



Scotch-Weld™

Structural Plastic Adhesive DP-8010

Product Data Sheet

Updated : February 2003
Supersedes : None

Product Description

3M Scotch-Weld™ DP8010 Structural Plastic Adhesive is a two part acrylic-based adhesive (10:1 ratio by volume) that can bond many low surface energy plastics, including many grades of polypropylene, polyethylene and TPO's without special surface preparation.

Scotch-Weld DP-8010 Structural Plastic Adhesive can replace screws, rivets, plastic welding, and two step processes which include chemical etchants, priming or surface treatments in many applications.

Typical Uncured Physical Properties

Note : the following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Property	Accelerator (Part A)	Base (Part B)
Colour	White	Pink/Amber
Density (kg/l)	1.05-1.09	0.95-1
Viscosity (cps) ⁽¹⁾	27,000	17,000
Base Resin	Amine	Methacrylate
Mix Ratio (Volume)	1	10
Mix Ratio (Weight)	1	9.8
Time to Handling Strength (0.35 MPa at 23°C)	1.5 – 2 hours	
Full Cure time (at 23°C)	8-24hrs	
Worklife at 23°C	10 - 12 min	

(1) Viscosity obtained by Brookfield DV-II, #7 spindle 20 rpm at 24 °C

Typical Cured Physical Properties

Note : the following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Colour	Yellow
Tg (°C) onset point DSC 10°C/min ⁽²⁾	34-38°C
Coefficient of Thermal Expansion (ppm/°C) ⁽²⁾	Below Tg
	Above Tg
Mechanical Properties ⁽³⁾ :	
Strain at break	3%
Stress at break (MPa)	13
Modulus at 1% Strain (MPa)	483

(2) Tg and CTE determined by TMA -40 °C – 120 °C at 5 °C / min (after 2 heat cycles)

(3) Mechanical properties obtained using a Sintech 5GL mechanical tester. Approximate dimensions of the test specimen was 1.5 x 0.5 x 0.3. Elongation was determined by crosshead displacement. Crosshead velocity was 0.5/min

Typical Adhesive

Note : the following technical information and data should be considered representative or typical

Performance Characteristics

only and should not be used for specification purposes.

Overlap shear strength⁽⁴⁾, tested at 24 °C

Substrate ⁵	OLS (MPa)	Failure mode
UHMW PE	5.2	Substrate yield
LDPE	2.4	Substrate yield
Black HDPE	5.9	Cohesive failure
PP	10.3	Cohesive failure
ABS	8.4	Substrate failure
Polycarbonate	8.6	Cohesive failure
PMMA (acrylic)	7.5	Substrate failure
PTFE	2.3	Substrate yield
Rigid PVC	10.9	Mixed cohesive / substrate
Polystyrene (HIPS)	3.2	Substrate yield
Nylon-6,6 30% Glass filled	-	No bond
G-FRP	12.8	Mixed mode failure
Cold Rolled Steel / HDPE	5.8	Adhesive to CRS
ED-5000 E-coated CRS/HDPE	8.5	Adhesive failure
EC-3924 primed CRS	11.0	Cohesive failure
Aluminium / HDPE	2.9	Adhesive to Al
EC-3924 primed Al / HDPE	10.0	Cohesive failure

- (4) Overlap shear test for adhesion determined in accordance to ASTM D1002, sample dimensions 1"×4"×1/8", with a ½ square inch of area of overlap, bonded to themselves unless otherwise noted, allowed to cure for at least 16 hours at 24°C before testing. Data collected using a Sintech 5GL Mechanical Tester. Test rate was 0.5"/min. Strength at 24°C unless otherwise noted.
- (5) In many cases bond performance depends upon the specific grade of material used. The data is representative of typical performance – each application should be fully evaluated using specific materials

Typical Adhesive Performance Characteristics (Continued)

Note : the following technical information and data should be considered representative or typical only and should not be used for specification purposes.

**Environmental Exposure Tests⁽⁶⁾
Overlap Shear Strength of HDPE bonds**

Condition	Time	Temp	OLS (MPa)	Failure mode
Control	-	24°C	10.6	Substrate
41°C/100%RH	14 days	41°C	8.0	Cohesive
41°C/100%RH	30 days	41°C	7.7	Cohesive
Water soak	14 days	71 °C	8.2	Cohesive
10% NaOH	14 days	24°C	10.2	Substrate/Cohesive
16% HCl	14 days	24°C	10.4	Cohesive
20% Bleach	14 days	24°C	10.4	Substrate/Cohesive
IPA	14 days	24°C	7.9	Substrate/Cohesive
50% antifreeze	14 days	24°C	10.6	Substrate
Gasoline	14 days	24°C	5.2	Cohesive
Diesel Fuel	14 days	24°C	10.0	Cohesive
Toluene	14 days	24°C	-	Complete failure

- (6) Environmental tests were conducted by immersing bonded coupons of extruded PP to extruded HDPE prepared in accordance to description in footnote 4.

Typical Adhesive

Note : the following technical information and data should be considered representative or typical

Performance Characteristics (Continued)

only and should not be used for specification purposes.

T-peel strength (piw)⁽⁷⁾, tested at 24 °C

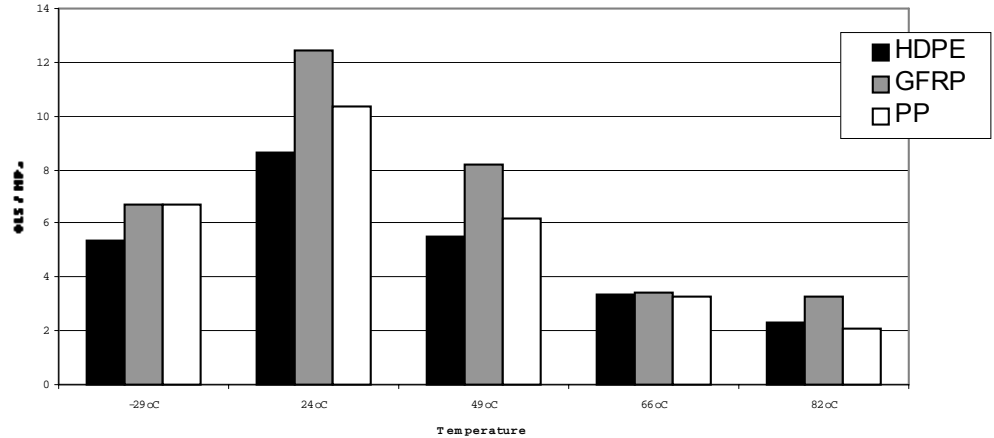
Substrate	Strength (piw)	Failure mode
HDPE	34	Cohesive

(7) Peel tests on 0.020" HDPE and 0.017" bondline thickness 8"x1" in T-Peel mode, peel rate 2"/min.

Typical Adhesive Performance Characteristics (Continued)

Note : the following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Temperature Resistance, Overlap Shear Strength / MPa

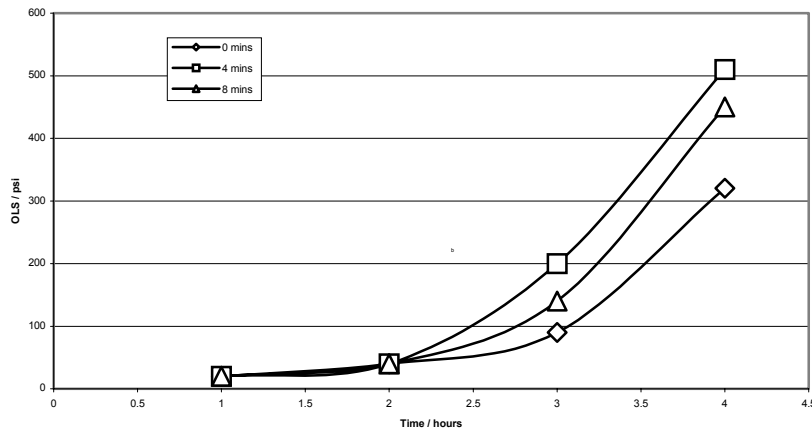


The above overlap shear tests data was collected on 5mm*100mm*25mm PP specimens overlapped 12.5mm, allowed to cure at 24°C for 7 days and then tested at a rate of 10mm/mn in overlap shear mode, at the temperature shown.

Typical Adhesive Performance Characteristics (Continued)

Note : the following technical information and data should be considered representative or typical only and should not be used for specification purposes.

Rate of Strength Build-up as a function of open time



The above rate of strength build up was collected on 25mm*100mm Aluminium and PP samples overlapped 12.5mm allowed to cure at 24°C and tested at a rate of 10mm/mn in overlap shear mode at 24°C.

Suggested Substrates

Note : The following suggestions are based on laboratory tests on typical grades of the listed substrates. Because of the many combinations of process aids and additives that are used with plastics substrates, the user is responsible for determining whether Scotch-Weld Structural Plastics Adhesive DP 8010 is appropriate for a given application.

Potential Primary Surfaces

- Polypropylene (PP)
- Polyethylene (PE, HDPE, LDPE)
- TPO's

Potential Secondary Surfaces

- Fibre Reinforced Plastics
- Primed metals
- Polycarbonate
- Wood
- Glass
- Rigid PVC
- ABS
- Acrylic (PMMA)
- Polystyrene
- Concrete
- PTFE (Teflon®)*

* Variable results have been obtained on this substrate – evaluate fully before use

Not Recommended Surfaces

Inconsistent results have been exhibited with substrate that contain oils and antistats.

- Bare (unpainted or unprimed) metals
- Silicones surfaces
- Mold-release Agents
- Polyimide
- Nylons

Handling/Curing Information

Directions for Use :

Important : Use only the specified 3M™ EPX™ Applicator system or appropriate meter mix equipment to ensure the proper 10:1 mix ratio and mix. Hand mixing is not recommended, and may result in unpredictable results.

Apply adhesive to clean, dry substrates, which are free of paint, oxide films, oils, dust, mold release agents and all other surface contaminants. See the Surface Preparation section for specific substrate preparation methods :

38ml cartridges :

Place Duo Pack cartridge of EPX applicator. Remove cap. Dispense and discard a small amount of adhesive to assure even ratio and free flow. Clear orifice if necessary. Use only orange 10:1 mixing nozzle by : 1) aligning nozzle notch with cartridge recess, and 2) twisting into place. Dispense and discard a small amount of adhesive through nozzle until the adhesive is mixed.

265ml cartridge :

While holding Duo-Pack cartridge in an upright position, remove and discard the insert from the cartridge by unscrewing plastics nut and removing metal washer. Place cartridge in a 10:1, 265ml EPX applicator.

Clean orifice if clogged, dispense and discard a small amount of adhesive to even pistons. Attach orange 10:1 EPX mixing nozzle by :

- a) sliding the nozzle over the cartridge orifice until the nozzle notch **aligns** and **seats** against the tab on the neck of the cartridge and ;
- b) screwing the plastic nut back onto the cartridge to secure the nozzle. Dispense and discard a small amount of adhesive until the adhesive has milky white appearance, if adhesive is clear check and small orifice for debris.

Meter Mix Equipment :

Follow manufacturer's precautions and directions for use, and recommendations.

1. After the adhesive is applied, substrates must be mated within the worklife of the adhesive, 8-10 minutes for one-sided applications. Adhesive thickness less than 130µm will yield unpredictable results. The joint design of the substrates should facilitate a 130 to 200µm adhesive thickness at the bondline. Adhesive contains 200µm microspheres for this purpose.
2. The bonded surfaces should be fixtured , or clamped for at least 2hrs. The clamping pressure should be sufficient to keep the surface in contact during cure (typically 0.028 - 0.055MPa). Plastic parts can be designed to be self fixturing, negating the need for external fixturing (Note : Heating the bondline to 66 - 80°C for 30 minutes will speed curing)
3. Cured adhesive appearance : the adhesive will yellow with time, a rippling effect in the adhesive as it cures is normal and indicates that the adhesive is mixed properly and curing normally

Handling/Curing Information (continued)

Approximate Coverage - By Size of Container

	Linear m per 38ml	Linear m per 265ml	Linear m per litre
12.7 mm	0.5	3.9	14.7
9.5 mm	0.9	7	26.4
6.3 mm	2.1	15.8	59.6
3.1 mm	8.8	63	237.7
1.6 mm	35	250	943.4

Coverage in square meter - (200µm bondline)

m² per 35ml	m² per 250 ml	m² per mixed litre
0.2	1.2	4.8

Surface preparation

Scotch-Weld Structural Plastic Adhesive DP-8010 can bond Polypropylene and Polyethylene without surface preparation. However, all substrates should be clean, dry and free of paint, oxide films, oils, dusts, mold release agents and other surface contaminants. The amount of surface preparation directly depends on the bond strength and environmental resistance desired by the user.

The following cleaning methods are suggested for common surfaces.

Steel and Aluminium (priming recommended)

1. Wipe free of dust with oil-free solvent such as acetone or isopropyl alcohol.
2. Sandblast or abrade using clean grit abrasives (180grit or finer).
3. Wipe again with solvent to remove loose particles.

If a primer is used, it should be applied within 4 hours after surface preparation. If 3M Structural Adhesive Primer 1945 B/A is used, apply a thin coating (10µm) on the metal surface to be bonded, air dry at 24°C for 1hr, then cure for 30minutes at 82°C, 5 minutes at 122°C or 3 hours at 24°C (Note : Aluminium may also be acid etched. Follow the manufacturer's precautions and directions for this procedure).

Plastic/Rubber

1. Wipe with isopropyl alcohol*.
2. Abrade using fine grit abrasive (180 grit or finer)
3. Remove residue by wiping again with isopropyl alcohol*.

Glass

1. Solvent wipe surface using acetone.*

* **Note :** When using solvents, be sure to extinguish all ignition sources and follow the manufacturer's precautions and directions for use.

Storage and Shelf Life

- Storage :** For maximum shelf life, store Duo Pack cartridges and bulk containers at 4°C or below.
- Shelf life :** When stored at the recommended temperature in the original unopened containers, this product has a shelf life of six months from date of shipment.

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Values presented have been determined by standard test methods and are average values not to be used for specification purposes. Our recommendations on the use of our products are based on tests believed to be reliable but we would ask that you conduct your own tests to determine their suitability for your applications. This is because 3M cannot accept any responsibility or liability direct or consequential for loss or damage caused as a result of our recommendations.



Tapes & Adhesives Group

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