

Starting Formulation

SF 5008

Epoxy-Modified Portland Cement Concrete EPI-REZ™ Resin WD-510 / EPIKURE™ Curing Agent 3072

Introduction This formulation illustrates the modification of a Portland Cement concrete with an epoxy resin system which is easily dispersed into water at the job site prior to admixing with the concrete. Incorporation of this epoxy resin system provides several advantages over conventional Portland Cement concretes.

- Features**
- Workable at lower water/cement ratios
 - Retains hydrating water in thin sections exposed to air during cure, eliminating the need for plastic film covers and special membrane coatings
 - Strengthens concretes cured under both ideal and adverse conditions
 - Bonds overlays, patches and extensions firmly to substrates, monolithic structure
 - Retards rate of acid attack in flooring, sewers, and treatment tanks located in acidic environments
 - Improves wear resistance of flooring subjected to steel wheel cart or skid tub traffic

Formula	<u>Material</u>	<u>Supplier</u>	<u>Pounds</u>	<u>Gallons</u>
PartA				
	Portland Cement, Type 1		100.0	3.61
	Silica Aggregate, 4 to 8 mesh	Whitaker, Clark & Daniels, Inc. Portage #48 Silica	120.0	5.44
	Silica Sand, 10 to 30 mesh	Whitaker, Clark & Daniels, Inc. #830 Sand Blast Sand	120.0	5.44
	Silica Sand, 30 to 100 mesh	Whitaker, Clark & Daniels, Inc. Portage #5 Sand	160.0	7.25
	Pigment	Akrochem. Corp. R-2899 Light Red Oxide	5.0	0.13
	Water	Standard Ultramarine Co.	23.0	2.76
	EPI-REZ WD-510 Resin	Hexion	10.2	1.06
	Part B Blend ¹		4.8	0.59
	Water		<u>15.0</u>	<u>1.80</u>
	Total		558.0	28.08

¹ 70:30 percent by weight of EPIKURE Curing Agent 3072 and nonylphenol.

Mixing Instructions The converter blend is prepared at room temperature by mixing a 70:30, percent by weight, solution of EPIKURE Curing Agent 3072 and Nonylphenol (Rohm & Haas Co.). Store the blend in sealed metal or polyolefin plastic containers until ready for use. Mix the EPI-REZ Resin WD-510 with the converter blend. Add the designated amount of water and stir until a uniform emulsion is obtained. Mechanical agitation is preferred for thorough mixing. Add the freshly prepared emulsion to the other materials in the cement mixer and mix to a uniform, workable consistency. Aggregate mixtures of smaller particle size should be used in the formulation of mortars, stuccos and exposed aggregate matrices.

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Application Instructions Old concrete substrates should be cleaned by either sandblasting or scarification (Tennant grinding machines) to remove surface contaminants such as oils, fats, greases, waxes, curing compounds, and paints. The laitance on new concrete can be removed with an acid etch followed by a thorough water flushing and scrubbing step. Steel can be cleaned by sandblasting just prior to placement of the new concrete. While the substrates need not be dry, standing water should be removed before proceeding with the next step.

Prepare a 70% solids dispersion of the preblended epoxy/converter system in water and apply as a bond coat to seal the substrate and insure maximum interfacial adhesion. Application may be accomplished by brush, spray, roller, or squeegee at a coverage rate of 200 to 400 square feet per gallon.

Mix the modified concrete in a paddle type mortar mixer, KOL Mixal or other equipment used for Portland Cement concretes and place in the form. To develop maximum adhesion, place the freshly mixed concrete before the bond coat gels. Depending on temperature, the bond coat will remain "open" for approximately 2 to 8 hours.

The epoxy modified concrete screeds and trowels more like conventional Portland Cement concrete than concretes modified with polyvinyl acetate, acrylic and styrene-butadiene emulsions. Working life of the epoxy modified concrete is shorter than that of the unmodified concrete. The epoxy modification results in more rapid development of strength properties, particularly for sections less than 2 inches thick where one surface is exposed to normal atmospheric conditions during cure. Under these conditions, flooring may be opened to rubber-tired traffic in 1 to 2 days; and ground, in the case of thin-set terrazos, after 3 to 4 days. Practical cure rates may be achieved at ambient temperatures as low as 7 °C.

Typical Formulation Table 1 / Formulation Properties Properties

	<u>Units</u>	<u>Value</u>
Combining Ratio, Epoxy System: Portland Cement by weight		
Emulsion: Portland Cement		30 : 100
Emulsion Solids: Portland Cement		15 : 100
Pot Life of Water-thinned Epoxy System		
at 70% Solids	min.	30
at 50% Solids	min.	50
Expected Pot Life of Concrete at 25 °C	hrs	1
Density	lbs/gal	19.9

40% R.H. ¹ All tests were conducted on 1/2-inch thick overlays applied to aged concrete substrate and cured at 25 °C and

Except where noted, a 2-week cure period was given prior to testing.

was ² Same formulation as 1101-84 except that no epoxy modification was used and the water to Portland Cement ratio increased to 45:100 by weight for purposes of equalizing slump. Surfaces of both overlays were exposed to room air at 25 °C and 50% R.H. during the cure period.

³ After 2 weeks partial water immersion.

Typical Cured State Table 2 / Cured State Properties ¹ Properties

Units Formulation 5008 Unmodified Control ²

Tensile Strength, Core and Pull Method

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4 days	psi	280	90
12 days	psi	330	100
30 days	psi	340	100
Tensile Bond Strength			
Tested Dry	psi	>300	>50
Tested Wet ³	psi	>300	>50
Chemical Resistance			
10% HCl		Slowly attacked over a period of hours	Immediate attack

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Storage Recommendations regarding storage conditions can be obtained by visiting our web site at www.hexion.com

General Information

These are starting formulations and are not proven in the user's particular application but are simply meant to demonstrate the efficacy of the products and to assist in the development of the user's own formulation. It is the user's responsibility to fully-test and qualify the formulation, along with the ingredients, methods, applications or equipment identified herein ("Information"), by the user's knowledgeable formulator or scientist, and to determine the appropriate use conditions and legal restrictions, prior to use of any Information.

Safety, Storage & Handling

Please refer to the MSDS for the most current Safety and Handling information.

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Contact Information

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For literature and technical assistance, visit our website at www.hexion.com

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