To maintain pipeline integrity and public safety, indirect inspection techniques such as Close Interval Pipe-to-Soil Potential Surveys (CIS) and Direct Current voltage Gradient (DCVG) Surveys are performed over pipeline right-of-ways at approximately ten (10) foot intervals. The techniques are above ground surveys which verify that the corrosion control systems in place are protecting the pipelines.

Since these surveys require electrolytic contact, dielectrics such as asphalt require drilling to road base for soil contact. Typically, a ½" or $^{7}/_{8}$" diameter hole is used to complete these surveys in paved areas. Below is a picture of a drilled hole adjacent to a pen sized device that is used to take the measurements:

The drilled hole repair is completed using one of three options;

1. 3M Loop Detector Sealant 5000 in combination with a polyfoam backer rod material. The Backer rod is cut into 6-inch lengths and then inserted and tamped into the hole so that the top of the backer rod is approximately 2-inches below asphalt grade. The 3M Loop Detector Sealant 5000 is then applied to the top of the backer rod with enough volume to fill the remaining void of the hole until it is flush with the roadway asphalt. This type of repair is the preferred method used ½ inch diameter holes.

   The product and process has been historically used as a sealant for wires installed at traffic loop detector signals. The 3M detector loop sealant encapsulates, insulates and protects the wires of a detector loop from the effects of the harsh roadway environment.

   The MSDS and product data specification sheets for this product can be found in Appendix A of this document. Additionally, a schematic of the hole repair can be found in Appendix A.

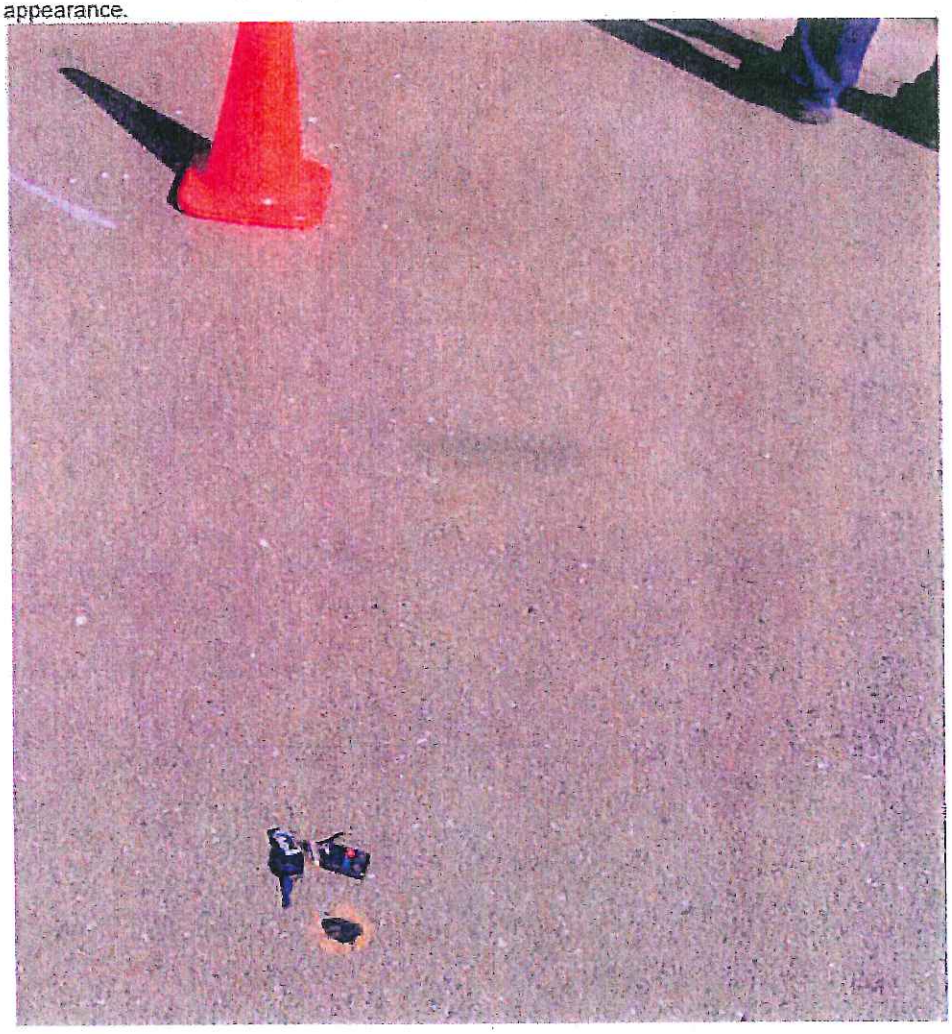
2. Quikrete 8620 Concrete Repair as a base for the hole and Quikrete 8630 Asphalt Repair for the top of the hole. This type of repair is an alternate method for ½ inch holes.

   The MSDS & Specification for these products can be found in Appendix B of this document. Additionally, a schematic of the hole repair can be found in Appendix B.

3. Compacted sand is used as a base for the hole and a Plug-R for the top of the hole. The plug is melted to grade matching the surrounding asphalt. This type of repair is typically used for 7/8 inch diameter holes.

   The MSDS & Specification for these products can be found in Appendix C of this document. Additionally, a schematic of the hole repair can be found in Appendix C.

Below is a picture of a typically repaired hole. Both products are similar in visual and physical appearance.



This work is routinely performed across the nation over the last six (6) years, including major cities such as San Francisco, California; Charlotte, North Carolina; Phoenix, Arizona; and New York, New York.

Appendix A

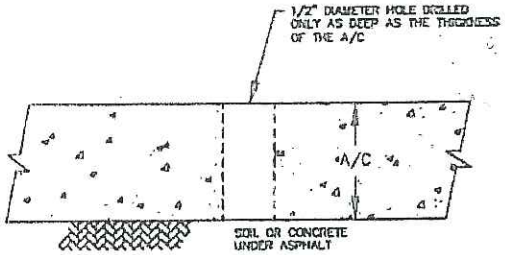


FIGURE 1: SCHEMATIC OF DRILLED HOLE

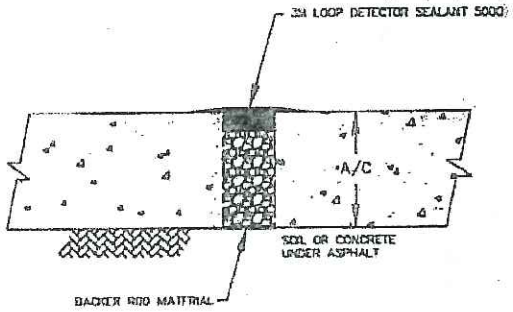


FIGURE 2: SCHEMATIC OF REPAIR AFTER TESTING

PROCEDURE FOR DRILLING HOLES FOR TESTING

TASK 1: DRILLING HOLES – A CREW DRILLS A ½ INCH DIAMETER HOLE JUST THROUGH THE A/C SO THAT A COPPER SULFATE HALF CELL CAN CONTACT THE TOP OF THE SOIL SURFACE JUST BELOW THE A/C. THE HOLES ARE DRILLED EVERY 10 FEET USING A PNEUMATIC OR ELECTRIC DRILL WITH A ½ INCH DIAMETER DRILL BIT.

TASK 2: CORROSION TESTING – THE "READER" PROCEEDS TO EACH HOLE USING A COPPER SULFATE HALF CELL SLIGHTLY SMALLER THAN ½ INCH DIAMETER OR EQUIVALENT, AND COLLECTS PIPE TO SOIL POTENTIAL MEASUREMENTS.

TASK 3: REPAIRING THE DRILLED HOLE – ONCE DATA HAS BEEN VALIDATED THE CREW WILL RETURN TO THE SITE TO PATCH THE HOLE AS SPECIFIED IN THE DRAWINGS ON THIS PAGE. 3M LOOP DETECTOR SEALANT 5000 IS USED TO FILL THE HOLE TO GRADE AND MATCH THE SURROUNDING A/C.

DRILLING AND REPAIR PROCEDURE FOR A/C
DURING INDIRECT INSPECTION SURVEYS

Mears Group, Inc.
TYPICAL APPLICATION

3M

Detector Loop Sealant

5000

Loop sealant designed specifically for the job

3M™ Detector Loop Sealant... easy to use...superior protection

3M detector loop sealant encapsulates, insulates and protects the wires of a detector loop from the effects of the harsh roadway environment. In temperature extremes, it retains flexibility so the wires are continuously protected to prevent loop failure.

Some good reasons you should be using 3M detector loop sealant

Saves application time

3M loop sealant is ready to use. There is no need to measure, mix or heat and no smoothing is required. Sealant can be applied on crowned or sloped roadways. It will not run to low spots.

Outstanding protection

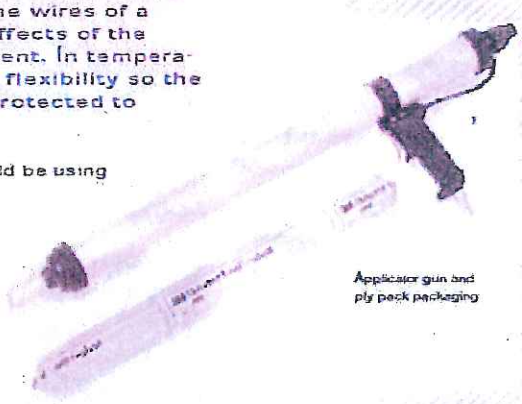
Loop wires are held in position and completely contained in a tough, yet flexible, rubber cocoon. Wires are protected against movement, road debris penetration and moisture, eliminating these causes of false calls.

Reduced maintenance

3M sealant will not shrink, so call-backs for refilling are eliminated. And sharp objects will not penetrate the tough rubber. Sealant cures with smooth surface so there is no need for finishing.

Natural curing

Sealant reacts with moisture in the environment to produce a rubber that is resistant to weather, oils, gasoline, antifreeze, brake fluid and road salt.



Applicator gun and ply pack packaging

Long lasting

The sealant will not become brittle with age or temperature extremes.

Temperature stable

The sealant won't degrade in high temperatures or fracture at temperatures as low as -40°F.

Roadway compatibility

3M sealant can be used with either concrete or asphalt, fresh or aged, wet or dry surfaces.

Fast, complete application

3M supplies special nozzles that help you fill the sawcut from the bottom to the top.

New, more convenient application

3M's new ply pack is especially well suited for customers who use applicator guns to apply sealant. Dispensing rate is improved by up to 300%. Disposable packaging waste is reduced by over 90% at the work site.

Simple, fast and sure way to do the job right

Specifications

(Performance Properties*)

Cured Sealant

Hardness (Indentation)
Rex Type A
Model 1700 35

Tensile Strength ..... 800 psi (56.24 kg/cm²)

Elongation 600%

Weathering Resistance
XW-Weatherometer
(350 hours) ..... Slight cracking

Salt Spray Resistance
(28 days @ 100°F (38°C)
5% NaCl) ..... No significant change in tensile strength and elongation

ARC Resistance ..... 71 seconds

Dielectric Constant ..... 6.35 @ 50 Hz
4.33 @ 500,000 Hz

Wet Sealant

Weight ..... 10.0 lbs/gal. (1.258 kg/L)

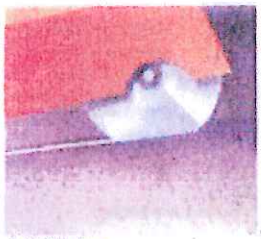
Non Volatile Content
(by Weight) 80%

Viscosity Brookfield RVF #6
Spindle @ 20 RPM
80°F (27°C) ..... 30,000 cps

Tack Free Time
(Polyethylene Film) ..... 24 hours

Flash Point ..... 105°F (40°C)

*All results based on 3M laboratory testing.



1. Cut the loop

2. Flush out debris and blow out standing water.

3. Install loop wires.

4. Fill saw cut with 3M™ Detector Loop Sealant.

Important Notice to Purchaser:

THE FOLLOWING IS MADE IN LIEU OF ALL WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE. 3M shall replace or refund the purchase price of such quantity of product found to be defective in material or manufacture or not in conformance with 3M's written specifications. Except as herein provided, 3M shall not be liable in contract or in tort for any injury, loss or damage, whether direct, indirect, incidental, special or consequential, arising out of the use, misuse, or the inability to use the product for intended use. No statement of recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

3M

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75-0500-2244-3

* Substance(s) refer to the potential contribution to the overall exposure by the cutaneous route including mucous membrane and eye, either by airborne or, more particularly, by direct contact with the substance. Vehicles can alter skin absorption.

SOURCE OF EXPOSURE LIMIT DATA:
ACGIH: American Conference of Governmental Industrial Hygienists
CMRG: Chemical Manufacturer Recommended Guideline
OSHA: Occupational Safety and Health Administration
AIHA: American Industrial Hygiene Association Workplace Environmental Exposure Level (WEEL)

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Odor, Color, Grade:	Black caulk with mild odor.
General Physical Form:	Liquid
Autoignition temperature	*No Data Available*
Flash Point	Approximately 109 °F [*Test Method:* Tagliabue Closed Cup]
Flammable Limits - LEL	1.5 % volume
Flammable Limits - UEL	7 % volume
Boiling point	313 °F
Density	1.22 g/ml [@ 20 °C]
Vapor Density	4.60 [*Ref Std:* AIR=1]
Vapor Pressure	2 mmHg [@ 68 °C]
Specific Gravity	1.22 [*Ref Std:* WATER=1]
pH	*Not Applicable*
Melting point	*Not Applicable*
Solubility in Water	Nil
Evaporation rate	0.21 [*Ref Std:* BUOAC=1]
Volatile Organic Compounds	248 g/l
Percent volatile	20 %
VOC Less H2O & Exempt Solvents	248 g/l
Viscosity	25000 centipoise

SECTION 10: STABILITY AND REACTIVITY

Stability: Stable.

Materials and Conditions to Avoid: *Amines*

Hazardous Polymerization: Hazardous polymerization will not occur.

Hazardous Decomposition or By-Products

Substance	Condition
Aldehydes	During Combustion
Carbon monoxide	During Combustion
Carbon dioxide	During Combustion

Hydrogen Cyanide	During Combustion
Oxides of Nitrogen	During Combustion

SECTION 11: TOXICOLOGICAL INFORMATION

Please contact the address listed on the first page of the MSDS for Toxicological Information on this material and/or its components.

SECTION 12: ECOLOGICAL INFORMATION

ECOTOXICOLOGICAL INFORMATION

Not determined.

CHEMICAL FATE INFORMATION

Not determined.

SECTION 13: DISPOSAL CONSIDERATIONS

Waste Disposal Method: Incinerate in a permitted hazardous waste incinerator. As a disposal alternative, dispose of waste product in a permitted hazardous waste facility.

EPA Hazardous Waste Number (RCRA): D001 (Ignitable)

Since regulations vary, consult applicable regulations or authorities before disposal.

SECTION 14: TRANSPORT INFORMATION

ID Number(s):
78-8110-9503-9, 78-8110-9504-7

Please contact the emergency numbers listed on the first page of the MSDS for Transportation Information for this material.

SECTION 15: REGULATORY INFORMATION

US FEDERAL REGULATIONS

Contact 3M for more information.

311/312 Hazard Categories:
Fire Hazard - Yes Pressure Hazard - No Reactivity Hazard - No Immediate Hazard - Yes Delayed Hazard - Yes

Section 313 Toxic Chemicals subject to the reporting requirements of that section and 40 CFR part 372 (EPCRA):

Ingredient	C.A.S. No	% by Wt
TOLUENE DIISOCYANATE	26471-62-5	01 - 10

STATE REGULATIONS

Contact 3M for more information.

CALIFORNIA PROPOSITION 65

Ingredient	C.A.S. No.	Classification
CARBON BLACK	1333-86-4	**Carcinogen
TOLUENE DIISOCYANATE	26471-62-5	**Carcinogen

** WARNING: contains a chemical which can cause cancer.

CHEMICAL INVENTORIES

The components of this product are in compliance with the chemical notification requirements of TSCA.

All applicable chemical ingredients in this material are listed on the European Inventory of Existing Chemical Substances (EINECS), or are exempt polymers whose monomers are listed on EINECS.

The components of this product are listed on the Australian Inventory of Chemical Substances.

The components of this product are listed on the Canadian Domestic Substances List.

Contact 3M for more information.

INTERNATIONAL REGULATIONS

Contact 3M for more information.

This MSDS has been prepared to meet the U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200.

SECTION 16: OTHER INFORMATION

NFPA Hazard Classification
Health: 2 Flammability: 2 Reactivity: 1 Special Hazards: Reacts with Water

National Fire Protection Association (NFPA) hazard ratings are designed for use by emergency response personnel to address the hazards that are presented by short-term, acute exposure to a material under conditions of fire, spill, or similar emergencies. Hazard ratings are primarily based on the inherent physical and toxic properties of the material but also include the toxic properties of combustion or decomposition products that are known to be generated in significant quantities.

HMIS Hazard Classification
Health: 2 Flammability: 2 Reactivity: 1 Protection: X - See PPE section.

Hazardous Material Identification System (HMIS®) hazard ratings are designed to inform employees of chemical hazards in the workplace. These ratings are based on the inherent properties of the material under expected conditions of normal use and are not intended for use in emergency situations. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint and Coatings