

Starting Formulation

SF 4016 Epoxy Adhesive 828 8 3061 Epoxy Adhesive for Bonding New Concrete to Old EPON™ Resin 828 / HELOXY™ Modifier 8 / EPIKURE™ Curing Agent 3061

Introduction This bond coat formulation is designed to adhere new (freshly mixed) concrete to adjoining old concrete with a strong, permanent bond exceeding the tensile strength of concrete. Applied as a 5 to 10 mil coating to the old concrete, this bond coat also seals porous substrates and prevents rapid dehydration of the newly placed concrete. Unlike emulsion bond coats, this epoxy formulation retains high bonding strength under damp conditions existing in on-grade and below-grade structures.

- Features**
- Convenient equal volume combining ratio
 - Long pot life (approximately 4 hours at 25 °C)
 - May be applied by brush, roller or spray
 - 10 mil coating will not sag or run on vertical surfaces

Formula	Material	Supplier	Pounds	Gallons
Part A				
	EPON Resin 828	Hexion	82.0	8.53
	HELOXY Modifier 8	Hexion	18.0	2.44
	Calcium Carbonate, No. 1 White	Thompson, Weinman & Co.	14.0	0.63
	Kevlar Merge IF 371 Aramid Pulp	Du Pont Co.	<u>2.0</u>	<u>0.08</u>
		Total A	116.0	11.68
Part B				
	EPIKURE Curing Agent 3061	Hexion	60.0	7.68
	Nonylphenol	Borg-Warner Chemical, Inc.	10.0	1.25
	Calcium Carbonate, No. 1 White	Thompson, Weinman & Co.	60.0	2.71
	Kevlar Merge IF 371 Aramid Pulp	DuPont Co.	<u>1.0</u>	<u>0.04</u>
		Total B	131.0	11.68
		Total Part A & B	247.0	23.36

Mixing Instructions Part A

Disperse the Kevlar IF 371 and the calcium carbonate into EPON Resin 828 using a Cowles Dissolver or other high shear mixer. High shear mixing is necessary to develop thixotropy with IF 371. Blend in the HELOXY Modifier 8 under moderate speed agitation until a uniform composition is obtained, then package.

Part B

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Disperse the Kevlar IF 371 and the calcium carbonate into EPI-CURE 3061 Curing Agent using a Cowles Dissolver or other high shear mixer. High shear mixing is necessary to develop thixotropy with IF 371. Blend in the nonylphenol under moderate speed agitation until a uniform composition is obtained, then fill into tightly sealed containers.

Note: Absorption of atmospheric moisture into the curing agent during compounding or storage will reduce the working life of the combined formulation. If possible, the blending tank should be covered during compounding of the converter portion. A blanket of inert gas provides additional insurance against moisture contamination.

Typical Handling Properties Table 1 / Handling Properties

		<u>Units</u>	<u>Value</u>	
Combining Ratio (Resin to Converter)		by weight	100 : 113	
		by volume	1 : 1	
Viscosity at 25°C, cP	Resin Portion	Converter Portion	Blended System	
	1 rpm	4,000	11,900	5,300
	5 rpm	2,540	7,640	3,100
	10 rpm	2,250	5,980	3,000
	20 rpm	2,010	4,790	2,780
Weight per Gallon of Combined System		lbs/gal	10.6	
Expected Pot Life at 25 °C, 1 pint mass		hrs	4-1/4	
Gel Time of Coatings at 25 °C				
3 mil thickness		hrs	30	
15 mil thickness		hrs	24	
Tensile Shear Strength				
Aluminum to Aluminum		psi	2,420	
Steel to Steel		psi	2,540	
Set Time of Bond Coat at 25 °C				
3 mil thickness		hrs	30	
15 mil thickness		hrs	24	

Application Instructions The old concrete should be cleaned by either sandblasting, scarification with a Tennant machine, routing or acid etching. If acid etching is employed, the residual acid and salts should be removed by flushing with a high pressure water stream or scrubbed with a stiff bristle broom and water. The old concrete should be visually dry for best bonding results. Cleaning of the old substrate is especially important for maintaining high strength bonds in ongrade and below-grade structure.

Blend the resin and converter portions thoroughly prior to applying. The two components may be color coded by the incorporation of pigments to aid identification and to determine visually when the combined system is completely mixed.

Apply the freshly mixed bond coat to the old concrete or other substrate in a thickness of approximately 5 to 10 mils. Coverage per gallon should range from 160 to 320 square feet. The bond coat may be applied by means of brush, roller, notched trowel or spray.

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The long pot life of the system permits use of conventional spray equipment. A Binks Model 62 pressure gun equipped with fluid nozzle 68, air nozzle 60 PB, needle No. 368, and operating under a line pressure of 60 psi and a cup pressure of 15 psi is one satisfactory setup. If the bond coat components are cooler than normal room temperature, the addition of up to 10 percent xylene or toluene may be necessary to provide adequate sprayability.

This bond coat will cure at practical rates at temperatures above 50 °F. Application is not advisable when the ambient temperature is below 50 °F, or below 55 °F and falling.

The freshly mixed concrete can be placed immediately after application of the bond coat or over a period of several hours, providing the bond coat has not gelled. At normal room temperature, no decrease in bond strength was observed when the fresh concrete was placed 6 hours after application of the bond coat.

Typical Adhesive Properties Table 2 / Adhesive Properties

Tensile Bond Strength (New Concrete to Old)	psi at Rupture	Mode of Failure
Time interval between application of bond coat and placement of concrete:		
10 minutes at 25 °C	278	100% concrete
2 hours at 25 °C	263	100% concrete
6 hours at 25 °C	285	100% concrete
Effect of substrate dampness and environmental conditioning:		
Old concrete dry; new concrete cured at 50% RH	278	100% concrete
Old concrete dry; new concrete cured at 50% RH; then specimen partially immersed in water for 2 weeks and tested damp	291	100% concrete
Old concrete partially immersed in water; new concrete cured at 100% RH; specimen tested damp	200	100% concrete

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.

Exposure to these materials should be minimized and avoided, if feasible, through the observance of proper precautions, use of appropriate engineering controls and proper personal protective clothing and equipment, and adherence to proper handling procedures. None of these materials should be used, stored, or transported until the handling precautions and recommendations as stated in the Material Safety Data Sheet (MSDS) for these and all other products being used are understood by all persons who will work with them. Questions and requests for information on Hexion, Inc. ("Hexion") products should be directed to your Hexion sales representative, or the nearest Hexion sales office. Information and MSDSs on non-Hexion products should be obtained from the respective manufacturer.

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