

3M

Scotch-Weld™

PUR Adhesives

TE031 Black

TE040 Black

TE100 Black

TS230 Black

Technical Data

July, 2014

Product Description	3M™ Scotch-Weld™ PUR Adhesives are a family of one-component, moisture curing, urethane adhesives. These adhesives are applied warm and can bond a wide variety of substrates such as wood, fiber reinforced plastic (FRP) and many other plastics to themselves, to metal and to glass.	
	3M™ Scotch-Weld™ PUR Adhesive TE031 Black	Extrudable grade adhesive with fast set time ideal for bonding a wide variety of plastics including polystyrene and polyacrylic.
	3M™ Scotch-Weld™ PUR Adhesive TE040 Black	Extrudable grade adhesive with fast set time and low viscosity ideal for bonding most wood, plastics, metal and glass
	3M™ Scotch-Weld™ PUR Adhesive TE100 Black	Extrudable grade adhesive with medium set time and low viscosity ideal for bonding wood. Bonds selected plastics. Yields thin glue lines.
	3M™ Scotch-Weld™ PUR Adhesive TS230 Black	Sprayable/extrudable grade adhesive with long set time ideal for bonding a wide variety of plastics including polystyrene and polyacrylic. Bonds aluminum and glass to plastic and wood.

Features

- One component
- 100% solids
- Various set times
- Rapid rate of strength build-up
- High strength bonds
- Highly plasticizer resistant
- Broad substrate adhesion
- Can be used to bond many heat sensitive materials

Typical Uncured Properties

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

	3M™ Scotch-Weld™ PUR Adhesives			
	TE031 Black	TE040 Black	TE100 Black	TS230 Black
Application Temperature¹	250°F (121°C)	250°F (121°C)	250°F(121°C)	250°F (121°C)
Viscosity (@250°F/121°C)²	14,000 cps	7,000 cps	9,000 cps	8,400 cps
Color (solid)	Black	Black	Black	Black
Open Time^{3,5}	2 minutes	2 minutes	2 minutes	4 minutes
Set Time⁵	30 seconds	40 seconds	1 minute	2.5 minutes
Density, Lbs/Gallon(molten)	8.7	8.9	8.8	9.1

¹Dispensing temperature should never exceed 275°F (135°C)

²Measured on Brookfield viscometer with Thermosel using spindle #27

³The bonding range of a 1/8" bead of molten adhesive on a non-metallic substrate

⁴The minimum amount of time required between when the bond is made and when it will support a 5 psi tensile load

⁵Open time and set time are based on a room temperature environment. Higher temperatures will lengthen open times and set times while lower ambient temperatures will shorten open times and set times

3M™ Scotch-Weld™

PUR Adhesives

TE031 Black • TE040 Black • TE100 Black • TS230 Black

Available Package Sizes

1/10 th gallon cartridge ^{1,2}	2 Kilo bag ³	5 gallon pail	55 gallon drum
10 fluid ounces/295ml	2 Kgs(4.4 pounds)	36 pounds (16.3 Kgs)	400 pounds (181.4 Kgs)
Thread size for nozzle M15 X 1.5	Slug OD. – 5.0" (127 mm)	Pail ID. – 11.25" (285.8mm) Pail Ht. – 13.5" (343 mm)	Drum ID. – 23.6" (600.5 mm) Drum Ht. – 34.8" (883.9 mm)

¹5 -1/10th gallon cartridges per case.

²10 disposable plastic nozzles are supplied with each case of adhesive.

³6 -2kg bags per case.

Approximate Coverage per container (Linear ft per container based on 1/8" dia. Bead size)

1/10 th gallon cartridge	2 Kilo bag	5 gallon pail	55 gallon drum
250' (76.2m)	1650' (502.9m)	13,500' (4114.8m)	170,200' (51876.9m)

Typical Cured Properties

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

Property	3M™ Scotch-Weld™ PUR Adhesives			
	TE031 Black	TE040 Black	TE100 Black	TS230 Black
Shore D Hardness ¹	48	35	57	42
Modulus ²	3,600 psi	2,850 psi	7,500 psi	3,000 psi
Tensile Strength @ Break ²	3,700 psi	2,750 psi	3,850 psi	3,200 psi
Elongation @ Break ²	750%	860%	675%	825%

¹Measured on .090" - .110" thick bars

²ASTM D 638, Die C, measured on .011" - .017" thick films cured for a minimum of 7 days at 77°F(25°C)/50% relative humidity (RH).

Typical Performance Characteristics

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

A. Overlap Shear Strength

Overlap shear (OLS) strengths were measured on 1" wide 1/2" overlap specimens. These bonds were made individually using 1" x 4" sample coupons. The thickness of the bond line was controlled with .003-.006" diameter glass bead spacers. The thicknesses of the substrates were: plastics, .125", Maple, .375".

The separation rate of the testing jaws was 2" per minute. All results are recorded in pounds per square inch (psi).

Overlap Shear Strength (psi), tested @ 73°F (23°C)

Substrate	3M™ Scotch-Weld™ PUR Adhesives			
	TE031 Black	TE040 Black	TE100 Black	TS230 Black
Maple	1,500	970	2,100	1,500
FRP	2,700	2,310	3,160	3,100
Polycarbonate	1,570	1,590	1,760	1,840
Polyacrylic	1,230 ¹	1,110	1,330 ¹	1,340 ¹
Polystyrene	580 ¹	690	710 ¹	690 ¹
ABS	1,340 ¹	1,290 ¹	990	1,400 ¹
PVC	1,870 ¹	2,110 ¹	1,900 ¹	2,110 ¹

¹Substrate failure

3M™ Scotch-Weld™

PUR Adhesives

TE031 Black • TE040 Black • TE100 Black • TS230 Black

Typical 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.

Overlap Shear Strength (psi), tested @ 180°F (82°C)

Substrate	3M™ Scotch-Weld™ PUR Adhesives			
	TE03 Black	TE040 Black	TE100 Black	TS230 Black
Maple	650	260	550	450
FRP	790	880	1,150	700

B. 180° Peel Strength (piw)

180° peel strengths were measured on 1" x 8" pieces of flexible cotton duck (canvas) bonded to rigid 1" x 4" substrates. The rigid substrates were approximately .125" thick and the separation rate of the testing jaws was 2" per minute. All strengths were measured at 73°F (23°C). All results are recorded in pounds per inch width (piw).

Substrate	3M™ Scotch-Weld™ PUR Adhesives			
	TE031 Black	TE040 Black	TE100 Black	TS230 Black
FRP	78 ¹	66	80 ¹	78 ¹
Polycarbonate	95 ¹	60	101 ¹	101 ¹
Polyacrylic	57	67	80 ¹	47
Polystyrene	68	22	11	45
ABS	70 ¹	65	65 ¹	47
PVC	84 ¹	90 ¹	78 ¹	90 ¹
Aluminum	1 ²	52	1 ²	48
Glass	2 ²	54	1 ²	45

¹Cotton duck (canvas) failed during test

²Note: 3M™ Scotch-Weld™ PURs TE031 and TE100 are not suggested for use on uncoated aluminum or glass.

C. Test Sample Cure Cycle

All bonds were cured for a minimum period of 7 days at 77°F (25°C)/50% RH before testing. Bonds were prepared using the suggested surface preparation procedure for the particular substrate tested.

Definitions

Open Time: Is the maximum time between the application of the adhesive and when the parts must be joined together. This information is based on 1/8" bead on non-metallic substrates at 75°F (20°C).

Set Time: Also known as fixturing /clamping time. This is the minimum amount of time required for the adhesive to solidify and hold the parts together. Measured by the time (in seconds) required in order to support a tensile load of 5 psi.

Surface Preparation

Aluminum (uncoated) and Rubber: Clean all surfaces to be bonded with methyl ethyl ketone (MEK), abrade with fine grit abrasive, wipe with MEK. After cleaning surfaces allow solvent¹ to completely evaporate before bonding. Priming may be necessary on aluminum if part will be subjected to hot/humid conditions.

3M™ Scotch-Weld™

PUR Adhesives

TE031 Black • TE040 Black • TE100 Black • TS230 Black

Surface Preparation (continued)

Glass²: Clean all surfaces to be bonded with methyl ethyl ketone (MEK). After cleaning surfaces allow solvent¹ to completely evaporate before bonding. Priming may be necessary on glass if part will be subjected to hot/humid conditions.

Metal²: Clean all surfaces to be bonded with a suitable solvent¹ such as acetone or methyl ethyl ketone (MEK). After cleaning surfaces allow solvent to completely evaporate before bonding.

Plastic³: Clean all surfaces to be bonded with a suitable solvent¹ such as acetone or methyl ethyl ketone (MEK). After cleaning surfaces allow solvent to completely evaporate before bonding

Plastic³: Clean all surfaces to be bonded with a suitable solvent¹ such as acetone or methyl ethyl ketone (MEK). After cleaning surfaces allow solvent to completely evaporate before bonding.

Plastic³: contaminated with mold release: Clean all surfaces to be bonded with a suitable solvent¹ such as acetone or methyl ethyl ketone (MEK), then abrade with fine grit abrasive, wipe with solvent such as acetone or MEK. After cleaning surfaces allow solvent to completely evaporate before bonding.

Wood: All surfaces should be dry and free of contaminants such as sawdust, dirt or other substances that may interfere with the adhesive bonding process. If the surface to be bonded contains a coating or finish, bonds should be made and evaluated to ensure proper adhesion.

1. When using solvents, use in a well ventilated area. Extinguish all sources of ignition in the work area and observe product directions for use and precautionary measures. Refer to product label and MSDS for further precautions. Always pre-test solvent to ensure it is compatible with substrates.

The use of alcohols as a cleaning solvent may interfere with the curing process of the PUR if proper precautions are not followed. If alcohol is used, allow adequate time for the alcohol to completely evaporate from the substrate before applying the PUR. Also prevent any alcohol from coming in contact with uncured adhesive.

2. Do not bond glass or metal to itself or each other because full cure will not occur due to the low moisture vapor permeation rate of the substrate.
3. 3M™ Scotch-Weld™ PUR Adhesives are not recommended for bonding untreated polyolefins to themselves or to other substrates. For these materials the adhesion maybe improved by surface treatment of the bond area using flame, corona, or plasma treatment.

Adhesive Warm - up

1/10th gallon Cartridges: Should be heated for a minimum of 45 minutes in either the 3M Pre-heater (Pn.23564) or EZ250 Adhesive Applicator (Pn. 23563). The PUR can be held at dispensing temperature for up to 16 hours* (total time in pre-heater and applicator).

2 kilogram bag, 5 gallon pail, and drum: For bulk dispensing equipment refer to the equipment manufacture for adhesive warm up procedures.

***Note: It is recommended that adhesive heated longer than this total time be discarded and fresh adhesive introduced.**

3M™ Scotch-Weld™

PUR Adhesives

TE031 Black • TE040 Black • TE100 Black • TS230 Black

Dispensing Equipment

Cartridge dispensing equipment: The 1/10th gallon cartridge should only be dispensed using the 3M™ Scotch-Weld™ PUR EZ250 Adhesive Applicator, Pn 23563. Refer to applicator instructions for complete information on cartridge loading and application.

Bulk dispensing equipment: Bulk containers of adhesive (2 kilogram foil bag, 5 gallon, and 55 gallon) can only be dispensed through equipment specifically designed for use with hot melt polyurethane reactive adhesives (PURs). All equipment must be used in strict accordance with the recommendations of the equipment manufacturer.

Note: The suggestions that follow should be reviewed thoroughly with the bulk equipment manufacturer before using.

Most bulk dispensing systems have separate temperature control zones for the platen (or reservoir), hose(s), and dispensing head(s). 5 and 55 gallon drum systems which utilize a heated platen should have all zones set to 250°F (121°C)¹ during normal operation. If equipped, the unit should be programmed to reduce temperatures of all zones to 160-180°F (71-82°C) if not in operation for more than 1 hour. For inverted 5 and 55 gallon systems, the reservoir should be set at 200°F (93°C) with all other zones at 250°F (121°C)¹. The reservoir can be set at temperatures up to 250°F (121°C)¹ if a full container of adhesive or more is dispensed through the machine in a day.

First Time Start-up and Extended Shutdown Periods: 3M Scotch-Weld™ Purge Material 3756 should be used for first time equipment start-up and for shutdown periods of longer than 1 week. 3M Scotch-Weld™ purge material 3756 is a non-reactive material designed to dispense and flow like Scotch-Weld polyurethane reactive adhesives.

Short Shutdown Periods: For shutdown periods of less than 2 weeks a high temperature grease should be applied to all dispensing heads. The grease acts as a moisture barrier which will help prevent or reduce cure in the dispensing heads.

¹Dispensing temperature should never exceed 275°F (135°C)

Adhesive Application

After heating adhesive to 250°F (121°C), apply an adequate amount of 3M™ Scotch-Weld™ PUR Adhesive to one of the substrates to be bonded. Adhesive should only be applied to clean, dry surfaces. (See surface preparation below for additional information)

For the best results apply the PUR only on substrates that are at ambient/room temperature prior to adhesive application.

Join the substrates within the recommended open time and hold/fixture the bonded part until the adhesive has adequately set.

Cleanup/curing Information

Clean up: Allow product to solidify. Remove uncured waxy material (usually within the first 20 minutes after application) by scraping with a putty knife or similar tool. For cured material, remove by cutting or sanding. **Avoid cleaning with alcohol as it will interfere with the curing process. Do not use heat or flame to remove adhesive.**

Cure Time: The cure rate will vary depending on air temperature, relative humidity, substrate type and bond line thickness. Cure rate is more rapid on wood (moisture-rich substrate) than on plastic.

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PUR Adhesives

TE031 Black • TE040 Black • TE100 Black • TS230 Black

Lot Code Information Example of lot number: 8023K4
Code Description
8 Last digit of year manufactured
023 Julian date (day number 0 – 366)
K4 Alpha-numeric lot code (random not sequential)
In this example, the date of manufacture is January 23, 2008.

Storage For maximum shelf life, store product at less than 49°C/120°F, indoors and protected from exposure to moisture.

Shelf Life Is the period of time, after 3M ships the product to a customer or distributor, the product will continue to satisfy applicable 3M manufacturing and quality standards. The shelf life stated applies only to product that is stored in the original, unopened container under specified storage conditions.

The stated shelf life of 1/10th gallon cartridge and 2 Kg foil bag is 12 months and 5 gallon and 55 gallon drum is 6 months.

Precautionary Information Refer to Product Label and Material Safety Data Sheet for health and safety information before using this product. For additional health and safety information, call 1-800-364-3577 or (651) 737-6501.

Technical Information The technical information, recommendations and other statements contained in this document are based upon tests or experience that 3M believes are reliable, but the accuracy or completeness of such information is not guaranteed.

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