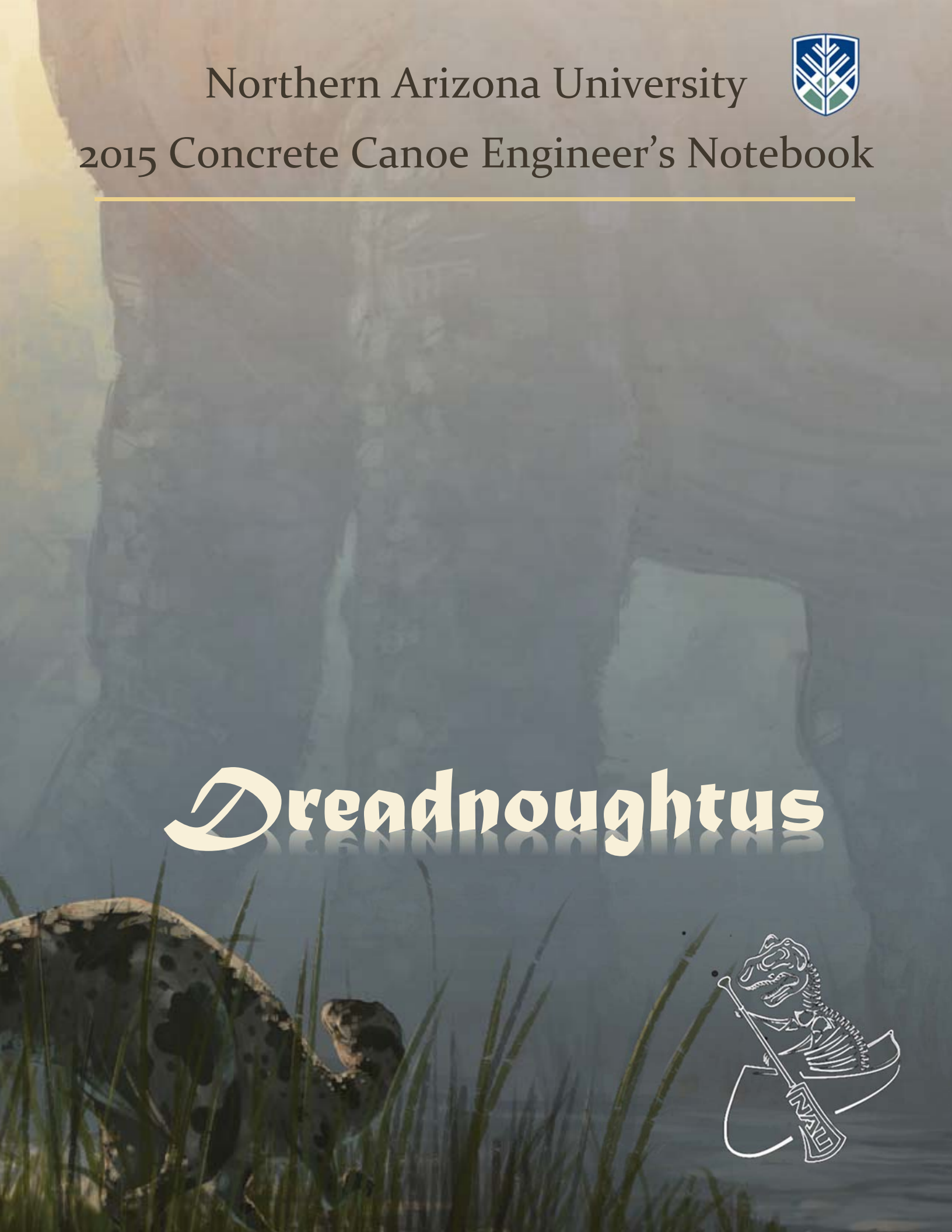
Northern Arizona University

2015 Concrete Canoe Engineer's Notebook



Northern Arizona University-Dreadnoughtus

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Tab A – Compliance Certificate

Northern Arizona University— Dreadnoughtus

I, Jeremy DeGeyter, 2015 Concrete Canoe Captain, certify the following statements:

- The construction and finishing process of the canoe has been performed in complete compliance with the rules and regulations of the National Competition.
- The registered participants at the Conference/National Competition are qualified student members and National Student Members of ASCE, and meet the eligibility requirements as specified in the rules and regulations of the National Competition.
- The canoe has been completely built within the current academic year of the competition.
- The team acknowledges that all material safety data sheets (MSDS) have been read by the project management team.
- The team acknowledges receipt of the *Request for Information* (RFI) *Summary.*

Registered Participants:

Name	ASCE National Member ID	Name	ASCE National Member ID
Ramon Aguilar	9851382	**Chelsie Kekaula**	10155517
Cynthia Alvarez	9797669	**Emily Melkesian**	9851597
Jeremy DeGeyter	9135577	**Matt Snyder**	10112834
Jacob Hood	10152690	**Kristin Van Sciver**	9121748

Canoe Parameters:

Parameter	Value
Maximum Length	21’ 11”
Maximum Width	2’ 3”
Maximum Depth	1’ 1”
Average Thickness	0.5”
Overall Estimated Weight	180 lbs

Concrete Parameters:

Parameter	Structural	Patch
Wet (Plastic) Unit Weight	65.5 lb/ft^3	60.2 lb/ft^3
Dry Unit Weight	57.4 lb/ft^3	52.1 lb/ft^3
Compressive Strength (28 day)	2150.0 psi	1000 psi
Tensile Strength (28 day)	225 psi	N/A
Composite Flexural Strength (28 day)	725 psi	N/A
Air Content	2.8%	3.8%

By signing below I certify that I have read and understand the aforementioned information and certify that all information present is valid.

Jeremy DeGeyter Project Manager jd599@nau.edu (518) 461-3895	Date	Robin Tuchscherer Faculty Advisor Robin.Tuchscherer@nau.edu (928) 523-8080	Date

Mold Construction

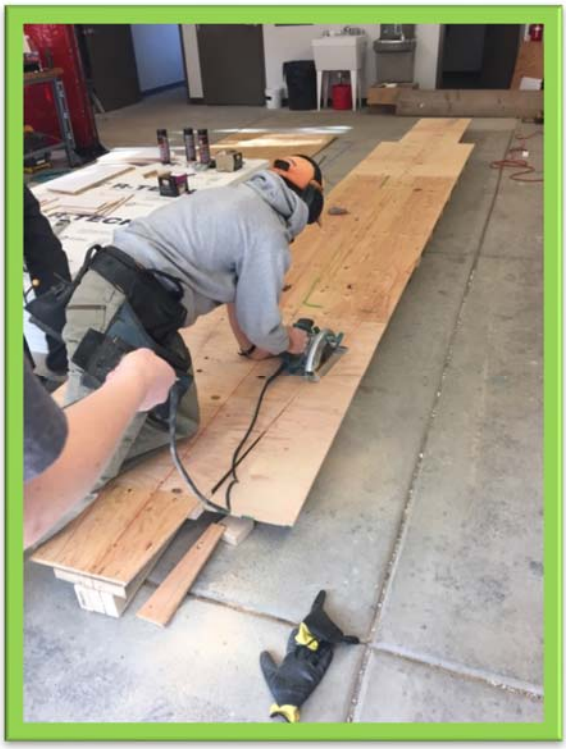


Figure 1: Construction of Mold Stand

Figure 2: Cutting Out Wooden Cross Sections

Figure 3: Cutting Foam Pieces for Cross Sections

Figure 4: Cutting Foam Cross Sections Using a Hot Wire

Figure 5: Gluing Sections Together

Figure 6: Completed Mold with Shrink Wrap

Figure 7: Cut Out of Bulkhead for Post Tensioning Anchorage

Figure 8: Application of Form Release Oil

Figure 9: Casting Ribs

Figure 10: Placement of Flotation for Bulkheads

Figure 11: Placing Concrete Using Spray Method

Figure 12: Placing of Reinforcement

Figure 13: Placing the Post Tensioning Cables Net

Figure 14: Post Tensioning System During Casting

Figure 15: Canoe at Desired 1/2" Thickness

Figure 16: Post Tensioning Canoe 7 Days After Casting

Figure 17: Finishing - Sanding

Figure 18: Staining the Canoe

Figure 19: Lettering of the Canoe

Figure 20: Applying Sealer

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

Hull Thickness/Reinforcement

$t_{reinforcement} = 0.0225in$ $(Determined\ using\ glass\ test\ per\ 2015\ NCCC\ Rules\ and\ Regulations)$

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

Scenario 1: Walls

$Hull\ Thickness: 0.5in$

$Reinforcement\ Thickness\ (1\ Layer): 0.0225in * 1 = 0.0225in$

$Post\ Tensioning = 0.125in$

$Post\ Tensioning\ Net = 0.02in$

$$Reinforcement\ Percentage = \frac{0.1675in}{0.50in} * 100 = 33.5\% < 50\%\ max.\ \boldsymbol{OK}!$$

Scenario 2: Bulkheads

$Hull\ Thickness: 0.5in$

$Reinforcement\ Thickness\ (2\ Layers): 0.0225in * 2 = 0.045in$

$Reinforcement\ Ties: 0.02in$

$Post\ Tensioning = 0.125in$

$$Reinforcement\ Percentage = \frac{0.19in}{0.50in} * 100 = 38.0\% < 50\%\ max.\ \boldsymbol{OK}!$$

Scenario 3: Ribs

$Hull\ Thicknes: 0.5in$

$Rib\ Thickness: 0.5in$

$Reinforcement\ Thickness\ (2\ Layers): 0.0225in * 2 = 0.045in$

$Post\ Tensioning = 0.125in$

$$Reinforcement\ Percentage = \frac{0.17in}{1.00in} * 100 = 17.0\% < 50\%\ max.\ \boldsymbol{OK}!$$

Scenario 4: Location of Post Tensioning Anchorage System in Bulkheads

$Hull\ Thickness: 2.10in$

$Reinforcement\ Thickness\ (1\ Layer): 0.0225in * 1 = 0.0225in$

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

$$Reinforcement\ Percentage = \frac{1.0225in}{2.10in} * 100 = 48.7\% < 50\%\ max.\ \boldsymbol{OK}!$$

Percent Open Area Calculations

$n_1 = 9$
$n_2 = 13$
$t_1 = 0.0235in$
$t_2 = 0.0618in$
$Aperture\ Dimension = 0.149in$

$$d_1 = aperture\ dimension + 2\left(\frac{t_1}{2}\right) = 0.149 + 2\left(\frac{0.0235}{2}\right) = 0.173in$$

$$d_2 = aperture\ dimension + 2\left(\frac{t_2}{2}\right) = 0.149 + 2\left(\frac{0.0618}{2}\right) = 0.211in$$

$$Length_{sample} = n_1 d_1 = [(9) * 0.173] = 1.56in$$

$$Width_{sample} = n_2 d_2 = [(13) * 0.211] = 2.74in$$

$$\sum Area_{open} = n_1 n_2 Area_{open} = 9x13x0.0222 = 2.59in^2$$

$$Area_{total} = Length_{sample} Width_{sample} = 4.27in^2$$

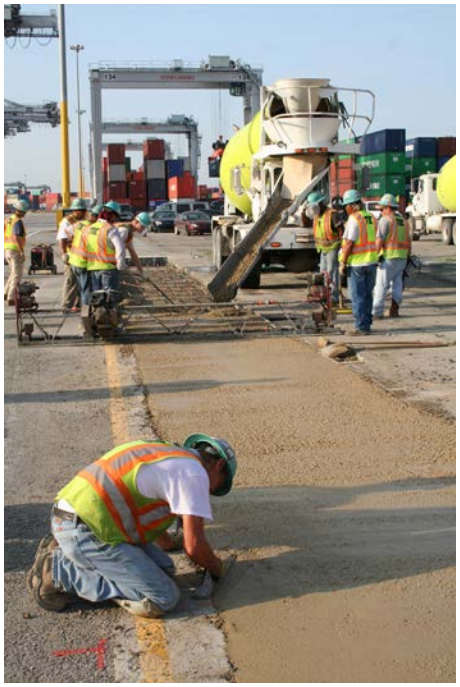
$$POA = \frac{\sum Area_{open}}{Area_{total}} x100\% = \frac{2.59}{4.27} * 100\% = 60.7\% > 40\%\ min.\ \boldsymbol{OK}!$$

Tab D – Material Technical Data Sheets

The following section contains Material Technical Data Sheets for all materials used in the construction of the concrete canoe.

Product Data Sheet

USA CERATECH
Better Cement. Better Concrete



ekkomaxx™ Bulk Cement System for General Use Structural Concrete

CERATECH's ekkomaxx™ Cement System is comprised of a non-portland hydraulic cement and proprietary liquid additives. CERATECH's **ekkomaxx™** 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 **ekkomaxx™** 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.

ekkomaxx™ is a hydraulic cement. Concrete produced with **ekkomaxx™** meets or exceeds ASTM - C - 1157 & 1600 requirements.

Characteristics

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

Applications

ekkomaxx™ is a general use, planet friendly, green sustainable cement solution for a wide variety of concrete construction applications. **ekkomaxx™** 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)	**6720** (43.1)	**8326** (58.0)	ASTM - C - 39
Flexural	**400** (2.8)	**691** (4.8)	**767** (5.4))	ASTM - C - 78
Splitting Tensile	**218** (1.5)	**605** (4.2)	**666** (4.6)	ASTM - C - 496
Modulus of Elasticity, msi (GPa)	**4.1** (28.7)	**4.8** (33.2)	**5.1** (35.0)	ASTM - C - 469
Coefficient of Thermal Expansion in/in/°F	Not Applicable	Not Applicable	**4.6**	AASHTO -TP-60
Rapid Freeze Thaw Resistance, (Durability Factor - Retained percentage of Dynamic Modulus) **300 Cycles**	**100%**			ASTM - C - 666A
Scaling Resistance, **lbs/ft²** (kg/m²) **50 Cycles**	**0**			ASTM - C - 672

ekkomaxx™ CARBON NEUTRAL CONCRETE

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 withing 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 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

Materials Useage	One Ton of Cement: Portland Cement	One Ton of Cement: ekkomaxx	One Cubic Yard of Concrete (Based on 1/3 ton of cement): Portland Cement	One Cubic Yard of Concrete (Based on 1/3 ton of cement): ekkomaxx
Virgin Resources	3500 lbs.	16 lbs.	667 lbs.	5.3 lbs.
Renewable Resources	0 lbs.	80 lbs.	0 lbs.	26.7 lbs.
Pre-Consumer Waste (Coal Ash)	None	1900 lbs.	200 lbs.	602 lbs.
Landfill Relief (Coal Ash)	None	1900 lbs.	200 lbs.	602 lbs.
Recycled Fine Aggregate (Pulverized consumer waste glass)	NA	NA	Cannot Use	50%
Post Consumer Waste (Crushed glass as an aggregate)	NA	NA	Cannot Use	Yes
Crude Oil	55 gallons	0 gallons	18.3 gallons	0 gallons
Total Energy Req'd.	6 M BTUs	0 BTUs	1.7 M BTUs	0 BTUs
Total CO_2 Production	2000 lbs.	12 lbs.	667 lbs.	4 lbs.
Water H_20 Required	Varies	0 Gals.	*36 Gals.	**18 Gals.

Portland cement production data from www.epa.gov

* Based on a w/c ratio of 0.44

** Based on a w/c ratio of 0.22

ekkomaxx™ CARBON NEUTRAL CONCRETE

4.30.14

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.
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Alexandria, VA 22311
Phone: (800) 581-8397 Fax: (703) 894-1068
Technical Support: (888) 341-2600

poraver® expanded glass

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.

PROPERTIES		STANDARD	PORAVER® STANDARD GRAIN SIZES					PORAVER® SPECIAL GRAIN SIZES	
Grain size	[mm]	ASTM C136	0.1-0.3	0.25-0.5	0.5-1	1-2	2-4	0.04-0.125	4-8
Particle size	[mesh #]		140-50	60-35	35-18	18-10	10-5	400-120	5-5/16"
Fineness modulus			0.66	1.92	2.72	3.81	4.7	*on request*	5.73
Dry loose bulk density	[kg/m³]	ASTM C9/C29M	400 ± 60	340 ± 30	270 ± 30	230 ± 30	190 ± 20	530 ± 70	180 ± 20
	[lb/ft³]		25 ± 3.8	21.2 ± 3.2	16.9 ± 3	14.4 ± 2.1	11.9 ± 1.8	33.1 ± 4.4	11.2 ± 1.7
Apparent density	[kg/m³]	ASTM C128	850 ± 120	680 ± 50	450 ± 50	410 ± 50	350 ± 40	*on request*	300 ± 40
	[lb/ft³]		53.1 ± 8.4	42.5 ± 5.6	28.1 ± 4.4	25.6 ± 3.6	21.8 ± 3	*on request*	18.7 ± 2.7
Compressive strength	[MPa]	EN 13055-1	2.8	2.6	2	1.6	1.4	*on request*	1.2
	[PSI]		406	377	290	232	203	*on request*	174
Water absorption by mass [1]	[Mass. %]	ASTM C128	35	28	20	20	23	*on request*	20
Water absorption by volume [1]	[Vol. %]	ASTM C128	22	15	9	7	7	*on request*	5
Organic impurities		ASTM C40	no injurious compounds					no injurious compounds	
Staining index (index number)		ASTM C641	0					0	
Loss on ignition	[%]	ASTM C114	~1					~1	
Clay lumps and friable particles	[%]	ASTM C142	-	-	-	< 2	< 2	-	< 2
Oversize		EN 13055-1	≤ 10% by mass					≤ 10% by mass	
Undersize			≤ 15% by mass					≤ 15% by mass	

[1] *% absorption determined after 5 minutes submerged in water*

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 [2]	-	0.07 [2]
	[BTU-in/hr-ft²-°F]		-	-	-	-	0.486 [2]	-	0.486 [2]

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 values DIBt according to approval Z-23.11-114*

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01/2014 SA

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 specially 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%
	K46	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%
	S60	10,000	90%	80%
	S60HS	18,000	90%	90%
iM Series	iM16K	16,000	90%	90%
	iM30K	28,000	90%	90%

True Density

	Product	True Density (g/cc)		
		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
	K46	0.46	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
	S60	0.60	0.57	0.63
	S60HS	0.60	0.57	0.63
iM Series	iM16K	0.46	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

	Product	Calculated Thermal Conductivity (W·m-1·K-1) at 70°F (21°C)
K Series	K1	0.047
	K15	0.055
	K20	0.070
	K25	0.085
	K37	0.124
	K46	0.153
S Series	S15	0.055
	S22	0.076
	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

		Floaters (% by bulk volume)	
	Product	Typical	Minimum
K Series	K1	96%	90%
	K15	96%	90%
	K20	96%	90%
	K25	96%	90%
	K37	94%	90%
	K46	92%	90%
S Series	S15	96%	90%
	S22	96%	90%
	S32	94%	90%
	S35	96%	90%
	S38	94%	90%
	S38HS	96%	90%
	S60	92%	90%
	S60HS	92%	90%
iM Series	iM16K	96%	90%
	iM30K	92%	90%

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

Averages about 60%.

Oil Absorption

0.2–0.6 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

		Particle Size (microns, by volume) 3M QCM 193.0			
	Product	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
	K46	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	30	55	65
	S60HS	12	29	48	60
iM Series	iM16K	12	20	30	40
	iM30K	8.6	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 48 3/4 in. × 42 3/4 in. × 50 in. including pallet.
Pallet size is 42 in. × 48 in.

*S60 and S60HS large boxes are 38 cubic ft.

Box Weights

	Product	Small Box	Large Box*	Truckload Large Box* 44 Pallets
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**.

3M

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St. Paul, MN 55144-1000
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www.3M.com/engineeredadditives

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Issued: 3/13 9049HB
98-0212-3859-1

PAREXUSA

Reinforcing Meshes

	DESCRIPTION	USES
355 Standard Mesh	4.5 oz fiberglass 38 in. (96.5cm) wide mesh. Highly flexible for full walls or details. Alkali-resistant.	Standard reinforcement of Parex USA EIFS walls for impact resistance and used in Parex USA Stucco Krak-Shield assemblies.
355.48 Long Standard Mesh	4.5 oz fiberglass mesh 48 in. (121.9cm) wide. Highly flexible for details. Alkali-resistant.	Standard reinforcement of Parex USA EIFS walls for impact resistance and used in Parex USA Stucco Krak-Shield assemblies.
356 Short Detail Mesh	4.5 oz fiberglass mesh 9.5 in. (24cm) wide. Highly flexible for details. Alkali-resistant.	Backwrapping , corners, reveals and trim.
352 Adhesive Mesh	4.5 oz fiberglass mesh. Self-adhesive, facilitates the wrapping of complex contours. Highly flexible for details. Alkali-resistant.	Complex architectural details only.
358.10 Intermediate Impact Mesh	12 oz fiberglass 38 in. (96.5cm) wide mesh. Intermediate strength to enhance impact and abuse resistance. Alkali-resistant.	Use with Parex USA EIFS to achieve EIMA/ASTM medium-impact strength classification. Used in Parex USA Stucco Krak-Shield assemblies.
358.14 High Impact Mesh	15 oz fiberglass 38 in. (96.5cm) wide mesh. High strength to enhance impact and abuse resistance. Alkali resistant.	Use with Parex USA EIFS to achieve EIMA/ASTM high-impact strength classification. 355 Standard Mesh must be used in combination with 358.14 High Impact Mesh for impact resistance.
358.20 Ultra High Impact Mesh	20 oz fiberglass 38 in. (96.5cm) wide mesh. Ultra high strength to enhance impact and abuse resistance. Alkali-resistant.	Use with Parex USA EIFS to achieve EIMA/ASTM ultra-high impact strength classification. 355 Standard Mesh must be used in combination with 358.20 Ultra-High Impact Mesh for Impact Resistance.
357 Corner Mesh	7.2 oz fiberglass 9.5 in (24cm) wide mesh. Heavy duty. Factory pre-bent to fold uniformly around corners. Designed to enhance impact and abuse resistance at corners. Alkali-resistant.	Corner reinforcement

Parex USA Reinforcing Meshes have been tested within the Parex USA EIFS Systems for compliance to Chapter 26 of the International Building Code.

Alkali resistant is defined as 120 pli (21 dN/cm) retained tensile strength per ASTM E2098 after 28 days soaked in 5% sodium hydroxide solution.

PAREXUSA

	Product	Nominal Weight	Coverage per Roll	Width	Length	Packaging
	355 Standard Mesh	4.5 oz/yd² (153g/m²)	475 ft² (43.6 m²)	38 in (96.5cm)	150'	4 rolls/box
	355.48 Long Standard Mesh	4.5 oz/yd² (153g/m²)	600 ft² (55.7 m²)	48 in (122cm)	150'	4 rolls/box
	356 Short Detail Mesh	4.5 oz/yd² (153g/m²)	119 ft² (11 m²)	9.5 in (24cm)	150'	16 rolls/box
	352 Adhesive Mesh	4.5 oz/yd² (153g/m²)	237 ft² (21.7m²)	19 in (48.2cm)	150'	8 rolls/box
Impact	358.10 Intermediate Impact Mesh	12 oz/yd² (407g/m²)	237 ft² (21.7m²)	38 in (96.5cm)	75'	4 rolls/box
Impact	358.14 High Impact Mesh	15 oz/yd² (509g/m²)	237 ft² (21.7m²)	38 in (96.5cm)	75'	2 rolls/box
Impact	358.20 Ultra High Impact Mesh	20 oz/yd² (692g/m²)	237 ft² (21.7m²)	38 in (96.5cm)	75'	2 roll/box
Specialty	357 Corner Mesh	7.2 oz/yd² (244g/m²)	119 ft² (11 m²)	9.5 in (24cm)	150'	4 rolls/box

APPLICATION:

- 355 Standard, 355.48 Long Standard and 356 Short Detail Mesh: The fiberglass mesh must be embedded into a Parex USA basecoat and be smoothed with a trowel until mesh is fully embedded and the basecoat, thickness is approximately 1/16 in. (1.5mm). The color of the reinforcing mesh should not be visible at the surface of the Parex USA basecoat material. A slight pattern of the mesh is acceptable, due to shrinkage of the cementitious basecoat upon drying. Install mesh taking care to avoid wrinkles. The mesh must be continuous at all corners and must be lapped a minimum of 2-1/2 in. (63.5mm) at the mesh seams.
- 352 Adhesive Mesh: 352 Adhesive Mesh is adhered to the EPS board before the basecoat is applied. Apply the basecoat and smooth it with a trowel until the mesh color is not visible. A slight pattern of the mesh is acceptable, due to shrinkage of the cementitious basecoat. The mesh must be continuous at all corners and must be lapped a minimum of 2-1/2 in. (63.5 mm) at the mesh seams.
- 358.10 Intermediate Impact, 358.14 High Impact, and 358.20 Ultra High Impact Mesh: The fiberglass mesh must be embedded into the wet basecoat and be smoothed with a trowel until fully embedded with the mesh color not visible. Tightly butt mesh edges but do not overlap them. Install Parex USA 357 Corner Mesh at all edges. 358.10 Intermediate Impact: Where mesh edges butt together, the joint has to be covered with a layer of Standard or Detail mesh with a minimum lap of 4 in. (102mm). For 358.14 High Impact Mesh and 358.20 Ultra High Impact Mesh, a second layer of 355 Standard Mesh must be applied on the whole surface.
- 357 Corner Mesh: The fiberglass mesh must be embedded into the wet base coat and be smoothed with a trowel until fully embedded with the mesh color not visible. A slight pattern of the mesh is acceptable, due to shrinkage of the cementitious basecoat. Tightly butt mesh edges but do not overlap them. Install mesh taking care to avoid wrinkles. Where mesh edges butt together, the joint has to be covered with a layer of Standard or Detail mesh with a minimum lap of 6 in. (152mm)

ASTM E2486 Impact Classification (formerly EIMA 101.86)

A. Standard Impact Resistance, 25-49 in-lbs (2.8 - 5.6 J) Impact Range
B. Medium Impact Resistance, 50-89 in-lbs (5.7-10.1 J) Impact Range
C. High Impact Resistance, 90-150 in-lbs (10.2-17.0 J) Impact Range
D. Ultra High Impact Resistance, >150 in-lbs (> 17.0 J) Impact Range

Parex USA, Inc.
4125 E. La Palma Ave., Suite 250
Anaheim, CA 92807
(866) 516-0061 Tech Support: (800) 226-2424

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EIMA SMA PAREXUSA SUSTAINABILITY

BASF

We create chemistry

3	03 30 00	Cast-in-Place Concrete
	03 37 13	Shotcrete
	03 40 00	Precast Concrete
	03 70 00	Mass Concrete

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^3 (0.3 kg/m^3) MasterFiber M 100 product outperforms all other plastic shrinkage fiber reinforcements at their typical dosage of 1.0 lb/yd^3 (0.6 kg/m^3).

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

MASTER® BUILDERS SOLUTIONS

Guidelines for Use

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

Mixing: Typically no modifications to the mixture proportions are required when the product is used at the engineered dosage of 0.50 lb/yd^3 (0.3 kg/m^3). 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^3 (0.3 kg/m^3), MasterFiber M 100 product is capable of reducing plastic shrinkage cracking by approximately 85%. Conventional monofilament polypropylene fibers at 1.0 lb/yd^3 (0.6 kg/m^3) 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^3 (0.3 kg/m^3).

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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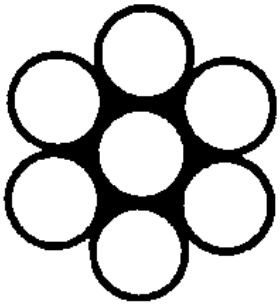
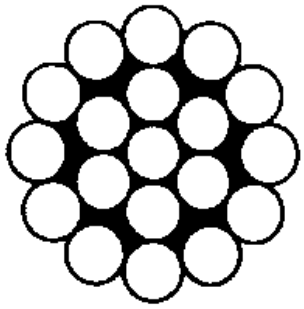
1800 Clark Boulevard
Brampton, Ontario L6T 4M7
Tel: 800 387-5862 ■ Fax: 905 792-0651

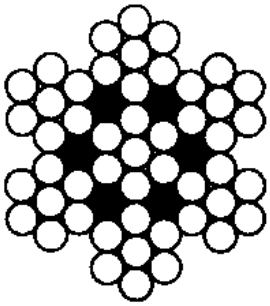
Stainless & Galvanized Steel



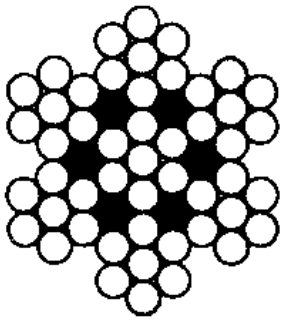
1x7 GALVANIZED CABLE		
Size	Lbs per 1,000 Ft	Tensile
3/32″	14	1,200
1/8″	35	2,100
3/16"	73	3,990
1/4"	121	6,650
5/16"	205	11,200
3/8"	273	15,400
1/2"	517	26,900



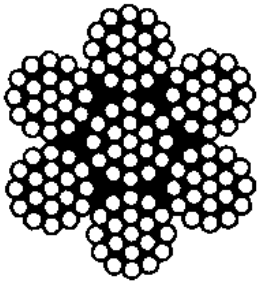
1x19 STAINLESS STEEL STRAND		
TYPE 316		
Size	Lbs per 1,000 Ft	Tensile
1/16"	8.5	--
3/32"	20	--
1/8"	35	1,780
5/32"	55	2,800
3/16″	77	4,000
7/32″	102	5,350
1/4″	135	6,900
5/16″	210	10,600
3/8″	300	14,800



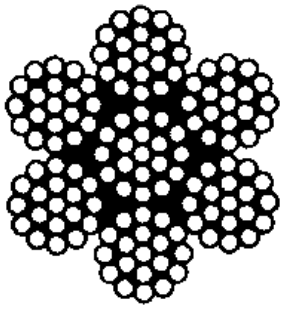
7x7 GALVANIZED CABLE		
Size	Lbs per 1,000 Ft	Tensile
1/16"	7.5	480
5/64"	11.0	650
3/32"	16.0	920
1/8"	28.0	1,700
5/32"	43.0	2,600
3/16"	62.0	3,700
1/4"	106.0	6,100



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

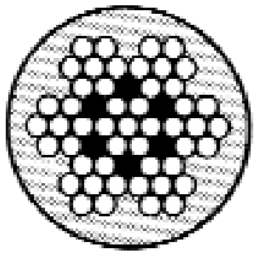


7x19 STAINLESS STEEL CABLE			
TYPE 304 and 316			
Size	Lbs per 1,000 Ft	Tensile	
		304	316
1/16"	7.5	480	360
3/32″	17.4	920	700
1/8"	29	1,760	1,360
5/32″	45	2,400	2,000
3/16"	65	3,700	2,900
7/32″	86	5,000	3,900
1/4"	110	6,400	4,900
5/16"	173	9,000	7,600
3/8"	243	12,000	11,000

Clear Vinyl and Nylon Coated Galvanized Cable

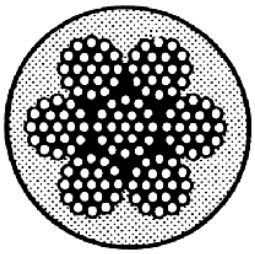
Cable Diam.	Coated to	Approx. Wt. Per 1000 ft in lbs	Breaking Strength in Pounds	Galvanized Construction
1/16"	3/32'	9.3	480	7 X 7
3/32"	1/8"	18.5	920	7 X 7
1/8"	3/16"	35.2	1,700	7 X 7

7 x 7



Cable Diam.	Coated to	Approx. Wt. Per 1000 ft in lbs	Breaking Strength in Pounds	Galvanized Construction
3/32"	1/8"	19.9	1,000	7 X 19
1/8"	3/16"	36.2	2,000	7 X 19
3/16"	1/4"	77.5	4,200	7 X 19
1/4"	5/16"	123.0	7,000	7 X 19
5/16"	3/8"	197.0	9,800	7 X 19
3/8"	7/16"	270.0	14,400	7 x 19

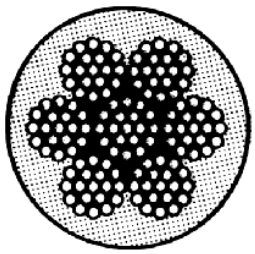
7 x 19



Clear Vinyl Coated Stainless Cable

Cable Diam.	Coated to	Approx. Wt. Per 1000 ft in lbs	Breaking Strength in Pounds	Stainless Construction
1/8"	3/16"	36.2	1,760	7 x 19
3/16"	1/4"	77.5	3,700	7 x 19
1/4"	5/16"	123.0	6,400	7 x 19
5/16"	3/8"	197.0	9,000	7 x 19
3/8"	7/16"	270.0	12,000	7 x 19

7 x 19



Also available on special order: nylon and vinyl in various colors.

Apprx. 10 days delivery. Minimum quantity required.

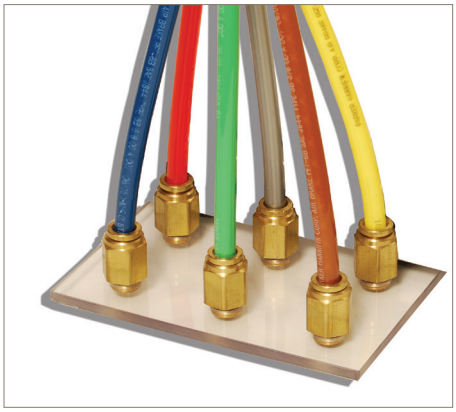
*Listed for comparison only. Actual operating loads may vary, but should never exceed recommended design factor or 20% of catalog breaking strength.

**Uncoated cable according to Federal Specification RR-W-410D.

Uncoated cable meets dimensional and strength requirements of MIL-W-83420E.

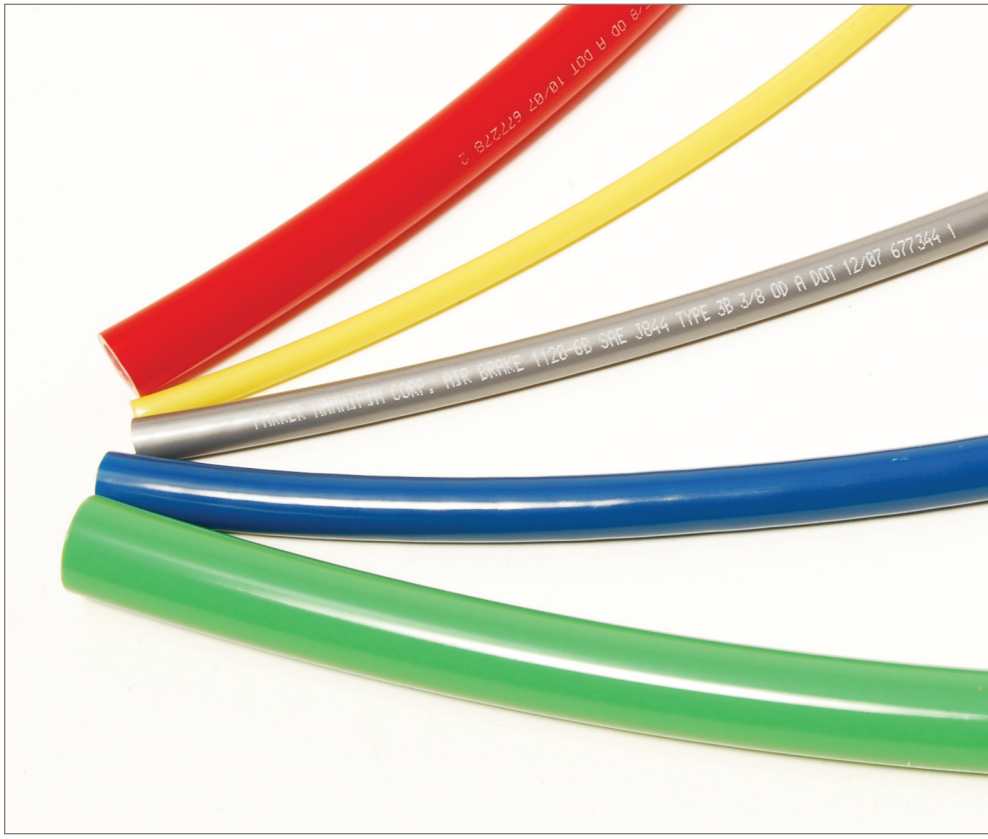
Air Brake Tubing

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:

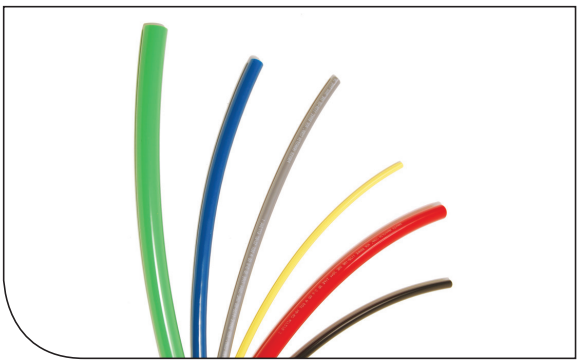
Parker Hannifin Corporation
Parflex Division
1300 North Freedom St.
Ravenna, OH 44266
phone 330 296 2871
fax 330 286 8433
www.parker.com/parflex

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 J844
- 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 73°F /23°C		Minimum Bend Radius		Weight		Standard Reel		Standard Pallet	
#												lbs	kg				
	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	69.0	.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	69.0	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	.376	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	900	62.1	2.50	63.5	7.00	3.18	250	76	3,000	914
1120-12B-XXX-250	3/4	.750	19.1	.566	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:

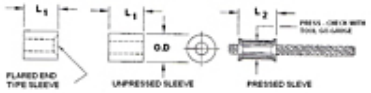
- NTA
- PTC
- PMT

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

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
38CBSZP	ZP Copper	3/8	21/32	11/16	13/16	.583	5000

Results 1 - 12 of 12

BASF
The Chemical Company

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.

Master Builders

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 peformance 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
United States 23700 Chagrin Boulevard, Cleveland, Ohio 44122-5544 ■ Tel: 800 628-9990 ■ Fax: 216 839-8821
Canada 1800 Clark Boulevard, Brampton, Ontario L6T 4M7 ■ Tel: 800 387-5862 ■ Fax: 905 792-0651

NSF Certified to NSF/ANSI 61

Master Builders

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 fiberglass 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 affects 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.

- 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

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 and ambient temperature are not necessarily the same.

Release Agent Use

6:1 Recommended Dilution Ratio

Plug #	Product Temperature
6	40° F (4.4° C) - 45° F (7.2° C)
5	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)

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*

SOLID COLOR CONCRETE STAIN

NO. 800 WHITE BASE

PRODUCT INFORMATION

BEHR PREMIUM® Solid Color Concrete Stain is a durable, water repellent, solid color stain. It is designed to help protect and enhance both interior exterior, vertical and horizontal, concrete surfaces. This siliconized, 100% acrylic formula, forms a strong, long-lasting opaque film on properly prepared surfaces.

RECOMMENDED USES:

This product is ideal for use on basements, patios, sidewalks, driveways, garage floors, cement blocks, and pillars. Use on properly prepared, interior or exterior surfaces, including:

- Concrete
- Masonry walls
- Brick

Do not use on surfaces subject to hydrostatic pressure. Driveways and garage floors with lack of proper surface preparation and/or excessive application can lead to automobile tires lifting the product from the surface.

PRODUCT SPECIFICATIONS:

Tint Bases/Max Tint Load:
No. 800 124 oz / 6 oz
No. 830 116 oz /14 oz

Sheen: 5-10 @85°
Sheen levels depend on porosity and various surface irregularities.

Resin Type: Siliconized 100% Acrylic

Weight per Gallon: 10.0 lbs

% Solids by Volume: 29.0%

% Solids by Weight: 40.8%

VOC: <100 g/L

Flash Point: N/A

Viscosity: 60-80 KU

Recommended Film Thickness:
Wet: 4.0 Dry: 1.2 mils @ 400 Sq. Ft./Gal.
Wet: 2.7 Dry: 0.8 mils @ 600 Sq. Ft./Gal.

Coverage: 400-600 Sq. Ft./Gal. depending on application method and substrate porosity. Does not include the loss of material from spraying.

APPLICATION:

Brush: Nylon/polyester

Roller: 1/4"-3/8" nap

Airless Spray: .015"-.019"

Filter: 60 mesh

Thinning: (If required) No more than 1/2 pint of water per gallon.

Dry Time: @ 77° & 50% RH
Longer dry time may be required in cooler temperatures and higher humidity.
To Touch: 2 hours
To Recoat: 2-4 hours
Full Cure: 2 weeks

SURFACE PREPARATION:

All surfaces must be clean, free of dust, chalk, oil, grease, wax, polish, mold and mildew stains, loose and peeling paint, rust, and all other foreign substances. Clean surfaces with a detergent and water solution by scrubbing the surface vigorously and rinse with a garden hose or a power washer and allow to dry throughly.

Masonry New: All masonry surfaces must be cured at least 30 days before painting. The pH must be 10.0 or lower prior to coating. All surfaces must be clean, free of dust, chalk, mold and mildew stains, loose and peeling paint and all other foreign substances. Clean surfaces with a detergent and water solution by scrubbing the surface vigorously and rinse with a garden hose or a power washer at a low setting (500-1200 PSI). DO NOT USE HIGH PRESSURE as this may harm the substrate. **Previously Painted Surface:** All surfaces must be clean, free of dust, chalk, mold and mildew stains, loose and peeling paint and all other foreign substances. Clean surfaces with a detergent and water solution by scrubbing the surface vigorously and rinse with a garden hose or a power washer and allow drying.

WARNING! If you scrape, sand or remove old paint, you may release lead dust. **LEAD IS TOXIC.** Contact the National Lead Information Center at 1-800-424-LEAD or log on to www.epa.gov/lead.

COMPLIES WITH THE BELOW AS OF 9/1/2014			
SCAQMD	YES	LADCO	YES
CARB	YES	AIM	YES
OTC	YES		

RECOMMENDED PRIMER/SYSTEMS:

New or uncoated Masonry:

- All surfaces must be clean, free of dust, chalk, oil, grease, wax, polish, mold and mildew stains, loose and peeling paint, rust and all other foreign substances.
- BEHR PREMIUM® Concrete & Masonry Bonding Primer No. 880

CLEAN UP:

Clean all tools and equipment with clean water. For disposal of empty containers and unused product, contact your household refuse collection service.

CAUTIONS/LIMITATIONS:

- Protect from freezing.
- For best results, apply at temperatures between 50°F - 90°F. Temperatures above 90°F may affect the application such as drying too fast. Avoid painting in direct sun. NOTE: If the surface is hot to the touch it should be considered to hot to apply this coating.
- Avoid heavy traffic for 72 hours.
- Allow 14 days cure time before subjecting to washing or cleaning for full cure.
- Shelf life under normal conditions is two years unopened.

GENERAL INFORMATION:

Warning! Causes eye and skin irritation. Harmful if swallowed. Wear protective clothing, gloves, eye, and face protection. Do not eat, drink, or smoke when using this product. Collect spillage and avoid release to the environment. Take off contaminated clothing and wash it before reuse. Wash hands thoroughly after handling. Dispose of unused, contents, container and other contaminated wastes in accordance with local, state, federal and provincial regulations.

First aid: If in eyes: Rinse cautiously with water for several minutes and remove contacts if present and easy to do. Continue rinsing and get medical attention if eye irritation persists. **If swallowed:** Rinse mouth and get medical attention if you feel unwell. **If on skin:** Wash with plenty of soap and water.

Revised 9/2014

SOLID COLOR CONCRETE STAIN

NO. 830

PRODUCT INFORMATION

BEHR PREMIUM® Solid Color Concrete Stain is a durable, water repellent, solid color stain. It is designed to help protect and enhance both interior and exterior, and vertical and horizontal, concrete surfaces. This siliconized, 100% acrylic formula, forms a strong, long-lasting opaque film on properly prepared surfaces.

RECOMMENDED USES:

This product is ideal for use on basements, patios, sidewalks, driveways, garage floors, cement blocks, and pillars. Use on properly prepared, interior or exterior surfaces, including:

- Concrete
- Masonry walls
- Brick

Do not use on surfaces subject to hydrostatic pressure. Driveways and garage floors with lack of proper surface preparation and/or excessive application can lead to automobile tires lifting the product from the surface.

PRODUCT SPECIFICATIONS:

Tint Bases/Max Tint Load:
No. 800 124 oz / 6 oz
No. 830 116 oz /14 oz

Sheen: 5-10 @85°
Sheen levels depend on porosity and various surface irregularities.

Resin Type: Siliconized 100% Acrylic

Weight per Gallon: 10.0 lbs

% Solids by Volume: 33.3%

% Solids by Weight: 44%

VOC: <100 g/L

Flash Point: N/A

Viscosity: 60-80 KU

Recommended Film Thickness:
Wet: 4.0 Dry: 1.2 mils @ 400 Sq. Ft./Gal.
Wet: 2.7 Dry: 0.8 mils @ 600 Sq. Ft./Gal.

Coverage: 400-600 Sq. Ft./Gal. depending on application method and substrate porosity. Does not include the loss of material from spraying.

APPLICATION:

Brush: Nylon/polyester

Roller: 1/4"-3/8" nap

Airless Spray: .015"-.019"

Filter: 60 mesh

Thinning: (If required) No more than 1/2 pint of water per gallon.

Dry Time: @ 77° & 50% RH
Longer dry time may be required in cooler temperatures and higher humidity.
To Touch: 2 hours
To Recoat: 2-4 hours
Full Cure: 2 weeks

SURFACE PREPARATION:

All surfaces must be clean, free of dust, chalk, oil, grease, wax, polish, mold and mildew stains, loose and peeling paint, rust, and all other foreign substances. Clean surfaces with a detergent and water solution by scrubbing thesurface vigorously and rinse with a garden hose or a power washer and allow to dry throughly.

Masonry New: All masonry surfaces must be cured at least 30 days before painting. The pH must be 10.0 or lower prior to coating. All surfaces must be clean, free of dust, chalk, mold and mildew stains, loose and peeling paint and all other foreign substances. Clean surfaces with a detergent and water solution by scrubbing the surface vigorously and rinse with a garden hose or a power washer at a low setting (500- 1200 PSI). DO NOT USE HIGH PRESSURE as this may harm the substrate. **Previously Painted Surface:** All surfaces must be clean, free of dust, chalk, mold and mildew stains, loose and peeling paint and all other foreign substances. Clean surfaces with a detergent and water solution by scrubbing the surface vigorously and rinse with a garden hose or a power washer and allow drying.

WARNING! If you scrape, sand or remove old paint, you may release lead dust. **LEAD IS TOXIC.** Contact the National Lead Information Center at 1-800-424-LEAD or log on to www.epa.gov/lead.

COMPLIES WITH THE BELOW AS OF 9/1/2014			
SCAQMD	YES	LADCO	YES
CARB	YES	AIM	YES
OTC	YES		

RECOMMENDED PRIMER/SYSTEMS:

New or uncoated Masonry:

- All surfaces must be clean, free of dust, chalk, oil, grease, wax, polish, mold and mildew stains, loose and peeling paint, rust and all other foreign substances.
- BEHR PREMIUM®Concrete & Masonry Bonding Primer No. 880

CLEAN UP:

Clean all tools and equipment with clean water. For disposal of empty containers and unused product, contact your household refuse collection service.

CAUTIONS/LIMITATIONS:

- Protect from freezing.
- For best results, apply at temperatures between 50°F - 90°F. Temperatures above 90°F may affect the application such as drying toofast. Avoid painting in direct sun. NOTE: If the surface is hot to the touch it should be considered too hot to apply this coating.
- Avoid traffic for 72 hours.
- Allow 14 days cure time before subjecting to park tires.
- Allow two weeks before washing or cleaning for full cure.
- Shelf life under normal conditions is two years unopened.

GENERAL INFORMATION:

Warning! Causes eye and skin irritation. Harmful if swallowed. Wear protective clothing, gloves, eye, and face protection. Do not eat, drink, or smoke when using this product. Collect spillage and avoid release to the environment. Take off contaminated clothing and wash it before reuse. Wash hands thoroughly after handling. Dispose of unused, contents, container and other contaminated wastes in accordance with local, state, federal and provincial regulations.

First aid: If in eyes: Rinse cautiously with water for several minutes and remove contacts if present and easy to do. Continue rinsing and get medical attention if eye irritation persists. **If swallowed:** Rinse mouth and get medical attention if you feel unwell. **If on skin:** Wash with plenty of soap and water.

Revised 9/2014

SEMI-TRANSPARENT CONCRETE STAIN

NO. 850

PRODUCT INFORMATION

BEHR PREMIUM® Semi-Transparent Concrete Stain provides the variation of color found in some natural stone. Surface imperfections, concrete composition, texture and application technique will affect the finished appearance. For a uniform solid color, use a product such as BEHR PREMIUM® Solid Color Concrete Stain.

RECOMMENDED USES:

This product is ideal for patios, pavers, driveways, walkways, garage floors. For use on uncoated and unsealed, properly prepared, interior or exterior surfaces such as:

- Concrete Floors
- Masonry
- Wall
- Brick

The composition of concrete varies; therefore, the lack of proper surface preparation and/or excessive application can lead to automobile tires lifting the product from the surface. For added protection, use a product such as BEHR PREMIUM® Wet-Look Sealer No. 985 for a high-gloss finish or a product such as BEHR PREMIUM® Low-Lustre Sealer No. 986 for a low-gloss finish. Allow stain at least 4 hours to dry before topcoating per label instructions.

COMPLIES WITH THE BELOW AS OF 9/1/2014			
SCAQMD	YES	LADCO	YES
CARB	YES	AIM	YES
OTC	YES	MPI#	58

PRODUCT SPECIFICATIONS:

Tint Bases/Max Tint Load:
No. 850 126 oz / 4 oz

Sheen: N/A
Sheen levels depend on porosity and various surface irregularities.

Resin Type: Siliconized 100% Styrene Acrylic

Weight per Gallon: 8.5 lbs

% Solids by Volume: 17.1%

% Solids by Weight: 19.0%

VOC: <100 g/L

Flash Point: N/A

Viscosity: 35-55 KU

Recommended Film Thickness:
Wet: 9.1 Dry: 1.6 mils @ 250 Sq. Ft./Gal.
Wet: 4.6 Dry: 0.8 mils @ 500 Sq. Ft./Gal.

Coverage: 250-500 Sq. Ft./Gal. depending on application method and substrate porosity. Does not include the loss of material from spraying.

APPLICATION:

Brush: Nylon/polyester

Roller: 3/8"-1/2" nap

Airless Spray: 015"-.019"

Filter: 60 mesh

Thinning: Use at packaged consistency; DO NOT THIN.

Dry Time: @ 77° & 50% RH
Longer dry time may be required in cooler temperatures and higher humidity.
To Touch: 1 hour
To Recoat: 4 hours

SURFACE PREPARATION:

Masonry: New concrete must cure for a minimum of 30 days. Remove old coating or sealer, if present, using a product such as BEHR PREMIUM® Concrete & Masonry Paint Stripper No. 992. Follow all label instructions. Test: Sprinkle a few drops of water onto the surface. If water is quickly absorbed, the surface is ready. If not absorbed, re-etch. For proper penetration and adhesion of topcoat, use a product such as BEHR PREMIUM® Concrete & Masonry Cleaner & Etcher No. 991 to clean and etch the surface. Follow all label instructions. Remove mildew stains with a product such as BEHR PREMIUM® Mold & Mildew Stain Remover No. 62. Follow all label instructions. Apply a product such as BEHR PREMIUM® Concrete & Masonry Bonding Primer No. 880 to increase adhesion of topcoat to the surface. Follow all label instructions. Do not thin. Intermix cans of same products to ensure color uniformity. Stir thoroughly before and during application.

WARNING! If you scrape, sand or remove old paint, you may release lead dust. **LEAD IS TOXIC.** Contact the National Lead Information Center at 1-800-424-LEAD or log on to www.epa.gov/lead.

CLEAN UP:

Clean all tools and equipment with clean water. For disposal of empty containers and unused product, contact your household refuse collection service.

CAUTIONS/LIMITATIONS:

- Protect from freezing.
- For best results, apply at temperatures between 50°F - 90°F. Temperatures above 90°F may affect the application such as drying too fast. Avoid painting in direct sun. NOTE: If the surface is hot to the touch itshould be considered too hot to apply this coating.
- Avoid heavy traffic for 24 hours.
- Allow 30 days before washing or cleaning for full cure.
- Shelf life under normal conditions is two years unopened.

GENERAL INFORMATION:

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First aid: If in eyes: Rinse cautiously with water for several minutes and remove contacts if present and easy to do. Continue rinsing and get medical attention if eye irritation persists. **If swallowed:** Rinse mouth and get medical attention if you feel unwell. **If on skin:** Wash with plenty of soap and water.

Revised 9/2014

PRODUCT DATA

W. R. MEADOWS. SEALTIGHT

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 @ 22.7º 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	
Ultraviolet Resistance	Non-yellowing
Chalk Resistance	No chalking
Check/Peel Resistance	No deterioration
Alkali Resistance	Excellent

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

Continued over ….

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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. ULTRITE® 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