

Agassiz - Northern Arizona University  
Material Technical Data Sheet (MTDS) Addendum  
February 17, 2020

Product Name	Type	ASTM	Link
Lehigh White Portland Cement Type 1	Portland Cement	C150	<a href="https://www.lehighwhitecement.com/wp-content/uploads/2019/01/specsheet.pdf">https://www.lehighwhitecement.com/wp-content/uploads/2019/01/specsheet.pdf</a>
Salt River Materials Group Class F Fly Ash	Fly Ash	C441 & C1012	<a href="https://www.srmaterials.com/files/products/Phoenix%20Fly%20Ash%20Tech%20Sheet2013.pdf">https://www.srmaterials.com/files/products/Phoenix%20Fly%20Ash%20Tech%20Sheet2013.pdf</a>
MasterLife® 300D Crystalline Capillary Waterproofing Admixture	Waterproofing Admixture	C494/C494M Type S	<a href="https://assets.master-builders-solutions.basf.com/en-us/basf-masterlife-300d-tds.pdf">https://assets.master-builders-solutions.basf.com/en-us/basf-masterlife-300d-tds.pdf</a>
FORCE 10,000® D	Densified Mocosilica (Silica Fume) Powder	C1202-94	<a href="https://gcpat.com/en/solutions/products/tb-0704-calculating-concrete-mix-proportions-force-10000d-concrete-technical">https://gcpat.com/en/solutions/products/tb-0704-calculating-concrete-mix-proportions-force-10000d-concrete-technical</a>  <a href="https://gcpat.com/sites/gcpat.com/files/pdf/current/resource/1376_force_10000_d_en.pdf">https://gcpat.com/sites/gcpat.com/files/pdf/current/resource/1376_force_10000_d_en.pdf</a>
Poraver® Expanded Glass	Light Weight Aggregate	*DIN EN 13055-1	<a href="https://www.poraver.com/wp-content/uploads/2019/12/191202_TDS_Poraver_PNA_8grains_EN_DE.pdf">https://www.poraver.com/wp-content/uploads/2019/12/191202_TDS_Poraver_PNA_8grains_EN_DE.pdf</a>
AeroAggregates UL-FGA G15	Ultra-Lightweight Foamed Glass Aggregate	C88, C142, C151, C40, C29	<a href="https://static1.squarespace.com/static/5bbbc9d84d87112e2778f235/t/5c04dca2b8a04595e9c44489/1543822499832/UL_FGA_G15.pdf">https://static1.squarespace.com/static/5bbbc9d84d87112e2778f235/t/5c04dca2b8a04595e9c44489/1543822499832/UL_FGA_G15.pdf</a>
Utelite Structural Fine Lightweight Aggregate	Lightweight Aggregate	C330-17	<a href="https://www.utelite.com/wp-content/uploads/2020/02/JANUARY-2020.pdf">https://www.utelite.com/wp-content/uploads/2020/02/JANUARY-2020.pdf</a>  <a href="https://www.utelite.com/wp-content/uploads/2019/02/Structural-Pump-Blend-Structural-Fine-LWA.pdf">https://www.utelite.com/wp-content/uploads/2019/02/Structural-Pump-Blend-Structural-Fine-LWA.pdf</a>
BASF MasterFiber® M 100 Monofilament Microsynthetic Fiber	Fibers	C1116/C1116M	<a href="https://assets.master-builders-solutions.basf.com/en-us/basf-masterfiber-m-100-tds.pdf">https://assets.master-builders-solutions.basf.com/en-us/basf-masterfiber-m-100-tds.pdf</a>
Interstar Powder Pigment	Powder Pigment	C979	<a href="https://www.interstar.ca/Content/Downloads/PowderPigment_en.pdf">https://www.interstar.ca/Content/Downloads/PowderPigment_en.pdf</a>
BASF MasterSet® DELVO Hydration Controlling Admixture	Setting Retarder	C494/C494M Type B Type D	<a href="https://assets.master-builders-solutions.basf.com/en-us/basf-masterset-delvo-tds.pdf">https://assets.master-builders-solutions.basf.com/en-us/basf-masterset-delvo-tds.pdf</a>
BASF MasterGlenium® 7500 Full Range Water-Reducing Admixture	Water Reducer	C494 C494M Type A Type F	<a href="https://assets.master-builders-solutions.basf.com/en-us/basf-masterglenium-7500-tds.pdf">https://assets.master-builders-solutions.basf.com/en-us/basf-masterglenium-7500-tds.pdf</a>
BASF MasterLife® SRA 035 Shrinkage-Reducing Admixture	Shrinkage Reducer	C494/C494M Type S	<a href="https://assets.master-builders-solutions.basf.com/en-us/basf-masterlife-sra-035-tds.pdf">https://assets.master-builders-solutions.basf.com/en-us/basf-masterlife-sra-035-tds.pdf</a>
Arizona Seal Non-Yellowing, Arcylic Quick Dry Sealing Compound	Sealer	C309, C1315	<a href="https://www.wrmeadows.com/data/366B.pdf">https://www.wrmeadows.com/data/366B.pdf</a>

Product Name	Type	ASTM	Link
StarRFoam II	EPS Foam	C578	<a href="https://starrfoam.com/wp-content/themes/twenty-nineteen-child/pdf/spec_sheet_starrfoamii_02122070528.pdf">https://starrfoam.com/wp-content/themes/twenty-nineteen-child/pdf/spec_sheet_starrfoamii_02122070528.pdf</a>
Basalt Reinforcement Mesh Geo-Grid	Mesh Reinforcement	N/A	<a href="https://basalt-mesh.com/">https://basalt-mesh.com/</a>

# Product Data Sheet

Division 3 — Concrete  
Division 4 — Masonry



## PRODUCT NAME

- Lehigh White Portland Cement Types I, II, III and V
- Lehigh White Portland Cement—Type I Water Repellent Added
- Lehigh White PLC—Portland Limestone Cement Type IL(10), GUL or GU
- Lehigh White Masonry Cement, Types N and S

## MANUFACTURER

Lehigh White Cement Company  
7660 Imperial Way  
Allentown, PA 18195  
Phone: 610.366.4600  
info@lehighwhitecement.com  
www.lehighwhitecement.com



## PRODUCT DESCRIPTION

Lehigh White Cement Company is the leading supplier of white cements in North America. We have been producing quality portland cements since 1897. For more than 100 years Lehigh has built a reputation for serving the construction industry with high performance products that encourage creativity and ensure longevity. This Product Data Sheet gives a brief overview of the types, specifications and some common uses of our cement. Depending on application, Lehigh White Cement products may be specified in Division 3 - Concrete or Division 4 - Masonry. For more info on our products visit us online @ [www.lehighwhitecement.com](http://www.lehighwhitecement.com).

## SPECIFICATIONS

### Portland Cements

Portland Cements are manufactured to meet ASTM C150 / AASHTO M85 and CSA A3001 specifications

### PLC - Portland Limestone Cement

Portland Limestone Cements are manufactured to meet either the ASTM C595 and CSA A3001 or ASTM C1157 specifications.

### Masonry Cements

Masonry Cements are manufactured to meet ASTM C91 and CSA A3002 specifications

## APPLICATIONS

**Lehigh White Portland Type I** - Lehigh White Cements are regularly used to produce architectural concrete. General applications include cast-in-place or precast wall panels, floors, slabs, terrazzo, thin-set and tile grouts, cast stone, masonry units and mortars, stucco, swimming pools & spas, glass fiber reinforced concrete, ornamental statuary, floor tiles, concrete roof tiles, perimeter security, pavers and traffic safety items such as concrete median barriers, bridge parapets, pedestrian crosswalks, curbs and other delineators. White cement is often used to produce bright finishes, vibrant colors or ultra high performance concretes that look great and provide structural performance that make them ideal for resilient building applications.

**Portland Type II and Type V** - In addition to general use, Type II and Type V cements have moderate heat of hydration. Combined in mixes with low water-to-cement ratios and low permeability, Type II and Type V cements are less susceptible to the negative effects of higher than normal sulfate concentrations.

## APPLICATIONS - Continued

**Portland Type III** - Type III portland cement is intended for use where high early strength or a finer grind is required. Type III portland cement is frequently used in precast and cold weather applications.

**Portland Limestone Cement CSA A3001 GUL / ASTM C595 Type IL(10)** - We intergrind approximately 10% limestone by weight as an ingredient in this blended cement which has similar strength & setting characteristics to our Type I cement. It is used in applications where Type I cement would be typical. It offers advantages in workability and sustainability.

**PLC - Portland Limestone Cements ASTM 1157 Type GU** - This cement conforms to the Standard Performance Specification for Hydraulic Cement for general construction. It is used where longer set times and workability are preferred characteristics. This specialty cement is most often used in cement rich mixtures such as pool plasters.

**Lehigh White Masonry Cements Types N and S** - Lehigh White Masonry Cements are combined with sand to produce either Type N or Type S Masonry Mortars per the ASTM C270 specification. They can also be used to produce interior plasters & exterior stucco. These cements are specially formulated for enhanced workability and water retention.

## QUALITY

Lehigh White Portland, PLC and Masonry Cements are produced using carefully selected raw materials and rigid manufacturing standards to assure uniform whiteness and high performance. Count on our quality to stretch architectural boundaries through design, color and texture.

## SUSTAINABILITY

Minerals used to produce white cement rank among the most abundant elements on earth. Besides having very low embodied energy and CO<sub>2</sub> emissions, portland cement concrete is resilient, durable & long lasting. Specify white cement for dynamic architectural & structural applications.

## STORAGE

Portland cement must be kept dry in order to retain its quality. Protect packaged cement from moisture; store bulk cement weather-tight silos.

## AVAILABILITY

Not every cement type is available in all markets. Lehigh White Cements are distributed throughout the United States and Canada.

## SAFETY

Prior to using or handling cement products first read and understand Safety Data Sheets available at [www.lehighwhitecement.com](http://www.lehighwhitecement.com).

## WARRANTY

Information and statements given are believed reliable, but are not to be construed as a warranty or representation for which the manufacturer assumes legal responsibility. No warranty, representation, or condition of any kind, expressed or implied (including no warranty of merchantability or fitness for a particular purpose) shall apply. Having no control over the use of cement, Lehigh will not guarantee finished work, nor shall Lehigh White Cement Company be liable for consequential damages.

For more product information or technical assistance:

[www.lehighwhitecement.com](http://www.lehighwhitecement.com)

email: [info@lehighwhitecement.com](mailto:info@lehighwhitecement.com)

# PHOENIX FLY ASH

## CLASS F POZZOLAN



Salt River Materials Group (SRMG) Class F Fly Ash meets all chemical and physical requirements of the current ASTM Specification C 618 Coal Fly Ash for use in Concrete. Collected and processed at several power plants in Northern Arizona and New Mexico, Phoenix Class F fly ash is a pre-approved pozzolan source for Arizona Department of Transportation (ADOT), Caltrans, New Mexico Department of Transportation (NMDOT), Colorado Department of Transportation (CDOT), Texas Department of Transportation (TxDOT), Utah Department of Transportation (UDOT), Idaho Transportation Department (IDT), Nevada Department of Transportation (NDOT), the Bureau of Reclamation and the Army Corps of Engineers.



### Proportioning

Under normal conditions, Phoenix Class F fly ash is used to replace 15-35% of portland cement by weight. Replacement rates outside of this normal range have been used successfully for more specialized applications. Phoenix Class F fly ash can also be added without cement reduction to achieve desired mix characteristics. Throughout the range of fly ash percentages, proper testing can provide proportions and material combinations yielding competitive strengths at various age requirements.

### Strength, Set Time and Pumping Ability

Strengths of concrete properly proportioned with Phoenix Class F fly ash can be designed to closely match those of equivalent cement-only mixes. In fact, due to the secondary pozzolanic reaction, fly ash mixes with similar 28-day compressive strengths generally achieve 10-20% higher strengths at ages beyond 28 days.

Concrete set times utilizing 15-35% Phoenix Class F fly ash can be extended if adjustments are not made to the mix. Proper testing can provide the materials combinations and proportions to yield comparable set times. Due to the spherical particle shape of fly ash, the ball bearing effect, whereby the use of fly ash in concrete lubricates the mix, results in superior pumping ability in mixes using very angular materials or high in coarse aggregate content.

### Durability

Tests made in accordance with ASTM C 441 and ASTM C 1012 have shown that the use of Phoenix Class F fly ash significantly reduces the potential for damage due to alkali-aggregate reactivity and sulfate attack. ACI 232.2, Use of Fly Ash in Concrete recommends Type II cement and Class F fly ash as superior to Type V cement alone for high resistance to sulfate attack.

### Water Demand

Depending on the quantity of ash used, the use of Phoenix Class F fly ash consistently provides a 10% or greater reduction in the amount of water required for a given workability. This translates directly into increased strength and durability, reduced potential for shrinkage, reduced segregation, and most importantly, lower permeability.

### Uniformity

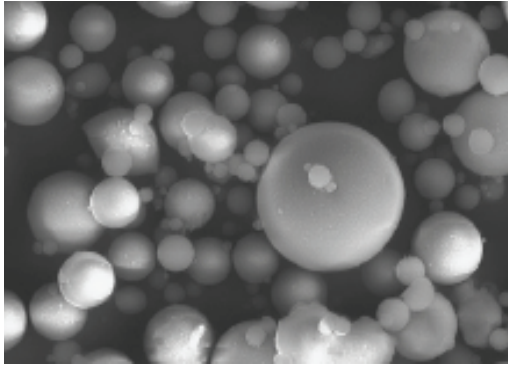
Phoenix Class F fly ash is selected by particle size to ensure the best and most consistent performance possible. In-line sampling can detect inferior fly ash and allow operators to reject it before the fly ash reaches the customer. This is why the carbon content in Phoenix Class F fly ash is consistently some of the lowest found in the region.

The understanding of end product performance enhances our ability to provide predictable and consistent product meeting customer requirements.

SRMG has processed and supplied fly ash to the Southwest since 1986. This experience enables SRMG to continue to provide some of the highest quality fly ash available.

Sources of Salt River Materials Group Fly Ash:

- Cholla
- Four Corners
- San Juan
- Escalante



Micrograph of Cholla Fly Ash particles



Four Corners Fly Ash Facility

Chemical Analysis	ASTM C618 Average Results				Class F Specification
	Cholla	Four Corners	San Juan	Escalante	
Calcium Oxide, CaO <sub>2</sub>	3.86%	2.10%	4.66%	3.91%	NA
Silicon Dioxide, SiO <sub>2</sub>	59.33%	61.70%	56.31%	62.31%	NA
Aluminum Oxide, Al <sub>2</sub> O <sub>3</sub>	23.78%	24.60%	27.24%	23.01%	NA
Ferric Oxide, Fe <sub>2</sub> O <sub>3</sub>	6.22%	4.38%	3.61%	4.82%	NA
SiO <sub>2</sub> +Al <sub>2</sub> O <sub>3</sub> +Fe <sub>2</sub> O <sub>3</sub>	89.33%	90.68%	87.16%	90.13%	70.0% Min
Magnesium Oxide, MgO	1.39%	1.22%	1.15%	1.24%	NA
Sulfur Trioxide, SO <sub>3</sub>	0.33%	0.18%	0.38%	0.23%	5.0% Max
Moisture content	0.06%	0.06%	0.06%	0.05%	3.0% Max
Loss on Ignition	0.36%	0.29%	0.45%	0.20%	6.0% Max
Available alkalis as Na <sub>2</sub> O	0.35%	0.35%	0.42%	0.28%	1.5% Max*
Total alkalis as Na <sub>2</sub> O	1.35%	2.01%	2.04%	1.21%	5.0% Max*
<b>Physical Analysis</b>					
Fineness, +325 Sieve	20.0%	22.0%	16.0%	25.0%	34.0% Max
Variation from average	0.30%	0.31%	0.58%	0.14%	5.0% Max
Density, g/cm <sup>3</sup>	2.25	1.95	2.05	2.10	NA
Variation from average	0.00%	0.00%	0.00%	0.02%	5.0% Max
<b>Strength Activity Index w/ Cement</b>					
7 Day, % of control	80%	79%	78%	78%	NA
28 Day, % of control	87%	85%	82%	85%	75% Min
Water Requirement, % of control	95%	96%	97%	96%	105% Max
Soundness	-0.03%	-0.03%	0.00%	-0.02%	0.8% Max

\* not an ASTM specification requirement

## Mission Statement

Creating Opportunities and Solutions with Quality Products and Exceptional People

## Values

Profitability The Right Way...  
Integrity, Accountability, Excellence



8800 E. Chaparral Rd., Ste 155 | Scottsdale, AZ 85250  
(480) 850-5757 | Fax: (480) 850-5758 | www.srmaterials.com



# MasterLife<sup>®</sup> 300D

## Crystalline Capillary Waterproofing Admixture

### Description

MasterLife 300D admixture is an integral crystalline capillary waterproofing admixture for concrete. It is designed for use in above- and below-grade applications.

MasterLife 300D admixture meets ASTM C 494/C 494M requirements for Type S, Specific Performance, admixtures.

A red-pigmented version of MasterLife 300D admixture is also available.

### Applications

Recommended for use in:

- Foundations
- Sewage and water treatment plants
- Tanks
- Underground vaults
- Tunnel and subway systems
- Water reservoirs
- Secondary containment structures
- Below-grade parking structures
- Precast components
- Swimming pools

### Features

- Crystalline cementitious material
- Integral addition
- Reduces concrete permeability
- Allows concrete to breathe

### Benefits

- Reduces penetration of water and other liquids
- Seals hairline cracks
- Resists positive and negative side hydrostatic pressure
- Protects against sewage and industrial wastes

### Performance Characteristics

**Setting Time:** MasterLife 300D admixture has little to no effect on concrete setting time within the recommended dosage range.

**Permeability:** MasterLife 300D capillary waterproofing admixture is a portland cement-based crystalline cementitious material that reacts in concrete to form non-soluble crystalline hydration products in the capillary pores of the concrete. These crystalline hydration products effectively reduce the permeability of concrete thus reducing capillary absorption and the penetration of water and other liquids.

#### Typical Data for MasterLife 300D admixture @ 2% by mass of cement

Performance characteristic	Test method	Performance relative to untreated concrete mixture
Capillary Absorption	ASTM C 1585	43% reduction
Water Penetration	Modified DIN 1048	40% reduction
Moisture Vapor Emission Rate	ASTM F 1869	Same
Electrical Conductance	ASTM C 1202	Same
Compressive Strength	ASTM C 39/C 39M	7% increase

## Guidelines for Use

**Concrete Quality:** Crystalline capillary waterproofing admixtures such as MasterLife 300D admixture, are categorized as Permeability-Reducing Admixtures (PRAs) in ACI 212.3R-16, Report on Chemical Admixtures for Concrete. These admixtures “are intended to be used in, and complement, well-proportioned concrete mixtures, not to compensate for poorly proportioned concrete mixtures. Although recommendations differ from each manufacturer, a w/cm of 0.45 or less is typical for concrete designed to resist water movement.” In accordance with the recommendations provided in ACI 318, ACI 350 and ACI 212.3R, BASF recommends the use of MasterLife 300D admixture in good quality concrete with a maximum water-cementitious materials ratio of 0.45 and a minimum compressive strength of 4000 psi (28 MPa).

**Dosage:** The dosage range for MasterLife 300D admixture is 2% to 2.5% by mass of cement. For most applications, the recommended optimum dosage of MasterLife 300D admixture is 2% by mass of cement. The dosage of the red-pigmented version of MasterLife 300D admixture is 2.5% by mass of cement. Please contact your local sales representative for additional information regarding the dosage of MasterLife 300D admixture for your application.

**Dispensing and Mixing:** MasterLife 300D admixture is batched at the concrete production plant in a manner similar to that for cement or other cementitious materials. It may be batched in either a central or truck mixer. Follow the procedures outlined in ASTM C 94/C 94M, Standard Specification for Ready-Mixed Concrete, for general batching and mixing instructions for concrete. Provide at least 5 minutes of mixing after the addition of MasterLife 300D admixture to ensure thorough and uniform distribution of the admixture in the concrete mixture.

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** MasterLife 300D admixture will neither initiate nor promote corrosion of reinforcing or prestressing steel embedded in concrete or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterLife 300D admixture.

**Compatibility:** MasterLife 300D admixture can be used with portland cements approved under ASTM, AASHTO or CRD specifications. It is compatible with most concrete admixtures, including all BASF admixtures. MasterLife 300D admixture is recommended for use with high-range water-reducing admixtures, such as the MasterGlenium® series, for maximum workability while maintaining a low water-to-cementitious materials ratio.

## Storage and Handling

MasterLife 300D admixture must be stored in a clean, dry area maintained at a minimum temperature of 45 °F (7 °C). MasterLife 300D admixture has a shelf life of one year when stored under recommended conditions.

## Packaging

MasterLife 300D admixture is available in 12 lb (5.5 kg) and 24 lb (11 kg) shreddable bags, and in 12 lb (5.5 kg) water-soluble bags. The red-pigmented version of MasterLife 300D admixture is available in 15 lb (7 kg) and 30 lb (14 kg) shreddable bags.

## Related Documents

Safety Data Sheet: MasterLife 300D admixture



## Additional Information

For additional information on MasterLife 300D admixture or its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

*The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.*

## Limited Warranty Notice

BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS. The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. An extended, limited, project-specific warranty may be available. Please contact your local BASF sales representative for further information. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.

# FORCE 10,000<sup>®</sup> D

High performance concrete admixture dry densified powder

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## Product Description

FORCE 10,000<sup>®</sup> D is a dry densified microsilica (silica fume) powder designed to increase concrete compressive and flexural strengths, increase durability, reduce permeability and improve hydraulic abrasion-erosion resistance. The specific gravity of FORCE 10,000<sup>®</sup> D is 2.20.

## Uses

FORCE 10,000<sup>®</sup> D can be used to consistently produce concrete with strengths of 6,000 psi (42 MPa) and higher in most instances with locally available materials and existing methods. It may also be used in precast and prestress applications where high early strengths are required.

The addition of FORCE 10,000<sup>®</sup> D also produces concrete with increased watertightness and dramatically reduced permeability compared to conventional mixes. Reduced permeability is an important advantage in slowing the intrusion of chloride where corrosion of reinforcing steel is a potential problem. Examples are parking garages, bridge decks and concrete in a marine environment. FORCE 10,000<sup>®</sup> D also enhances the durability of concrete against aggressive chemical attack and in hydraulic abrasion-erosion applications.

## Preconstruction Trial Mix

It is strongly recommended that trial mixes be made several weeks before construction start up. This will allow the concrete producer an opportunity to determine the proper batching sequence and amounts of other admixtures needed in order to deliver the required concrete mix to the job site. A trial mix will also help determine whether the combination of concrete materials and construction practices will allow the concrete to meet a specified performance. GCP's broad experience with this product can help the concrete producer deliver a satisfactory product regardless of the mixture proportions. Contact your GCP Applied Technologies sales representative for help with trial mixes.

## Finishing & Curing

FORCE 10,000<sup>®</sup> D concrete can be used in flatwork with little or no modification to the recommended practices outlined in ACI 302, *Guide for Concrete Floor and Slab Construction*.

FORCE 10,000<sup>®</sup> D will reduce the surface bleed water of concrete in large applications. ACI 308, *Standard Practice for Curing Concrete*, must be followed to ensure that any problems that can occur due to decreased bleeding are minimized. Your GCP Applied Technologies representative is available to review your particular job needs.

## Performance

FORCE 10,000® D improves concrete through two mechanisms. The extremely fine microsilica particles are able to fill the microscopic voids between the cement particles, creating a less permeable structure. In addition, the microsilica reacts with the free calcium hydroxide within the concrete to form additional calcium silicate hydrate (glue), producing a tighter paste-to-aggregate bond. FORCE 10,000® D does not affect concrete set times.

FORCE 10,000® D will improve the mechanical properties of concrete. In order to meet specified concrete performance levels, however, many variables are involved. These include, but are not limited to; concrete materials, weather conditions, testing techniques and mixing, transporting, placing and finishing practices. ACI and ASTM guidelines must be strictly adhered to.

## Addition Rates

FORCE 10,000® D dosage rates will vary based on the requirements of the application. Dosage rates should be calculated on percent microsilica by weight of cement, or on lb/yd<sup>3</sup> (kg/m<sup>3</sup>) of concrete, as appropriate. Dosage rates will be as specified. If not specified, consult your GCP Applied Technologies representative for your particular job needs.

## Compatibility with Other Admixtures and Batch Sequencing

FORCE 10,000® D is compatible with all conventional water reducers, superplasticizers, set retarders and DCI® corrosion inhibitor. Any air-entraining agent which works effectively with superplasticizers and microsilica, particularly vinsol resins such as DARAVAIR® by GCP Applied Technologies, are recommended. Only non-chloride set accelerators, such as POLARSET®, may be used with FORCE 10,000® D concrete. All admixtures must be added separately to assure their prescribed performance. Trial mixes and pretesting of concrete are recommended to optimize dosage rates, and ensure ultimate performance.

FORCE 10,000® 10,000 D can be used in either central or transit mix concrete production. FORCE 10,000® D may be used in conjunction with waterreducing admixtures (both normal and high-range as approved by ASTM) to assure workability of the mix.

## Packaging, Handling and Storage

FORCE 10,000® D is available in bulk, and 25 lbs (11.4 kg) Concrete Ready Bags™.

Bagged FORCE 10,000® D should be stored in a dry, protected area. Manual dispensing by tearing the bags is the normal method. A dust mask should be used when dispensing the bagged product, consult the product MSDS for more complete instructions.

## Dispensing Equipment

Bulk FORCE 10,000® D may be stored in already existing cement silos. The silos must be completely clean with no foreign residue remaining which may cause contamination. Up-pipes to the silo for unloading bulk tankers should also be clean and clear of obstructions. Small diameter 4 in. (100 mm) rigid metal pipes with several angles (especially right angles) will cause longer unloading times. Large diameter 6 in. (150 mm) flat lined, flexible rubber pipes will allow for the least unloading time. Dispensing bulk FORCE 10,000® D will take place in the same manner as that used for cement. Augering or dropping from the silo to the weigh hopper is the usual practice.

**gcpat.com | North America Customer Service: 1 877-4AD-MIX1 (1 877-423-6491)**

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.

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

In Canada, 294 Clements Road, West, Ajax, Ontario, Canada L1S 3C6.

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Last Updated: 2018-08-24

[gcpat.com/solutions/products/force-10000-d](http://gcpat.com/solutions/products/force-10000-d)

# TB-0704 — Calculating Concrete Mix Proportions for FORCE<sup>®</sup> 10,000D Concrete Technical Bulletin

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## Introduction

This technical bulletin describes the steps required to adjust concrete mix proportions to accommodate the addition of FORCE 10,000D<sup>®</sup> dry-densified silica fume.

## Specifications

The mix design process begins with a specification which may appear in several forms:

- **Prescription Specification**—The specifier prescribes that a certain percentage of silica fume be used in the mix; e.g., 7.0% ± 0.5% silica fume by weight of cement. In this specification process, the amount of silica fume required is easy to determine since it is based on a percentage of the amount of cement in the mix design. FORCE 10,000 D<sup>®</sup>—The calculation is direct, i.e., 7% of 445 kg/m<sup>3</sup> (750 lbs/yd<sup>3</sup>) of cement is 31.2 kg/m<sup>3</sup> (52.5 lbs/yd<sup>3</sup>) of FORCE 10,000 D<sup>®</sup>.
- **Performance Specification**—The specifier requires the concrete to have certain properties at a given age; e.g., “the concrete shall pass 1,000 coulombs or less at 90 days by ASTM C1202-94 (AASHTO T277),” or “the concrete shall have a minimum compressive strength of 70 MPa (10,000 psi) at 90 days.” In a performance specification, test mixes must be run to determine the silica fume dosage necessary to meet the coulomb or strength requirements.
- All mix designs must be tested before project start-up to ensure that the FORCE 10,000<sup>®</sup> concrete meets all of the performance requirements for the project. Job site conditions, such as weather, placement procedures and logistics should be anticipated and planned when the mix design is being evaluated prior to project start-up. Please Note: ASTM C1202 (AASHTO T277) should

## Part 1: FORCE 10,000 D<sup>®</sup> — Dry-densified Silica Fume

A concrete producer wants to use FORCE 10,000 D<sup>®</sup> to meet a specific requirement of 1,000 coulombs at 28 days. The specification also calls for a maximum water/cement ratio of 0.40. The producer plans to use 7.5% silica fume by weight of cement to meet this coulomb requirement. Concrete workability must also be taken into consideration.

## Part 2: Concrete Mix Adjustments

Testing the concrete mix prior to the job start-up provides a performance history for the mix and allows adjustments that may be necessary to meet project

be used as an indicator only. It has a high degree of error and the 90 day testing requirement may create problems. This test method should not be used as a standard for payment penalties.

- **Combination Specification**—The third type of specification combines both prescription and performance requirements. The specifier requires a certain performance level and a minimum silica fume content; e.g., “the concrete shall have a maximum coulomb reading of 1,000 coulombs at 90 days, and the concrete shall have a minimum silica fume content of 7.5% by weight of cement.” Maximum water/cement ratios, other admixtures and minimum cement factors may also be specified.

requirements. These adjustments may include the following:

- **Increasing the Silica Fume Dosage**—Silica fume dosage rates have to be adjusted upward to meet the performance requirements for a particular project.
- **Increasing the Superplasticizer Dosage**—The addition of silica fume to concrete increases the cohesiveness of the mix and additional superplasticizer is normally required to provide the required workability.
- **Increasing the Air-Entraining Agent Dosage**—The addition of silica fume to concrete may decrease the efficiency of the air-entraining agent. If this occurs, adjust the air-entraining agent dosage rates upward.

## Step 1:

Start with a mix that meets the water/cement ratio requirement.

MATERIALS	SSD MASS, KG/M <sup>3</sup>	SSD WEIGHT, LBS/YD <sup>3</sup>
Cement	386	650
Water	154	260
W/C	0.40	0.40
Fine aggregate (SG=2.65)	712	1200
Coarse aggregate	1068	1800
ADVA®	261 mL/100kg	4 oz/100 lbs
Air content	6.5%	6.5%

## Step 2:

Convert 7.5% silica fume to kg (lbs) based on the cement factor.

Silicia Fume (SG=2.20):      386 kg X 7.5%=29 KG      650 lbs X 7.5%=49 lbs

## Step 3:

Adjust the yield of the mix to account for the addition of the silica fume.

SI FORMULA	US FORMULA
SF in kg X (SG of fine agg/SG of MS) = kg of sand to be removed from mix	SF in lbs X (SG of fine agg/SG of MS) = lbs of sand to be removed from mix
SI CALCULATION	US CALCULATION
29 kg X (2.65/2.20) =35 kg sand to be removed from mix	49 lbs X (2.65/2.20) = 59 lbs sand to be removed from mix

## Step 4:

Adjust the amount of superplasticizer to maintain the same workability as the original mix. The amount of superplasticizer needed varies from job to job depending upon the materials used in the mix and the placement conditions.

UNIT OF MEASUREMENT	SI	US
Original ADVA® dosage	261 mL/100 kg cement	4.0 oz/100 lbs cement
Added ADVA® dosage to compensate for addition of FORCE 10,000®	261 mL/100 kg cement	4.0 oz/100 lbs cement
Total ADVA® dosage	552 mL/100 kg cement	8.0 oz/100 lbs cement

## Step 5:

Recalculate the mix design for the addition of FORCE® 10,000 D®, dry-densified silica fume with the addition of ADVA®.

MATERIALS	SSD MASS, KG/M <sup>3</sup>	SSD WEIGHT, LBS/YD <sup>3</sup>
Cement	386	650
Water	154	260
W/C	0.40	0.40
Fine aggregate	712-35=677	1200-59=1141
Coarse aggregate	1068	1800

ADVA®	552 mL/100kg	8 oz/100 lbs
Air content	6.5%	6.5%
FORCE® 10,000 D	29	49

## Step 6:

Run a test on the mix to assure that it meets all project requirements prior to start of the job.

[gcpat.com](http://gcpat.com) | North America Customer Service: 1 877-4AD-MIX1 (1 877-423-6491)

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Last Updated: 2018-11-29

<https://gcpat.com/en/solutions/products/tb-0704-calculating-concrete-mix-proportions-force-10000d-concrete-technical>



# TECHNICAL DATA SHEET

**LIGHTWEIGHT AGGREGATE ACCORDING TO DIN EN 13055-1**

Poraver® expanded glass is available in six standard and two special grain sizes. With this wide variety of grain sizes from 0.04 mm to 4 mm, Poraver® expanded glass offers a suitable lightweight aggregate solution for every field of application.

PROPERTIES	STANDARD	PORAVER® STANDARD GRAIN SIZES						PORAVER® SPECIAL GRAIN SIZES					
		0.040-125	0.1-0.3	0.25-0.5	0.5-1	1-2	2-4		0.1-0.5	0.25-1			
Grain size	[mm]												
Particle size	[mesh #]	400-120	140-50	60-35	35-18	18-10	10-5	140-35	60-18				
	[kg/m³]	530 ± 70	400 ± 60	340 ± 30	270 ± 30	230 ± 30	190 ± 20	380 ± 60	311 ± 30				
Dry loose bulk density	[lb/ft³]	33.1 ± 4.4	25 ± 3.8	21.2 ± 3.2	16.9 ± 3	14.4 ± 2.1	11.9 ± 1.8	23.7 ± 3.8	19.4 ± 1.9				
Oversize													
Under size	DIN EN 13055-1												
Apparent density	[kg/m³]	1,400 <sup>2,3)</sup> ± 300	950 <sup>1)</sup> ± 150	700 <sup>1)</sup> ± 80	500 <sup>1)</sup> ± 80	400 <sup>1)</sup> ± 60	320 <sup>2)</sup> ± 40	on request	on request				
	[lb/ft³]	87.4 <sup>2,3)</sup> ± 18.7	59.3 <sup>1)</sup> ± 9.4	43.7 <sup>1)</sup> ± 5.0	31.2 <sup>1)</sup> ± 5.0	25 <sup>1)</sup> ± 3.7	19.9 <sup>2)</sup> ± 2.5	on request	on request				
Water absorption by mass <sup>4)</sup>	[Mass. %]	-	35	21	18	19	14	on request	on request				
	[Vol. %]	-	33	15	9	7	4.5	on request	on request				
Water absorption by volume <sup>4)</sup>	[MPa]	on request	≥ 4.5	≥ 2.6	≥ 2	≥ 1.6	≥ 1.4	≥ 3	≥ 2.3				
	[psi]	on request	≥ 653	≥ 377	≥ 290	≥ 232	≥ 203	≥ 435	≥ 334				
Compressive strength													
Moisture content on delivery													
Softening point													
pH value	DIN EN ISO 7879												
Colour													
Thermal conductivity	[W/m·K]		0.094	0.090	-	0.072	0.070 <sup>3)</sup>	0.095	0.082				
	[BTU·in/ft²·°F]		0.652	0.625	-	0.500	0.486 <sup>3)</sup>	0.659	0.569				
CE according to DIN EN 13055-1		-	•	•	•	•	•	-	-				

## CHEMICAL ANALYSIS

CONSTITUENT	Applied to the sample dried at 105°C	Analysis method
SiO <sub>2</sub>	70 - 75 %	DIN EN ISO 12677 measured with XRF
Na <sub>2</sub> O	10 - 15 %	
CaO	7 - 11 %	
Al <sub>2</sub> O <sub>3</sub>	0.5 - 5 %	
MgO	0 - 5 %	
K <sub>2</sub> O	0 - 4 %	
Loss on ignition	< 0,1 %	

The strength grades may vary within the tolerance range of bulk densities. The availability and delivery conditions for special grain sizes will be agreed on an individual basis.

<sup>1)</sup> Test according to DIN V 18004, calculation of apparent (relative) density please see method DIN EN 1097-6

<sup>2)</sup> Apparent (relative) density according to EN 1097-6

<sup>3)</sup> Minimal measurements due to fineness of the material

<sup>4)</sup> % absorption is determined after five minutes submersion in tap water at 20 ± 2°C

<sup>5)</sup> Calculated values DIBT according to Approval Z-23.11-1.14 (Thermal insulating material, non combustible according to construction material class DIN 4102A1)



# TECHNISCHES DATENBLATT

## LEICHTZUSCHLAG GEMÄSS DIN EN 13055-1

Poraver® Blähglas ist in sechs Standardkorngrößen und zwei weiteren Spezialkorngrößen erhältlich.

Mit seinen unterschiedlichen Korngrößen von 0,04 bis 4 mm bietet Poraver® Blähglas als Leichtzuschlag die passende Lösung für jeden Anwendungsbereich.

EIGENSCHAFTEN	STANDARD	PORAVER® STANDARD KORNGROSSEN						PORAVER® SPEZIALKORNGROSSEN	
		0,04-0,125	0,1-0,3	0,25-0,5	0,5-1	1-2	2-4		
Korngröße	[mm]	400-120	140-50	60-35	35-18	18-10	10-5	140-35	60-18
Partikelgröße	[mesh #]	530	400	340	270	230	190	380	311
	[kg/m³]	±70	±60	±30	±30	±30	±20	±60	±30
Schüttdichte	[kg/ft³]	33,1	25	21,2	16,9	14,4	11,9	23,7	19,4
	[lb/ft³]	±4,4	±3,8	±3,2	±3	±2,1	±1,8	±3,8	±1,9
Überkorn		≤ 10 M.-%							
Unterkorn		≤ 15 M.-%							
Kornrohichte	[kg/m³]	1.400 <sup>2a)</sup> ±300	950 <sup>1)</sup> ±150	700 <sup>1)</sup> ±80	500 <sup>1)</sup> ±80	400 <sup>1)</sup> ±60	320 <sup>2a)</sup> ±40	auf Anfrage	auf Anfrage
	[lb/ft³]	87,4 <sup>2a)</sup> ±18,7	59,3 <sup>1)</sup> ±9,4	43,7 <sup>1)</sup> ±5,0	31,2 <sup>1)</sup> ±5,0	25 <sup>1)</sup> ±3,7	19,9 <sup>2)</sup> ±2,5	auf Anfrage	auf Anfrage
	[M.-%]	-	35	21	18	19	14	auf Anfrage	auf Anfrage
Wasseraufnahme <sup>4)</sup>	[Vol.-%]	-	33	15	9	7	4,5	auf Anfrage	auf Anfrage
Druckfestigkeit	[MPa]	auf Anfrage	≥ 4,5	≥ 2,6	≥ 2	≥ 1,6	≥ 1,4	≥ 3	≥ 2,3
	[psi]	auf Anfrage	≥ 653	≥ 377	≥ 290	≥ 232	≥ 203	≥ 435	≥ 334
Feuchtegehalt bei Anlieferung		≤ 0,5 %							
Erweichungspunkt		ca. 700°C / 1.300°F							
pH Wert		8 - 12							
Farbe		cremeweiß							
	[W/m·K]	0,094	0,090	-	0,072	0,070 <sup>3)</sup>	0,095	0,082	
Wärmeleitfähigkeit	[BTU·in/h·ft²·°F]	-	0,652	0,625	-	0,500	0,486 <sup>3)</sup>	0,659	0,569
			-	•	•	•	•	-	-
CE gemäß DIN EN 13055-1									

## CHEMISCHE ANALYSE

BESTANDTEILE	Bezogen auf die bei 105°C getrocknete Probe	Analysemethode
SiO <sub>2</sub>	70 - 75 %	DIN EN ISO 12677 gemessen mit RFA
Na <sub>2</sub> O	10 - 15 %	
CaO	7 - 11 %	
Al <sub>2</sub> O <sub>3</sub>	0,5 - 5 %	
MgO	0 - 5 %	
K <sub>2</sub> O	0 - 4 %	
Glühverlust	< 0,1 %	

Die Kornfestigkeit der einzelnen Korngrößen kann sich im Toleranzbereich der Schüttdichte ändern. Verfügbarkeit und Lieferbedingungen werden für Spezialkorngrößen individuell vereinbart.

<sup>1)</sup> Prüfung nach DIN V 18004, Berechnung der schenkbaren Rohdichte siehe Methode EN 1097-6

<sup>2)</sup> Scheinbare Rohdichte gemäß EN 1097-6

<sup>3)</sup> Minimale Werte aufgrund der Feinheit des Materials

<sup>4)</sup> Wasseraufnahme wird nach 5 min in Leuchtgaswasser bei 20 ± 2°C bestimmt

<sup>5)</sup> Berechnete Werte DfR nach Zulassung Z-23.11-114 (Wärmedämmstoff, nicht brennbar nach Baustoffklasse DIN 4102-41)





# AeroAggregates UL-FGA G15

Ultra-Lightweight Foamed Glass Aggregate

## Density (Unit Weight)

Uncompacted dry bulk density (ASTM C29/C29M/ AASHTO T 19) <sup>1</sup>	12-15 pcf
Estimated compacted dry density	
1.11 Compression Ratio (10% Compaction of Each Lift)	13.3-16.7 pcf
1.25 Compression Ratio (20% Compaction of Each Lift)	15-18.8 pcf
Estimated buoyant unit weight	-15 pcf

## Typical Gradation Characteristics (uncompacted) [ASTM C136/ AASHTO T 27] <sup>1</sup>

D85	2.5" (maximum)
D15	0.375" (minimum)

## Physical Characteristics

Moisture Content	
Volumetric (%)	0-10 (6% typical)
Gravimetric (%) [ASTM C566/ AASHTO T 255] <sup>1</sup>	0-60 (25% typical)
Particle Specific Gravity (AASHTO T 85)	0.38
Porosity	
Uncompacted	0.5
1.25 Compression Ratio	0.38
Soundness (% Loss)	
Magnesium Sulfate (ASTM C88/AASHTO T 104) <sup>1</sup>	4.1-14
Sodium Sulfate (ASTM C88/AASHTO T 104) <sup>1</sup>	3.1- 6.9
Stability	
Angle of internal friction – loose	45°
Angle of internal friction – up to 1200 psf (ASTM D3080) <sup>1</sup>	55°
Angle of internal friction – up to 3000 psf (ASTM D3080) <sup>1</sup>	41°

<sup>1</sup>Modified test method due to particle size/density



**Physical Characteristics (cont.)**

Impurities	
Clay lumps (ASTM C142)	0
Organic impurities (ASTM C40)	0
Popouts (ASTM C151)	0
Electrical Resistance	
Lab (AASHTO T 288)	15,600 ohm-cm

**Chemical Characteristics**

Ignition loss (ASTM C114)	0
Sulfates (ppm) [AASHTO T 290]	11
Chlorides (ppm) [AASHTO T 291]	<10
TCLP (SW-846)	Non-leaching

**Daily Quality Control Testing**

Bulk dry density, maximum [EN 1097-3] <sup>1</sup>	15 pcf
Compressive Strength at 20% Deformation, minimum [EN 1097-11] <sup>1</sup>	15,000 psf

**Advantages**

Good Insulator	Capillary Break	Freeze-Thaw Stable	Rodent Resistant
Highly-Permeable	Volume Stable	Non-Flammable	Accelerated Construction

**Shipping & Handling** 100 CY/Truckload

By shipping up to 100 CY per truckload, we are not only reducing the number of trucks on the road, helping logistics, but we also are reducing the carbon footprint of your aggregate needs.

Material can also be supplied in super sacks for easy placement on sites with confined access.

<sup>1</sup>Modified test method due to particle size/density

For more information, please visit [aeroaggregates.com](http://aeroaggregates.com) or call (833) 261-8499.



1500 Chester Pike | Eddystone, PA 19022  
(833) 261-8499 | [www.aeroaggregates.com](http://www.aeroaggregates.com)  
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**UTELITE CORPORATION**  
 Average Monthly Gradation Report  
 As Per A.S.T.M. C-136

DATE : Jan-20

Material - COARSE		SIEVES						
	# 3/4	# 1/2	# 3/8	# 4	# 8			
A.S.T.M. C-330 PASSING								
COARSE ( 1/2" TO # 4 ) :	100	90 - 100	40 - 80	0 - 20	0 - 10			
TEST RESULTS :	100.00	90.32	61.65	11.02	2.37			
RETAINED %	0.00	9.68	28.68	50.63	8.65			PAN
WT/FT3	52.60	AVG. MOISTURE %		7.25		CALC. DRY WT. FT3	48.79	2.37

Material - STRUCTURAL MEDIUM		SIEVES						
	# 1/2	# 3/8	# 4	# 8	# 16			
A.S.T.M. C-330 PASSING								
STR-MED (3/8" TO #8)	100	80 - 100	5-40	0 - 20	0 - 10			
TEST RESULTS :	100.00	93.46	12.23	1.90	1.02			
RETAINED %	0.00	6.54	81.23	10.33	0.88			PAN
WT/FT3	51.87	AVG. MOISTURE %		5.80		CALC. DRY WT. FT3	48.86	1.02

Material - FINES		SIEVES								
	# 3/8	# 4	# 8	# 16	# 30	# 50	# 100			
MANUFACTURER'S SPEC.									F.M.	
PERCENT PASSING ( # 4 TO 0 ) :	100	85 - 100	.....	15 - 55	.....	0 - 10	0 - 5		4.31	
TEST RESULTS :	100.00	94.60	44.80	18.30	6.40	3.50	1.80			
RETAINED %	0.00	5.40	49.80	26.50	11.90	2.90	1.70		PAN	
WT/FT3	54.40	AVG. MOISTURE %		3.55		CALC. DRY WT. FT3	52.47		1.80	

Material - CRUSHED FINES		SIEVES								
	# 3/8	# 4	# 8	# 16	# 30	# 50	# 100			
A.S.T.M. C-330 PASSING									F.M.	
FINE ( # 4 TO 0 ) :	100	85 - 100	.....	40 - 80	.....	10 - 35	5 - 25		3.25	
TEST RESULTS :	100.00	99.50	80.30	47.00	26.30	14.10	7.90			
RETAINED %	0	0.50	19.20	33.30	20.70	12.20	6.20		PAN	
WT/FT3	59.00	AVG. MOISTURE %		12.43		CALC. DRY WT. FT3	51.67		7.90	

Material - 10 MESH		SIEVES								
	# 3/8	# 4	# 8	# 16	# 30	# 50	# 100			
A.S.T.M. C-330 PASSING									F.M.	
FINE ( # 4 TO 0 ) :	100	85 - 100	.....	40 - 80	.....	10 - 35	5 - 25		2.53	
TEST RESULTS :	100.00	100.00	99.40	71.60	40.90	22.20	13.00			
RETAINED %	0.00	0.00	0.60	27.80	30.70	18.70	9.20		PAN	
WT/FT3	54.40	AVG. MOISTURE %		7.93		CALC. DRY WT. FT3	50.09		13.00	

Material - STRUCTURAL BLEND		SIEVES									
	# 1/2	# 3/8	# 4	# 8	# 16	# 30	# 50	# 100			
MANUFACTURER'S SPEC.										F.M.	
FINE ( # 4 TO 0 ) :	100	85 - 100	65 - 95	45 - 85	25 - 55	10 - 40	5 - 20	3 - 10		3.06	
TEST RESULTS :	100.00	91.73	76.83	51.70	43.47	16.57	8.83	5.13			
RETAINED %	0	8.27	14.90	25.13	8.23	26.90	7.73	3.70		PAN	
WT/FT3	62.00	AVG. MOISTURE %		9.62		CALC. DRY WT. FT3	56.03			5.13	

Material - BLOCK BLEND		SIEVES										
	# 1/2	# 3/8	1/4"	# 4	# 8	# 16	# 30	# 50	# 100			
MANUFACTURER'S SPEC.											F.M.	
FINE ( # 4 TO 0 ) :	100	97 - 100	85 - 95	75 - 90	65 - 80	35 - 50	15 - 30	5 - 20	5 - 15		1.91	
TEST RESULTS :	100.00	99.00	90.20	82.50	66.30	37.00	18.80	9.60	5.20			
RETAINED %	0	1	8.80	7.70	16.20	29.30	18.20	9.20	4.40		PAN	
WT/FT3	61.60	AVG. MOISTURE %		10.76		CALC. DRY WT. FT3	54.97				5.20	



February 21, 2019

Utelite Corporation  
6375 Three Mile Canyon Road,  
Coalville, UT 84017

Attention: Mr. Jeff Barrick

**Subject: Qualifications Testing of Utelite Structural Fine Lightweight Aggregate**

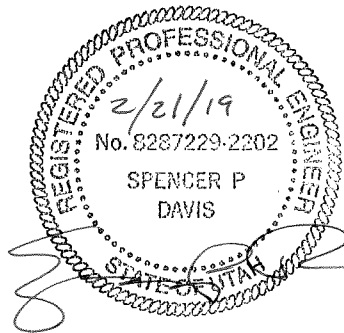
**Dear: Mr. Jeff Barrick**

Kleinfelder has performed testing, per your request, to verify the conformance of Utelite Structural Fine Lightweight Aggregate with ASTM C330-17 "Standard Specification for Lightweight Aggregates for Structural Concrete".

Upon review of the results, the Utelite Structural Fine Lightweight Aggregates meet C330-17 test requirements for the Calendar Year 2019.

See the following results.

Sincerely,



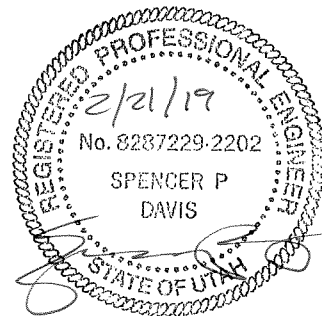
**Spencer Davis, PE**  
Senior Geotechnical Engineer

849 West Levoy Drive, Suite 200  
Salt Lake City, UT, 84123  
o| (1) 801.261.3336  
d| (1) 801.713.2870  
m| (1) 435.512.0580  
f| (1) 801.261.3306

## Fine Aggregates

SIEVE ANALYSIS			TEST RESULTS			
Sieve Size (ASTM C136)	Accum. % Passing	Specifications	Standard	CHEMICAL and PHYSICAL PROPERTIES	Results	Specification
9.5 mm (3/8")	100	100	ASTM C40	Organic Impurities	Color Comparison=	Lighter than Standard
4.75mm (No. 4)	99	85-100	ASTM C641	Staining Index	Stain Index=	20
2.36 mm (No. 8)	83	---	ASTM C114	Loss on Ignition	Loss, %=	0.210
2.00 mm (No. 10)	76	---	ASTM C142	Clay Lumps and Friable Particles	Fine Aggregate, %=	0.51
1.18mm (No. 16)	56	40-80	ASTM C29	Bulk Density: Dry Loose Condition	Unit Weight, lbs./cu.ft.=	58.6
0.600 mm (No. 30)	35	---	ASTM C29	Bulk Density: Saturated Loose Condition	Unit Weight, lbs./cu.ft.=	68.9
0.425mm (No. 40)	28	---	ASTM C1761	Absorption of Lightweight Fine Aggregate	*Absorption, %=	17.6
0.300mm (No. 50)	23	10-35	ASTM C127/128	Relative Density of Fine Aggregate (SSD)	Relative Density, (SSD)=	1.827
0.150mm (No. 100)	17	5-25	ASTM C88	Soundness of Aggregates (Sodium Sulfate)	Fine Soundness Loss, %=	2.6
0.075mm (No. 200)	13.9	---	ASTM C88	Soundness of Aggregates (Magnesium)	Fine Soundness Loss, %=	3.2

\*Absorption is calculated using a minimum soak time of 24-hours



# MasterFiber® M 100

## Monofilament Microsynthetic Fiber

### Description

MasterFiber M 100 product is a high-tensile strength, high modulus of elasticity, ultra-thin monofilament homopolymer polypropylene fiber designed to quickly distribute uniformly throughout the concrete matrix. At the engineered dosage level of 0.50 lb/yd<sup>3</sup> (0.3 kg/m<sup>3</sup>) MasterFiber M 100 product outperforms all other plastic shrinkage fiber reinforcements at their typical dosage of 1.0 lb/yd<sup>3</sup> (0.6 kg/m<sup>3</sup>).

### Applications

Recommended for use in:

- Residential slabs-on-ground
- Commercial slabs-on-ground
- Stucco
- Dry-packaged cement based products
- Precast products
- Pools and pool decks
- Water tanks
- Shotcrete

### Features

- 225 million 0.75 in. (19 mm) fibers in one pound (0.45 kg) of product
- Uniform distribution throughout the concrete matrix
- Excellent finishability

### Benefits

- Excellent reduction in plastic shrinkage cracking
- Transforms macro-cracks into micro-cracks
- Measurably reduces plastic settlement
- Measurably reduces the concrete permeability, thus increasing the durability and service life of the concrete
- Performs as an excellent companion in blends with macrosynthetic fibers and steel fibers

### Performance Characteristics

#### Physical Properties

Specific Gravity	0.91
Melting Point	320 °F (160 °C)
Ignition Point	1,094 °F (590 °C)
Absorption	Nil
Alkali Resistance	Excellent
Tensile Strength	70 ksi (480 MPa)
Modulus of Elasticity	1,230 ksi (8.48 GPa)
Available Lengths	0.5 in. (13 mm) and 0.75 in. (19 mm)
Equivalent Diameter	0.00047 in. (12 microns)
Denier	1 dpf



## Guidelines for Use

**Dosage:** The recommended dosage of MasterFiber M 100 product is 0.50 lb/yd<sup>3</sup> (0.3 kg/m<sup>3</sup>).

**Mixing:** Typically no modifications to the mixture proportions are required when the product is used at the engineered dosage of 0.50 lb/yd<sup>3</sup> (0.3 kg/m<sup>3</sup>). MasterFiber M 100 product fibers can be introduced into the mixing system at any time except when the cement is being introduced. Mixing time will vary based on when the fibers are introduced to the mixer. The normal range is 3-5 minutes of mixing with the higher number preferred when the fibers are added after all of the standard ingredients have been introduced and mixed.

## Engineering Specifications

MasterFiber M 100 product is a uniquely developed fiber to minimize plastic shrinkage cracking in concrete. With 112.5 million fibers in the engineered dosage of 0.50 lb/yd<sup>3</sup> (0.3 kg/m<sup>3</sup>), MasterFiber M 100 product is capable of reducing plastic shrinkage cracking by approximately 85%. Conventional monofilament polypropylene fibers at 1.0 lb/yd<sup>3</sup> (0.6 kg/m<sup>3</sup>) typically do not achieve 70% reduction in plastic shrinkage cracking.

MasterFiber M 100 product meets the requirements of ASTM C 1116/C 1116M, Section 4.1.3, Type III and Note 2 as well as ICC ES AC32, Section 3.1.1 when used at the engineered dosage of 0.50 lb/yd<sup>3</sup> (0.3 kg/m<sup>3</sup>).

## Product Notes

MasterFiber M 100 product is not a replacement for structural steel reinforcement and therefore, should not be used to replace any of the load-carrying steel reinforcement in a concrete element.

## Packaging

MasterFiber M 100 product is packaged in pre-weighed 0.50 lb (0.23 kg) and 2.5 lb (1.13 kg) degradable bags to ensure optimum dosing and homogeneous distribution of the product.

## Related Documents

Safety Data Sheets: MasterFiber M 100 product

## Additional Information

For additional information on MasterFiber M 100 product, contact your local sales representative.

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## Product Information Sheet

### Description

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Interstar Powder Pigments for colored concrete are pure iron oxide pigments designed to be used specifically in integral coloring of cementitious materials. Interstar colors are certified to ASTM C979 standard for integral coloring.

### Color Range

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Interstar Powder Pigments are available in a variety of standard colors. In addition, the color development and matching services of the Interstar Color Laboratory offers controlled, custom-blended pigments to meet your own special color requirements.

### Primary Application

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- Bricks
- Blocks
- Pavers
- Roof Tiles
- Floors
- Walks
- Patios
- Driveways
- Precast
- Poured in place concrete construction

### Benefits

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- Easy Dispersing
- Convenient packaging
- Maximum coloring power
- Wide variety of colors
- Environmentally friendly and non-toxic
- Sunfast
- Water dispersible
- Lime proof
- Non-bleeding
- Synthetic iron oxides

### Technical Data

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#### Packaging:

Interstar Powder Pigments are available in 25 lb and 50 lb bags. Each package is clearly identified with color name, number and weight.

#### Storage:

Store in a cool, dry, well-ventilated area. Protect from moisture.

#### Properties:

- Appearance: Dry powder (buff, tan, brown, black, red or yellow)
- Odor: None
- Density: 0.3 - 1.2 g/mL (19 - 75 lb/ft<sup>3</sup>)
- pH: 4.0 - 7.0
- Fineness: 95%-99% minus 325 mesh (Color Dependent)
- Particle Shape: Cubical, Acicular, Spherical (Color Dependent)
- Particle Size: Generally less than 1 micron

## Usage

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**Directions:** Generally, Interstar Powder Pigments should be added after the aggregate charge and before the addition of cement and the majority of water. This allows the aggregate to distribute the color uniformly, which will promote an even distribution of pigment particles on the surface of the cement particles. Always add ingredients in the same order for each batch. Water-to-cement ratio should not exceed 0.45 for best mixing results. Many block and paver mixes require 0.40 or less. However, a value less than 0.30 may not allow enough water to penetrate for proper cement hydration and workability. A minimum mix time of 3 minutes after color addition is recommended for best dispersion results. To maintain consistency for each job, it is important to use the same source and/or brand of ingredients such as sand, gravel or cement.

**Limitations:** The optimal dosage of pigment suggested varies between 2% and 7%, based on the total weight of cementitious materials. A dosage of 10% of pigment based on the total weight of cementitious materials is the saturation point for pigment coloration. If the percentage of pigment is over 10% of the total weight of cementitious materials, there will be no benefits and it can affect the results considerably. In addition, if the percentage is lower than 1% of the total weight of cementitious materials, the coloration will be uneven and will affect the results.

## Safety

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Appropriate ventilation should be provided to keep dust concentrations below acceptable exposure limits. For additional information, please refer to the Material Safety Data Sheet (MSDS).

## Availability

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Interstar products are available throughout Canada, the United States and Mexico. Please contact our Customer Service Department (1-800-567-1857) to place an order or to find a distributor in your area.

## Technical Services and Samples

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The Interstar Color Laboratory is available to match existing colored concrete, develop special color tones or to provide expert color assistance to solve your individual color needs. Please contact Interstar Color Laboratory for assistance. Since the color shades of cement and aggregates (coarse and fine) are different in each locality, it is recommended to send 10 lb of the local cement and 25 lb of the coarse and fine aggregate that will be used in the concrete mix design, along with a sample of the desired color that is to be produced.

**Samples:** Samples of Interstar's standard colors and specially-blended colors are available in convenient cement color briquettes or mini-pavers. The color block samples are mixed in the Interstar Laboratory with locally supplied cement and aggregates, or with cement and aggregates available to Interstar at the time of production.

## Warranty

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The limit of liability of this company shall be the purchase price paid by the user or buyer for the quantity of the Interstar product involved. See Interstar's Warranty for complete details.

CORPORATE HEADQUARTERS  
4255 Portland Boulevard  
Sherbrooke, QC  
J1L 3A5  
Tel.:819.563.9975 or 1.800.567.1875  
Fax.:819.563.1317 or 1.888.563.1317

US OFFICE  
530 Madison Avenue  
Junction City, Illinois  
62882, USA  
Tel.:618.533.3600 or 1.877.693.1212  
Fax.:618.533.3636 or 1.888.563.1317

CALGARY, ALBERTA  
MEXICO CITY, MEXICO  
MONTERREY, MEXICO  
SEOUL, SOUTH KOREA

[www.interstar.ca](http://www.interstar.ca)  
[info@interstar.ca](mailto:info@interstar.ca)

# MasterSet<sup>®</sup> DELVO

## Hydration Controlling Admixture

### Description

MasterSet DELVO ready-to-use, liquid admixture is used for making more uniform and predictable high-performance concrete. MasterSet DELVO admixture retards setting time by controlling the hydration of portland cement and other cementitious materials while facilitating placing and finishing operations. MasterSet DELVO admixture meets ASTM C 494/C 494M requirements for Type B, retarding, and Type D, water-reducing and retarding, admixtures.

### Applications

Recommended for use in:

- Stabilization of concrete washwater
- Stabilization of returned plastic concrete
- Stabilization of freshly batched concrete for long hauls
- 4x4<sup>™</sup> Concrete
- Pumped concrete, shotcrete (wet mix) and conventionally-placed concrete
- Plain, reinforced, precast, prestressed, lightweight and normal weight concrete
- Pervious concrete

### Features

- Reduced water content required for a given workability
- Retarded setting time characteristics
- Improved workability

### Benefits

- Provides flexibility in the scheduling of placing and finishing operations
- Offsets the effects of slump loss during extended delays between mixing and placing
- Reduces waste associated with concrete washwater and returned concrete
- Increased strength – compressive and flexural

### Performance Characteristics

**Rate of Hardening:** The temperature of a concrete mixture and the ambient temperature (forms, earth, air, etc.) affect the hardening rate of concrete. At higher temperatures, concrete hardens more rapidly which may cause problems with placing and finishing.

One of the functions of MasterSet DELVO admixture is to retard the set of concrete. Within the normal dosage range, it will generally extend the working and setting times of concrete containing normal portland cement, fly ash, slag cement and silica fume approximately 1 hour to 5 hours compared to a plain concrete mixture. This depends on job materials and temperatures. Trial mixtures should be made under approximate job conditions to determine the dosage required.

**Compressive Strength:** Concrete produced with MasterSet DELVO admixture will develop higher early (within 24 hours) and higher ultimate strengths than plain concrete when used within the recommended dosage range and under normal, comparable curing conditions. When MasterSet DELVO admixture is used in heat-cured concrete, the length of the preheating period should be increased until the initial set of the concrete is achieved. The actual heat-curing period is then reduced accordingly to maintain existing production cycles without sacrificing early or ultimate strengths.

## Guidelines for Use

**Dosage:** MasterSet DELVO admixture is recommended for use at a dosage of  $4 \pm 1$  fl oz/cwt ( $260 \pm 65$  mL/100 kg) of cementitious materials for most concrete mixtures using average concrete ingredients. For long time-to-discharge applications, such as long hauls, dosages higher than the recommended range may be required. Specifically, for shotcrete applications, MasterSet DELVO admixture is recommended for use at a dosage of 1.5 fl oz/cwt to 25 fl oz/cwt (100 mL/100 kg to 1,500 mL/100 kg) of cementitious materials. Because of variations in job conditions and concrete materials, dosages other than the recommended amounts may be required. In such cases, contact your local sales representative. For concrete washwater and returned concrete stabilization, utilize MasterSet DELVO charts to determine the appropriate dosage rates.

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** MasterSet DELVO admixture will neither initiate nor promote corrosion of reinforcing steel in concrete. This admixture does not contain intentionally-added calcium chloride or other chloride-based ingredients.

**Compatibility:** MasterSet DELVO admixture may be used in combination with any BASF admixture. When used in conjunction with another admixture, each admixture must be dispensed separately into the mixture.

**CAUTION:** While MasterSet DELVO and MasterLife CI 30 admixtures are compatible in the same concrete mixture when added separately, these two admixtures are NOT compatible in the same STORAGE TANK OR CONTAINER, in any ratio, as potentially harmful gas may result from blending the two. Contact a BASF representative if there are any questions regarding admixture storage or admixture compatibility.

## Storage and Handling

**Storage Temperature:** MasterSet DELVO admixture should be stored above freezing temperatures. If MasterSet DELVO admixture freezes, thaw at 35 °F (2 °C) or above and completely reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

**Shelf Life:** MasterSet DELVO admixture has a minimum shelf life of 12 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterSet DELVO admixture has been exceeded.

## Packaging

MasterSet DELVO admixture is supplied in specially designed 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Safety Data Sheets: MasterSet DELVO admixture

## Additional Information

For more information on MasterSet DELVO admixture, contact your local sales representative.

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3	03 30 00	Cast-in-Place Concrete
	03 40 00	Precast Concrete
4	03 70 00	Mass Concrete
	04 05 16	Masonry Grouting

# MasterGlenium® 7500

## Full-Range Water-Reducing Admixture

### Description

MasterGlenium 7500 full-range water-reducing admixture is very effective in producing concrete mixtures with different levels of workability including applications that require self-consolidating concrete (SCC). MasterGlenium 7500 admixture meets ASTM C 494/C 494M compliance requirements for Type A, water-reducing, and Type F, high-range water-reducing, admixtures.

### Applications

Recommended for use in:

- Concrete with varying water reduction requirements (5-40%)
- Concrete where control of workability and setting time is critical
- Concrete where high flowability, increased stability, high-early and ultimate strengths, and improved durability are needed
- Producing self-consolidating concrete (SCC)
- Strength-on-demand concrete, such as 4x4™ Concrete
- Pervious concrete

### Features

MasterGlenium 7500 full-range water-reducing admixture is based on the next generation of polycarboxylate technology found in all of the MasterGlenium 7000 series products. This technology combines state-of-the-art molecular engineering with a precise understanding of regional cements to provide specific and exceptional value to all phases of the concrete construction process.

- Dosage flexibility for normal, mid-range and high-range applications
- Excellent early strength development
- Controls setting characteristics
- Optimizes slump retention/setting relationship
- Consistent air entrainment

### Benefits

- Faster turnover of forms due to accelerated early strength development
- Reduces finishing labor costs due to optimized set times
- Use in fast track construction
- Minimizes the need for slump adjustments at the jobsite
- Less jobsite QC support required
- Fewer rejected loads
- Optimizes concrete mixture costs

### Performance Characteristics

Concrete produced with MasterGlenium 7500 admixture achieves significantly higher early age strength than first generation polycarboxylate high-range water-reducing admixtures. MasterGlenium 7500 admixture also strikes the perfect balance between workability retention and setting characteristics in order to provide efficiency in placing and finishing concrete. The dosage flexibility of MasterGlenium 7500 allows it to be used as a normal, mid-range, and high-range water reducer.



## Guidelines for Use

**Dosage:** MasterGlenium 7500 admixture has a recommended dosage range of 2-15 fl oz/cwt (130-975 mL/100 kg) of cementitious materials. For most mid- to high-range applications, dosages in the range of 5-8 fl oz/cwt (325-520 mL/100 kg) will provide excellent performance. For high performance and producing self-consolidating concrete mixtures, dosages of up to 12 fl oz/cwt (780 mL/100 kg) of cementitious materials can be utilized. Because of variations in concrete materials, jobsite conditions and/or applications, dosages outside of the recommended range may be required. In such cases, contact your local sales representative.

**Mixing:** MasterGlenium 7500 admixture can be added with the initial batch water or as a delayed addition. However, optimum water reduction is generally obtained with a delayed addition.

## Product Notes

**Corrosivity – Non-Chloride, Non-Corrosive:** MasterGlenium 7500 admixture will neither initiate nor promote corrosion of reinforcing steel embedded in concrete, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterGlenium 7500 admixture.

**Compatibility:** MasterGlenium 7500 admixture is compatible with most admixtures used in the production of quality concrete, including normal, mid-range and high-range water-reducing admixtures, air-entrainers, accelerators, retarders, extended set control admixtures, corrosion inhibitors, and shrinkage reducers.

**Do not use MasterGlenium 7500 admixture with admixtures containing beta-naphthalene sulfonate. Erratic behaviors in slump, workability retention and pumpability may be experienced.**

## Storage and Handling

**Storage Temperature:** MasterGlenium 7500 admixture must be stored at temperatures above 40 °F (5 °C). If MasterGlenium 7500 admixture freezes, thaw and reconstitute by mechanical agitation.

**Shelf Life:** MasterGlenium 7500 admixture has a minimum shelf life of 9 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterGlenium 7500 admixture has been exceeded.

## Packaging

MasterGlenium 7500 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Safety Data Sheets: MasterGlenium 7500 admixture

## Additional Information

For additional information on MasterGlenium 7500 admixture or on its use in developing concrete mixtures with special performance characteristics, contact your local sales representative.

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# MasterLife<sup>®</sup> SRA 035

## Shrinkage-Reducing Admixture

### Description

MasterLife SRA 035 shrinkage-reducing admixture was developed specifically to reduce drying shrinkage of concrete and mortar, and the potential for subsequent cracking. MasterLife SRA 035 admixture functions by reducing capillary tension of pore water, a primary cause of drying shrinkage. MasterLife SRA 035 admixture will meet ASTM C 494/C 494M requirements for Type S, Specific Performance, admixtures.

### Applications

Recommended for use in:

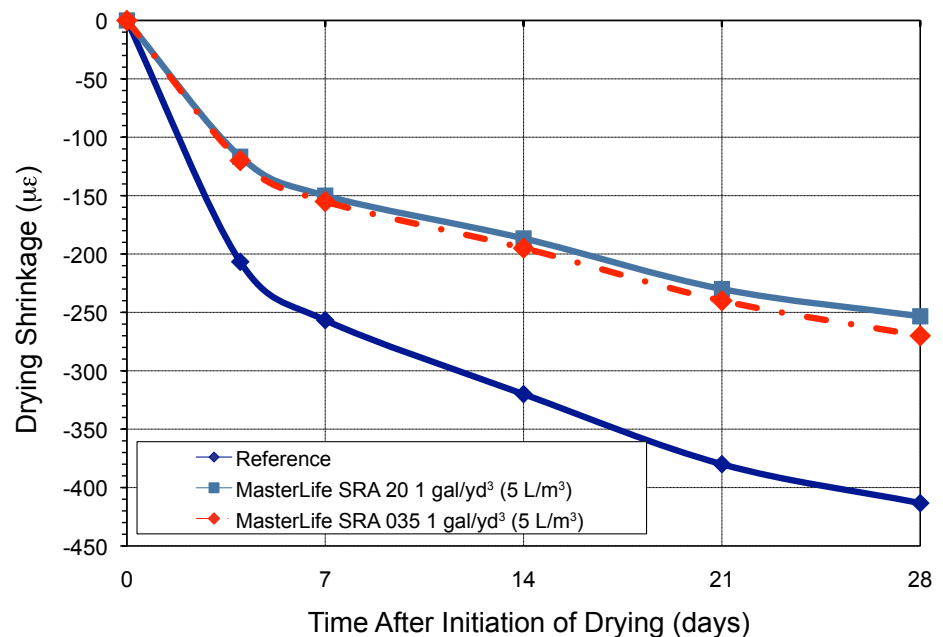
- Ready-mixed or precast concrete structures requiring shrinkage reduction and long-term durability
- Wet mix shotcrete

### Features

- Reduces the capillary tension of pore water in cementitious mixtures
- Provides moderate to significant reductions in the drying shrinkage of cementitious mixtures
- Reduces stresses induced from one-dimensional surface drying in concrete slabs, walls and other elements

### Benefits

- Reduces microcracking and drying shrinkage cracking in concrete, mortar and paste
- Minimizes curling in concrete slabs
- Improves aesthetics, watertightness and durability in concrete elements and structures
- Minimizes prestress loss in prestressed concrete applications



## Performance Characteristics

MasterLife SRA 035 admixture does not substantially affect slump. MasterLife SRA 035 admixture may slightly increase bleed time and bleed ratio. MasterLife SRA 035 admixture may also delay time of set by 1-2 hours depending upon dosage and temperature. Compressive strength loss is minimal with MasterLife SRA 035 admixture. For air-entrained concrete applications, truck trial evaluations as detailed in the section titled "Compatibility" must be performed to verify that the specified air content can be achieved consistently. Therefore, contact your local sales representative when concrete treated with MasterLife SRA 035 admixture is being proposed for applications exposed to freezing and thawing environments.

## Guidelines for Use

**Dosage:** Knowledge of the shrinkage characteristics of the concrete mixture proposed for use is required prior to the addition of MasterLife SRA 035 admixture. The dosage of MasterLife SRA 035 admixture will be dependent on the desired drying shrinkage and the reduction in drying shrinkage required. Therefore, it is strongly recommended that drying shrinkage testing be performed to determine the optimum dosage for each application and each set of materials. The typical dosage range of MasterLife SRA 035 admixture is 0.5 to 1.5 gal/yd<sup>3</sup> (2.5 to 7.5 L/m<sup>3</sup>). However, dosages outside of this range may be required depending on the level of shrinkage reduction needed for a given application and because of variations in concrete materials, jobsite conditions and other factors. In such cases, contact your local sales representative for further guidance.

**Dispensing and Mixing:** MasterLife SRA 035 admixture may be added to the concrete mixture during the initial batch sequence or at the jobsite. The mix water content should be reduced to account for the quantity of MasterLife SRA 035 admixture used. If the delayed addition method is used, mixing at high speed for 3-5 minutes after the addition of MasterLife SRA 035 admixture will result in mixture uniformity.

## Product Notes

**Corrosivity:** Non-Chloride, Non-Corrosive: MasterLife SRA 035 admixture will neither initiate nor promote corrosion of reinforcing steel, prestressing steel or of galvanized steel floor and roof systems. Neither calcium chloride nor other chloride-based ingredients are used in the manufacture of MasterLife SRA 035 admixture.

**Compatibility:** MasterLife SRA 035 admixture is compatible with all air entrainers, water-reducers, mid-range water-reducers, high-range water reducers, set retarders, accelerators, silica fume, and corrosion inhibitors. For air-entrained concrete applications, MasterAir® AE 200 admixture is the preferred air entrainer. The dosage of air entrainer must be established through truck trial evaluations. The trials should include a simulated haul time of at least 20 minutes to assess air content stability. MasterLife SRA 035 admixture should be added separately to the concrete mixture to ensure desired results.

## Storage and Handling

**Storage Temperature:** MasterLife SRA 035 admixture is a potentially combustible material with a flash point of 198 °F (92 °C). This is substantially above the upper limit of 140 °F (60 °C) for classification as a flammable material, and below 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 refer to the Safety Data Sheet. MasterLife SRA 035 admixture should be stored at ambient temperatures above 35 °F (2 °C), and precautions should be taken to protect the admixture from freezing. If MasterLife SRA 035 admixture freezes, thaw and reconstitute by mild mechanical agitation. Do not use pressurized air for agitation.

**Shelf Life:** MasterLife SRA 035 admixture has a minimum shelf life of 12 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your local sales representative regarding suitability for use and dosage recommendations if the shelf life of MasterLife SRA 035 admixture has been exceeded.

## Packaging

MasterLife SRA 035 admixture is available in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

## Related Documents

Safety Data Sheets: MasterLife SRA 035 admixture

## Additional Information

For additional information on MasterLife SRA 035 admixture, or its use in developing a concrete mixture with special performance characteristics, contact your local sales representative.

*The Admixture Systems business of BASF's Construction Chemicals division is the leading provider of solutions that improve placement, pumping, finishing, appearance and performance characteristics of specialty concrete used in the ready-mixed, precast, manufactured concrete products, underground construction and paving markets. For over 100 years we have offered reliable products and innovative technologies, and through the Master Builders Solutions brand, we are connected globally with experts from many fields to provide sustainable solutions for the construction industry.*

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BASF warrants this product to be free from manufacturing defects and to meet the technical properties on the current Technical Data Guide, if used as directed within shelf life. Satisfactory results depend not only on quality products but also upon many factors beyond our control. **BASF MAKES NO OTHER WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO ITS PRODUCTS.** The sole and exclusive remedy of Purchaser for any claim concerning this product, including but not limited to, claims alleging breach of warranty, negligence, strict liability or otherwise, is shipment to purchaser of product equal to the amount of product that fails to meet this warranty or refund of the original purchase price of product that fails to meet this warranty, at the sole option of BASF. Any claims concerning this product must be received in writing within one (1) year from the date of shipment and any claims not presented within that period are waived by Purchaser. **BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.**

Purchaser must determine the suitability of the products for the intended use and assumes all risks and liabilities in connection therewith. This information and all further technical advice are based on BASF's present knowledge and experience. However, BASF assumes no liability for providing such information and advice including the extent to which such information and advice may relate to existing third party intellectual property rights, especially patent rights, nor shall any legal relationship be created by or arise from the provision of such information and advice. BASF reserves the right to make any changes according to technological progress or further developments. The Purchaser of the Product(s) must test the product(s) for suitability for the intended application and purpose before proceeding with a full application of the product(s). Performance of the product described herein should be verified by testing and carried out by qualified experts.



## StarR Foam II

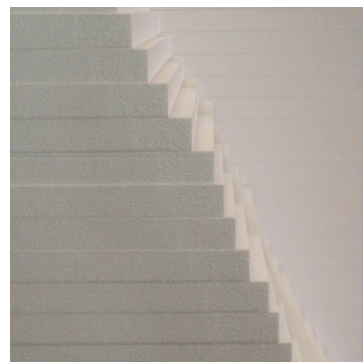
**StarR Foam II** is a lightweight, closed cell, rigid insulation manufactured from expanded polystyrene (EPS). It is available with reflective metallic, clear, and white facers. StarR Fan Fold meets or exceeds ASTM C578, Standard Specification for Rigid, Cellular, Polystyrene Thermal Insulation.

## APPLICATIONS

- Geofoam
- Sheathing
- Packaging
- Void fill
- Road base
- Cavity Walls
- Retaining walls
- Docks and piers
- Exterior insulation
- Underslab insulation
- Split slab insulation
- Below grade insulation
- Interior wall insulation
- Finishing systems (EIFS)
- Pre-cast concrete panels
- Custom computer cut shapes
- Tilt-up concrete insulation
- Ramps and bridges approaches
- Commercial roofing insulation
- Metal roof & metal deck flute-fill

## BENEFITS

- Stable R-value
- Environmentally friendly
- Energy efficient
- Code approvals
- Termite protection available
- Proven performance
- Moisture resistant
- Cost-effective
- No CFC, HCFC, HFC, or formaldehyde



## OPTIONS

- Available sizes:
- 4'x4' panels (1/4" to 48" thick)
  - 4'x8' panels (1/4" to 48" thick)
- Contact your sales representative for more information.

## LOCATIONS

### KINGMAN, AZ

4555 Olympic Way  
Kingman, AZ 86401

**928-681-2800**

### ANTHONY, TX

1004 Omar Road  
Anthony, TX 79821

**915-886-4636**

### ARLINGTON, TX

3220 E. Avenue F  
Arlington, TX 76011

**800-722-6218**

## PHYSICAL & THERMAL PROPERTIES

PROPERTIES	TYPE II	TEST METHOD
Nominal Density (pcf)	1.50	ASTM C303
Thermal Resistance (R-Value)		
(per inch) at @25F	4.76	ASTM C518 or C177
(per inch) at @40F	4.55	
(per inch) at @75F	4.17	
Water Vapor Permeability (perms)	3.5	ASTM E96
Water Absorption (max. % volume)	3.0	ASTM C272
Oxygen Index, Min.	24%	ATM D 2863

## STRENGTH PROPERTIES

PROPERTIES	TYPE II	TEST METHOD
Comprehensive Strength @10% deformation, min. (pcf)	15-21	ASTM D1621
Flexural Strength (min. psi)	35.0	ASTM C203
Dimensional Stability	2.00%	ASTM D2126
Flame Spread	<20	ASTM E84
Smoke Devolped	150-300	ASTM E84

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## Technical Data Sheet

### Basalt Meshes

### Window Sizes 5mm, 10mm, 25mm, 50mm

Window Size	5mm	10mm	25mm	50mm
Total Weight/ Area	220 grams/ sq. meter	110 grams/ sq. meter	350 grams/ sq. meter	370 grams/ sq. meter
	6.5 oz./sq. yard	3.85 oz./sq. yard	10.26 oz./sq. yard	10.85 oz./sq. yard
Weight Resin Coating	20 grams/ sq. meter	10 grams/ sq. meter	36 grams/ sq. meter	38 grams/ sq. meter
	0.7 oz./sq. yard	0.35 oz./sq. yard	1.3 oz./sq. yard	1.35 oz./sq. yard
Thickness	0.6-0.7 mm	0.6-0.7 mm	.08-.09 mm	.08-.09 mm
	0.021-0.025 in.	0.021-0.025 in.	0.032-0.035 in.	0.032-0.035 in.
Maximum Load-Warp	48,000 N/meter	24,000 N/meter	80,780 N/meter	114,000 N/meter
	3,290 lb. force/ foot	1,645 lb. force/ foot	5536 lb. force/ foot	7,813 lb. force/ foot
Maximum Load-Weft	45,000 N/meter	20,000 N/meter	78,900 N/meter	86,000 N/meter
	3084 lb. force/ foot	1370 lb. force/ foot	5407 lb. force/ foot	5,894 lb. force/ foot
Elongation at break-Warp	6.67 %	6.67 %	6.67 %	6.67 %
Elongation at break-Weft	3.53 %	3.53 %	3.53 %	3.53 %
Breaking Elongation- Warp	13.54 mm	13.34 mm	13.34 mm	13.34 mm
	0.53 inch	0.53 inch	0.53 inch	0.53 inch
Breaking Elongation- Weft	7.07 mm	7.07 mm	7.07 mm	7.07 mm
	0.28 inch	0.28 inch	0.28 inch	0.28 inch
Standard Roll Dimensions	1 meter x 50 meters	1 meter x 50 meters	1 meter x 50 meters	1 meter x 50 meters
	3.28 ft. x 164 ft.	3.28 ft. x 164 ft.	3.28 ft. x 164 ft.	3.28 ft. x 164 ft.
Shipping Weight	27 lbs.	17 lbs.	45 lbs.	48 lbs.
Shipping Dimensions	42" x 8" x 8"	42" x 8" x 8"	42" x 12" x 12"	42" x 12" x 12"

Different widths and roll lengths available on special order



# PRODUCT DATA

MasterFormat: 03 35 00

W. R. MEADOWS®

SEALTIGHT®

NO. 366-B

APRIL 2014  
(Supersedes August 2011)

## ARIZONA SEAL

Non-Yellowing, Acrylic Quick Dry Sealing Compound

### DESCRIPTION

ARIZONA SEAL is an acrylic polymer solution that dries to a transparent film, which improves abrasion resistance of the concrete surface. It is specially formulated to enhance the natural beauty of most cementitious materials and will not after-yellow. In addition, ARIZONA SEAL is also formulated to enhance the beauty of natural stone in exposed aggregate surfaces while providing maximum surface protection. When properly applied, ARIZONA SEAL produces a glossy "wet look" finish.

### USES

ARIZONA SEAL can be used on exterior concrete surfaces without discoloring, checking, or peeling. Its long-lasting protective film offers improved resistance to rain, sun, freezing temperatures, oil, grease, de-icing salts, cleaning agents (except for aromatic solvents), caustics, most acids and industrial chemicals, airborne soot, dust, and other pollutants. ARIZONA SEAL is also ideal for freshly finished or existing (old) exposed aggregate surfaces.

### FEATURES/BENEFITS

- Permeable film allows moisture in cured concrete to evaporate.
- Provides shiny, wet look ... enhances the beauty of concrete and exposed aggregate.
- Applies easily to newly placed or existing concrete or exposed aggregate surfaces.
- Dries quickly once applied.
- Seals and dustproofs.
- Improves resistance to staining and wear.
- Accepts acrylic paint overlays.
- Ready to use.

### PACKAGING

1 Gallon Units  
5 Gallon Pails  
55 Gallon Drums

### COVERAGE

300 – 600 ft.<sup>2</sup>/gal., depending on surface finish.

### SHELF LIFE

When stored indoors and in original, unopened containers at temperatures between 40 - 90° F , shelf life is two years from date of manufacture.

### SPECIFICATIONS

- AASHTO M 148, Type 1, Classes A & B
- ASTM C 309, Type 1 Classes A & B
- ASTM C 1315, Type I, Class A

### TECHNICAL DATA

VOC Content: 653 g/L

### APPLICATION

**Surface Preparation ...** Exposed Aggregate: ARIZONA SEAL may be applied over freshly finished exposed aggregate as soon as the surface moisture has disappeared. On existing exposed aggregate, clean the surface thoroughly and rinse well. ARIZONA SEAL may be applied to damp surfaces.

**Existing (Old) Concrete ...** Concrete surfaces must be clean and dry with all stains, oil, grease, dust, dirt, and curing compounds removed prior to application. ULTRITE® DEGREASER from W. R. MEADOWS is recommended for cleaning.

**Mixing ...** For optimum performance, gentle mixing or agitation is recommended. CAUTION: TO AVOID FOAMING, DO NOT MIX EXCESSIVELY.

**Application Method ...** Exposed Aggregate: Apply using a good quality natural bristle brush or a short nap roller. Spread in a thin, even coat, being careful to avoid puddling.

*CONTINUED ON REVERSE SIDE...*

## W. R. MEADOWS, INC.

P.O. Box 338 • HAMPSHIRE, IL 60140-0338  
Phone: 847/214-2100 • Fax: 847/683-4544  
1-800-342-5976  
[www.wrmeadows.com](http://www.wrmeadows.com)

HAMPSHIRE, IL / CARTERSVILLE, GA / YORK, PA  
FORT WORTH, TX / BENICIA, CA / POMONA, CA  
GOODYEAR, AZ / MILTON, ON / ST. ALBERT, AB

**Concrete ...** Use a low pressure, high solids, industrial/commercial-grade sprayer, such as a Chapin 19069, that is suitable for use with high concentrations of solvents such as xylene, acetone, etc. Sprayers should be fitted with solvent-resistant Extreme Viton (encapsulated silicone Viton) **or** EPDM seals, gaskets, o-rings, etc. (Do **NOT** use garden sprayers or foam oil sprayers.) The sprayer must be clean and dry prior to application. It's also important to read and follow all instructions provided by the sprayer manufacturer, **PRIOR** to use. Use a sprayer or short-nap roller to apply a uniform film. Avoid puddling in low areas. If puddles occur, brush or roll them out. A spray tip rated at 0.5 GPM is recommended for best results.

For optimum performance, apply first coat at 600 ft.<sup>2</sup>/gal. After the first coat has thoroughly dried, apply a second coat at 600 ft.<sup>2</sup>/gal. **NOTE:** The second coat should be applied at a right angle.

**Drying Time ...** Drying times may be extended, depending on application rate, temperature, humidity, and project conditions. Protect the freshly coated surface from traffic, dust, condensation, and rain while drying. The surface will be slippery while drying and may become slippery under certain conditions.

**Cleanup ...** Application equipment should be cleaned promptly after use with xylene or toluene.

## **PRECAUTIONS**

**DO NOT DILUTE. FOR EXTERIOR APPLICATION ONLY.** Do not apply ARIZONA SEAL if the temperature of the surface is less than 40° F. Do not apply to painted or frozen surfaces. Apply a test patch in an inconspicuous area before applying to the intended surface.

ARIZONA SEAL should not be applied during high temperature conditions in direct sunlight. These conditions cause rapid evaporation, which does not allow the film to form properly. Under these conditions, the film may peel, bubble, and/or turn white (blush).

ARIZONA SEAL should not be applied to exposed aggregate subject to excessive moisture. Entrapped moisture in a solvent-based sealer may cause the film to peel and/or turn white (blush).

Do not apply ARIZONA SEAL over stained wood joint dividers. This may cause stain to spread while the sealer is wet. Avoid brush or roller contact with wood partitions. The surface may become slippery under certain conditions.

## **LEED INFORMATION**

May help contribute to LEED credits:

- MR Credit 2: Construction Waste Management
- MR Credit 5: Regional Materials

**For most recent data sheet, further LEED information, and MSDS, visit [www.wrmeadows.com](http://www.wrmeadows.com).**



## **LIMITED WARRANTY**

W. R. MEADOWS, INC. warrants at the time and place we make shipment, our material will be of good quality and will conform with our published specifications in force on the date of acceptance of the order. Read complete warranty. Copy furnished upon request.

## **Disclaimer**

The information contained herein is included for illustrative purposes only, and to the best of our knowledge, is accurate and reliable. W. R. MEADOWS, INC. cannot however under any circumstances make any guarantee of results or assume any obligation or liability in connection with the use of this information. As W. R. MEADOWS, INC. has no control over the use to which others may put its product, it is recommended that the products be tested to determine if suitable for specific application and/or our information is valid in a particular circumstance. Responsibility remains with the architect or engineer, contractor and owner for the design, application and proper installation of each product. Specifier and user shall determine the suitability of products for specific application and assume all responsibilities in connection therewith.