

ECLIPSE® PLUS

Shrinkage reducing admixture

Product Description



Eclipse® Plus is a liquid admixture for concrete (or virtually any Portland cement based material) which dramatically reduces the materials shrinkage due to drying. Eclipse Plus contains no expansive material,

but instead acts chemically to attack the primary mechanism causing shrinkage. Concrete containing Eclipse Plus at dosage rate of 1.5 gal/yd³ (7.5 L/m³) has shown to reduce shrinkage, as measured per ASTM C157, by as much as 80% at 28 days, and up to 50% at one year or beyond. This level of shrinkage reduction, in well proportioned concrete mixtures utilizing quality materials has demonstrated to eliminate cracking due to drying shrinkage in fully restrained concrete. Eclipse Plus weighs approximately 8.0 lbs/gal (0.96 kg/L).

Uses

Eclipse Plus Shrinkage Reducing Admixture may be used in any concrete, but will provide the most value in structures and environments where cracks due to drying shrinkage are prevalent and the repercussions are most severe. Some examples of applications where this is true are bridge decks, parking garages, marine structures, high performance floors, and containment structures.

Freeze-Thaw Durability

Eclipse Plus is specially formulated for use in air-entrained concrete where freeze-thaw durability is required. The graph shows ASTM C666-97 test results.

Air Management Guidelines

The following guidelines are recommended for Eclipse Plus in concrete that will be subject to freeze-thaw cycles. Testing should be done on your own mixes to determine your own results.

Product Advantages

- Reduces shrinkage up to 80% at 28 days and up to 50% at 1 year or beyond
- Eliminates cracking due to dry shrinkage in fully restrained concrete
- Reduces surface tension
- Saves time and costly repairs
- Enhanced durability with longer usable life

- Minimum specified concrete compressive strength of 4,500 psi (31 MPa) at 28 days and maximum water-cementitious materials ratio of 0.45.
- Minimum plastic air content of 6%, measured in accordance to ASTM C94.

For more information consult your local Grace sales professional.

Performance

Drying shrinkage of concrete is a complicated phenomenon which is widely acknowledged to be the function of several mechanisms. The primary driver in the predominant mechanism causing shrinkage for internal relative humidity in excess of 40% is the surface tension of water. As water-filled pores in the size ranges of 2.5 to 50 nm (nm = nanometers = one billionth of a meter) lose moisture, curved menisci are formed, and the surface tension of water pulls the walls of the pores. (In pores greater than 50 nm, the magnitude of the tensile force, relative to the size of the pore, becomes negligible; pores smaller than approximately 2.5 nm will not support the formation of a meniscus.)



Eclipse Plus reduces the surface tension of water. With reduced surface tension, the force pulling in on the walls of the pores is reduced. With Eclipse Plus at a dosage rate of 1.5 gal/yd³ (7.5 L/m³), this effect results in ultimate shrinkage reductions up to 50%.

Impact on Fresh Concrete Properties

When substituted in a mixture design for an equivalent volume of water, Eclipse Plus has little or no effect on concrete slump. It does however have a slight retarding effect (typically less than one hour extension of set time, see section on compatibility), and will aid in extending slump life. Where tested to date, mixtures containing Eclipse Plus will require increased amounts of air entrainer to achieve a specified level of air.

Impact on Hardened Concrete Properties

The primary impact of Eclipse Plus is the reduction in drying shrinkage as previously detailed, but other hardened concrete properties are affected as well. The addition of Eclipse Plus may cause a reduction in concrete compressive strengths. These reductions in compressive strengths vary from 0 to 15% depending on the mixture and materials used. The typical reduction is 10% or less. In mixtures proportioned for durability, this level of strength reduction is typically not an issue. For established concrete mixtures where strength must be maintained, superplasticizers such as ADVA® Flow may be used to cut water to offset the strength reduction of Eclipse Plus, without compromising its shrinkage reduction capabilities. For more information on this topic, consult your local Grace sales professional.

Addition Rates

In standard mixtures, the recommended addition rate to maximize the effectiveness of Eclipse Plus is 1.5 gal/yd³ (7.5 L/m³) and in other mixtures, 5% by weight of mix water. For the range of addition rates between 0.5 gal/yd³ (2.5 L/m³) and 2.0 gal/yd³ (9.9 L/m³), shrinkage reduction as a function of dosage is relatively linear and any dosage within this range may be selected to obtain a desired level of shrinkage performance. Addition rates outside this range are not recommended unless adequately tested.

Eclipse Plus is added at high dosages and should be accounted for in the mixture design. For a conventional concrete mix with 1.5 gal/yd³ (7.5 L/m³) of Eclipse Plus, this liquid volume will contribute to the overall porosity of the concrete in the same fashion as 1.5 gal/yd³ (7.5 L/m³) of added water. In addition, the effect on concrete slump will be virtually the same as the equivalent

volume of water. It is therefore recommended, when incorporating Eclipse Plus into an established mixture design, that it should replace an equal volume of water.

Compatibility with Other Admixtures and Batch Sequencing

Eclipse Plus is compatible with most Grace admixtures as long as they are added separately to the concrete mix, usually through the water holding tank discharge line. In general, Eclipse Plus may be added to the concrete batch sequencing at any time, however preferably after the dry materials and most of the water. Different sequencing may be used if local testing shows better performance. Please see Grace Technical Bulletin TB-0110, *Admixture Dispenser Discharge Line Location and Sequencing for Concrete Batching Operations* for further recommendations. Eclipse Plus should not come in contact with any other admixture before or during the batching process, even if diluted in mix water.

Pretesting of the concrete mix should be performed before use, and as conditions and materials change in order to assure compatibility, and to optimize dosage rates, addition times in the batch sequencing and concrete performance. For concrete that requires air entrainment, the use of an ASTM C260 air-entraining agent Darex® II is preferred. However, any Daravair® or Darex product may be used to provide suitable air void parameters for freeze-thaw resistance. Please consult your Grace representative for guidance.

Packaging & Handling

Eclipse Plus is currently available in bulk quantities by Grace metered systems, in 275 gal (1,041 L) totes, or in 55 gal (208 L) drums.

Dispensing Equipment

A complete line of automatic dispensing equipment is available through W. R. Grace & Co.–Conn. Eclipse Plus may be introduced at any time in the batching cycle.

Flammability

Eclipse Plus has a flash point of 209°F (98°C). This is substantially above the upper limit of 140°F (60°C) for classification as a flammable material, and above the limit of 200°F (93°C) where DOT requirements would classify this as a combustible material. Nonetheless, this product must be treated with care and protected from excessive heat, open flame or sparks. For more information, consult the MSDS.

www.graceconstruction.com

North American Customer Service: 1-877-4AD-MIX1 (1-877-423-6491)

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