

POLARIS

2016 CONCRETE CANOE ENGINEER'S NOTEBOOK



NORTHERN ARIZONA UNIVERSITY

Northern Arizona University–Polaris

TABLE OF CONTENTS

Tab A-Compliance Certificate	A-1
Tab B-Construction Photographs	B-1
Mold Construction.....	B-1
Canoe Construction.....	B-5
Finishing Techniques.....	B-9
Tab C- Hull Thickness/Reinforcement and Percent Open Area Calculations	C-1
Hull Thickness/Reinforcement.....	C-1
Percent Open Area.....	C-3
Tab D- Material Technical Data Sheets	D-1
BASF Master Color.....	D-1
3M Glass Bubbles.....	D-2
Parflex 1120 Series Nylon Tubing (1/8" OD).....	D-3
7x7 Galvanized Steel 1/16" Wire Cables.....	D-4
Lexco Copper Button Stops.....	D-5
EkkoMAXX™.....	D-6
BASF Master Fiber M100.....	D-7
Poraver® Expanded Glass.....	D-8
Nox-crete Pro Release.....	D-9
W.R. Meadows Decra-Seal.....	D-10
SpiderLath.....	D-11
BASF MB-AE™ 90.....	D-12
SIGMA Hydrochloric Acid.....	D-13

Tab B-Construction Photographs

Mold Construction



Figure 1: Cutting Cross-Section with Hot Wire



Figure 2: Cutting Cross-Section with Hot Wire



Figure 3: Gluing Sections Together



Figure 4: Placing Wood in Cross-Section



Figure 5: Placing Joint Compound on Mold



Figure 6: Applying Shrink-wrap to Mold Section



Figure 7: Completed Mold



Figure 8: Applying Form Oil to Mold

Canoe Construction

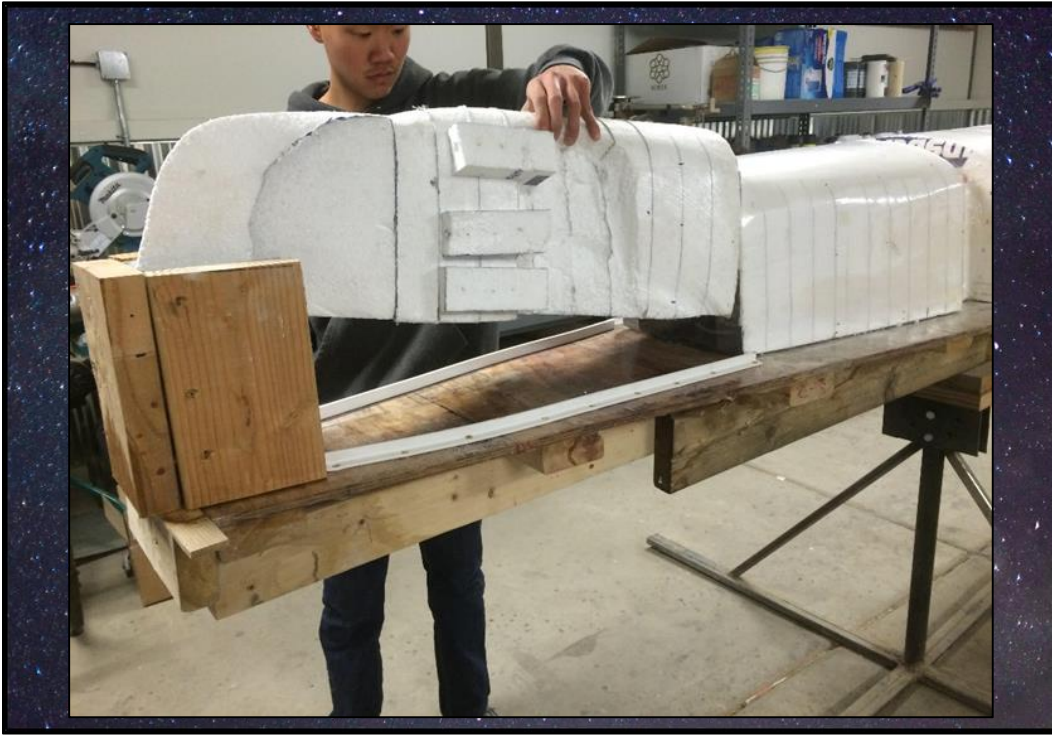


Figure 9: Placing Foam Bulkhead

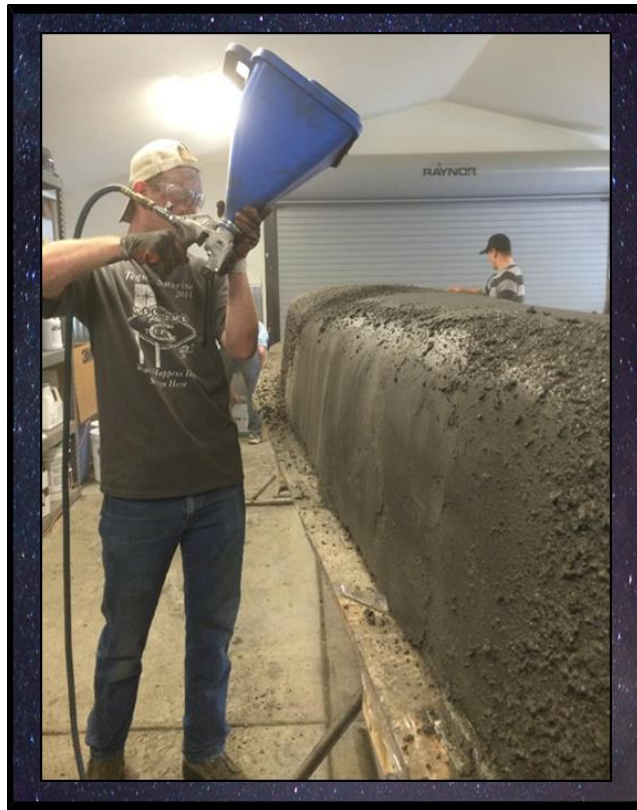


Figure 10: Applying Concrete



Figure 11: Post-Tensioning Placement on Bow Bulkhead

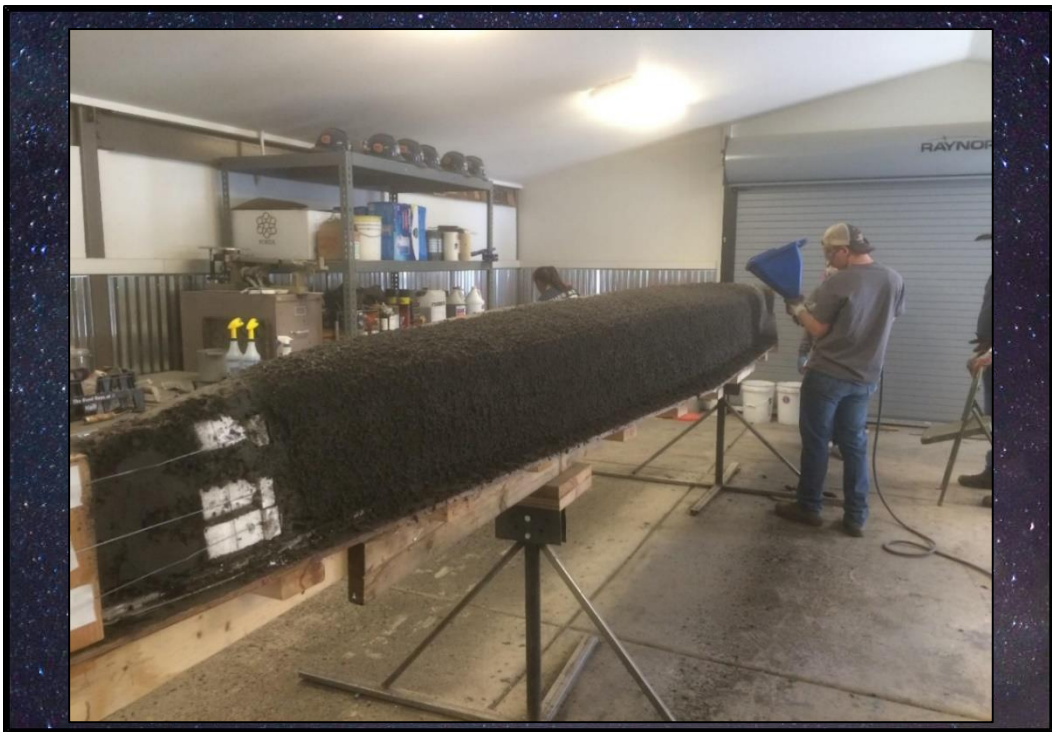


Figure 12: Placing Concrete over Post-Tensioning



Figure 13: Placing Reinforcement on Stern Bulkhead



Figure 14: Placing Reinforcing Mesh over Canoe



Figure 15: Troweling Concrete



Figure 16: Constructing Incubator over Canoe

Finishing Techniques



Figure 17: Placing Concrete in Post-Tensioning Void

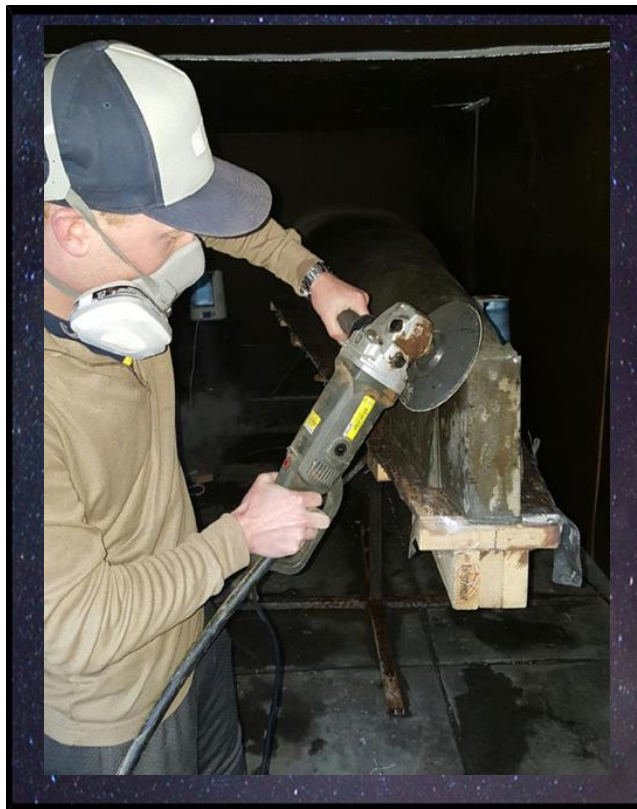


Figure 18: Sanding Bow Bulkhead

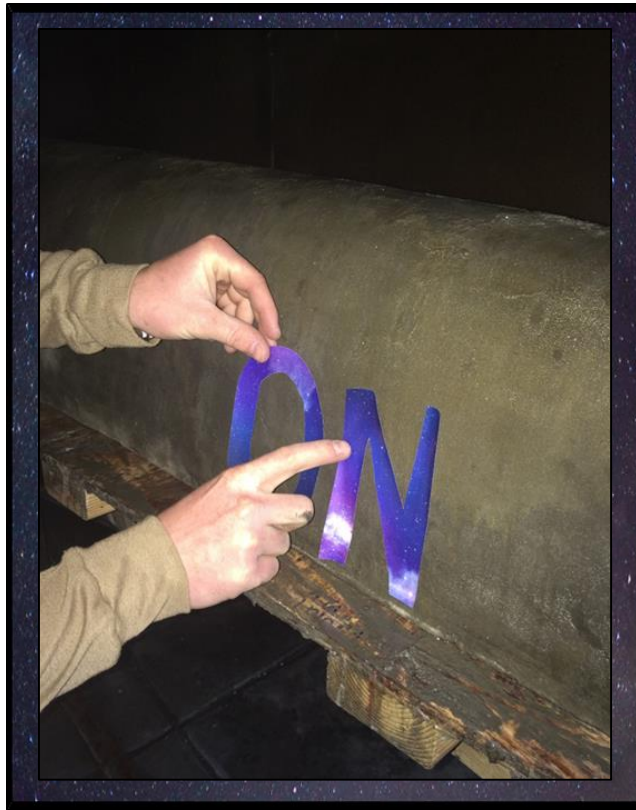


Figure 19: Placing Lettering



Figure 20: Applying Sealer

Tab C– Hull Thickness/Reinforcement and Percent Open Area Calculations

Hull Thickness/Reinforcement

$t_{\text{reinforcement}} = 0.03025\text{in}$ (Determined using glass test per 2016 NCCC Rules and Regulations)

$t_{\text{post tensioning}} = 0.125\text{in}$ (0.0625in wire encased in 0.125in tubing)

Scenario 1: Walls

Hull Thickness: 0.5in

Reinforcement Thickness (1 Layer): $0.03025\text{in} * 1 = 0.03025\text{in}$

Post Tensioning = 0.125in

Reinforcement Percentage = $\frac{0.15525\text{in}}{0.50\text{in}} * 100 = 31.05\% < 50\% \text{ max. OK!}$

Overlap Areas (Includes 4 inch overlap and layer at the top of the walls):

Hull Thickness: 0.5in

Reinforcement Thickness (3 Layers): $0.03025\text{in} * 3 = 0.09075\text{in}$

Post Tensioning = 0.125in

Reinforcement Percentage = $\frac{0.21575\text{in}}{0.50\text{in}} * 100 = 43.15\% < 50\% \text{ max. OK!}$

Scenario 2: Bulkheads

Hull Thickness: 0.5in

Reinforcement Thickness (1 Layer): $0.03025\text{in} * 1 = 0.03025\text{in}$

Post Tensioning = 0.125in

Reinforcement Percentage = $\frac{0.15525\text{in}}{0.50\text{in}} * 100 = 31.05\% < 50\% \text{ max. OK!}$

Scenario 3: Ribs

Hull Thicknes: 0.5in

Rib Thickness: 2.5in

Reinforcement Thickness (2 Layers): $0.03025\text{in} * 2 = 0.0605\text{in}$

Post Tensioning = 0.125in

Reinforcement Percentage = $\frac{0.1855\text{in}}{3.00\text{in}} * 100 = 6.18\% < 50\% \text{ max. OK!}$

Scenario 4: Location of Post Tensioning Anchorage System in Bulkheads

Hull Thickness: 2.10in

Reinforcement Thickness (1 Layer): $0.03025\text{in} * 1 = 0.03025\text{in}$

Bearing Plates = 1in (Includes thickness of post tensioning)

$$\text{Reinforcement Percentage} = \frac{1.03025\text{in}}{2.10\text{in}} * 100 = 49.05\% < 50\% \text{ max. } \mathbf{OK!}$$

Percent Open Area Calculations

$$n_1 = 10$$

$$n_2 = 10$$

$$t_1 = 0.048in$$

$$t_2 = 0.085in$$

$$Aperture\ Dimension = 0.25in$$

$$d_1 = aperture\ dimension + 2\left(\frac{t_1}{2}\right) = 0.25 + 2\left(\frac{0.048}{2}\right) = 0.298in$$

$$d_2 = aperture\ dimension + 2\left(\frac{t_2}{2}\right) = 0.25 + 2\left(\frac{0.085}{2}\right) = 0.335in$$

$$Length_{sample} = n_1 d_1 = [(10) * 0.298] = 2.98in$$

$$Width_{sample} = n_2 d_2 = [(10) * 0.335] = 3.35in$$

$$\sum Area_{open} = n_1 n_2 Area_{open} = 10 \times 10 \times 0.0625 = 6.25in^2$$

$$Area_{total} = Length_{sample} Width_{sample} = 2.98in \times 3.35in = 9.983in^2$$

$$POA = \frac{\sum Area_{open}}{Area_{total}} \times 100\% = \frac{6.25}{9.983} * 100\% = 62.6\% > 40\% \text{ min. } \mathbf{OK!}$$



We create chemistry

3

03 30 00

Cast-in-Place Concrete

03 40 00

Precast Concrete

MasterColor® Liquid-Coloring Admixtures

Formerly RHEOCOLOR L*

Description

MasterColor liquid-coloring admixtures are patented, engineered, high quality coloring dispersions producing enhanced decorative concrete.

MasterColor liquid-coloring admixtures are ready-to-use integral liquids that come in four base colors:

- Black
- Light Red
- Medium Red
- Yellow

The four base colors can be used to make a wide range of colors including but not limited to the colors depicted on the MasterColor Decorative Concrete Color Selector.

Applications

Recommended for use in:

- Integrally colored decorative concrete
- Imprinted concrete
- Ready-mixed concrete
- Manufactured concrete products
- Stone veneer products
- Precast concrete
- Pervious concrete
- Self-consolidating concrete

Features

- Liquid-coloring admixtures formulated for the automated CAM (Coloring Admixture Measuring) System
- Compatible with BASF admixtures used in the production of durable decorative concrete
- Faster dispersion into concrete

Benefits

- Beautiful, long-lasting integrally colored concrete
- Enhanced finishing characteristics
- Color vibrancy
- Excellent color accuracy
- Batch-to-batch color consistency and verifiable color batching results
- Increased productivity and reduced labor
- Clean and simple batching
- Quality custom color services

MasterColor liquid-coloring admixtures meet the colorfastness testing of 500 hours light exposure per ASTM C 979. In addition, MasterColor liquid-coloring admixtures have successfully completed 1500 hours of aggressive Xenon Arc testing per ASTM G 155.

Typical Properties: Density: 14-16 lb/gal (1.68-1.92 kg/L) (@ 72 °F (22 °C))

MASTER®
» BUILDERS
SOLUTIONS

Guidelines for Use

General: Due to the graying effect of most cements, there are some custom colors that can only be produced using very light or white cements. Variations in water content, cement type, color variations in cementitious materials or aggregates, finish texture, timing of operations, curing or forming methods, release agents or surface treatments may produce distinct, though in many cases slight, variations in final color. All standard color matches are completed using a medium shade of portland cement.

Dosage: MasterColor color formulas for standard and other regional colors are programmed into the CAM System upon installation.

MasterColor admixtures are water neutral at loading rates of 5% or less. At loading rates greater than 5%, MasterColor admixtures may provide increased water reduction depending on local concrete materials. Therefore, at loading rates above 5%, laboratory/field evaluations of MasterColor admixtures are recommended to verify desired concrete performance.

Mixing: With the automated CAM System, MasterColor liquid-coloring admixtures are weighed or metered and dispensed prior to or while loading concrete. Product and rinse water are calculated by the CAM System and should be included as total batch water. For best results add coloring admixtures prior to batching concrete. For post addition, mix a minimum of 4-5 minutes at normal mixing speed to assure uniformity.

For best results, truck or mixer should be clean and pre-wet with no standing water. A minimum batch size equal to 1/3 of the mixer capacity should be used as a guideline for efficient mixing. Keeping the addition order, mixing time, materials and water-cementitious materials ratio constant between multiple batches is critical for color consistency.

Concrete Placement and Finishing: Final color and textures should be pre-approved with a cured jobsite mock-up. In accordance with proper construction practices, slabs-on-ground shall be placed over properly compacted and prepared subgrade. Spade formed edges and consolidate and strike off surface as normal. Care should be taken to avoid over-vibration, over-working and over-finishing, or other practices that might cause excessive bleeding or significantly increase the surface mortar content.

Trowelling or broom-finishing decorative concrete should be performed in the same direction to maintain uniform appearance. Do not add additional water to the concrete either by retempering or by adding water to the surface during the finishing process.

Curing: Proper curing of decorative concrete is required to enhance the depth of color, provide a more uniformly colored concrete, and provide surface protection. MasterKure[®] CC 1315 water-based curing and sealing compound from BASF or a similar, compatible curing and sealing compound is recommended.

Note: Until decorative concrete is fully cured, the color may appear darker than expected. Curing with burlap, plastic sheeting, water or other curing compounds may be detrimental to color uniformity and is not recommended. For more information on curing decorative concrete contact your local sales representative.

Maintenance: Regular cleaning of decorative concrete is recommended. In general, resealing may be required periodically as the sealed surface wears. Maintenance applications will be accelerated in areas of heavy use or frequent or aggressive cleaning. Heavily soiled interior areas may be cleaned by wet mopping or scrubbing with a stiff-bristle brush and properly diluted, high-quality commercial detergent. For large areas, automatic scrubbers may be more efficient and cost effective.

Clean-Up: MasterColor liquid-coloring admixtures are water based and can be cleaned with soap and water.

Product Notes

Corrosivity – Non-Chloride, Non-Corrosive: MasterColor liquid-coloring admixtures will neither initiate nor promote corrosion of reinforcing steel embedded in concrete. No calcium chloride or chloride-based ingredients are used in the manufacture of these products. Complete safety information can be found on the MasterColor liquid-coloring admixture Safety Data Sheets.

Compatibility: MasterColor liquid-coloring admixtures are compatible with most admixtures used in the production of quality concrete. Supplementary cementitious materials may affect color and should be checked for potential adjustments. All admixtures should be dispensed into the concrete separately. The use of calcium chloride accelerators are not recommended in decorative concrete. Final color and texture should be verified with a cured jobsite mock-up.

Storage and Handling

Storage Temperature: MasterColor liquid-coloring admixtures should be stored between 40 and 100 °F (4 and 38 °C) with regular mixing or recirculation. To prevent pigment sedimentation, recirculate the material every 90 days or less. Always mix material well prior to use. Automated recirculation is included with the CAM System. If MasterColor liquid-coloring admixtures freeze, contact your local sales representative.

Shelf Life: MasterColor liquid-coloring admixtures have a minimum shelf life of 12 months if properly stored.

Packaging

MasterColor liquid-coloring admixtures are available in 3,350 lb (1,520 kg) net returnable totes.

Related Documents

Safety Data Sheets: [MasterColor liquid-coloring admixture](#)

- Black
- Light Red
- Medium Red
- Yellow

Additional Information

For additional information on [MasterColor liquid-coloring admixtures](#), 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. 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.

* RHEOCOLOR L became [MasterColor](#) under the Master Builders Solutions brand, effective January 1, 2014.

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page 3 of 3

3M™ Glass Bubbles

K Series, S Series and iM Series

Introduction

3M™ Glass Bubbles are engineered hollow glass microspheres that are alternatives to conventional fillers and additives such as silicas, calcium carbonate, talc, clay, etc., for many demanding applications. These low-density particles are used in a wide range of industries to reduce part weight, lower costs and enhance product properties.

The unique spherical shape of 3M glass bubbles offers a number of important benefits, including: higher filler loading, lower viscosity/improved flow and reduced shrinkage and warpage. It also helps the 3M glass bubbles blend readily into compounds and makes them adaptable to a variety of production processes including spraying, casting and molding.

The chemically stable soda-lime-borosilicate glass composition of 3M glass bubbles provides excellent water resistance to create more stable emulsions. They are also non-combustible and non-porous, so they do not absorb resin. And, their low alkalinity gives 3M glass bubbles compatibility with most resins, stable viscosity and long shelf life.

3M Glass Bubbles K Series, S Series and iM Series are especially formulated for a high strength-to-weight ratio. This allows greater survivability under many demanding processing conditions, such as injection molding. They also produce stable voids, which results in low thermal conductivity and a low dielectric constant. 3M glass bubbles are available in a variety of sizes and grades to help you meet your product and processing requirements.

Typical Properties

Not for specification purposes

Isostatic Crush Strength

	Product	Test Pressure (psi)	Target Fractional Survival	Minimum Fractional Survival
K Series	K1	250	90%	80%
	K15	300	90%	80%
	K20	500	90%	80%
	K25	750	90%	80%
	K37	3,000	90%	80%
	K48	6,000	90%	80%
S Series	S15	300	90%	80%
	S22	400	90%	80%
	S32	2,000	90%	80%
	S35	3,000	90%	80%
	S38	4,000	90%	80%
	S38HS	5,500	90%	80%
	S80	10,000	90%	80%
	S80HS	18,000	90%	90%
iM Series	iM16K	16,000	90%	90%
	iM30K	28,000	90%	90%

True Density

	Product	Typical	Minimum	Maximum
K Series	K1	0.125	0.10	0.14
	K15	0.15	0.13	0.17
	K20	0.20	0.18	0.22
	K25	0.25	0.23	0.27
	K37	0.37	0.34	0.40
	K48	0.48	0.43	0.49
S Series	S15	0.15	0.13	0.17
	S22	0.22	0.19	0.25
	S32	0.32	0.29	0.35
	S35	0.35	0.32	0.38
	S38	0.38	0.35	0.41
	S38HS	0.38	0.35	0.41
	S80	0.60	0.57	0.63
	S80HS	0.60	0.57	0.63
iM Series	iM16K	0.48	0.43	0.49
	iM30K	0.60	0.57	0.63

Typical Properties

Chemical Resistance

In general, the chemical properties of 3M™ Glass Bubbles resemble those of a soda-lime-borosilicate glass.

Thermal Conductivity

K Series	K1	0.047
	K15	0.055
	K20	0.070
	K25	0.085
	K37	0.124
	K48	0.153
S Series	S15	0.055
	S22	0.078
	S32	0.108
	S35	0.117
	S38	0.127
	S38HS	0.127
	S60	0.200
	S60HS	0.200
iM Series	iM16K	0.153
	iM30K	0.200

Conductivity increases with temperature and product density. The thermal conductivity of a composite will depend on the matrix material and volume loading of 3M glass bubbles.

Thermal Stability

Appreciable changes in bubble properties may occur above 1112°F (600°C) depending on temperature and duration of exposure.

Flotation

	Product	Floaters (% by bulk volume)	
		Typical	Minimum
K Series	K1	98%	90%
	K15	98%	90%
	K20	98%	90%
	K25	98%	90%
	K37	94%	90%
	K48	92%	90%
S Series	S15	98%	90%
	S22	98%	90%
	S32	94%	90%
	S35	98%	90%
	S38	94%	90%
	S38HS	98%	90%
	S60	92%	90%
	S60HS	92%	90%
iM Series	iM16K	98%	90%
	iM30K	92%	90%

Packing Factor (Ratio of bulk density to true particle density)

Averages about 60%.

Oil Absorption

1.2–0.6 g oil/cc of 3M glass bubbles, per ASTM D281-84.

Volatile Content

Maximum of 0.5 percent by weight.

Alkalinity

Maximum of 0.5 milliequivalents per gram

pH

Because 3M glass bubbles are a dry powder, pH is not defined. The pH effect will be determined by the alkalinity as indicated above. When 3M glass bubbles are mixed with deionized water at 5% volume loading, the resulting pH of the slurry is typically 9.1 to 9.9, as measured by a pH meter.

Dielectric Constant

K Series: 1.2 to 1.7 @ 100 MHz, based on theoretical calculations.

S Series: 1.2 to 2.0 @ 100 MHz, based on theoretical calculations.

iM Series: 1.2 to 1.7 @ 100 MHz, based on theoretical calculations

The dielectric constant of a composite will depend on the matrix material and volume loading of 3M glass bubbles.

Particle Size

Product	Particle Size (microns, by volume) 3M QCM 193.0				
	Distribution			Effective Top Size	
	10th %	50th %	90th %		
K Series	K1	30	65	115	120
	K15	30	60	105	115
	K20	30	60	90	105
	K25	25	55	90	105
	K37	20	45	80	85
	K48	15	40	70	80
S Series	S15	25	55	90	95
	S22	20	35	65	75
	S32	20	40	70	80
	S35	20	40	65	80
	S38	15	40	75	85
	S38HS	19	44	70	85
	S60	15	29	55	65
	S60HS	12	29	48	60
iM Series	iM16K	12	20	30	40
	iM30K	8.8	15.3	23.6	26.7

Particle Size (continued)

Hard Particles (3M QCM 93.4.3)

No hard particles (e.g. glass slag, flow agent, etc.) greater than U.S. number 40 (420 microns) standard sieve will exist.

Oversize Particles (3M QCM 93.4.4)

For *K1*, *K15*, *K20* and *K25* glass bubbles:

Using a 10 gram sample on a U.S. number 80 standard sieve (177 microns), a maximum of five (5) percent by weight glass bubbles will be retained on the sieve.

For *K37* and *K46* glass bubbles:

Using a 10 gram sample on U.S. number 100 standard sieve (149 microns), a maximum of one (1) percent by weight glass bubbles will be retained on the sieve.

For *S15*, *S32*, *S35*, *S38*, *S38HS*, *S60*, *S60HS*, *iM16K* and *iM30K* glass bubbles:

Using a 10 gram sample on a U.S. number 140 standard sieve (105 microns), a maximum of three (3) percent by weight glass bubbles will be retained on the sieve.

For *S22* glass bubbles:

Using a 10 gram sample on a U.S. number 200 standard sieve (74 microns), a maximum of five (5) percent by weight glass bubbles will be retained on the sieve.

Appearance (3M QCM 22.85)

White to the unaided eye.

Flow (3M QCM 22.83)

3M™ Glass Bubbles remain free flowing for at least one year from the date of shipment if stored in the original, unopened container in the minimum storage conditions of an unheated warehouse.

Labeling

3M glass bubbles will be packaged in suitable containers to help prevent damage during normal handling and shipping. Each container will be labeled with:

1. Name of manufacturer
2. Type of 3M glass bubbles
3. Lot number
4. Quantity in pounds

Storage and Handling

To help ensure ease of storage and handling while maintaining free flowing properties, 3M™ Glass Bubbles have been made from a chemically stable glass and are packaged in a heavy-duty polyethylene bag within a cardboard container.

Minimum storage conditions should be unopened cartons in an unheated warehouse.

Under high humidity conditions with an ambient temperature cycling over a wide range, moisture can be drawn into the bag as the temperature drops and the air contracts. The result may be moisture condensation within the bag. Extended exposure to these conditions may result in “caking” of the 3M glass bubbles to various degrees. To minimize the potential for “caking” and prolong the storage life, the following suggestions are made:

1. Carefully re-tie open bags after use.
2. If the polyethylene bag is punctured during shipping or handling, use this bag as soon as possible, patch the hole, or insert the contents into an undamaged bag.
3. During humid summer months, store in the driest, coolest space available.
4. If good storage conditions are unavailable, carry a minimum inventory, and process on a first in/first out basis.

Dusting problems that may occur while handling and processing can be minimized by the following procedures:

1. For eye protection wear chemical safety goggles. For respiratory system protection wear an appropriate NIOSH/MSHA approved respirator. (For additional information about personal protective equipment, refer to Material Safety Data Sheet.)

2. Use appropriate ventilation in the work area.

3. Pneumatic conveyor systems have been used successfully to transport 3M glass bubbles without dusting from shipping containers to batch mixing equipment. Static eliminators should be used to help prevent static charges.

Diaphragm pumps have been used to successfully convey 3M glass bubbles. Vendors should be consulted for [specific recommendations](#).

3M glass bubble breakage may occur if the product is improperly processed. To minimize breakage, avoid high shear processes such as high speed Cowles Dissolvers, point contact shear such as gear pumps or 3-roll mills, and processing pressures above the strength test pressure for each product.

Health and Safety Information

For product Health and Safety Information, refer to product label and [Material Safety Data Sheet \(MSDS\)](#) before using product.

Packaging Information

Small Box (10 Cubic ft.)

A single corrugated box with a plastic liner. All boxes are banded together and to the wooden pallet. 4 boxes per pallet.

Each box inside diameter is 22 in. × 19 in. × 39 in.

Pallet size is 42 in. × 48 in.

Large Box (50 Cubic ft.)*

A single corrugated box with a plastic liner. Top enclosed with interlocking double cover banded. Bottom is normal box closure, entire box banded to wooden pallet.

Each box inside diameter is 48 in. × 42 in. × 44 in. Overall load size is 48³/₄ in. × 42³/₄ in. × 50 in. including pallet.

Pallet size is 42 in. × 48 in.

*860 and 860HB large boxes are 38 cubic ft.

Box Weights

K Series	K1	40 lb.	210 lb.	9,240 lb.
	K15	50 lb.	265 lb.	11,660 lb.
	K20	60 lb.	350 lb.	15,400 lb.
	K25	80 lb.	430 lb.	18,920 lb.
	K37	100 lb.	660 lb.	29,040 lb.
	K46	125 lb.	815 lb.	35,860 lb.
S Series	S15	50 lb.	265 lb.	11,660 lb.
	S22	60 lb.	385 lb.	16,940 lb.
	S32	100 lb.	525 lb.	23,100 lb.
	S35	100 lb.	630 lb.	27,720 lb.
	S38	100 lb.	680 lb.	29,920 lb.
	S38HS	100 lb.	680 lb.	29,920 lb.
	S60	125 lb.	850 lb.	37,400 lb.
	S60HS	125 lb.	850 lb.	37,400 lb.
iM Series	iM16K	99 lb.	800 lb.	—
	iM30K	125 lb.	850 lb.	37,400 lb.

*Box weights may vary due to manufacturing tolerances on each product.

Resources

3M™ Glass Bubbles are supported by global sales, technical and customer service resources, with fully-staffed technical service laboratories in the U.S., Europe, Japan, Latin America and Southeast Asia. Users benefit from 3M's broad technology base and continuing attention to product development, performance, safety and environmental issues.

For additional technical information on 3M glass bubbles in the United States, call 3M Advanced Materials Division, 800-367-8905.

For other 3M global offices, and information on additional 3M products, visit our website at: www.3M.com/engineeredadditives.

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98-0212-3859-1

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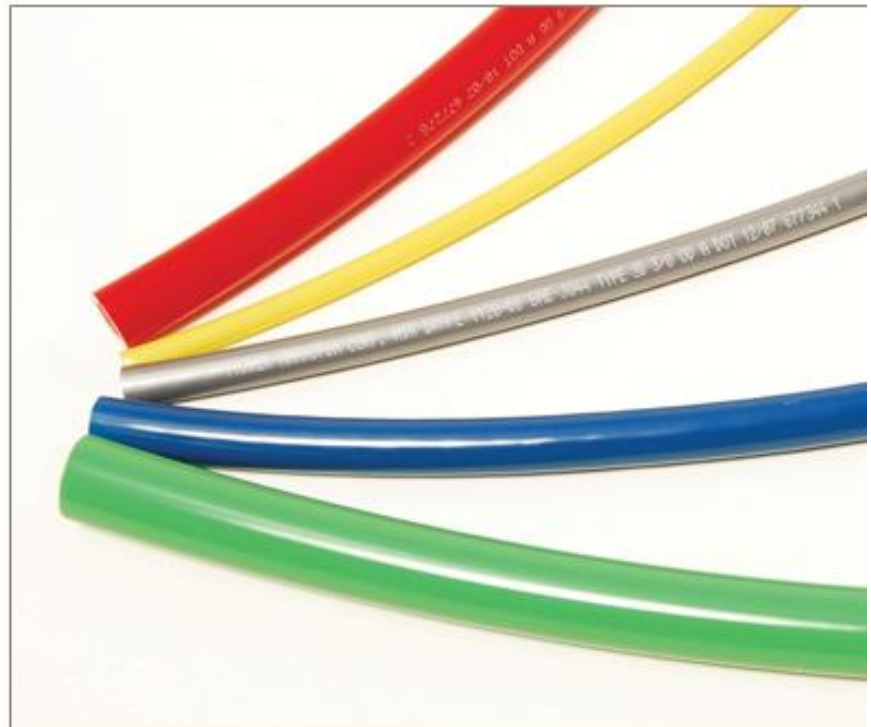
Air Brake Tubing

Nylon Free, Bulk Air Brake Tubing



Parflex 1120 Series Tubing is developed for brake system connections that maintain a basically fixed relationship between couplings during vehicle operation. Tubing is made from virgin nylon and is available in more than ten colors for quick identification of lines.

Parker Air Brake tubing is produced in a Type A (Single-wall extruded Nylon) and a Type B (Nylon core, Fiber reinforcement, Nylon jacket) tubing. Both products meet specifications SAEJ844 and DOT FMVSS 49CFR 571.106. Also, these products are 100% pressure tested and operate up to 200°F (93°C).



Contact Information:

Parker Hannifin Corporation
Parflex Division
1300 North Freedom St.
Ravenna, OH 44266
phone 330 296 2871
fax 330 286 8433
www.parker.com/parflex

Product Features:

- 100% Pressure Tested
- Excellent UV Stability
- Abrasion Resistant
- Kink Resistant
- No plasticizers
- Increased dimensional stability
- Reduced manufacturing and labor costs
- Less downtime due to kinking failures
- Tubing maintains extended dimensional integrity



ENGINEERING YOUR SUCCESS.

1120 Nylon Air Brake Tubing



Features

- 100% Pressure Tested
- Excellent UV Stability
 - Abrasion Resistant
 - Kink Resistant

Certifications

- Meets SAE Specification J644
- Meets DOT FMVSS 49CFR 571.106

Applications



- Air brake lines

Part Number	Tube O.D.		Outside Diameter		Inside Diameter		Nominal Wall Thickness		Burst Pressure at 100°F (32°C)		Minimum Bend Radius		Weight		Standard Reel		Standard Pallet	
	#	inch	inch	mm	inch	mm	inch	mm	psi	bar	inch	mm	lbs./100 ft.	kg./31 mtr.	feet	meter	feet	meter
1120-2A-XXX-1000	1/8	.125	3.2	.079	2.0	.023	0.6	1000	68.0	.370	9.4	.340	.154	1000	305	24,000	7315	
1120-2.5-XXX-1000	5/32	.156	4.0	.092	2.3	.032	0.8	1200	82.7	.500	12.7	.570	.259	1000	305	24,000	7315	
1120-3A-XXX-1000	3/16	.188	4.8	.118	3.0	.035	0.9	1200	82.7	.750	19.1	.770	.349	1000	305	24,000	7315	
1120-4A-XXX-1000	1/4	.250	6.4	.170	4.3	.040	1.0	1200	82.7	1.00	25.4	1.21	.549	1000	305	24,000	7315	
1120-5A-XXX-500	5/16	.313	7.9	.232	5.9	.040	1.0	1000	68.0	1.25	31.8	1.57	.712	500	152	12,000	3658	
1120-6B-XXX-500	3/8	.375	9.5	.251	6.4	.062	1.6	1400	96.5	1.50	38.1	2.70	1.22	500	152	12,000	3658	
1120-8B-XXX-500	1/2	.500	12.7	.378	9.6	.062	1.6	950	65.5	2.00	50.8	3.90	1.77	500	152	6,000	3658	
1120-10B-XXX-250	5/8	.625	15.9	.441	11.2	.092	2.3	800	62.1	2.50	63.5	7.00	3.18	250	76	3,000	914	
1120-12B-XXX-250	3/4	.750	19.1	.568	14.4	.092	2.3	800	55.2	3.00	76.2	8.60	3.90	250	76	3,000	914	

XXX represents color code.

Construction

Material:

Type A – Single-wall extruded Nylon (polyamide)

Type B – Nylon (polyamide) core, fiber reinforcement, Nylon (polyamide) jacket/sheath

Operating Parameters

Temperature Range:

-40°F to +200°F (-40°C to +93°C)

Working Pressure: 150 psi (10.3 bar)

Fittings

Parker Fittings available from:
Fluid System Connectors Division
Otsego, MI
(269) 692-6555
(269) 694-4614 FAX

FSC Product Families:

- NT
- A
- PTC
- FMT

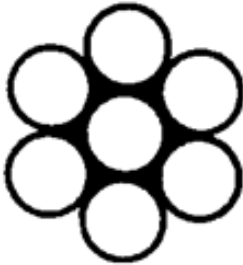
Colors

Color Code		
●	BLK	Black
●	BLU	Blue
●	BRN	Brown
●	GRN	Green
●	ORG	Orange
●	PUR	Purple
●	RED	Red
●	SIL	Silver
●	TAN	Tan
●	YEL	Yellow
○	WHT	White

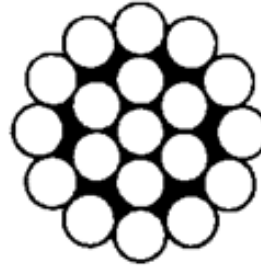
4660-1120

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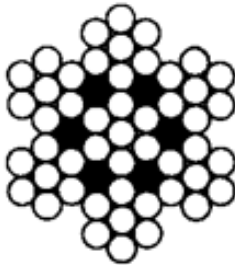
Stainless & Galvanized Steel



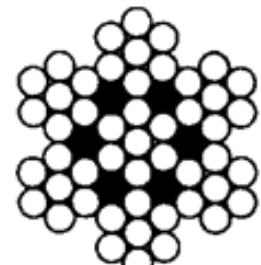
1x7 GALVANIZED CABLE		
Size	Lbs per 1,000 Ft	Tensile
3/32"	14	1,200
1/8"	35	2,100
3/16"	73	3,990
1/4"	121	6,650
5/16"	205	11,200
3/8"	273	15,400
1/2"	517	26,900



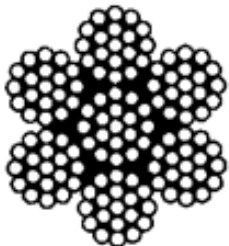
1x19 STAINLESS STEEL STRAND		
TYPE 316		
Size	Lbs per 1,000 Ft	Tensile
1/16"	8.5	--
3/32"	20	--
1/8"	35	1,780
5/32"	55	2,800
3/16"	77	4,000
7/32"	102	5,350
1/4"	135	6,900
5/16"	210	10,600
3/8"	300	14,800



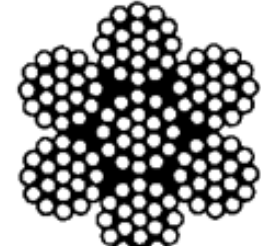
7x7 GALVANIZED CABLE		
Size	Lbs per 1,000 Ft	Tensile
1/16"	7.5	480
5/64"	11.0	650
3/32"	16.0	920
1/8"	28.0	1,700
5/32"	43.0	2,600
3/16"	62.0	3,700
1/4"	106.0	6,100



7x7 STAINLESS STEEL CABLE		
TYPE 304		
Size	Lbs per 1,000 Ft	Tensile
1/16"	7.5	480
3/32"	16.0	920
1/8"	28.0	1,700
3/16"	62.0	3,700
1/4"	110	6,100
5/16"	173	9,000
3/8"	243	12,000



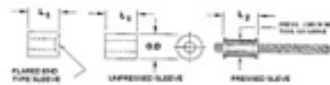
7x19 GALVANIZED CABLE		
Size	Lbs per 1,000 Ft	Tensile
3/32"	17.4	1,000
1/8"	29	2,000
5/32"	45	2,800
3/16"	65	4,200
7/32"	86	5,600
1/4"	110	7,000
5/16"	173	9,800
3/8"	243	14,400



7x19 STAINLESS STEEL CABLE			
TYPE 304 and 316			
Size	Lbs per 1,000 Ft	Tensile	
		304	316
1/16"	7.5	480	360
3/32"	17.4	920	700
1/8"	29	1,760	1,360
5/32"	45	2,400	2,000
3/16"	65	3,700	2,900
7/32"	86	5,000	3,900
1/4"	110	6,400	4,900
5/16"	173	9,000	7,600
3/8"	243	12,000	11,000

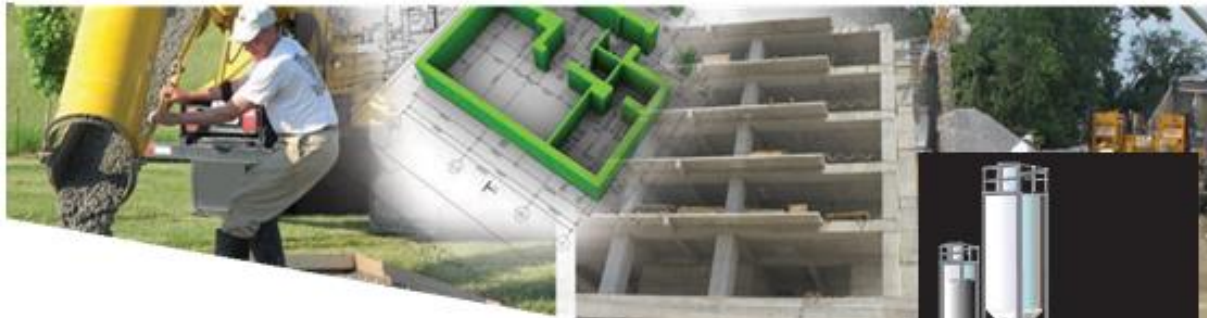
Lexco Cable Mfg.
 7320 West Agatite
 Norridge, IL 60706
 PH 800.626.6556
 PH 773.588.8890
 FX 773.478.4584
 sales@lexcocable.com

Zinc plated Copper Button stops



Results 1 - 12 of 12

Item #	Material / Finish	Cable Size	O.D.	L1	L2	Press. Typ.	Typical Holding Strength (lbs)
132CBSZP	ZP Copper	1/32	7/64	1/4	9/32	N/A	120
364CBSZP	ZP Copper	3/64	11/64	7/32	9/32	.146	240
116CBSZP	ZP Copper	1/16	13/64	7/32	9/32	.182	430
332CBSZP	ZP Copper	3/32	21/64	5/16	3/8	.283	600
18CBSZP	ZP Copper	1/8	21/64	5/16	3/8	.283	900
532CBSZP	ZP Copper	5/32	27/64	5/16	13/32	.345	1200
316CBSZP	ZP Copper	3/16	27/64	5/16	13/32	.345	1600
732CBSZP	ZP Copper	7/32	7/16	5/8	25/32	.345	2500
14CBSZP	ZP Copper	1/4	21/32	11/16	13/16	.583	3500
932CBSZP	ZP Copper	9/32	21/32	11/16	13/16	.583	4000
516CBSZP	ZP Copper	5/16	21/32	11/16	13/16	.583	4000
396CBSZP	ZP Copper	3/8	21/32	11/16	13/16	.583	5000



ekkamaxx™ Bulk Cement System for General Use Structural Concrete

CERATECH's ekkamaxx™ Cement System is comprised of a non-Portland hydraulic cement and proprietary liquid additives. CERATECH's ekkamaxx™ cement can be mixed in all standard industry mixing apparatus including barrel mixers, pan type turbo mixers and continuous mix systems.

Depending upon product and / or project specifications, the ekkamaxx™ Cement System may require standard industry Portland cement concrete admixtures such as AEA's & SRA's. Other admixtures used with Portland cement are no longer needed.

Working times, slump, strength development and finishing times can be easily adjusted by varying CERATECH's liquid additive ratios.

ekkamaxx™ is a hydraulic cement. Concrete produced with ekkamaxx™ meets or exceeds ASTM-C-1157 & 1800 requirements.

Characteristics

CERATECH's green sustainable cement technology creates a *dense interlocking crystalline material structure* that produces a very durable structural concrete.

Applications

ekkamaxx™ is a general use, planet friendly, green sustainable cement solution for a wide variety of concrete construction applications. ekkamaxx™ cement produces a structural concrete suitable for roads and bridges, aviation runways, boat ramps, building foundations, roller compacted concrete, precast concrete products and most any other new construction application.

Typical Concrete Strengths

Data based on a nominal concrete mix design utilizing 750 pounds of cement powder per cubic yard of concrete produced. Concrete performance also dependent upon aggregate types & quality. Results provided by licensed engineering test laboratory and represent typical results from production materials. Actual results may vary from third party testing results; however, CERATECH's materials meet and/or exceed established internal quality control standards, (available upon request). All samples were air cured 4" diameter x 8" cast cylinders.

Concrete Strengths, psi (MPa)	24 hours	7 day	28 day	ASTM Test Method
Compressive	3187 (21.8)	8720 (43.1)	8826 (58.0)	ASTM - C - 39
Flexural	480 (2.8)	881 (4.8)	787 (5.4)	ASTM - C - 78
Splitting Tensile	218 (1.5)	806 (4.2)	888 (4.6)	ASTM - C - 496
Modulus of Elasticity, psi (GPa)	4.1 (28.7)	4.3 (33.2)	6.1 (35.0)	ASTM - C - 469
Coefficient of Thermal Expansion, 1/in/°F	Not Applicable	Not Applicable	4.6	AASHTO - TP-68
Rapid Freeze Thaw Resistance, (Quality Factor - Retained percentage) (cycles) 300 Cycles	100%			ASTM - C - 666A
Scaling Resistance, (psi) (kg/cm ²) 50 Cycles	0			ASTM - C - 672



Properties & Typical Concrete Strengths (continued)

Color: Cement powder is light tan

Specific Gravity: 2.6 - 2.8

Concrete Setting Time (@ 72°F / 22°C) ASTM-C-403

Initial Set: 60 minutes to 4 hours

Final Set: 90 minutes to 6 hours

Note: Set times can be adjusted by varying the dosage rates of CERATECH's liquid additives.

Curing: Follow standard ACI curing practices.

Coating Time: Concrete may be coated with a non-breathable epoxy type material 72- 96 hours from time of placement. Place ceramic tile, wood laminates & vinyl within 7 days & sheeting within 21 days

Availability

The ekkomaxx™ Cement System is available throughout the U.S.

Contact CERATECH Sales for more information 800-581-8397

Powder available in 2000 lb. Super Saks or bulk. Liquid activators available in 275 gallon totes or bulk transport truck.

Storage

Cement powder should be stored in cool dry conditions

Liquid additives should be kept above 50°F / 10°C.

Conditions of Use

- To achieve optimum results from ekkomaxx™ cement in concrete, it is essential that it is correctly specified and used.
- Consult with CERATECH Field Engineering for concrete mix designs, water to cement ratios and appropriateness of ekkomaxx™ cement for your specific project requirements.
- Normal hot & cold weather practices should also be followed.
- ekkomaxx™ cement is produced from natural materials and slight shade variations may occur.
- CERATECH Inc. cannot be held responsible where workmanship has not been carried out in accordance with industry standard practices.

Sustainability & Environmental Impact



OCT 25 2007



One Ton of Cement

One Cubic Yard of Concrete
(Based on 150 lbs of cement)

Materials Usage	One Ton of Cement		One Cubic Yard of Concrete	
	Portland Cement	ekkomaxx	Portland Cement	ekkomaxx
Virgin Resources	3500 lbs.	18 lbs.	887 lbs.	6.3 lbs.
Renewable Resources	0 lbs.	80 lbs.	0 lbs.	28.7 lbs.
Pre-Consumer Waste (Dioxin Ash)	None	1900 lbs.	200 lbs.	892 lbs.
Landfill Relief (Dioxin Ash)	None	1900 lbs.	200 lbs.	892 lbs.
Recycled Fine Aggregate (Pulverized consumer waste/glass)	NA	NA	Cannot Use	60%
Post-Consumer Waste (Crushed glass as an aggregate)	NA	NA	Cannot Use	Yes
Crude Oil	66 gallons	0 gallons	13.3 gallons	0 gallons
Total Energy Req'd.	8 M BTUs	0 BTUs	1.7 M BTUs	0 BTUs
Total CO ₂ Production	2000 lbs.	12 lbs.	887 lbs.	4 lbs.
Water H ₂ O Required	Varies	0 Gals.	**38 Galc.	**18 Galc.

Portland cement producer data from www.usga.gov

Based on a 150 lbs ratio of CEM



Technical Support

Further information and advice on this product and the full range of CERATECH Cement products can be obtained through the contacts listed below. Click on the following link for immediate access to our website. www.ceratechinc.com
 email: fieldengineering@ceratechinc.com

Health & Safety

- See Material Safety Data Sheet (MSDS) www.ceratechinc.com/products/msds
- This document does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.
- Dispose of water and materials in accordance with Federal, State and Local regulations.
- The use of a dust mask, safety goggles and gloves is recommended.

The information in this data sheet is accurate at time of printing, but CERATECH Cements U.S. reserves the right to amend details as part of their product development program.

CERATECH Inc.
 1600 North Beauford St.
 Suite 320
 Alexandria, VA 22311
 Phone: (800) 681-3397 Fax: (703) 894-1088
 Technical Support: (888) 541-2800



4.30.14



We create chemistry

03 30 00	Cast-in-Place Concrete
03 37 13	Shotcrete
03 40 00	Precast Concrete
03 70 00	Mass Concrete

3

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/vd² (0.3 kg/m²) MasterFiber M 100 product outperforms all other plastic shrinkage fiber reinforcements at their typical dosage of 1.0 lb/vd² (0.6 kg/m²).

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
- Watertanks
- 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/yd³ (0.3 kg/m³).

Mixing: Typically no modifications to the mixture proportions are required when the product is used at the engineered dosage of 0.50 lb/yd³ (0.3 kg/m³). 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/yd³ (0.3 kg/m³), MasterFiber M 100 product is capable of reducing plastic shrinkage cracking by approximately 85%. Conventional monofilament polypropylene fibers at 1.0 lb/yd³ (0.6 kg/m³) 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/yd³ (0.3 kg/m³).

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.

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. BASF WILL NOT BE RESPONSIBLE FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL (INCLUDING LOST PROFITS) OR PUNITIVE DAMAGES OF ANY KIND.

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Admixture Systems
www.master-builders-solutions.basf.us

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23700 Chagrin Boulevard
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Tel: 800 628-9990 © Fax: 216 839-8821

Canada
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 337-5362 © Fax: 905 792-0651

page 3 of 3

Technical data sheet

According to ASTM C330, C331, C332

Poraver[®] expanded glass is available in five standard and two special grain sizes. With this wide variety of grain sizes from 0.04 mm to 8 mm, Poraver[®] expanded glass granulate offers a suitable lightweight aggregate solution for every field of application.



Poraver [®] product	standard	Poraver [®] standard grain sizes					Poraver [®] special grain sizes	
		0.1-0.3	0.25-0.5	0.5-1	1-2	2-4	0.04-0.125	4-8
Grain size [mm]		0.1-0.3	0.25-0.5	0.5-1	1-2	2-4	0.04-0.125	4-8
Particle size [mesh #]	0000 C136	140-50	60-35	35-18	18-10	10-5	400-120	5-5/16 ⁴
Fineness modulus		0.66	1.92	2.72	3.81	4.7	an request	5.73
Dry loose bulk density [kg/m ³]	0000 C9/C29H	400	340	270	230	190	530	180
		8.18	8.18	8.18	8.18	8.18	8.18	8.18
Dry loose bulk density [lb/ft ³]		25	21.2	16.9	14.4	11.9	33.1	11.2
		8.18	8.18	8.18	8.18	8.18	8.18	8.18
Apparent density [kg/m ³]	0000 C128	850	680	450	410	350	an request	300
		8.18	8.18	8.18	8.18	8.18	an request	8.18
Apparent density [lb/ft ³]		53.1	42.5	28.1	25.6	21.8	an request	18.7
		8.18	8.18	8.18	8.18	8.18	an request	8.18
Compressive strength [MPa]	00 13055-1	2.8	2.6	2	1.6	1.4	an request	1.2
		406	377	290	232	203	an request	174
Water absorption by mass ¹⁾ [Mass. %]	0000, C128	35	28	20	20	23	an request	20
Water absorption by volume ¹⁾ [vol. %]	0000, C128	22	15	9	7	7	an request	5
Organic impurities	0000, C40	no injurious compounds						
Staining index (index number)	0000, C641	0						
Loss on ignition [%]	0000, C114	≈ 1						
Clay lumps and friable particles [%]	0000, C142			< 2		< 2		
Oversize	00	≤ 10% by mass						
Undersize	13055-1	≤ 15% by mass						
The following data are valid for all grain sizes:								
pH value		9-12					9-12	
Moisture content on delivery		≤ 0.5%					≤ 0.5%	
Softening point		approx. 700°C / 1300°F					approx. 700°C / 1300°F	
Color		creamy white					creamy white	
Thermal conductivity [W/m·K]							0.07 ¹⁾	
							0.486 ¹⁾	

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.

²⁾ Calculated value DB₉ according to approved 2.33.11-134

PRO-RELEASE



Chemically active, multi-purpose, water based concrete form release agent.

Cold Weather Additive: Pro-Release with Winter Guard
Concentrated: Pro-Release Concentrate

HOW IT WORKS

Pro-Release is an economical, water based, general purpose concrete form release agent that combines both chemically active and barrier-type components for improved performance with most concrete mix designs, including mix designs incorporating **pozzolans** such as fly ash or blast furnace slag.

APPLICATIONS

- ◆◆ Use on steel and fib in precast applications, low-cost overlaid import plywood, curb and gutter forms, plastic and plywood faced handset forms.
- ◆◆ Use in commercial and residential concrete forming applications.

ADVANTAGES

- ◆◆ Economical alternative to higher cost specialty type form release agents where cost per gallon considerations **outweigh** performance requirements.
- ◆◆ Chemical and barrier components provide improved release for most concrete mix designs, including mixes **containing pozzolans** such as fly ash or blast furnace slag.
- ◆◆ Dries fast and is not slippery.
- ◆◆ Resists removal by normal rain showers.
- ◆◆ Low odor, nonflammable, water based formulation is safe to use and meets all federal and state VOC requirements.
- ◆◆ Green Engineered™ – better for health and the environment.
- ◆◆ Available with Winter Guard™ additive for cold weather application and storage. With Winter Guard™, Pro-Release can be safely applied at temperatures above 25° F (-4° C) and can be stored at temperatures below 25° F (-4° C) without damaging the emulsion.
- ◆◆ Available as Pro-Release Concentrate which can be easily diluted with water, kerosene or fuel oil and provides **excellent** emulsion stability. When mixed with water, Pro-Release Concentrate components stay mixed longer.
- ◆◆ Variable dilution rate allows user the freedom to maximize Pro-Release Concentrate performance depending on **concrete** mix design, stripping schedule and weather conditions by simply adjusting the dilution mix ratio.
- ◆◆ Pro-Release Concentrate can also be used as a form maintenance coating to soften concrete buildup on forms **by** simply reducing the dilution ratio.
- ◆◆ Pro-Release Concentrate will not freeze unless diluted with water.

▲ PRECAUTIONS ▲

- ◆◆ Water based, chemically active form release agents are not visible on applied surfaces once dry. This is normal **and** does not affect release agent performance. After form stripping, a white, powdery film will be present on form surfaces. This causes no **adverse effects** on the form or the concrete and should not be confused with buildup.
- ◆◆ Not recommended where forms are to be removed in less than 12 hours, unless artificial heat or accelerating **admixtures** are used to hasten development of concrete surface strength.
- ◆◆ Protect Pro-Release from freezing. If allowed to freeze, product packaging may rupture and the emulsion stability **of** this product may be affected, making it difficult to keep product mixed during application. Product which is suspected of freezing should not be used. Pro-Release Concentrate will not freeze unless diluted with water. If diluted with water and allowed to freeze, product may separate, rendering it unsuitable for use. Pro-Release with Winter Guard™ can be successfully applied at temperatures as low as 25° F (-4° C) and can be stored **at** temperatures below 25° F (-4° C) without damaging the emulsion. Product must **be** 25° F (-4° C) or more before use. Do not store at temperatures below -10° F (-23° C).
- ◆◆ **Do** not apply Pro-Release if temperature is at or below 32° F (0° C). Applications of Pro-Release that have dried **are** not affected by freezing temperatures. For application in temperatures as low as 25° F (-4° C), use Pro-Release with Winter Guard™.
- ◆◆ Allow applied product to dry thoroughly before coming into contact with rain or wet concrete. Dry time will vary based **on** ambient temperature and humidity conditions. Reapply product if treated form surface is exposed to rain prior to drying.
- ◆◆ Diluting Pro-Release Concentrate with a petroleum distillate such as kerosene or fuel oil may result in **exceeding** federal or state VOC regulations. Contact **Nox-Crete** for specific information concerning your application.
- ◆◆ **Generally** not recommended for use in architectural concrete forming applications without verifying **performance** and concrete appearance with a field-scale mock-up.

USE INSTRUCTIONS

- ◆◆ Request current product literature, labels and material safety data sheets from manufacturer and read thoroughly **before** product use.

PRO-RELEASE

Form Release Agents



chemical solutions to concrete problems

- ◆◆ Site environmental conditions, concrete mix designs, substrate conditions and construction have a major effect on product selection, application methods, procedures and rates, appearance and performance. Product literature provides general information applicable to some conditions. However, an adequate site test application by the purchaser or installer in advance of field scale use is mandatory (irrespective of any other verbal or written representations) to verify that product and quantities purchased can be satisfactorily applied and will achieve desired appearance and performance under intended use conditions.
- ◆◆ The typical application rate is 600-800 sf/gal (15 - 20 sm/L) depending upon substrate. Conduct a test application to verify the proper application rate for your use.
- ◆◆ Pro-Release Concentrate must be diluted prior to use. Product may be diluted with water, kerosene or fuel oil (see Precautions). Typical dilution rate is one part Pro-Release Concentrate to six parts diluent. For use as a maintenance coating, dilute one part Pro-Release Concentrate to three parts water or other diluent.
- ◆◆ To simplify dilution of Pro-Release Concentrate with water, use Nox-Crete's Mix Station which provides accurate, dependable and economical dilution and mixing performance. Comes equipped with mixing plugs to accommodate varying product temperature conditions - see chart to the right.
- ◆◆ Pro-Release is best applied using a low pressure sprayer. For hand pump spray applications, use Nox-Crete's Perfect Form And Concrete Sprayer or the more economical Ideal Form And Concrete Sprayer. Obtain best results by applying a uniform application of Pro-Release immediately following form stripping. Allow coated form surfaces to dry prior to placing concrete.
- ◆◆ Avoid over application and remove excess material, runs and puddles with rags.
- ◆◆ Prevent material overspray from contacting reinforcing steel and/or tensioning cables.
- ◆◆ Application equipment and overspray can be cleaned with detergent and water.

TECHNICAL DATA

Physical Properties	Pro-Release	Pro-Release Winter Guard	Pro-Release Concentrate
Bulk Density	8.2 lbs./gal. (0.98 kg/L)	8.2 lbs./gal. (0.98 kg/L)	7.7 lbs./gal. (0.92 kg/L)
Flash Point	>200°F (>93° C)	>200°F (>93° C)	>200°F (>93° C)
Odor	Pleasant	Pleasant	Pleasant
VOC	<20 g/L	<120 g/L	<100 g/L
VP	<17 mmHg	<17 mmHg	<1.0 mmHg

Updated 05/19/14. This version supersedes all previous versions.

PACKAGING

Pro-Release is packaged in 5 gal (19 L) pails and 55 gal (208 L) drums. Pro-Release Concentrate is packaged in 1 gal. (3.8 L), 5 gal (19 L) and 55 gal (208 L) containers and 275 gal (1,041 L) bulk totes.

SHELF LIFE

Shelf life is one year. Use before the "USE BY" date stated on product packaging.

HANDLING/STORAGE

Pro-Release (without Winter Guard™) should be stored in a dry location within a temperature range of 40° F (4° C) and 100° F (38° C). Pro-Release with Winter Guard™ can withstand storage under freezing conditions. Store Pro-Release Concentrate in a dry area away from heat, sparks and open flame. If diluted with water, protect from freezing.

AVAILABILITY & TECHNICAL SERVICES

In addition to corporate offices in Omaha, Nebraska, Nox-Crete Products Group maintains regional offices and distribution centers in principal markets throughout the world. For source or technical information, call 800-669-2738 or 402-341-2080.

LIMITED WARRANTY

NOTICE-READ CAREFULLY

CONDITIONS OF SALE

Nox-Crete offers this product for sale subject to, and Buyer and all users are deemed to have accepted, the following conditions of sale and limited warranty which may only be varied by written agreement of a duly authorized corporate officer of Nox-Crete. No other representative of or for Nox-Crete is authorized to grant any warranty or to waive limitation of liability set forth below.

WARRANTY LIMITATION

Nox-Crete warrants this product to be free of manufacturing defects, if the product when purchased was defective and was within use period indicated on container or carton, when used, Nox-Crete will replace the defective product with new product without charge to the purchaser.

Nox-Crete makes NO OTHER WARRANTY, either express or implied, concerning this product. There is NO WARRANTY OF MERCHANTABILITY. In no case shall Nox-Crete be liable for special, indirect or consequential damages resulting from the use or handling of the product and no claim of any kind shall be greater in amount than the purchase price of the product in respect of which damages are claimed.

INHERENT RISKS

Nox-Crete MAKES NO WARRANTY WITH RESPECT TO THE PERFORMANCE OF THE PRODUCT AFTER IT IS APPLIED BY THE PURCHASER, AND PURCHASER ASSUMES ALL RISKS ASSOCIATED WITH THE USE OR APPLICATION OF THE PRODUCT.

MIX STATION PLUG CHART FOR PRO-RELEASE CONCENTRATE

To ensure proper dilution ratio, select the proper mixing plug based on the actual product temperature. Product temperature

Plug #	Product Temperature
6	Release Agent Use 45° F (7.2° C)
5	3:1 Recommended Dilution Ratio 45° F (7.2° C) - 52° F (11° C)
4	52° F (11° C) - 59° F (15° C)
3	59° F (15° C) - 85° F (29.4° C)

Maintenance Coat Use 3:1 Recommended Dilution Ratio

Plug #	Product Temperature
Remove Plug	50° F (10° C) - 65° F (18.3° C)
6	65° F (18.3° C) - 85° F (29.4° C)

PRO-RELEASE p. 2

Nox-Crete PRODUCTS GROUP • 1444 S. 20th St. • P.O. Box 8102 • Omaha, Nebraska 68108 USA
PHONE: (800) Nox-Crete (669-2738) or (402) 341-2080 • FAX: (800) FAX-ORDER (329-6733) www.Nox-Crete.com



DATA SHEET NO. 3568-000

DECRA-SEAL™
Non-Yellowing Acrylic Curing & Sealing Compound for Decorative Concrete (VOC-Compliant)

DESCRIPTION

DECRA-SEAL is a non-yellowing, acrylic-based, high solids, liquid curing and sealing compound for decorative concrete. The product is clear, transparent and easy to apply. DECRA-SEAL also offers improved resistance to water, alkalis, mild acids, and petroleum spirits. The product has been formulated to seal and protect decorative coloured concrete by producing a hard, clear film. This product is specifically formulated for the residential decorative concrete market. DECRA-SEAL meets the 350 g/L VOC limit for concrete curing compounds.

USES

DECRA-SEAL is designed for various applications, including exterior concrete surfaces, driveways, patios, swimming pool areas, and exposed aggregate, as well as any exterior surface where protection and sealing of concrete is desired. The use of DECRA-SEAL on any exterior concrete surface provides a durable, long-lasting finish that has improved resistance to chemicals, oil, grease, de-icing salts and abrasions.

FEATURES/BENEFITS

- Provides a totally clear membrane that will not yellow, for new or existing concrete.
- Seals all concrete surfaces providing a glossy appearance and easier cleanup.
- Dustproofs concrete with a tough, durable film.
- Helps minimize spalling of exterior concrete.
- Provides good blush resistance in damp areas.
- Applies easily ... dries to the touch in 30 – 60 minutes.
- Provides a clear, tough film which improves abrasion and stain resistance.
- Offers improved resistance to rain, sun, freezing temperatures, most acids and industrial chemicals, oil, grease, de-icing salts, cleaning agents (except aromatic solvents), caustics, airborne soot, dust, and other pollutants.
- Seals and enhances the beauty of many concrete surfaces for years.
- Can be recoated after thorough cleaning to restore original beauty.

- VOC-compliant.

PACKAGING

3.8 Litre (1 U.S. Gal.) Cans
 18.9 Litre (5 U.S. Gal.) Pails

COVERAGE

7.37 – 14.73 m² per litre (300 – 600 ft.²/U.S. gallon).
 Coverage may vary due to porosity and condition of the concrete.

SHELF LIFE

When stored indoors and in original, unopened containers at temperatures between 4° - 32° C, shelf life is two years from date of manufacture.

SPECIFICATIONS

- ASTM C 309, Type 1, Class A & B
- ASTM C 1315, Type 1, Class A
- Complies with Volatile Organic Compound (VOC) Concentration Limits for Architectural Coatings Regulations in Canada.

TECHNICAL DATA

The following results were obtained under laboratory conditions:

Drying Time @ 22.7° C, 50% RH	1 – 2 hours**
Re-coat	2 – 24 hours
Foot Traffic	4 – 6 hours
Wheel Traffic	6 – 12 hours
VOC Content	344 g/L
Solids Content	25%
Adhesion to Concrete	Excellent
Ultraviolet light (UV) degradation ASTM C 1315, 8.86	Non-yellowing
Ultraviolet Resistance	No chalking
Chalk Resistance	No deterioration
Check/Peel Resistance	Excellent
Oil Resistance	Excellent

**All concrete or air temperatures and high relative humidity will extend drying times

Continued over

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 Montreal Sales: (877) 405-5186

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www.wrmeadows.com W. R. MEADOWS OF

APPLICATION

SURFACE PREPARATION

Fresh (New) Concrete ... Apply as soon as all surface water has disappeared and the concrete surface will not be marred by walking workers.

Existing (Old) Concrete ... Concrete surface must be clean and dry with all stains, oil, grease, dust, dirt, and curing compounds removed prior to application. ULTRITE₂ DEGREASER from W. R. MEADOWS is recommended for cleaning.

Application Method ... 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 standard industrial-grade sprayer, such as a Chapin 19069, equipped with Viton fittings, a 3.79 LPM nozzle, and fan spray pattern, is recommended. Apply over the entire surface; avoid puddling in low areas.

For full application guidelines, please visit <http://www.wrmeadows.com/vocapp/>.

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

Drying Time ... Product dries quickly. Drying times will vary depending on application rate, temperature, humidity, and project conditions. Restrict foot traffic for at least four hours. Twelve hours is preferable.

Cleanup ... Clean tools after use with a solvent such as xylene, toluene, or SEALTIGHT SOLENT from W. R. MEADOWS.

PRECAUTIONS

Coating is to be applied without dilution or thinning. For exterior application only. Surfaces treated with DECRA-SEAL (VOC) may become slippery under certain conditions.

Product 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). Surface temperature of the concrete must be between 4° – 32° C.

Product should not be applied to concrete exposed to excessive moisture. Entrapped moisture in a solvent-based sealer may cause the film to peel and/or turn white (blush). Over application may result in the finished film appearing hazy or white.

Product may be used on colored concrete, but mottling may occur. Do not use on dense or non-porous surfaces, i.e. brick, stone, etc. Concrete containing calcium chloride will remain dark longer when treated with this product. Concrete floors properly cured with this product meet section 8.9 "Adhesion of Tile Cements" of ASTM C 1315. For other specifications, secure the approval of the paint or resilient flooring manufacturer before applying this product.

MASTERFORMAT NUMBER AND TITLE

03 39 23 – Membrane Concrete Curing

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

2014-04-21

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WARRANTY: W. R. Meadows of Canada warrants that, at the time and place we make shipment, our materials will be of good quality and will conform with our published specifications in force on the date of acceptance of the order. THE FOREGOING WARRANTY SHALL BE EXCLUSIVE AND IN LIEU OF ANY OTHER WARRANTY, EXPRESS OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE AND ALL OTHER WARRANTIES OTHERWISE ARISING BY OPERATION OF LAW, COURSE OF DEALING, CUSTOM OF TRADE OR OTHERWISE. As the exclusive remedy for breach of this Warranty, we will replace defective materials, provided, however, that the buyer examines the materials when received and promptly notify us in writing of any defect before the materials are used or incorporated into a structure. Three (3) months after W. R. Meadows of Canada has shipped the materials, all our Warranty and other duties with respect to the quality of the materials delivered shall conclusively be presumed to have been satisfied, all liability therefore terminates and no action for breach of any such duties may thereafter be commenced. W. R. Meadows of Canada shall in no event be liable for consequential damages. Unless otherwise agreed to in writing, no warranty is made with respect to materials not manufactured by W. R. Meadows of Canada. We cannot warrant or in any way guarantee any particular method of use or application or the performance of materials under any particular condition. Neither this Warranty nor our liability may be extended or amended by our salesmen, distributors or representatives, or by our distributor's representatives, or by any sales information or drawings.

SPIDERLATH Innovation

Spiderlath is the only complete lathing system that solves all the problems created by other lath systems. Billions of dollars are spent each year in lawsuits and construction costs because of DRY ROT and MOLD. One of the most critical components in the design of your building project is the prevention of dry rot and mold. Building wraps/water barriers are designed to prevent these occurrences when installed properly. All holes and voids must be sealed to prevent moisture from penetration to the substrate. If the wrap is compromised it no longer provides the protection to the wood product behind it.

SpiderLath		Metal Lath		
Square Feet	Rolls	Weight	Sheets	Weight
300 sf	1	20 lbs	18	90 lbs
600 sf	2	40 lbs	36	180 lbs
1,200 sf	4	80 lbs	72	360 lbs
1,400 sf	8	160 lbs	144	720 lbs

Spiderlath lath system offers the best protection to the water barrier/building wrap. The patent pending strip design will stop water from penetrating due to its gasket/sealing properties. When a fastener is applied through the strip, the strip compresses around the fastener thereby sealing the fastener hole.

Because of this non compatibility, the cementitious material may crack and fail. Spiderlath is made of a fiberglass material, is compatible, and does adhere to the cementitious material. By adhering to the material it can transfer its tensile strength thereby eliminating most cracking failures.

SPIDERLATH, Inc.

130 Welsco Rd.
Smackover, AR 71762



Telephone: 870.725.3902
E-mail: info@spiderlath.com
www.SpiderLath.com Spi

The Future of Lath

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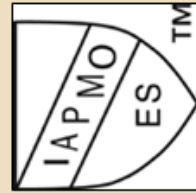
SPIDERLATH Technical Data

- Roll size: 4 ft. x 75 ft.
- Rolled up dimensions: 21 in. x 48 in.
- Roll weight: 20 lbs.
- Alkali Resistant (AR) fiberglass containing Zirconium Dioxide (ZrO2).
- Three dimensional Leno Weave.
- Mesh weight: 8.82 oz. per sq. yd. (300 gsm).
- Mesh opening size: 0.25 in. (6.35 mm).
- Semi rigid coating.
- Stripping on back is semi rigid.
- Stripping is fl foam.
- Stripping measurements: 9 equally spaced strips (6 in.) 0.375 in. x 0.5 in. x 75 ft.
- Each roll is wrapped in stretch wrap and contains installation instructions.

SPIDERLATH Testing

The ICC-ES AC275 is the benchmark "Acceptance Criteria for Glass Fiber Lath Used in Cementitious Exterior Wall Coatings or Exterior Cement Plaster". SpiderLath has equalled or exceeded each of the tests required in the ICC-ES AC275 and has received the appropriate Evaluation Report from IAPMO, accredited by the American National Standards Institute (ANSI).

For complete testing results and technical information, please visit our website at www.spiderlath.com/test.



IAPMO Evaluation #0141

SPIDERLATH Mesh Features

- SpiderLath is designed to be a replacement alternative for metallath. Listed below are some of the applications used with SpiderLath: manufactured stone veneer, one and three coat stucco, natural stone thin veneer, concrete counter tops, plaster, tile, and water drainage systems.
- SpiderLath offers corrosion free material designed to last the life of the material being applied to it. SpiderLath is made from molten extruded Alkali Resistant fiberglass using Zirconium Dioxide.
- Cutting SpiderLath will not damage the alkaline resistant properties.
- SpiderLath uses a twisted weave to aid in keying the mortar.
- Easy to use, cuts with scissors or knife. Lath scratches and cuts are eliminated.
- SpiderLath adds tensile and flexural strength to the cementitious material providing a stronger bond.
- A thin coat of stiffening material is added to the fiberglass mesh to make the product easier to handle and faster to install.
- Very versatile, allowing it to be installed horizontally, vertically or diagonally.
- Easy to transport. Weighing only 20 lbs. per roll (300 sq. ft.) This is equivalent to 18 sheets of 2.5 metal lath which would weigh about 90 lbs.
- Versatile and strong enough to use with heavy weight products such as three coat stucco and natural stone veneer.
- Installation time (labor costs) is reduced significantly because of the size and the ease at which the installer can unroll, stretch, and fasten.

Please visit the [SpiderLath web site \(www.spiderlath.com\)](http://www.spiderlath.com) for information, installation instructions, test results, and more.

SPIDERLATH Strip System

SpiderLath strip system offers these advantages:

- **Nailing guide.** Less waste of fasteners.
- **Mesh impact system.** Reduces the blow of the fastener, eliminating damage to the glass fibers.
- **Gasket sealer.** Seals around fastener holes, preventing penetration of water to the substrate, thus eliminating dry rot and mold.
- **Stand-off.** Allows mortar material to fill in behind the mesh and hold it on top of the mesh, forming a solid sheet of cementitious material. This allows the fiberglass mesh to be placed in the center of the cementitious material where it provides the optimal strength to assure less cracking and failures.

SPIDERLATH Installation

1. Place SpiderLath with the strip system facing the substrate/water barrier.
2. Stretch lath tight.
3. Fasten SpiderLath using large head nails, washer head screws or wide crown staples or any fastener approved by the local building code.
4. Overlap all edges 2 inches. Apply coat of mortar behind lath to fill in entire inside and coat outside of lath 0.5 inch.



INSTALLATION LABOR COSTS ARE REDUCED SIGNIFICANTLY

Description

MB-AE 90 air-entraining admixture is for use in concrete mixtures. It meets the requirements of ASTM C 260, AASHTO M 154 and CRD-C 13.

Applications

Recommended for use in:

- Concrete exposed to cyclic freezing and thawing
- Production of high-quality normal or lightweight concrete (heavyweight concrete normally does not contain entrained air)

MB-AE™ 90

Air-Entraining Admixture

Features

- Ready-to-use in the proper concentration for rapid, accurate dispensing

Benefits

- Improved resistance to damage from cyclic freezing and thawing
- Improved resistance to scaling from deicing salts
- Improved plasticity and workability
- Reduced permeability – increased watertightness
- Reduced segregation and bleeding

Performance Characteristics

Concrete durability research has established that the best protection for concrete from the adverse effects of freezing and thawing cycles and deicing salts results from: proper air content in the hardened concrete, a suitable air-void system in terms of bubble size and spacing, and adequate concrete strength, assuming the use of sound aggregates and proper mixing, transporting, placing, consolidation, finishing and curing techniques. MB-AE 90 admixture can be used to obtain adequate freeze-thaw durability in a properly proportioned concrete mixture, if standard industry practices are followed.

Air Content Determination: The total air content of normal weight concrete should be measured in strict accordance with ASTM C 231, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method" or ASTM C 173/C 173M, "Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method." The air content of lightweight concrete should only be determined using the Volumetric Method. The air content should be verified by calculating the gravimetric air content in accordance with ASTM C 138/C 138M, "Standard Test Method for Density (Unit Weight), Yield, and Air Content (Gravimetric) of Concrete." If the total air content, as measured by the Pressure Method or Volumetric Method and as verified by the Gravimetric Method, deviates by more than 1-1/2%, the cause should be determined and corrected through equipment calibration or by whatever process is deemed necessary.

Guidelines for Use

Dosage: There is no standard dosage for MB-AE 90 admixture. The exact quantity of air-entraining admixture needed for a given air content of concrete varies because of differences in concrete-making materials and ambient conditions. Typical factors that might influence the amount of air entrained include: temperature, cementitious materials, sand gradation, sand-aggregate ratio, mixture proportions, slump, means of conveying and placement, consolidation and finishing technique.

Product Data: MB-AE™ 90

The amount of MB-AE 90 admixture used will depend upon the amount of entrained air required under actual job conditions. In a trial mixture, use 1/4 to 4 fl oz/cwt (16-260 mL/100 kg) of cementitious material. Measure the air content of the trial mixture, and, if needed, either increase or decrease the quantity of MB-AE 90 admixture to obtain the desired air content.

In mixtures containing water-reducing or set-control admixtures, the amount of MB-AE 90 admixture needed may be somewhat less than the amount required in plain concrete.

Due to possible changes in the factors that can affect the dosage of MB-AE 90 admixture, frequent air content checks should be made during the course of the work. Adjustments to the dosage should be based on the amount of entrained air required in the mixture at the point of placement.

If an unusually high or low dosage of MB-AE 90 admixture is required to obtain the desired air content, consult your BASF Construction Chemicals representative. In such cases, it may be necessary to determine that, in addition to a proper air content in the fresh concrete, a suitable air-void system is achieved in the hardened concrete.

Dispensing and Mixing: Add MB-AE 90 admixture to the concrete mixture using a dispenser designed for air-entraining admixtures, or add manually using a suitable measuring device that ensures accuracy within plus or minus 3% of the required amount.

For optimum, consistent performance, the air-entraining admixture should be dispensed on damp, fine aggregate. If the concrete mixture contains fine lightweight aggregate, field evaluations should be conducted to determine the best method to dispense the air-entraining admixture.

Precaution

In a 2005 publication from the Portland Cement Association (PCA R&D Serial No. 2789), it was reported that problematic air-void clustering that can potentially lead to above normal decreases in strength was found to coincide with late additions of water to air-entrained concretes. Late additions of water include the conventional practice of holding back water during batching for addition at the jobsite. Therefore, caution should be exercised with delayed additions of water to air-entrained concrete. Furthermore, an air content check should be performed after any post-batching addition to an air-entrained concrete mixture.

Product Notes

Corrosivity– Non-Chloride, Non-Corrosive: MB-AE 90 admixture will neither initiate nor promote corrosion of reinforcing and prestressing steel embedded in concrete, or of galvanized floor and roof systems. No calcium chloride or other chloride-based ingredients are used in the manufacture of this admixture.

Compatibility: MB-AE 90 admixture may be used in combination with any BASF Construction Chemicals admixture, unless stated otherwise on the data sheet for the other product. When used in conjunction with other admixtures, each admixture must be dispensed separately into the concrete mixture.

Storage and Handling

Storage Temperature: MB-AE 90 admixture should be stored and dispensed at 31 °F (-0.5 °C) or higher. Although freezing does not harm this product, precautions should be taken to protect it from freezing. If MB-AE 90 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: MB-AE 90 admixture has a minimum shelf life of 18 months. Depending on storage conditions, the shelf life may be greater than stated. Please contact your BASF Construction Chemicals representative regarding suitability for use and dosage recommendations if the shelf life of MB-AE 90 admixture has been exceeded.

Safety: Chemical goggles and gloves are recommended when transferring or handling this material.

Packaging

MB-AE 90 admixture is supplied in 55 gal (208 L) drums, 275 gal (1040 L) totes and by bulk delivery.

Related Documents

Material Safety Data Sheets: MB-AE 90 admixture.

Additional Information

For additional information on MB-AE 90 admixture, or its use in developing a concrete mixture with special performance characteristics, contact your BASF Construction Chemicals representative.

The Admixture Systems business of BASF Construction Chemicals is a leading provider of innovative additives for specialty concrete used in the ready mix, precast, manufactured concrete products, underground construction and paving markets throughout the NAFTA region. The Company's respected Master Builders brand products are used to improve the placing, pumping, finishing, appearance and performance characteristics of concrete.

BASF Construction Chemicals, LLC
Admixture Systems

www.masterbuilders.com

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Product Information

Hydrochloric acid

Product Number **H 1758**
Store at Room Temperature

Product Description

Molecular Formula: HCl
Molecular Weight: 36.46
CAS Number: 7647-01-0
Synonym: muriatic acid¹

Based on an approximate density of 1.2 g/ml and a percentage range of 36.5 - 38.0%, concentrated HCl is in the range 11.6-12.0 M (or N, for this monoprotic acid).

This product is designated as Molecular Biology grade and is suitable for molecular biology applications.

This product is a clear colorless liquid which is a solution of hydrogen chloride gas dissolved in water.

Hydrochloric acid is a strong inorganic acid that is utilized widely in research and in large scale applications. Its large scale applications include the refinement of ore for the production of tin and tantalum, the cleaning of metal products, and the hydrolysis of starch and proteins in the manufacture of food products.¹ HCl is also frequently used in chemical synthesis, as in the preparation of polyhydroxylated amino acid derivatives, 3,4-disubstituted piperidines, norcarbovir analogs, and (α -hydroxyalkyl)phosphorus amphiphiles.^{2,3,4,5}

HCl is used to hydrolyze samples for chromatographic analysis, such as in matairesinol in flax seed, glycopeptides, κ -carrageenan derived oligosaccharides, and syn- and anti-1,3-diols.^{6,7,8,9} Several reports have described protein analysis for amino acid composition using HCl for peptide and protein hydrolysis.^{10,11,12,13}

Precautions and Disclaimer

For Laboratory Use Only. Not for drug, household or other uses.

Preparation Instructions

This is an aqueous solution that can be diluted to any concentration in water, but since the dilution is exothermic, this product should be added carefully to the water.

Storage/Stability

The product is stable at room temperature if kept sealed and away from bases and metals. Solubility of HCl gas decreases somewhat with increased temperature. The solution may develop a yellowish color with time due to traces of iron, chlorine, or organic matter.

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