

TECHNICAL REPORT

Polywater BonDuit and BonDuit XL UL Adhesive Recognition Certification

October 8, 2020

UL 746A Polymeric Materials – Use in Electrical Equipment Evaluations

ENGINEERING SUMMARY

BonDuit[®] and BonDuit[®] XL Conduit Adhesives are recognized by UL. Both comply with the requirements of Polymeric Materials for use in Electrical Equipment as described below. BonDuit and BonDuit XL adhesive bonds were tested with HDPE/Sch 80 PVC and Fiberglass/Sch 80 PVC. Material is suitable for indoor and outdoor use, exposure to high humidity, or occasional exposure to water. Temperature rating is 60°C (140°F) and minimum temperature of -31° F (-35° C).

MARKINGS

BonDuit and BonDuit XL are recognized adhesives under CCN QOQW2 and are tested to UL Method 746A.



TEST PROTOCOLS UL 746C Polymeric Materials – Use in Electrical Equipment Evaluations

Adhesive bond was evaluated using lap shear bond strength based on Method A, ASTM D1002 using a crosshead speed of 0.05 inches/minute following each exposure as described below. A bond thickness range of 0.25 – 2.54 mm was evaluated.

Clause 69.3 Effect of Temperature

Ten specimens were conditioned for 1000 hours at 60°C (140°F).

To pass: After the conditioning, specimens were brought to room temperature and tested. The average conditioned value for lap shear adhesion is to be at least 50 percent of the unconditioned value.

Status: Passed effect of temperature testing.

Clause 69.4 Effect of Humidity

Ten specimens were conditioned for 7 days at 95 to 100 percent relative humidity at 60.0°C +/- 1.0°C (140.0°F +/- 1.8°F).

To pass: After the conditioning, specimens were brought to room temperature and tested. The average conditioned value for lap shear adhesion is to be at least 50 percent of the unconditioned value.

Status: Passed effect of humidity testing.

Clause 69.5 Effect of Cold

There shall be no visual signs of cracking or chipping of the bond between the two adhered specimen parts after conditioning for 24 hours at minus 35.0°C +/- 1.0°C (minus 31° +/- 1.8°F) for outdoor-use applications. Six specimens were subjected to the cold conditioning.

Status: Passed effect of cold testing.

Clause 69.6 Effect of cyclic conditions

Ten specimens were subjected to three complete cycles of the conditioning indicated in Table 69.1.

Table 69.1 Cycling conditions	
For indoor end-use application	For outdoor end-use applications
24 hours at T followed immediately by at least 96 hours at 35.0°C +/- 2.0°C (95.0°F +/- 3.6°F), 90 percent relative humidity, followed by 8 hours at 0.0° +/- 2.0°C (32.0°F +/- 3.6°F)	A minimum of 24 hours immersed in 25.0° C +/- 2.0°C (77.0° F +/- 3.6°F) water; followed immediately by 24 hours at T followed immediately by at least 96 hours at 35.0° C +/- 2.0°C (95.0° F +/- 3.6°F), 90 percent relative humidity; followed by 8 hours at -35.0° C +/- 2.0°C (-31.0° F +/- 3.6°F).
Note: T is the rated temperature, but not less than 60°C (140°F).	

To pass, After the conditioning, specimens were brought to room temperature and tested. The average conditioned value for lap shear adhesion is to be at least 50 percent of the unconditioned value.

Status: Passed effect of cyclic conditions testing.

ADDENDUM 1 – UL TEST CERTIFICATE OF COMPLIANCE REPORT

CERTIFICATE OF COMPLIANCE

Certificate Number E513922
Report Reference E513922-20200928
Issue Date 2020-SEPTEMBER-29

Issued to: AMERICAN POLYWATER CORP
11222 60th St N
Stillwater MN 55082

This certificate confirms that
representative samples of

COMPONENT - POLYMERIC ADHESIVE SYSTEMS,
ELECTRICAL EQUIPMENT

Component - Polymeric Adhesive System:
Cat No, Bonduit BT, Bonduit BTXL.

Have been investigated by UL in accordance with the
component requirements in the Standard(s) indicated on
this Certificate. UL Recognized components are incomplete
in certain constructional features or restricted in
performance capabilities and are intended for installation in
complete equipment submitted for investigation to UL LLC.

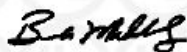
Standard(s) for Safety: UI 746C - Polymeric Materials - Use in Electrical Equipment
Evaluations
UI 746A - Polymeric Materials – Short Term Property
Evaluations

Additional Information: See the UL Online Certifications Directory at
<https://iq.ulprospector.com> for additional information.

This *Certificate of Compliance* does not provide authorization to apply the UL Recognized Component Mark. Only
the UL Follow-Up Services Procedure provides authorization to apply the UL Mark.

Only those products bearing the UL Recognized Component Mark should be considered as being UL Certified
and covered under UL's Follow-Up Services.

Look for the UL Recognized Component Mark on the product.



Bruce Mahrenholz, Director North American Certification Program

UL LLC

Any information and documentation involving UL Mark services are provided on behalf of UL LLC (UL) or any authorized licensee of UL. For questions, please
contact a local UL Customer Service Representative at <http://ul.com/about/locations/>



ADDENDUM 2 – SUMMARY OF RESULTS

UL Project No. 47899376624
File E513922 - QOQW2

Description of samples received:

Sample No.	Cat No.	Adhesive Thickness: mm (in.)	Substrate 1 (Panel A)	Substrate 2 (Panel B)	Adhesive Color	Temperature Rating
A	Bonduit BT	0.25 mm (0.001 in)	PVC	HDPE	dark grey/black (mixed)	60°C
B			PVC	Fiberglass		
C	Bonduit BT	2.54 mm (0.100 in)	PVC	HDPE	dark grey/black (mixed)	60°C
D			PVC	Fiberglass		
E	Bonduit BTXL	0.25 mm (0.001 in)	PVC	HDPE	dark grey/black (mixed)	60°C
F			PVC	Fiberglass		
G	Bonduit BTXL	2.54 mm (0.100 in)	PVC	HDPE	dark grey/black (mixed)	60°C
H			PVC	Fiberglass		

RESULTS - AVERAGE BOND STRENGTH (PSI)

Cat No.	Sample # (Thickness measured)	As-Received	Temperature 1000hr @104°C	Humidity	Thermal Cycling	Cold	Comments
Bonduit BT	A (0.53 mm)	231.69	266.12	228.38	243.99	Comply	Pass
	B (0.48 mm)	505.11	1127.76	556.40	682.62	Comply	Pass
	C (2.72 mm)	175.37	195.03	193.16	197.15	Comply	Pass
	D (2.59 mm)	367.72	616.03	363.63	442.17	Comply	Pass
Bonduit BTXL	E (0.11 mm)	175.95	206.82	188.65	220.52	Comply	Pass
	F (0.15mm)	430.83	808.53	494.85	585.93	Comply	Pass
	G (2.56 mm)	151.17	206.73	204.80	215.21	Comply	Pass
	H (2.71 mm)	419.43	677.76	396.59	485.00	Comply	Pass

REQUIREMENT

After each conditioning, the specimens shall be brought to and tested at room temperature to determine the bond strength values.

The average conditioned value shall be at least 50 percent of the As-Received value.

Visual examination shall be conducted after the Cold condition for signs of cracking or chipping of the bond between the two adhered parts of the specimen.