



**Adhesive
Solutions**

GROUP OF COMPANY

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3M

Scotch-Weld™

EPX™ Epoxy Adhesive DP410

Product Data Sheet

Updated : October 2001
Supersedes : April 1997

Product Description

DP410 epoxy adhesive is a low flow, two-part structural adhesive. It is designed for use where toughness, high strength and rapid cure are required.

DP410 offers the following features:

Very rapid cure at room temperature; cure rate may be accelerated by the application of mild heat.

Convenient 2:1 mix ratio by volume

Mixed adhesive is low flow for ease of application

Ten minute work life with very fast strength build-up

Toughened epoxy system with good elevated temperature resistance

High environmental resistance

Physical Properties

Not for specification purposes

	BASE	HARDENER
Base	Toughened Epoxy	Modified Amines
Colour	Off-White	Off-White
Consistency	Low sagging paste	Low sagging paste
Specific Gravity (ca)	1.14	1.07
Mix Ratio By weight.... By volume...	100 100	47 50
Work Life at 23 ± 1°C	4-7 min for a 10 g mix 10-16 min for a 2 g mix	
Standard 3M Shelf Life	12 months from date of despatch by 3M when stored in the original carton at 23°C & 50 % Relative Humidity	

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Performance Characteristics

Not for specification purposes

Overlap Shear Strength 1

Overlap shear specimens were made according to AECMA test method EN 2243-1 using 1.6 mm thick 2024 T3 clad

aluminium with the surface prepared by the optimised FPL etch method.

Test conditions	Results
- 55 ± 3°C	28.9
23 ± 2°C	34.0
80 ± 2°C	8.4
100 ± 2°C	3.0
120 ± 2°C	2.0

- All values in Mpa
- Cure cycle : 7 days at 23 ± 2°C under a pressure of 100 kPa the first 24 hours

- Glass beads are used to control glue line thickness (# 150 µm)

Overlap Shear Strength 2

Overlap shear specimens were made according to test method EN 2243-1 using 1.6 mm thick 2024 T3 clad aluminium with the surface prepared by the

optimised FPL etch, chromic acid anodised and primed with Scotch-Weld 3960 corrosion inhibiting primer.

Test conditions	Results
- 55 ± 3°C	30.8
23 ± 2°C	37.7
80 ± 2°C	14.9
23 ± 2°C after 750 hrs at 50°C, ≥ 95 % RH	29.4
23 ± 2°C after 750 hrs 5% salt spray at 35°C	28.3

- All values in Mpa
- Cure cycle : 7 days at 23 ± 2°C under a pressure of 100 kPa the first 24 hours

- Glass beads are used to control glue line thickness (# 150 µm)

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Performance Characteristics (Cont...)

Not for specification purposes

Overlap Shear Strength 3

Typical adhesive performance characteristics

- All values in Mpa
- Cure cycle : 7 days at 23 ± 2°C under a pressure of 100 kPa the first 24 hours
- Glass beads are used to control glue line thickness (# 150 µm)

• METALS	
Abraded 2024 T3 clad aluminium	25.4
Abraded 6111 T6 aluminium	
Cold rolled steel (abraded)	17.2
Hot dip galvanised steel	18.9
Brass (abraded)	18.2
Stainless Steel (abraded)	18.5
	20.9
• THERMOPLASTICS	
Acrylic (abraded)	2.4
Polycarbonate (abraded)	3.4
Polystyrene (abraded)	3.4
PVC	3.3
ABS	4.3
Nylon 6.6	1.7
• THERMOSETS	
Fibreglass Reinforced Polyester (abraded)	9.7 (substrate failure)
Fibreglass Reinforced Phenolics	24.9 (substrate failure)
Carbon Fibre Reinforced Epoxy	37.2

Metal To Metal Peel Strength

Roller peel specimens were made according to test method EN 2243-2 using 2024 T3 clad aluminium prepared by the optimised FPL etch. 23 ± 2°C : 240 N/25 mm

Environmental Properties

Typical results obtained on 1.6 mm thick FPL etched 2024 T3 clad aluminium. Overlap shear specimens were made according to test method EN 2234-1. Testing after a 750 hour ageing was done at 23 ± 2°C.

- All values in Mpa
- Cure cycle : 7 days at 23 ± 2°C under a pressure of 100 kPa the first 24 hours
- Glass beads are used to control glue line thickness (# 150 µm)

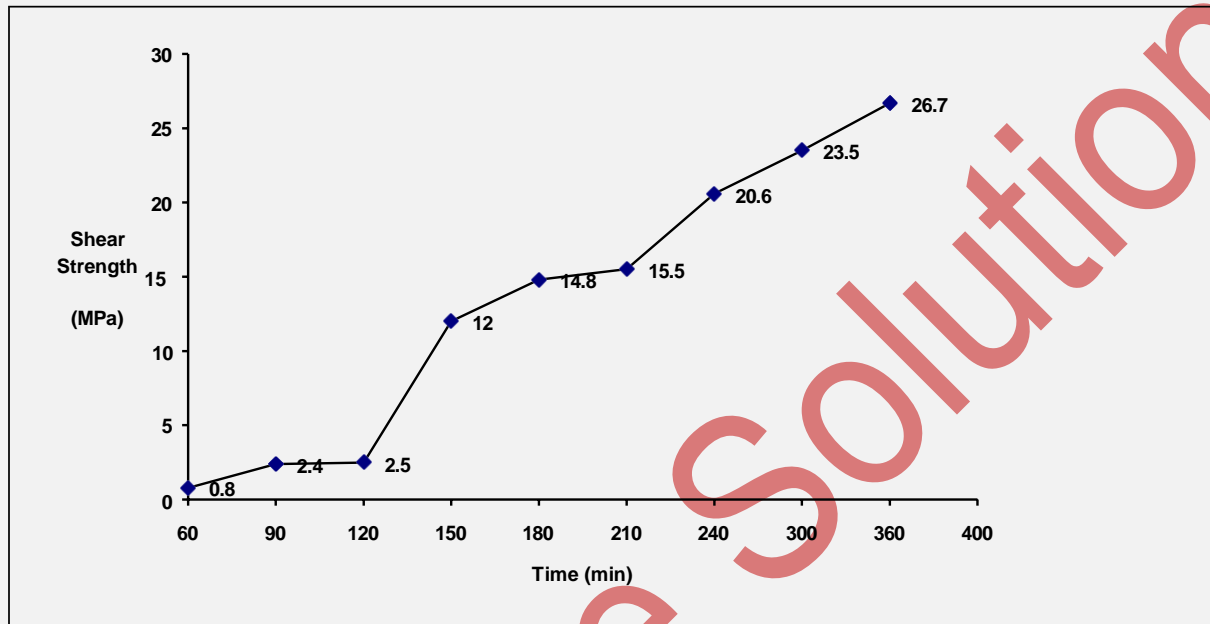
Conditions	Test Results
Control	34.0
D.I water at 23°C	24.6
80°C dry heat	36.7
JP4 fuel at 23°C	33.0
Engine oil at 23°C	35.1
Hydraulic oil at 23°C	30.9
50°C, ≥ 95 % relative humidity	22.7
5 % salt spray at 35°C	19.8

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Rate Of Cure - Strength Build Up

The rate of strength build-up was determined by pulling individual specimens (etched 2024 T3 clad aluminium) left at $23 \pm 2^\circ\text{C}$.

Each reported point is an average of three specimens.



After 24 hrs : 33.3 MPa
After 48 hrs : 36.6 MPa
After 96 hrs : 37.9 MPa
After 7 days : 36.5 MPa

After 15 days : 39.3 MPa
After 30 days : 36.2 MPa
After 60 days : 35.8 MPa

Storage Conditions

Store product at 23°C or lower for maximum storage life.
Rotate stock on a "first in-first out" basis.

Upon request, your 3M representative will be pleased to advise the anticipated shelf life of this product under the applicable storage conditions.

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Directions for Use

- For high strength structural bonds, paint, oils, dust, mould release agents and other surface contaminants must be completely removed. However, the amount of surface preparation directly depends on the required bond strength and the environmental ageing resistance desired by user. For specific surface preparations on common substrates, see following information.

- Use glove to minimise skin contact. Do not use solvents for cleaning hands.

- Mixing

For Duo Pack Cartridges

DP 410 is supplied in a dual syringe plastic Duo-Pak cartridge as part of the EPX™ Applicator System. To use, simply insert the Duo-Pak cartridge into the EPX applicator and start plunging the cylinders using light pressure on the trigger. Next, remove the Duo-Pak cartridge cap and expel a small amount of adhesive to be sure both sides of the Duo-Pak cartridge are flowing evenly and freely. If automatic mixing of Part A and Part B is desired, attach the EPX mixing nozzle to the Duo-Pak cartridge and begin dispensing the adhesive.

For hand mixing, expel the desired amount of adhesive and mix thoroughly. Mix approximately 15 seconds after uniform colour is obtained.

Surface Preparation:

For high strength structural bonds, paint, oils, dust, mould release agents and other surface contaminants must be completely removed. However, the amount of surface preparation directly depends on the required bond strength and the environmental ageing resistance desired by user. The following cleaning methods are suggested for common surfaces :

Steel

1. Wipe free of dust with oil-free solvent such as acetone, isopropyl or alcohol solvents.*

2. Sandblast or abrade using clean fine grit abrasive.

3. Wipe again with solvent to remove loose particles

Aluminium

1. Alkaline Degrease :
Oakite 164 water solution (10%) at $85 \pm 5^\circ\text{C}$ for 10-20 minutes. Rinse immediately in large quantities of cold running water.

2. Acid Etch : place panels in the following solution for 10 minutes at $65 \pm 3^\circ\text{C}$

Sodium Dichromate 44.8g
Sulphuric Acid, 66°Be 332g
2024-T3 aluminium
(dissolved 1.5g
Tap water adjust to 1 litre

3. Rinse : rinse panels in clean running tap water.

4. Dry : air dry 15 minutes; force dry 10 minutes at $65 \pm 5^\circ\text{C}$

5. If primer is to be used, it should be applied within 4 hours after surface preparation.

Plastic/Rubber

1. Wipe with Isopropyl alcohol.*

2. Abrade using fine grit abrasives.

3. Wipe with Isopropyl alcohol.*

Glass

1. Solvent wipe surface using acetone or MEK.*

2. Apply a thin coating (2.5 μm or less) of primer such as Scotch-Weld EC-3901 Primer to the glass surfaces to be bonded and allow the primer to dry before bonding.

() Note : When using solvents, extinguish all ignition sources and observe manufacturer's directions and precautions for handling such materials.*

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Health and Safety
Information

Refer to product label and Material Safety Data Sheet for health and safety information before using the product.
For information please contact your local 3M Office
www.3M.com

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