

Eclipse® Floor

Low shrinkage mix design optimisation guidelines

Eclipse® Floor shrinkage-reducing admixture is a liquid concrete admixture specifically formulated for reducing the drying shrinkage properties of non air-entrained concrete. This Technical Bulletin details mix design optimisation recommendations which will enhance the potential of eliminating or dramatically reducing drying shrinkage cracking in slab-on-grade construction. The inclusion of Eclipse Floor at a minimum dosage rate of 3.7L / m³ should be included in these design modifications. If available, testing at 7.4L / m³ may provide greater shrinkage reduction favourable to greater joint spacing. Testing a three point curve using 3.7-4.9-7.4L / m³ Eclipse Floor will provide optimal test data to determine drying shrinkage performance vs. Eclipse Floor dosage rate.

Maximum 0.50 Water/Total Cementitious Ratio

- Admixtures, not water, should be used to achieve required workability, since water is primary detriment for drying shrinkage.
- 18kg reduction in water content will reduce drying shrinkage approximately by 15%.
- The lower the water-cement ratio, the lower is the drying shrinkage.

Admixture Selection

- Recommend use of ADVA® type superplasticisers to optimise mix design shrinkage characteristics and to achieve low water-cement ratios. Mid-range water reducers may not be as favourable to shrinkage performance as ADVA type superplasticisers. ADVA type superplasticisers will allow for water reduction to meet water-cement ratio requirements while providing workability and will help to optimise drying shrinkage properties when used in conjunction with Eclipse Floor. If ADVA type products are not working, utilising mid-range water reducers is recommended.
- Avoid utilising chloride containing admixtures.
- Avoid superplasticisers which can promote retardation at higher addition rate.

Coarse Aggregate-Major Impact on Drying Shrinkage Properties

- Increase coarse aggregate content to minimum 1,040kg / m³. Use larger size aggregates when locally available. Mixes utilising 19mm aggregate can shrink up to 30% more than mixes utilising 25mm aggregate.
- Utilise quality aggregates that have low absorption and compressibility (modulus of elasticity) properties. Sandstone and slate aggregates may have poor shrinkage properties while limestone, dolomite, granite and feldspar often have low (good) shrinkage properties.

Cementitious Constituents

- Quantify cement brand impact on drying shrinkage by testing.
- Type II cements usually shrink less than Type I and much less than Type III cements.
- Fly ash and slag are fully compatible with mixes containing Eclipse Floor.

Minimum 28 MPa (4000 psi) 28 Day Compressive Strength

- Inclusion of Eclipse Floor may result in 28 day strength reduction on the order of 10% relative to an identical mix not containing Eclipse Floor.
- Strength should be designed by the engineer for anticipated loads.

Use of Eclipse with Type A Water Reducers

- Inclusion of Eclipse Floor may result in set retardation, typically in the 45 minute range when utilised as a stand-alone admixture. This can be amplified by the use of some Type A water reducer and some pozzolans.
- Trial mixes are recommended to determine time of set characteristics of the Eclipse mix.

Mix Design Review and Test Matrix - Optional

- GCP Sales personnel and the Regional Technical Service Manager will:
- Review test matrix and proposed mix designs to share best practices.
- Furnish current data available for the control mix. Data should include compressive strength tests, shrinkage data, aggregate gradations, and history of mix design performance.
- Review period will take 10-15 business days after the Regional Technical Service Manager receives all information.

Shrinkage Testing

Mix designs must be evaluated for drying shrinkage properties via ASTM C 157--Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete (See Eclipse Shrinkage Testing Technical Bulletin).

- Assure testing lab has appropriate equipment, personnel and experience.
- Recommend 7 day wet cure (versus 28 days).
- An initial reading (one day reading) should be taken per ASTM C157 at 24 hr +/- ½ hr.
- Air dry readings should be taken at minimum 3, 7, 14, 21, and 28 days. A reading at 56 days will lead to more accurate understanding of mix design drying shrinkage properties.
- Eclipse Floor mixes should be compared against same mix without Eclipse Floor (reference mix).

Trial Placement

A pre-job test pour is recommended using a minimum three cubic yards. The trial pour should be used to determine setting characteristics, workability and general suitability for desired field performance.

Final Mix Design and Data Review

- After completion of required testing, the final mix design along with all plastic and hardened concrete properties (including shrinkage) should be forwarded to your local GCP representative. They will review the data with the Regional Technical Service Manager and Product Manager.
- The final design should be field trialed to confirm the plastic properties (i.e. slump, set time, finishability etc.) are suitable for the specific application.

gcpat.com | For technical information: asia.enq@gcpat.com

Australia 1800 855 525 New Zealand +64 9 448 1146 China Mainland +86 21 3158 2888 Hong Kong +852 2675 7898
India +91 124 402 8972 Indonesia +62 21 893 4260 Japan +81 3 5226 0231 Korea +82 32 820 0800 Malaysia +60 3 9074 6133
Philippines +63 49 549 7373 Singapore +65 6265 3033 Thailand +66 2 709 4470 Vietnam +84 8 3710 6168

We hope the information here will be helpful. It is based on data and knowledge considered to be true and accurate, and is offered for consideration, investigation and verification by the user, but we do not warrant the results to be obtained. Please read all statements, recommendations, and suggestions in conjunction with our conditions of sale, which apply to all goods supplied by us. No statement, recommendation, or suggestion is intended for any use that would infringe any patent, copyright, or other third party right.

Eclipse Floor and ADVA are trademarks, which may be registered in the United States and/or other countries, of GCP Applied Technologies, Inc. This trademark list has been compiled using available published information as of the publication date and may not accurately reflect current trademark ownership or status.

© Copyright 2016 GCP Applied Technologies, Inc. All rights reserved.

GCP Applied Technologies Inc., 62 Whittemore Avenue, Cambridge, MA 02140, USA

Printed in Singapore | 12/16 | 200-TB-302



gcp applied technologies