



CEMENT ADMIXTURES ASSOCIATION

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the Sign of Quality

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ADMIXTURE INFORMATION SHEET AIS 3

CAA/ACIFC – Guidance on specification and use of admixtures for production of concrete for industrial floors

1: Introduction:

Admixtures, and particularly water reducing admixtures, can offer substantial benefits in flooring concrete by reducing the free water content while maintaining appropriate workability for rapid placement and compaction. This reduces drying shrinkage in the concrete and hence the potential for cracking and curling of the slab.

Other types of admixture can further reduce shrinkage, speed the setting to allow earlier finishing or can aid the finishing of flooring concrete.

As with all admixture applications, careful selection of admixture type and grade is essential to obtaining a satisfactory result. Correct addition and mixing are also key to obtaining a uniform concrete. These guidelines are intended to assist the supplier and user of flooring concrete to optimise the advantages from the use of admixtures.

2: Water reducing admixtures for use in flooring:

2.1: Admixtures whose major active ingredient is based on the following materials, have been found most suitable for use in concrete floors. They disperse easily through the concrete and maximise the water reduction. In hot weather some additional retardation may be necessary with these admixtures.

- Sulphonated Naphthalene Formaldehyde condensates
- Sulphonated Melamine Formaldehyde condensates
- PolyCarboxylated Ethers

The PolyCarboxylated Ether types have proved particularly beneficial as they give exceptional uniformity of dispersion and minimal retardation of set.

2.2: Admixtures based on Sugar reduced lignosulphonates can be suitable for floors if additional care is exercised over mix design, uniformity of mixing and the possibility of greater retardation; especially in cold weather and/or when PFA or GGBS is being used.

2.3: Admixtures based on or modified with the following, are likely to enhance retardation and should

be avoided in flooring concrete, especially under cold conditions and where PFA or GGBS are being used:

- Hydroxycarboxylic acids salts
- Carbohydrate based polymers (Hydroxylated Polymers, Corn Syrups and Malto Dextrin's)
- Molasses

3: Other admixtures for use in flooring:

3.1: Other admixtures that may have special applications in concrete floors include:

- Set accelerating admixtures which can bring about quicker stiffening and allowing earlier finishing, especially in cold conditions.
- Shrinkage reducing admixtures which can reduce cracking due to drying shrinkage and cut down on the number of joints.
- Finishing aids can be incorporated into dispersing admixtures of the types indicated in 2.1 above.

3.2: Other admixtures that may cause problems with concrete floors:

- Air entraining agents should be avoided in floors that will be power finished as the entrained air can be one of the causes of surface delamination after hardening.
- Some other admixtures may cause an increase in the level of air in the concrete and should, therefore, be used with caution.

4: Batching admixtures for use in flooring:

- It is desirable that all the components of the concrete, including admixtures, are mixed at the batching plant. Where this procedure is not adopted, site addition must be under the direct supervision of a concrete technologist or engineer, should be restricted to the admixtures detailed in 2.1 and to the guidelines for site addition covered in section 5.

- Prior to supply of concrete, the contractor and the concrete supplier should agree the admixture type, admixture addition time and method, concrete mixing and consistence checking procedure. Further guidance on this can be found in section 6.2 of the UK Concrete Society Good Concrete Guide No 1.
- It is essential that flooring concrete is uniformly and consistently mixed. To achieve this generally requires greater attention to the mixing procedure and duration.
- It is essential that only mixers and mixer trucks with blades and drums in good condition are used and are loaded within recommended capacity for mixing.
- After batching, sufficient mixing must then be given to ensure uniform dispersion of admixture and other materials.
- It is essential that, during addition, the admixture does not come into contact with dry cement.
- The concrete will only have uniformity of workability and set across the slab if there is consistency in the order and timing of the concrete batching sequence and this is particularly important when admixtures are being used.

5: Site addition of admixtures:

- The addition of any mix component including water at the site is not recommended unless it is actively supervised by a qualified concrete technologist or engineer. It should also be restricted to the addition of those types of admixture detailed in section 2.1 of this document.
- Admixture addition at the plant followed by a further addition on site is more likely to cause inconsistency than a single addition at one location.
- If circumstances, such as hot weather or differential delays in delivery, dictate that admixture addition is best made on site, a written procedure must be agreed and implemented by all parties.

The procedure should include:

- The effect on set time of ambient temperature when the concrete is delivered.
- Checking for uniformity of workability before and after the addition of admixtures, fibres, water or other materials.
- Calibration of dosing equipment, uniformity of dosing, dosage rate, mixing sequence and mixing time.
- Recording any materials, including admixtures and water, added at site and the time of addition, workability before and after addition, quantity added and additional fast mix time.
- Consideration of the effect on setting time due to batch to batch variation in admixture dosage and time of admixture addition after original mixing.

6: Other factors affecting placing and finishing characteristics:

The following factors should be considered prior to starting the job.

- Take account of the likely weather and the potential for a significant change from the expected ambient temperature on the day of concreting.
- Ensure specified workability at the time of placing will be compatible with the placing method.
- Account for workability loss resulting from the use of fibres, delays in delivery and placing.
- Large batch to batch variation in workability and late additions of water can both affect setting time and should therefore be avoided.
- The compatibility and effect on setting of the concrete must be determined when dry shake and colour systems are used as they may also contain undeclared admixtures.

This report was produced by a CAA / ACIFC joint task group which met as a sub-group of the ACIFC Concrete Mix Design and Admixtures Working Party.

Information on Admixtures:

For general information on admixtures contact:

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