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⅛" Groove Test

Observations of ⅛" saw-cut grooves and how well they are sealed in asphalt or concrete

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Purpose:

- Observe and record if a ⅛" saw-cut groove can be completely sealed by loop sealant or epoxy.

Hypothesis:

If ⅛" saw-cut blades are used then loop sealant cannot fully seal the wire in the groove.

Materials:

- Saw-cut groove assembled of clear Plexiglas* with a wood base with the following dimensions:
  - 1 ¼" deep x .125" wide (equivalent to brand new ⅛" saw-blade) (Quantity x2)
  - 1 ¼" deep x .122" wide (equivalent to used ⅛" saw-blade) (Quantity x2)
- Brand X ⅛" groove approved loop wire (Quantity x2)
- Brand Y ⅛" groove approved loop wire (Quantity x2)
- Bondo P-606V Epoxy
- Chemque Q-seal 290S Loop Sealant
- Caliper (A device to measure width of wire and grooves)
- Camera for documentation purposes

* Clear plexiglas was chosen to simulate a ⅛" saw-cut groove in asphalt/concrete because the complete groove (including under the wires) can be observed after sealant is applied.

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Procedure:

Testing did not begin until each Plexiglas groove was measured with a Caliper to match the desired width of .125 and .122 (2 of each). Each groove was labeled with the width and type of wire used to eliminate confusion. Brand Y and Brand X ⅛" loop wire width was also measured and its width was recorded (see Results section). 3 conductors of Brand Y loop wire were laid into 2 different Plexiglas ⅛" groove bases (.125 and .122). 4 conductors of Brand X loop wire were laid into 2 different Plexiglas ⅛" groove bases (.125 and .122) (see F*igure 1*). Each base was then given a special label (Chemque Q-seal 290S Loop Sealant and Bondo P-606V Epoxy) to insure the proper sealant is used for each groove and that each wire gets tested with the correct type of sealant or epoxy. Each ⅛" Plexiglas groove was covered with tape so that the assistant could not see the inside wires. Sealant was applied to each ⅛" Plexiglas groove making sure to completely seal/fill the groove by making several passes. The ⅛" Plexiglas grooves were then covered and allowed time to harden overnight. Covering and tape were removed and the results were documented and pictured.

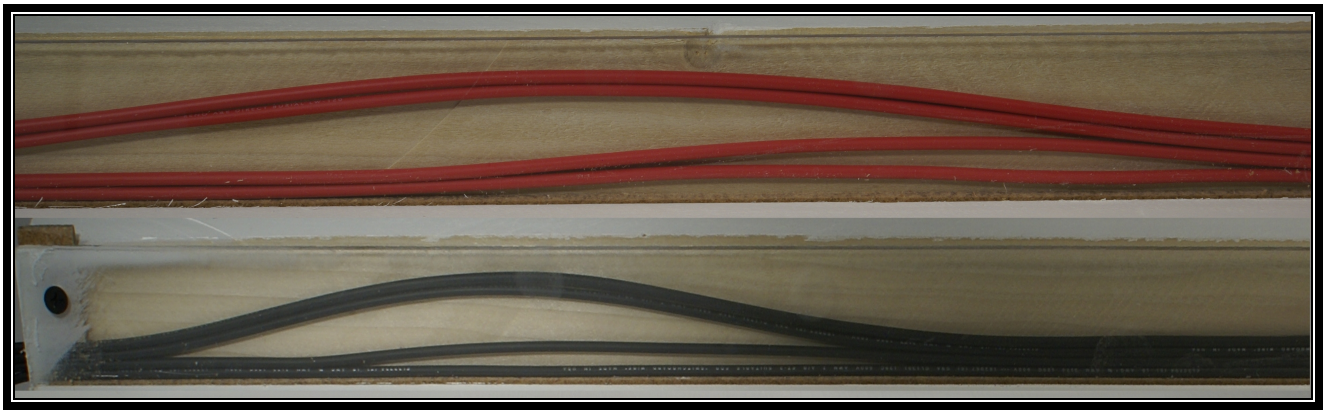

Figure 1

Picture of 1/8" Plexiglas groove with Brand Y's and Brand X's ⅛" groove approved wire inside before loop sealant is applied.

Results:

Loop Wire used	Width of wire	Amount of 1/8" groove clearance
Brand X ⅛" Wire	.118	.007
Brand Y ⅛" Wire	.109	.002

Wire Width Data Recorded.

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Brand of Loop Sealant	Air Pocket in 1/8" groove Brand X's wire	Air Pocket in 1/8" groove Brand Y's wire
Bondo Epoxy	Yes	Yes
Chemque	Yes	Yes

Air Pocket Data Recorded

Results show regardless of the viscosity and type of sealant used that a ⅛" saw-cut groove will not fully seal the wires, allowing space for an air-pocket (see *Figure 2*).

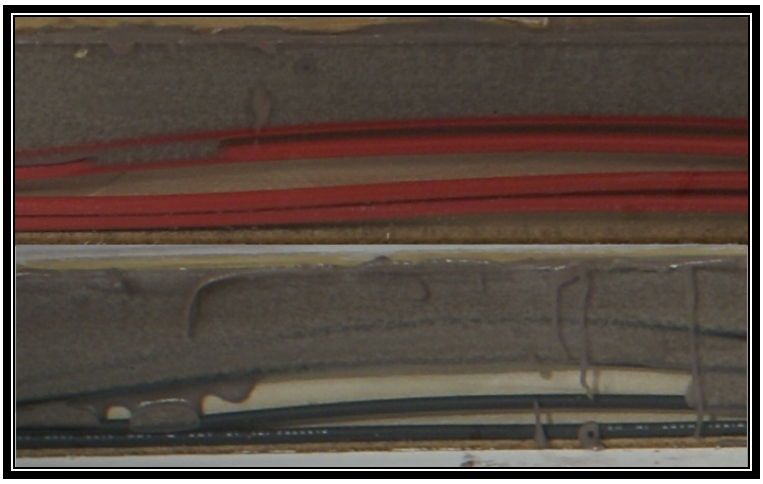

Figure 2

Picture of air-pocket after sealant has been applied

Conclusion:

If a ⅛" saw-cut blade is used then the groove will not be completely sealed and air-pockets will be present which cause several intermittent loop problems.

Always use a 3/16" blade or larger.

What this means, BD Loops comments:

Air pockets within the groove can cause a number of problems resulting in repeat service calls. Air pockets within the loop design allow space for the wires inside to move, when the wires move even slightly a false detection will occur. In colder temperatures air-pockets can cause even more problems by pushing the entire loop out of the saw-cut groove. This occurs when water enters the air-pocket and freezes. When water freezes it expands, that force will push the loop out of the groove completely. This then makes the loop susceptible to traffic and nature's wrath eventually causing the loop to short to ground (fail).

BD Loops Test Results

Results:

Brand of Loop Sealant	Air Pocket in 3/16" groove
Bondo Epoxy	No
Chemque	No

Data Recorded.

Results show that installation of BD Loop's preformed loop will not allow air-pockets to form. (see *figure 3*)

Figure 3

Picture of a BD Loops saw-cut in ⅛" Plexiglas with <u>no air-pocket</u>

Conclusion:

Always recommend and install a BD Loops 3/16" preformed loop for all saw-cut applications to avoid costly repeat service calls, failed loops, and returned detectors.

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