



# شركة أبولو لكيمائيات الأبنية Apollo For Construction Chemicals

## **Apollo Flo-Grout UW1 Method Statement** (Non shrink cementitious grout for underwater application)

### **Section A: General Comments**

#### **High temperature working**

It is suggested that, for temperatures above 35°C, the following guidelines are adopted as good working practices:

- (i) Unmixed materials and equipment should be stored in a cool shaded area and away from direct sunlight.
- (ii) Avoid application during peak temperature of the day.
- (iii) Plan for enough materials, tools and labour to ensure continuous application process.

#### **Low temperature working**

It is suggested that, for temperatures above 35°C, the following guidelines are adopted as good working practices:

- (i) Store unmixed materials in a warm (preferably temperature controlled) environment, avoiding exposure to frost or temperatures below 5°C.
- (ii) Cold temperatures will decrease the flow properties of the grout.
- (iii) Avoid applying the grout if the temperature is around 5°C and falling.

#### **Equipment**

It is suggested that the following list of equipment is adopted as a minimum requirement:

<i>Protective clothing</i>	:	<i>Protective overalls</i>
	:	<i>Good quality gloves and goggles</i>
<i>Equipment</i>	:	<i>Tremie pipe</i>
	:	<i>Mixer</i>
	:	<i>Large mixing paddle</i>
	:	<i>Mixing bucket</i>
	:	<i>Drill</i>



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### Section B: Application

#### 1.0 Substrate Preparation

- 1.1 The substrate should be sound, clean and free from contamination.
- 1.2 Surface laitance curing compound and other contaminations should be removed by sand/grit blasting or manually by wire brush or any effective method.
- 1.3 For isolated areas and large base plate areas, it is recommended to open air release vent holes to relieve air pressure.
- 1.4 Base plate underside preparations: The underside of the base plate should be clean and free from oil, grease, rust, scale or other loosely adherent material.

#### 2.0 Formwork

- 2.1 As the mixed grout possesses high fluidity characteristics, all formwork and shutters should be watertight. This can be obtained by sealing underneath the formwork and between joints by using Apollo Flo-Grout UW1 mixed to a stiff consistency or any other suitable means.
- 2.2 Also for casting underwater, adequate gap between formwork and substrate should be allowed for tremie pipe while casting vertically.

#### 3.0 Mixing

- 3.1 To ensure proper mixing, a mechanically powered mixer or drill fitted with a suitable paddle should be used. Also, ensure that the machine's mixing capacity and labour availability is enough to be able to continuously carry out the grouting process.
- 3.2 Depending on the consistency required, the addition of 4.5 litres (Flowable) of clean water should be added to a clean container.
- 3.3 The 25 kg powder is then added slowly to the water while mixing continuously with a low speed mixer/drill (400 - 600 rpm).
- 3.4 Mixing should be continued for 3 minutes until a uniform consistency is obtained.

#### Notes:

- *At low temperatures (below 8°C), warm water is recommended to achieve the early*



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*strength. And the formwork is recommended to be kept longer time.*

- *At high temperatures (35°C and above), cold water (less than 20°C) must be used for mixing.*

### 4.0 Placement procedure

- 4.1 Apollo Flo-Grout UW1 can be applied in a single layer at thicknesses between 10 – 100 mm when poured above water. When poured under water, thicknesses up to 200 mm can be placed in a single layer. For greater thicknesses, a washed aggregate between 5 - 12 mm should be added at a maximum ratio of 1:1 by weight.
- 4.2 Within 20 minutes of mixing, place the grout to maximize the full benefits of the expansion process.
- 4.3 Make sure to restrict the grout flow initially so water doesn't get entrapped.
- 4.4 To reduce any back pressure, raise the tube as necessary but not over the surface level of the grout.

### 5.0 Curing

- 5.1 Curing is not needed for fully submerged conditions.
- 5.2 However, when cast above water, it should be treated in a manner similar to concrete. Curing can be conducted by either using concrete curing compounds such or by using wet hessian and polyethylene sheets.

### 6.0 Cleaning

- 6.1 All tools should be cleaned immediately after finishing with water.
- 6.2 Hardened materials can be cleaned mechanically.

### 7.0 Remarks

- 7.1 Calculate the time required for preparing and mixing the cementitious grout and include this in the program to ensure continuous pouring. In many cases, two working teams are necessary to supply the feed hopper and to maintain the workflow. Do not reduce the mixing time, even when in a hurry.
- 7.2 Check the substrate in advance. Ensure that the substrate is in good condition and is clean.



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- 7.3 Wherever possible, unrestrained 'shoulders' are to be avoided. These have a tendency to crack and/or debone.
- 7.4 Contact Apollo Technical Services Department for advice on control spacing for large base plate grouting projects.



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## Section C: Approval and variations

This method statement is offered by Apollo for construction chemical as a 'standard proposal' for the application of **Apollo Flo-Grout UW1**. It remains the responsibility of the Engineer to determine the correct method for any given application. Where alternative methods are to be used, these must be submitted to Apollo for construction chemical for approval, in writing, prior to commencement of any work. Apollo for construction chemical will not accept responsibility or liability for variations to the above method statement under any other condition.