

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 60 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)	450 Volts/Mil (Nonconductive)
Air-tight (no leakage):	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® 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 TR™ 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 MSDS 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.

** BonDuit® Conduit Adhesive is available with a slower-cure rate for larger applications that may require more working time. (Product Code BTSC)*

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:

Cat #	Package Description
BT-KITG	Kit contains: 2 50-ml BonDuit® Adhesive Cartridges 8 Mixing Nozzles 1 Strip of Sanding Cloth 8 TR-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 TR-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.)
BT-TOOL	1 Dispensing Tool
BT-10NOZZLE	10 Mixing Nozzles
BT-CART12PK	12 50-ml BonDuit® Adhesive Cartridges in a Package

*** Slower curing version BonDuit® Conduit Adhesive available (BTSC). Call factory for details.*

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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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