

TECHNICAL DATA SHEET

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, water-tight joint.

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

Adhesive Shear Strength:

Typical bond strengths were measured by joining two pieces of HDPE conduit with a PVC coupling and BonDuit® Adhesive. The force required to pull apart the joint after 24 hours at 70° F was measured.

| <u>Conduit Diameter</u> | <u>Pullout Force</u> |
|-------------------------|------------------------|
| 1 Inch | 724 lbs _f |
| 1½ Inch | 1233 lbs _f |
| 2 Inch | 2,025 lbs _f |
| 4 Inch | 5,333 lbs _f |

Results based on 3rd-party laboratory testing.

Hydrostatic (Pressure) Testing:

BonDuit® Conduit Adhesive forms a water-tight 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, and observed over time for leakage. The joint was then subjected to a short duration, high pressure test.

| <u>Test Duration</u> | <u>Result</u> |
|----------------------|---------------|
| 1,000 Hours | No Leaks |

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

Short Duration High Pressure (Burst Test)

| <u>Maximum Pressure</u> | <u>Result</u> |
|-------------------------|---------------|
| >250 psi | No Leaks |

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



BonDuit® Conduit Adhesive is supplied in a two-part cartridge and is mixed as it is applied.

Product Benefits:

- Easy to use
- Fast cure
- Durable bond
- Water-tight and air-tight seal
- High tensile strength
- Suitable for most common ducts

End Use:

BonDuit® Conduit Adhesive bonds polyethylene to:

- PVC Couplings
- Concrete Vaults
- Transition Couplings
- Above Ground Conduits
- Steel Sweeps and Elbows
- Fiberglass and Composite Connections

Component Physical Properties:

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

| Property | Part A (Resin) | Part B (XL Agent) |
|-------------------------|-----------------------|--------------------------|
| 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 | < 2 | < 2 |

Typical Cured Resin Properties:

BonDuit® Conduit Adhesive cures to form a solid, durable resin seal.

Typical Property (7 Days cure @ 70° F)

| | |
|--|---------------|
| Color | Grey |
| Peak Exotherm @ 70° F | < 200° F |
| Hardness (Shore D Durometer) | 70 – 80 |
| Flexibility (ASTM D790) | > 2% |
| Dielectric Strength (ASTM D149) (Nonconductive) | 450 Volts/Mil |
| Air-tight (continuous): | 120 psi |

Typical Adhesive Shear Strength:

| Substrate | Result |
|---------------------------------|-------------------------|
| HDPE to PVC | 275 lbs/in ² |
| HDPE to Steel | 550 lbs/in ² |
| HDPE to Aluminum | 325 lbs/in ² |
| HDPE to Fiberglass | 175 lbs/in ² |
| Fiberglass to Steel | 525 lbs/in ² |
| Fiberglass to PVC | 125 lbs/in ² |
| Fiberglass to Fiberglass | 375 lbs/in ² |

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

Typical Impact Resistance:

| Substrate | Result |
|-------------------------|---------------|
| HDPE | 24.8 in-lbs |
| PVC | 37.2 in-lbs |
| Galvanized Steel | 22.3 in-lbs |
| Fiberglass | 37.2 in-lbs |

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

Bonding Materials:

BonDuit® Conduit Adhesive adheres to:

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

Environmental Resistance:

BonDuit® Conduit Adhesive can withstand the typical rigors of the conduit environment.

Temperature Cycle Testing: 10 cycles from 0° F to 130° F showed no significant change in adhesion

BonDuit® Conduit Adhesive, if applied and frozen before cure, shows no significant change in adhesion when warmed and allowed to cure at a later time.

BonDuit® Conduit Adhesive 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 is allowed to cure 7 days, immersed in the reagent, and then aged at ambient temperature for 3 months.

| Chemical Exposure | Percent of 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 & 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/BTinstructions.pdf). (www.polywater.com/BTinstructions.pdf)

One 50-ml cartridge will produce a ¼-inch bead of the mixed adhesive approximately 42 inches long.

Preparation:

Proper surface preparation ensures a strong, long-lasting, airtight and watertight bond. The surface should be sanded and cleaned with a RP™ Cleaner Wipe to remove oils and displace any remaining water. Adhesion using different surface preparation methods was tested using a lap shear test. In this test, BonDuit® Conduit Adhesive is applied to create an overlapping bond between HDPE and PVC.

| <u>Surface Preparation</u> | <u>Percent of Control Bond Shear Strength</u> |
|----------------------------|---|
| No Preparation | 100% (Control) |
| Cleaner Only | 120% |
| Sanding Only | 410% |
| Cleaner & Sanding | 480% |

Application Temperature

Working temperature for BonDuit® Conduit Adhesive is 35°F to 95°F (2°C to 35°C).

Cool Weather Application

In cool weather (below 60°F, 16°C) keep BonDuit® Conduit Adhesive warm before using, above 60°F (16°C). Keep couplings in a warm area before use. It may be necessary to heat the transition joint to force adhesive cure. Below 35°F (2°C), the joint should be heated to cure the adhesive.

Warm Weather Application

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

Safety:

BonDuit® Conduit Adhesive 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.

Cure Rate:

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

| <u>Temp.</u> | <u>Working Time</u> | <u>Set Time</u> |
|--------------|---------------------|-----------------|
| 35°F (2°C) | 40 min | 7 hrs |
| 52°F (11°C) | 20 min | 3 ½ hrs |
| 60°F (16°C) | 10 min | 1 ½ 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.

| <u>Cure Time at 70°F</u> | <u>Air Pressure</u> | <u>Result</u> |
|--------------------------|---------------------|---------------|
| 90 Minutes | 150 psi | Pass |
| 120 Minutes | 200 psi | Pass |

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

Installation:

Joints made with BonDuit® Conduit Adhesive can be placed into position once the connection is made. The adhesive will cure under water or under ground. Conduits can be put into service once full cure is reached.

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 governmental 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), and 80% of final strength in two hours (@ 75° F). The peak exotherm temperature of mixed product shall not exceed 200° F (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 air pressure after curing one hour at 75° F. The pull-out strength of a two-inch polyethylene duct sealed to a PVC coupling shall be at least 910 lbs force after curing one hour at 75° F and at least 1820 lbs force 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 to 250° F. 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:

| <u>Cat #</u> | <u>Package Description</u> |
|--------------|--|
| BT-KITG | Kit contains: 2 50-ml BonDuit® Adhesive Cartridges 8 Mixing Nozzles 1 Strip of Sanding Cloth 8 RP-1 Cleaning Wipes 1 Instruction Sheet 1 Dispensing Tool |
| BT-KIT | Kit contains: 2 50-ml BonDuit® Adhesive Cartridges 8 Mixing Nozzles 1 Strip of Sanding Cloth 8 RP-1 Cleaning Wipes 1 Instruction Sheet (Dispensing tool not included.) |
| BT-KITB6G | Bulk kit contains 6 Individual Kits, BT-KIT 1 Dispensing Tool Included |
| BT-KITB6 | Bulk kit contains 6 Individual Kits, BT-KIT (Dispensing tool not included.) |
| TOOL-50-11 | 1 Dispensing Tool |
| MXR-12T-10 | 10 Mixing Nozzles |
| BT-CART12PK | 12 50-ml BonDuit® Adhesive Cartridges in a Package |

Copyright 2015. American Polywater Corporation. All Rights Reserved

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.

American Polywater expressly disclaims any implied warranties and conditions of merchantability and fitness for a particular purpose. American Polywater's only obligation shall be to replace such quantity of the product proven to be defective. Except for the replacement remedy, American Polywater shall not be liable for any loss, injury, or direct, indirect, or consequential damages resulting from product's use, regardless of the legal theory asserted.

Lit-BTTECH/REV004

Makers of Polywater® and Dyna-Blue® Cable Lubricants
and Pull-Planner™ Software

**American
Polywater®
Corporation**

11222 60th St. N
Stillwater, MN 55082
U.S.A

1-800-328-9384
1-651-430-2270

<http://www.polywater.com> (URL)

support@polywater.com (e-mail)