



## POLYWATER® BonDuit® Conduit Adhesive

### DESCRIPTION

BonDuit® Conduit Adhesive joins polyethylene duct to PVC, fiberglass, and metal duct using standard PVC couplings. This rapid-cure, two-part resin adhesive forms a durable bond for a strong, permanent joint. It creates a watertight, airtight seal.

BonDuit is a versatile, field-friendly conduit joining solution. It works for multiple conduit types and sizes. It is easy to use and requires no special training.

### ADHESIVE SHEAR STRENGTH

BonDuit was used to join two pieces of HDPE conduit with a PVC coupling. Typical bond strengths were measured as the force required to pull apart the joint after 24 hours at 70°F (21°C).

CONDUIT DIAMETER	PULLOUT FORCE
1 inch (2.5 cm)	724 lbf (3.22 kN)
1½ inch (4 cm)	1,233 lbf (5.48 kN)
2 inch (5 cm)	2,025 lbf (9.01 kN)
4 inch (10 cm)	5,333 lbf (23.72 kN)

*Results based on third-party laboratory testing.*

### HYDROSTATIC (PRESSURE) TESTING

BonDuit forms a watertight joint. HDPE duct was joined to PVC duct with a PVC coupling and the adhesive. The ducts were filled with water, sealed, pressurized to 120 psi (8.3 bar), and observed over time for leakage. The joint was then subjected to a short duration, high pressure test.

TEST DURATION	RESULT
1,000 Hours	No leaks

*Continuous pressure test based on ASTM D1598, "Time to Failure of Plastic Pipe Under Constant Internal Pressure."*

SHORT-TIME HIGH PRESSURE (BURST TEST)	
MAXIMUM PRESSURE	RESULT
>250 psi (>17 bar)	No Leaks

*Burst test based on ASTM D1599, "Resistance to Short-Time Hydraulic Pressure of Plastic Pipe, Tubing and Fittings (Burst Test)."*



*BonDuit mixes as it is applied to create permanent joints.*

### PRODUCT FEATURES

- Versatile—Bonds different materials, multiple sizes
- Superior—Stronger pullout strength than mechanical couplings
- Durable—Bonds with high strength within an hour
- Easy to Use—Requires no special training
- Convenient—Contains required components for quick installation

### END USE

BonDuit bonds polyethylene to:

- PVC couplings
- Concrete vaults
- Transition couplings
- Above ground conduits
- Steel sweeps and elbows
- Fiberglass and composite connections
- PEX, CPVC, ABS, Polypropylene

## COMPONENT PHYSICAL PROPERTIES

BonDuit is a 2-part resin. Both parts are thin pastes packaged in a mixing cartridge.

PROPERTY	PART A	PART B
Color	Dark grey/black	White/light yellow
Form	Paste	Paste
Odor	No odor	Slight sulfur odor
VOC	0 g/L	0 g/L
Specific gravity	1.2	1.2

## CURED RESIN PROPERTIES

BonDuit cures to form a solid, durable resin seal.

PROPERTY (7 DAY CURE, 70°F)	RESULT
Color	Grey
Peak exotherm @ 70°F (21°C)	<200°F (<95°C)
Hardness (Shore D Durometer)	78–88
Flexibility (ASTM D790)	> 2%
Dielectric strength (ASTM D149)	450 Volts/Mil (nonconductive)
Airtight (continuous)	120 psi (8.3 bar)

## TYPICAL ADHESIVE SHEAR STRENGTH

BonDuit will bond to dissimilar surfaces. Bond strength will be the same or greater than the weaker substrate when two different materials are joined.

SUBSTRATE	RESULT
HDPE	105 psi (0.72 N/mm <sup>2</sup> )
PVC	185 psi (1.28 N/mm <sup>2</sup> )
Fiberglass	2000 psi (13.8 N/mm <sup>2</sup> )
Steel	2300 psi (15.9 N/mm <sup>2</sup> )
Aluminum	860 psi (5.93 N/mm <sup>2</sup> )
Copper	3500 psi (24.1 N/mm <sup>2</sup> )

*Tested using ASTM D1002. Samples sanded, cleaned and cured for 24 hours.*

## TYPICAL IMPACT RESISTANCE

SUBSTRATE	RESULT
HDPE	24.8 in-lb (2.8 N·m)
PVC	37.2 in-lb (4.2 N·m)
Fiberglass	22.3 in-lb (2.5 N·m)
Galvanized steel	37.2 in-lb (4.2 N·m)

*Tested using ASTM G14. Samples are sanded, cleaned and allowed to cure for 24 hours.*

## BONDING MATERIALS

BonDuit adheres to:

- Polyethylene
- PVC, CPVC
- Composite
- PEX
- ABS
- Polypropylene
- Fiberglass
- Concrete
- Porcelain
- Steel
- Aluminum
- Copper

## ENVIRONMENTAL RESISTANCE

BonDuit can withstand the typical rigors of the conduit environment.

### OPERATING TEMPERATURE

-60°F to 250°F (-50°C to 120°C)

Temperature Cycle Testing: 10 cycles from 0°F to 130°F (18°C to 55°C) showed no significant change in adhesion.

BonDuit, if applied and frozen before cure, shows no significant change in adhesion when warmed and allowed to cure after temperature is raised.

BonDuit withstands ultraviolet and direct sunlight exposure with no decrease in functionality.

## CHEMICAL RESISTANCE

The chemical resistance of a polyethylene to PVC bond (joined with BonDuit Adhesive) is tested by measuring shear strength after exposure to the reagent compared to a non-exposed control. The joint cured for 7 days, immersed in the reagent, and then aged at ambient temperature for 3 months.

CHEMICAL EXPOSURE	% CONTROL
Salt water (4%)	85% (Pass)
Alkaline soap solution (pH 12)	100% (Pass)
Odorless mineral spirits	>100% (Pass)

The BonDuit Adhesive bond shows good resistance to salt water, alkaline solutions, and odorless mineral spirits (paraffinic solvent). A 6-month water and oil soak test also shows no significant change in adhesion compared to a control.

## APPLICATION

BonDuit Adhesive is easy to use. For full installation information, please see [BonDuit Usage Instructions](http://www.polywater.com/wp-content/uploads/pdf/WEB-BonDuit-Generic-Use-Instruction-9-25.pdf). (<http://www.polywater.com/wp-content/uploads/pdf/WEB-BonDuit-Generic-Use-Instruction-9-25.pdf>)

One 50-ml cartridge will produce a ¼-inch (6 mm) bead of mixed adhesive approximately 42 inches (1.1 meter) long.

### Preparation:

Proper surface preparation ensures a strong, long-lasting, airtight and watertight bond. For best adhesion, surface should be sanded and cleaned with Type RP™ Cleaner Wipe to remove oils and displace any remaining water. Comparison of preparation technique is below:

SURFACE PREPARATION	BOND STRENGTH (% CONTROL)
No preparation	100% (Control)
Cleaner only	120%
Sanding only	410%
Cleaner and sanding	480%

*Adhesion between HDPE and PVC substrates tested using ASTM D1002 (lap shear) with different preparation methods.*

### Application Temperature:

Keep BonDuit above freezing during application.

### Working Temperature:

40°F to 120°F (4°C to 50°C)

### General Installation:

Joints made with BonDuit can be placed into position once the connection is made. Adhesive cures underwater or underground. Conduits can be put into service once full cure is reached.

### Cool Weather Application:

In cool weather (below 60°F, 16°C) keep BonDuit and couplings warm before using, above 60°F (16°C). It may be necessary to heat the transition joint to force adhesive cure. Below 40°F (4°C), the joint should be heated to cure the adhesive.

### Warm Weather Application:

In warm weather (above 85°F, 29°C), keep BonDuit cool, below 70°F (21°C). This will help keep the adhesive from curing before coupling is attached. If possible, use during cooler mornings and out of direct sunlight to slow down cure rate.

### Underwater Application:

BonDuit will retain its strength when cured underwater. Surface should be abraded and cleaned per standard instructions. Joint can be placed underwater within 5 minutes of application.

## CURE RATE

BonDuit develops a strong bond, allowing movement or burial quickly.

TEMPERATURE	WORK TIME	SET TIME
35°F (2°C)	40 min	7 hrs
52°F (11°C)	20 min	3½ hrs
60°F (16°C)	10 min	1½ hrs
70°F (21°C)	6 min	60 min
88°F (31°C)	4 min	40 min

After one hour at 70°F (21°C), the BonDuit resin will reach approximately 50% of its cure strength and will “set”. It will continue to cure and will reach maximum bond strength after approximately 24 hours at 70°F (21°C).

Once cured, conduit joints made with BonDuit Adhesive will hold adequate air pressure for cable blowing operations.

CURE TIME, 70°F (21°C)	AIR PRESSURE	RESULT
90 Minutes	150 psi (10.3 bar)	Pass
120 Minutes	200 psi (13.8 bar)	Pass

The prepared conduit system holds the above pressure for 10 minutes.

## SAFETY

BonDuit has a low level of toxicity. Good industrial hygiene practice and appropriate precautions should be employed during use. Provide appropriate ventilation/respiratory protection against decomposition products during welding/flame operations (i.e., torches used to install heat shrink products) on or near cured product. See SDS for specific details.

## STORAGE AND HANDLING

Keep cartridge tightly closed in a cool, dark, dry location. Reseal cartridge after use. Keep away from sources of ignition and protect from freezing. All cartridges should be disposed of in an environmentally safe manner and in accordance with government regulations.

Unopened product has a shelf life of 18 months.

## MODEL SPECIFICATION

*The statement below may be inserted into a customer specification to help maintain engineering standards and ensure work integrity.*

Approved conduit joining system is BonDuit Conduit Adhesive. The conduit adhesive shall come in a multiple-use cartridge to bond various conduit connections without special fitting or positioning jigs. The packaging shall automatically mix and meter the adhesive. The cure rate for the adhesive shall be fast, reaching 50% of final strength in one hour (@ 75°F, 24°C), and 80% of final strength in two hours (@ 75°F, 24°C). The peak exotherm temperature of mixed product shall not exceed 200°F, 93°C (20-gram sample.) Product shall be suitable for use on various duct materials, multiple duct sizes and connection types.

Once cured, the adhesive seal shall be airtight and watertight. A one-inch, PVC coupling sealed to a polyethylene duct with the adhesive shall hold 120 psi (8.3 bar) air pressure after curing one hour at 75°F (24°C). The pull-out strength of a 2-inch (5 cm) polyethylene duct sealed to a PVC coupling shall be at least 910 lbs. force (4.05 kN) after curing one hour at 75°F (24°C) and at least 1820 lbs. force (8.10 kN) after curing for 24 hours. The adhesive shall have a minimum flexural strain of 2% as measured by ASTM D790.

The cured adhesive shall be resistant to water, salt water, oils, and UV degradation. The cured bond shall withstand temperature extremes from -60°F (-50°C) to 250°F (120°C). It shall withstand multiple freeze-thaw cycles. The cured product shall be non-conductive with a minimum dielectric strength of 450 Volts/Mil as measured by ASTM D149.

## ORDER INFORMATION

CAT #	PACKAGE DESCRIPTION
BT-KIT	2 - adhesive cartridges; 8 - mixing nozzles; 1 - strip of sanding cloth; 8 - Type RP cleaning wipes (cat # RP-1)
BT-KITG	Same as kit above; includes TOOL-50-11
BT-KITB6	Bulk kit contains 6 individual kits, BT-KIT
BT-KITB6G	Same as kit above; includes TOOL-50-11
TOOL-50-11	1 - dispensing tool
MXR-12T-10	10-pack of mixing nozzles
BT-CART12PK	12 - adhesive cartridges; 36 - mixing nozzles

## CONTACT US

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**IMPORTANT NOTICE:** The statements here are made in good faith based on tests and observations we believe to be reliable. However, the completeness and accuracy of the information is not guaranteed. Before using, the end-user should conduct whatever evaluations are necessary to determine that the product is suitable for the intended use.

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