



*the Sign of Quality*

## CEMENT ADMIXTURES ASSOCIATION

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### **Admixture Sheet – ATS 16**

### **Truck washwater admixtures**

#### **1 Function**

There is a growing problem with disposal of washwater from cleaning the inside of truck mixer drums at many readymixed concrete plants. The Landfill Tax has increased the cost of disposal and the ability to dispose of contaminated water through the drainage system has also been prohibited. One solution to this is to recycle the washwater by the use of a truck washwater admixture.

Washwater stabilisation systems are used to stabilise concrete wash water in the drum of a ready mixed truck on an overnight or over weekend basis. The washings are then incorporated in the production of the next day's initial load. This process eliminates or reduces the volume of solids/water deposited into a plant wash pit. Research has shown that the correct use of proprietary admixtures does not impart any deleterious effect on the properties of fresh concrete in respect of stiffening times, strength or other properties.

Technically, they may also be used to stabilise returned loads, which may be either downgraded to a lower specification and/or made up to new loads. However such concretes could only be used with the agreement of the supplier, customer and regulating body. These materials function by coating the cement particles and preventing hydration taking place for a specified period of time. The time delay depends on the dosage, which is itself related to a number of other factors. With some systems, an activator may also be used to restart hydration.

#### **2 Materials**

The principal chemicals are:

- Phosphonates
- Hydroxycarboxylic acid derivatives
- Hydroxylated polymers

#### **3 Mechanism**

The chemicals used have the ability to stop the hydration of the main phases of the Portland cement; especially the tri-calcium silicate, even after initial hydration has started and to prevent nucleation of the calcium hydroxide from solution. Further hydration is suspended until an activator is added or the system is flooded with an excess of fresh hydration product when a new batch of concrete is added.

#### **4 Use**

##### **4.1 Dose**

Dosage varies between manufacturers depending on the materials used and the period before fresh concrete is to be mixed but is typically between 1 and 3 litres for a 6m<sup>3</sup> truck. Powder versions are available designed to ease dosing for applications at the plant or site.

## 4.2 Dispensing

The product should be dispensed through a calibrated, automatic dispenser. This should include a system that allows full traceability of the use, i.e. as part of the Quality System.

## 4.3 Overdose

Overdosing can lead to retardation with most types of concrete.

## 4.4 Operation

- The readymix truck should be emptied of all returned concrete except tailings coating the drum.
- The correct dosage is added, either via a dispenser for liquid products or via “no of sachets” for powder products.
- Then two methods of cleaning can be used :
  - **Water Wash**
  - The driver then operates a lance that discharges the admixture and water at high pressure to wash the residue to the bottom of the drum.
  - The dispenser is programmed to deliver exactly 200 litres of water into the drum.
  - The drum may now be left static until the next day (or over a weekend if appropriately dosed).
  - The only alteration to the next mix is to reduce the water by 200 litres.
  - **Stoneing**
  - This uses 2 tonnes of coarse aggregate plus 200 litres of water
  - This mixture including the admixture are turned in the drum then brought up and down the blades three times. The drum is stopped on the third cycle whilst the mixture is at the top.
  - The drum is then left to stand.
  - The next mix added should be adjusted for the coarse aggregate and water.

## 4.5 Use with other admixtures

Washwater admixtures are compatible with air entrainers, normal and superplastic admixtures. The manufacturer’s advice should be sought regarding other types of admixture.

# 5 Effects on properties of concrete

## 5.1 Strength

The compressive strength of concrete is not significantly affected by the use of washwater admixtures provided the product is used according to the manufacturers instructions. In many cases the strength of the concrete has been shown to increase.

## 5.2 Workability

The workability of the concrete is not affected by the use of washwater admixtures.

## 5.3 Setting time

The setting time of the concrete is not significantly affected by the use of washwater admixtures.

## 5.4 Other fresh concrete properties

Air entrainment, bleed and temperature rise are similar to those of a control concrete containing no washwater admixture.

## 5.5 Other hardened concrete properties

Creep and drying shrinkage are not altered from that of plain concrete and durability is unchanged.