

# Expanplast PA21\*

Retarding water reducing and air entraining admixture

## Uses

- To produce air entrained concrete for increased durability and resistance to damage by frost and deicing salts.
- Typical applications include concrete roads and bridge decks, airport runways and taxiways and other extensive areas of concrete exposed to potential frost damage.
- To improve cohesion and workability of concrete mixes where poorly graded aggregates must be used and bleeding, segregation or sand runs occur.
- To improve stability and cohesion in extruded concrete.

## Advantages

- Air entrainment increases the resistance of concrete to attack by frost and de-icing salts, reducing problems of surface scaling and concrete failure.
- Entrained air bubbles assist in the formation of a stable cohesive mix, reducing segregation and bleeding
- Air entrainment improves workability and helps produce a dense, uniform, close textured surface free from gravel nests and sand runs, further enhancing durability.
- Water reduction allows concrete to be produced with reduced permeability and increased strength compared to that obtained with air entrainment alone.

## Standards compliance

Expanplast PA21\* complies with ASTM C260 and C494 type B & D, and with the uniformity and air entrainment requirements of BS 5075 Part 3.

## Description

Expanplast PA21\* is chloride free water reducing admixture and air-entraining admixture based on selected sugar-reduced lignosulphonates, and surface active agents, it is supplied as brown solution which instantly disperses in water.

The surface-active agents in Expanplast PA21\* act at the interface between the mixing water and cement / aggregate particles to produce microscopic air bubbles, which are evenly distributed throughout the concrete.

Expanplast PA21\* disperses the fine particles in the concrete mix, enabling the water content of the concrete to perform more effectively. The improved dispersion of cement particles enhances the efficiency of hydration. At higher dosage levels retardation of setting will be obtained.

## Dosage

The optimum dosage of Expanplast PA21\* to meet specific requirements should always be determined by trials using the materials and conditions that will be experienced in use.

The normal dosage range is from 0.40 to 1.50 liters/100 kg of cementitious material, including PFA, GGBFS and microsilica.

Dosages at the higher end of the ranges recommended will give significant retardation and may only be suitable for use in warmer climates.

## Use at other dosages

Dosages outside the typical ranges quoted above may be used to meet particular mix requirements. Contact Fospak for advice in these cases.

## Effects of overdosing

An overdose of double the intended amount of Expanplast PA21\* will result in a significant increase in retardation as compared to that normally obtained at the intended dosage.

This effect is found with most water reducing admixtures, although the degree may vary. Provided that adequate curing is maintained, the ultimate strength of the concrete will not be impaired by increased retardation and will generally be increased.

The effects of overdosing will be further increased if sulphates resisting cement or cement replacement materials are used.

An overdose will increase core workability and increased initial workability will tend to extend the working life of the concrete, which will delay finishing and stiffening times to some extent.

## Properties

Appearance : Brown liquid

Specific gravity : Typically 1.150 - 1.160 at 20 °C



## Instructions for use

### Checking and control

Once a suitable dosage has been selected, particular care should be taken to ensure consistency of materials used and mixing and delivery procedures. Variability in the cleanliness and grading of the aggregates may have differing effects on the plasticizing and air entraining properties of the admixture. Air content should be checked regularly by such means as the pressure method described in BS 1881 and ASTM C231.

### Factors affecting air entrainment

A number of factors can affect the air entrainment obtained for a particular dosage of air entraining admixture, some of which are listed below. The examples given of changes that these factors may make to a concrete mix should be taken as guidelines only and the actual effects in any particular situation confirmed in trials.

- a) Sands of apparently the same grading may have significantly different effects on the level of air entrainment, depending on factors such as silt content, particle size distribution and particle shape. Where changes in sand source or content must be made, or where sand varies within the same source, a careful check must be made on the effects on air entrainment
- b) Increased cement fineness will tend to increase air entrainment. Increased cement content will tend to decrease air content. Changes in cement source and type may also lead to changes in the admixture dosage required to obtain particular air content
- c) The presence of carbon or organic impurities may reduce the effectiveness of an air entrained and require an increased dosage. This will not usually be a problem but care may be required when using PFA, certain pigments or lignite bearing sands.
- d) Increased concrete temperature will tend to reduce air entrainment. Typically a rise from 10 C to 32 °C may have the level of air. In normal mixing conditions daily fluctuations will not give significant variations
- e) Variations of mixer type and transit time may change the level of air entrainment. Small losses may occur during pumping. These will generally be consistent for a given set of conditions. High air contents may significantly reduce pump efficiency over long pump distances.
- f) Normal compacting procedures will not affect air entrainment. Prolonged vibration should be avoided.
- g) Increased dosages may be required at low workability levels to achieve the required air content.

## Compatibility

Expanplast PA21\* is suitable for use with all types of cements OPC, SRC and cement replacement materials such as PFA, GGBFS, and silica fume.

The use of a combination of admixtures in the same concrete mix and or cement replacements may alter the setting time, trials should always be conducted to determine such setting times.

## Dispensing

The correct quantity of Expanplast PA21\* should be measured by means of a recommended dispenser. The admixture should then be added to the concrete with the mixing water to obtain the best results. Contact Fospak for advice regarding suitable equipment and its installation.

## Estimating - packaging

Expanplast PA21\* is available in 210 liter drums and bulk supply.

## Storage

Expanplast PA21\* has a minimum shelf life of 12 months provided the temperature is kept within the range of 2 °C to 50°C. Should the temperature of the product fall outside this range then contact your local Fospak office for advice.

**Freezing point: Approximately - 6°C**

## Precautions

### Health and safety

Expanplast PA21\* does not fall into the hazard classifications of current regulations. However, it should not be swallowed or allowed to come into contact with skin and eyes.

Suitable protective gloves and goggles should be worn. Splashes on the skin should be removed with water. In case of contact with eyes rinse immediately with plenty of water and seek medical advice. If swallowed seek medical attention immediately do not induce vomiting.

For further information consult the Material Safety Data Sheet available for this product.

### Fire

Expanplast PA21\* is water based and non-flammable.



CONSTRUCTION CHEMISTRY

## Cleaning and disposal

Spillages of Expanplast PA21\* should be absorbed onto sand, earth or vermiculite and transferred to suitable containers. Remnants should be hosed down with large quantities of water.

The disposal of excess or waste material should be carried out in accordance with local legislation under the guidance of the local waste regulatory authority.

\* Denotes the trademark registered

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