gcp applied technologies

EXP 684

High-range water-reducing admixture

ASTM C494 Type A and F and ASTM C1017 Type I

Product Description

EXP 684 is a high efficiency, polycarboxylate-based high-range water reducer designed for the production of a wide range of concrete mixes, from conventional to self-consolidating concrete. It is designed to impart extreme workability without segregation to the concrete. EXP 684 is supplied as a ready-to-use liquid that weighs approximately 8.5 lbs/gal (1.0 kg/L).

EXP 684 does not contain intentionally added chlorides.

Uses

EXP 684 is a plant-added superplasticizer that is formulated to impart improved workability to the concrete and to achieve high early compressive strength as required by the precast industry. EXP 684 can be used for the production of self-consolidating concrete (SCC) in precast/prestressed applications and may be used in conventional concrete production.

EXP 684 may be used in low water-cementitious ratio applications where concrete stability and improved tolerance to concrete material variability are required.

EXP 684 may be used to produce concrete with very low water-cementitious ratios while maintaining normal levels of workability.

Addition Rates

EXP 684 is an easy to dispense liquid admixture. Dosage rates can be adjusted to meet a wide spectrum of concrete performance requirements. Addition rates for EXP 684 can vary from 6 to 30 fl oz/100 lbs (400 to 2000 mL/100 kg) with the type of application, but will typically range from 9 to 18 fl oz/100 lbs (600 to 1200 mL/100 kg) of cementitious. Should conditions require using more than the recommended addition rate, please consult your GCP representative.

Mix proportions, cementitious content, aggregate gradations and ambient conditions will affect EXP 684 dosage requirements. If materials or conditions require using more than the recommended addition rates, or when developing mix designs for self-consolidating concrete, please consult your GCP representative for more information and assistance.

Compatibility with Other Admixtures and Batch Sequencing

EXP 684 is compatible with most admixtures as long as they are added separately to the concrete mix. However, EXP 684 is not recommended for use in concrete containing naphthalene-based admixtures including Daracem® 19 and Daracem 100, and melamine-based admixtures including Daracem 65. In general, it is recommended that EXP 684 be added to the concrete mix near the end of the batch sequence for optimum performance. Different sequencing may be used if local testing shows better performance. Please see GCP Technical Bulletin TB-0110, *Admixture Dispenser Discharge Line Location and Sequencing for Concrete Batching Operations* for further recommendations.

Pretesting of the concrete mix should be performed before use and as conditions and materials change in order to ensure compatibility with other admixtures, and to optimize dosage rates, addition times in the batch sequencing and concrete

Product Advantages

- Excellent dosage efficiency, moisture control and air control
- Superior air entrainment control
- Enhanced concrete cohesiveness with low viscosity for rapid placement
- Superior finish on cast surfaces
- Enhanced strength development

performance. For concrete that requires air entrainment, the use of an ASTM C260 air-entraining agent (such as Airalon®, Daravair® or Darex® product lines) is recommended to provide suitable air void parameters for freeze-thaw resistance. Please consult your GCP representative for guidance.

Packaging & Handling

EXP 684 is a light blue liquid available in bulk, delivered by metered trucks, or in totes and drums.

EXP 684 will freeze at approximately 32°F (0°C) but will return to full functionality after thawing and thorough mechanical agitation.

Dispensing Equipment

A complete line of accurate, automatic dispensing equipment is available.

EXP 684 ASTM C494 Type F High-Range Water Reducer Test Data

	U.S. Units		Metric	
	Control	**EXP 684**	**Control**	**EXP 684**
Cement (pcy) (kg/m³)	516	520	306	309
Coarse aggregate (pcy) (kg/m³)	1929	1950	1144	1157
Fine aggregate (pcy) (kg/m³)	1253	1297	743	770
Water (pcy) (kg/m³)	245	215	145	128
w/cm	0.475	0.414	0.475	0.414
Slump (inches) (mm)	3.75	3.25	95	80
Plastic air (%)	5.5	5.6	5.5	5.6
Compressive strength				
1 day (psi) (MPa)	1590	2270	11.0	15.7
7 day (psi) (MPa)	4290	5390	29.6	37.2
28 day (psi) (MPa)	5690	7590	39.2	52.3
Initial set time (hr:min)	4:52	4:16	4:52	4:16
Length change 28 day (%)	-0.029	-0.025	-0.029	-0.025
Freeze-thaw resistance (RDME %)	99	96	99	97

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