

## Starting Formulation

### SF 4004 Ambient Epoxy Adhesive 828 3125 Ambient Cure Epoxy Adhesive for Metallic Bonding EPON™ Resin 828 / EPIKURE™ Curing Agent 3125

**Introduction** This epoxy adhesive is especially good at bonding various metal substrates at ambient temperature of 25°C or more. It also provides some tolerance to trace amounts of lubricants which may remain on bond surfaces when cleaning conditions are not ideal.

**Suggested Uses**

- Bonding of metals, at ambient temperatures. It will also bond well to concrete, glass and many rigid plastics.

**Features**

- Ability to bond to various metal substrates
- Tolerance to trace/small amounts of residual surface oil
- At least one hour working time at 25°C
- Good strength development in 24 hours

Formula	Material	Supplier	Pounds	Gallons
Part A				
	EPON Resin 828	Hexion	100.0	10.31
	Aluminum Powder 120	ALCOA – Specialty Metals Division	<u>100.0</u>	<u>4.44</u>
		Part A	200.0	14.75
Part B				
	EPIKURE Curing Agent 3125	Hexion	<u>54.5</u>	<u>6.73</u>
		Part B	54.5	6.73
	Total Part A & B		254.5	21.48

**Mixing Instructions** Disperse the aluminum powder into a portion (50-70%) of the EPON Resin 828 using dispersing equipment capable of mixing viscous, paste-like materials, such as a planetary type mixer. Mix until uniform consistency is attained. Add remaining EPON Resin 828 and mix until a uniform consistency is attained.

This formulation is a basic starting point and can be modified with other filler types, such as talc, alumina, ground silica, wollastonite, or calcium carbonate.

Modification with silane coupling agents, such as DOW CORNING® Z-6040 silane improves bonds to concrete and glass.

Pigment may be incorporated into either or both portion for the purpose of color coding. As with all pigments, their effect on the performance of the final, cured product should be

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investigated prior to production approval.

Typical Handling Table 1 / Handling Properties  
Properties

	<u>Units</u>	<u>Value</u>
Mix Ratio , resin : curing agent		
by weight		100 : 27
by volume		2.2 : 1
Expected Working Life @ 25°C (1 pint)	min.	60
Viscosity		
Part A/Part B @ 25°C	---	Paste
Part A/Part B @ 40°C	P	80 -120

**Application Instructions** All surfaces to be bonded should be free of dust, dirt, grease, or other contaminants. For optimum adhesion it is recommended to roughen bonding surfaces. This can be accomplished with abrasive media appropriate for the materials being bonded (such as medium grit emery paper, abrasive disks, grit blasting, wire brushes, etc.). Abrasion should always be followed by degreasing to remove contaminants and loose particles. Chemical etching is another method to provide a rough surface for improved adhesion.

Thoroughly mix the adhesive components and apply immediately by spreading a thin film over the surface to be bonded. Maintain light pressure during cure for optimum bonding.

Cure Schedule Room Temperature: 2-3 days @ 23°C

or

Elevated Temperature: Adhesive can be heat cured to shorten cure time. Maximum cure temperature should not exceed 250°F.

Typical Cured State Table 2 / Adhesive Properties – Aluminum 2024 T-3, Acid Etched  
Properties

<u>Test Property</u>	<u>ASTM</u>	<u>Tested at</u>	<u>Units</u>	<u>Value</u>
Tensile Shear Strength	D-1002			
Cured 24 hrs @ 23°C		25°C	psi	1500
Cured 48 hrs @ 23°C		25°C	psi	2050
Cured 24 hrs @ 121°C		121°C	psi	550
Cured 48 hrs @ 121°C		121°C	psi	775

Typical Adhesive Table 2 / Adhesive Properties  
Properties

<u>Substrate</u>	<u>Cure Schedule</u>	<u>Tensile Shear Strength</u> at 25 °C
Etched Aluminum, 2024T-3	15 minutes at 25 °C	180 psi
	1 hour at 25 °C	340 psi
	2 hours at 25 °C	900 psi
	3 hours at 25 °C	1800 psi
	24 hours at 25 °C	2600 psi

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	3 days at 25 °C	2300 psi
	7 days at 25 °C	2400 psi
	1 day at 25 °C followed by 2 hours at 100 °C	2400 psi
	7 days at 25 °C followed by 7 days water soak	2200 psi
Cold-rolled Steel, solvent-wiped	1 day at 25 °C followed by 2 hours at 100 °C	1200 psi
		Compressive Shear Strength at 25 °C
Concrete, dry	7 days at 25 °C	>900 (concrete failure)
		Tensile Bond Strength at 25 °C
Concrete, dry to steel	3 days at 25 °C	>300 (concrete failure)
Concrete, damp to steel	3 days at 25 °C	>300 (concrete failure)

Storage Recommendations regarding storage conditions can be obtained by visiting our web site at [www.hexion.com](http://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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