

Starting Formulation

SF 4023 One-Package Adhesive 828 and 58034 Latent One-Package Adhesive for Oily Steel EPON™ Resin 828 and 58034 / Latent Curing Agents

Introduction These starting point one-package adhesive formulations are especially suited for metal – metal bonding when the metal surfaces have a small amount of residual drawing oil, such as often encountered in automotive body assembly operations.

Suggested Uses

- Automotive stamped metal flange adhesives and other applications where metal panels may be contaminated with small amounts of residual drawing fluids/oils which cannot be removed before assembly.

Features

- One Pack
- Adhesion to stamped metal contaminated with small amounts of drawing oil
- Service temperatures up to 121°C (250°F)

Formula Component	Supplier	Units	A	B	C	D
EPON Resin 828	Hexion	pbw	80	80	80	80
EPON Resin 58034	Hexion	pbw	20	20	20	20
Kevlar® Plup - thixorope	DuPont Advanced Fibers		1	1	1	---
Dyhard 100SF (dicyandiamide), micronized - latent curing agent	Degussa Corp. – Fine Chemicals	pbw	---	---	4	10
Carbohydrazide, micronized - latent curing agent	Fairmount Chemicals	pbw	12.5	---	---	---
Adipic Dihydrazide, micronized - latent curing agent	Fairmount Chemicals	pbw	---	25	---	---
Imicure® AML-1 (1-methylimidazole) , - catalyst	Air Products	pbw	---	---	0.25	---
Dyhard UR300 (fenuron) - catalyst	Degussa Corp. – Fine Chemicals	pbw	---	---	---	4.9

Mixing Instructions A high speed mixer (such as a Cowles) can be used; however, care should be taken to keep temperature as low as possible. Temperatures should be kept below 45°C (115°F).
Load EPON Resin 828 at room temperature or lowest practical temperature for your pumping equipment.
Add and disperse Kevlar pulp starting at 25 – 30°C. Higher viscosity (due to lower temperature) helps break-up and disperse the pulp.
Add curing agent and catalyst powders and mix until a smooth, uniform blend is achieved.

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

Typical Handling Properties Table 1 / Handling Properties

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	Units	Value
Expected Working Life @ 4.5°C (40°F)		
Formulations A,B,C	months	3 – 6
Formulations D	months	6 – 12
Form / Viscosity @ 25°C Blend		High viscosity thixotropic liquid

Application Instructions These formulations will usually provide moderate bond strengths on metals lightly contaminated with drawing oils (<200 mg/sq. ft.). However, for optimum bond strengths, surfaces to be bonded should be clean and free of dust, dirt, grease, oil or other contaminants. 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.

Apply by spreading a thin film approximately 0.005 inch thick over the surface to be bonded. Maintain light pressure during cure for optimum bonding.

Cure Schedule 1 hour @ 121°C (250°F) or 30 minutes @ 150°C (300°F)

Typical Cured State Properties Table 1 / Adhesive Properties – Various Substrates ¹

Test Property	Substrate	ASTM	Units	A	B	C	D
Tensile Shear Strength @ 25°C (77°F)	Galvanealed Steel	D-1002	psi	1180	1675	1540	1185
	Cold-Rolled Steel		psi	1125	1625	900	975
	Galvanized Steel		psi	1200	1360	1210	1385
Tensile Shear Strength @ 121°C (250°F)	Galvanealed Steel		psi	400	735	345	300
	Cold-Rolled Steel		psi	435	785	265	260
	Galvanized Steel		psi	430	860	175	150

¹ Test coupons were lightly coated with drawing oil.

² Cure cycle simulated automotive paint bake cycle: 15 minutes @ 157°C (315°F) followed by 60

minutes @ 25°C (77°F), followed

by 30 minutes @ 121°C (250°F).

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

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