strength : A 15% free water reduction is often possible with Conplast PA21(K). The resultant increased compressive strength normally offsets the anticipated strength loss associated with air entrainment thus producing air entrained concrete with no increase in cement content.

Resistance to salts : Air entrainment increases the resistance of the concrete to surface scaling, which is an adverse effect associated with repeated exposure to marine salts or application of de-icing salts to the concrete surface.

Application instructions

Dosage

The optimum dosage is best determined by site trials with the actual concrete mix which enables the effects of workability and air content to be measured. The rate of addition is generally within the range of 10 ml - 40ml Conplast PA21(K) per 50 kg cement depending on requirements at site. A dosage of 0.03 litres to 50Kg cement is normally sufficient to obtain 5% air entrainment.

Dispensing

The use of dispensing equipment is strongly recommended and wherever possible Conplast PA21(K) should be added to the gauging water as it enters the mixer. The technical department should be consulted regarding suitable equipment and installation. A number of factors previously mentioned will affect the degree of air entrainment and once the rate of application has been established, care should be taken to ensure consistency of raw material supplied, mixing and delivery procedures.

Mix design

Where Conplast PA21(K) is used in an existing mix design, the cement and aggregate proportions should be adjusted to take into account the increase in yield. The sand content can normally be reduced by about 20kg/m² for each additional 1% of air entrained.

Curing

Efficient concrete curing is essential and is best achieved by use of Concure WB spray applied curing compound. If traditional methods such as water spray or wet hessian are used, they must be carried out thoroughly.

Bleeding / segregation :

The addition of Conplast PA21(K) produces a more cohesive concrete mix without bleeding and segregation, allowing even harsh mixes to be placed and compacted easily. The following table illustrates the reduction of bleeding by using Conplast PA21(K). Tests were carried out in accordance with IS:9103 - 1979.

Admixture	Slump mm	Air entrainment	Total W/C	Bleeding water Percent
None	60	1.10	0.55	3.23
Conplast PA21(K)	60	4.9	0.447	Nil



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Cleaning

Spillages of Conplast PA21(K) can be removed with water.

Overdosing

An overdose of double the recommended measure of Conplast PA21(K) will increase workability and air content and can result in slight set retardation and less strength of the concrete. However the ultimate strength of the concrete should not be impaired if advantage is taken of the water reduction and the concrete is adequately cured.

Estimating

Packing

Conplast PA21(K) is supplied in 20 and 200 litre drums.

Storage

Conplast PA21(K) has a minimum shelf life of 12 months provided the temperature is kept within a range of 2°C to 50°C. If this temperature is exceeded in any respect advice should be sought from Fosroc.

Precautions

Health & Safety

Conplast PA21(K) is non-toxic. Any splashes should be rinsed thoroughly with water. Splashes to the eyes should be washed immediately with water and medical advice should be sought.

Fire

Conplast PA21(K) is non-flammable.

Additional information

Technical data and guidance can be provided on a wide range of admixtures and concreting aids including accelerators, retarders, waterproofers, mould release agents, curing compounds, workability aids and repair materials.

Separate data is available on these products.



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Fosroc Chemicals (India) Pvt. Ltd.

Head Office

111/3, Hafeeza Chamber II Floor,
K H Road, PBNo. 2744, Bangalore 560027

www.fosroc.com

Bangalore

Shankar House, IV Floor
1 & 18, RMV Extension
Bangalore 560 080
Ph:080-2361 3161/2361 2004
Fax : 080-2361 7454
email: Bangalore@fosroc.com

Mumbai

208/209, Persepolis
Sector 17, Vashi
Navi Mumbai 400 703
Ph:022-2789 6412/14
Ph:022-2789 6413
email:Mumbai@fosroc.com

Delhi

First floor,1/2 East Patel Nagar
Opp: Vivek Cinema, Main Patel Rd
New Delhi 110 008
Ph:011-25884903/4
Fax: 011- 25884422
email:Delhi@fosroc.com

Kolkata

P-569, Lake Terrace Extn.
First Floor
Kolkata 700 029
Ph: 033 24650917 / 55343188
Fax: 033-24650891
email:Kolkata@fosroc.com

- Ahmedabad : (079) 26762799 ● Ankleshwar :(02646) 220704/224687 ● Bhubaneshwar : (0674) 2546415 ● Chennai (044) 24899949/24853383
- Chandigarh : (0172) 2639360 ● Cochin : (0484) 2356668 ● Coimbatore : (0422) 2472966 ● Goa : (0832) 2542465 ● Guwahati (0361) 2548793
- Hyderabad : (040) 27662324/27662425 ● Hubli (0836) 09343402597 ● Indore : (0731) 504339/5061477 ● Jaipur : (0141) 2235349
- Jamshedpur: (0657) 2223848 ● Lucknow :(0522) 2239044 ● Nagercoil 09842134873 ● Visakhapatnam : (0891) 2564850 / 2707607

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telephone

++91 80-22240018/120

fax

++91 80-22233474

e-mail

india@fosroc.com

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Regional Offices