

# Expanplast\* UW



CONSTRUCTION CHEMISTRY

## Underwater concrete admixture system

### Uses

Expanplast\* UW is an admixture system specially designed to:

- Allows concrete to be placed underwater
- Increases the cohesion of concrete mixes and minimizes washout
- Produces well compacted high quality concrete

### Advantages

- Reduces washout of cement paste during placing
- Can remove need for specialist placing equipment
- Allows higher strength and reinforced concrete to be satisfactorily placed underwater

### Description

Expanplast\* UW is a chloride free water soluble cellulose polymer supplied as a fine powder. Expanplast\* UW produces a gel in the water which surrounds the cement particles and protects them from washout.

Expanplast\* UW delays the initial set of concrete and so allows longer transport and placing times. Once the concrete is in place, no washout will occur.

### Dosage

The normal dosage of Expanplast\* UW is 0.4% by weight of cement, but it can be used at up to 1.0% though some increase in retardation must be expected. Site trials should be carried out to establish the optimum dosage for the mix to be used and method of placement.

### Effects of overdosing

An overdose of double the recommended measure of Expanplast\* UW will result in an increase in the anti-washout properties, significantly increased retardation and strength loss of the concrete.

### Properties

**Chloride content** : Nil to BS 5075

**Form** : Powder

### Compatibility with cements

Expanplast\* UW is suitable for use with all types of Portland cements, SRC cements and cement replacement materials such as PFA, GGBFS and microsilica.

### Compatibility with other admixtures

Expanplast\* UW is not generally compatible with other types of admixture. It has been formulated to give good workability and the additional use of a plasticizing admixture is not normally recommended.

If it is found necessary to use a plasticizer or other type of admixture, contact Epanchem Fospak Technical department for advice.

### Setting times

Stiffening time of concrete using Expanplast\* UW is retarded by approximately 3 to 5 hours at normal dosages, depending on temperature, cement and mix characteristics.

### Cement washout

Typically ordinary concrete can exhibit a washout of up to 30% of the fines content. Using Expanplast\* UW in the same mix, this can be reduced to less than 6%.

Washout resistance is assessed by filling a perforated basket with the concrete mix, allowing it to drop through water five times and measuring the loss in weight of the concrete after each drop.

### Instructions for use

#### Mix design

Mix proportions should be determined as for a cohesive pump mix. A sand content of 40-55% of the total aggregate weight is recommended. A normal minimum cement content for underwater placing is 400 kg/m<sup>3</sup>. Site/plant trials must be carried out to determine the optimum mix design and workability requirements.

#### Mixing

When concrete is made using a forced action mixer, Expanplast\* UW should be added towards the end of the mixing cycle. It should be added slowly and with care. Mixing should continue for a further 1-2 minutes.

When concrete is truck mixed Expanplast\* UW should be added to the concrete after mixing either at the plant if near the site, or at site. Expanplast\* UW should be added slowly into the truck and mixed for 5-10 minutes at high speed. It is essential that truck mixers used are in good condition.



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Agitator trucks are not suitable. When the concrete is truck mixed it may be necessary to adjust the workability of the concrete after Expanplast\* UW has been added. This may be done with a small amount of additional water or the addition of a suitable plasticizer.

The concrete should be constantly agitated until the moment of placing.

### Placing

The concrete may be pumped, skipped or tremied into place, alternatively it may be flowed down an incline. Free fall of highly workable concrete tends to result in turbulent flow which segregates the mix and increases water:cement ratio. At high workability it is, therefore, not recommended that the concrete is allowed to free fall, even from the end of a tremie.

### Typical results

#### Mix design

<b>OPC</b>	:	400 kg/m <sup>3</sup>	
<b>20 mm gravel</b>	:	750 kg/m <sup>3</sup>	
<b>10 mm gravel</b>	:	370 kg/m <sup>3</sup>	
<b>Sand (Zone M)</b>	:	655 kg/m <sup>3</sup>	
<b>Expanplast* UW</b>		<b>Nil</b>	<b>0.5</b>
<b>Dosage (% w/w)</b>		<b>(Control)</b>	
<b>W/C</b>	:	0.49	0.50
<b>Slump</b>	:	190	220
<b>Flow</b>	:	25/59	27/49

<b>Washout after 5 drops(%)</b> :	29	5
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#### Compressive strength (N/mm)

<b>1 day</b>	:	15	10
<b>7 days</b>	:	43	39
<b>28 days</b>	:	53	50

### Technical support

Epanchem Fospak provides a technical advisory service for on-site assistance and advice on admixture selection, evaluation trials and dispensing equipment. Technical data and guidance can be provided for admixtures and other products for use with fresh and hardened concrete.

### Estimating

### Supply

**Expanplast\* UW :** 4.5 kg packs

### Storage

Expanplast\* UW should be stored in its sealed bags, protected from moisture and off the floor. A minimum shelf life of 12 months could then be expected.

### Precautions

### Health and safety

Expanplast\* UW has no specific health hazards. It is non-toxic but should not be ingested. Any eye contamination should be flushed with clean water and medical advice should be sought.

### Fire

Expanplast\* UW powder may burn slowly. Use water to extinguish.

### Cleaning and disposal

Spillages of Expanplast\* UW will get when in contact with moisture and should therefore be removed in the dry state.

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.



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\* Denotes the trademark registered.

#### REGIONAL SALES OFFICES IN PAKISTAN:

##### **Fospak (Pvt) Ltd.**

##### **Head Office**

702, Business Avenue,  
Block-6, PECHS., Shahr-e-Faisal,  
Karachi, Pakistan.

Tel # +92-21-34528477, 34529859

Fax # +92-21-34522436

Email : info.khi@fospak.com.pk

##### **Lahore Sales Office**

2nd Floor Sarwar Shaheed Plaza,  
Cavalry Ground,  
Main Boulevard, Lahore Cantt,  
Lahore, Pakistan.

Tel # +92-42-36675773

Fax # +92-42-36675838

Email : info.lhr@fospak.com.pk

##### **Rawalpindi Sales Office**

1st Floor,  
Al-Harmin Plaza,  
Main Murree Road,  
Rawalpindi, Pakistan.

Tel # +92-51-4575746

Fax # +92-51-9290590

Email : info.isb@fospak.com.pk

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