U.S. Traffic Corporation

Manufacturers & System Engineers

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TECH TIPS

The Proper Loop Wire

Why is loop wire so important?

One of the main causes of vehicle loop detector failures is the use of inferior wire types when constructing the loop. Since moisture can cause a significant change in the dielectric constant of the insulation, which results in excessive loop (frequency) drift, you must choose a wire with an insulation that is most impervious to moisture. It is also important to choose a wire with a rugged, abrasion resistant insulation. Remember that all pavements are porous and contain trapped moisture. Water or other chemicals will eventually reach the insulation and either attack the insulation, be absorbed by it, or migrate through tiny cracks in the insulation to change the dielectric or break down the insulation and cause shorts to ground.

What about THHN wire?

Polyvinyl chloride (PVC) insulation (TFFN, THHN and THHN-THWN) should be avoided, since it tends to absorb moisture and cracks very easily. The insulation is thin and soft, leaving it vulnerable to damage during installation and rapid age cracking after sealing. Any one of the above types has only 0.015" of insulation from 12 ga. to 18 ga. If there is any doubt about its vulnerability, crimp the insulation with a pair of pliers an see how it cracks. See how easy it strips with a picketknife. What would an unnoticed piece of wire or shard of glass buried in the pavement slot do to the insulation? The outer diameter is 0.115" for 14 ga. wire and 0.103" for 16 ga. wires. When installed in a 1/4" (0.250") slot, as is often done, the turns (wraps) can lay side by side in the slot and the turns twist under preceding turns and not stack snugly in a single layer, as they should be, leading to reduced loop efficiency.

Which type of wire should I use?

Cross linked polyethelyne (XLPE) or polyester insulation provides excellent protection for wire used in saw cut loop installations. Both of these types are very abrasion resistant, much harder (not impossible) to strip, and very moisture resistant. U.S. Traffic Corporation offers three types of wire to meet the needs of the most demanding loop installations. These are DSI-116, DSI-116S and DSI-120. All three types have melting points of well over 400°F. See table below for comparison of XLPE and THHN insulation.

DSI-116 Wire.

The DSI-116 loop wire is a 16 ga. stranded wire with 0.080" thick cross linked polyethylene insulation. The outer diameter of the wire is approximately 0.218" and fits nicely in a 1/4" saw cut. This wire may be used in either concrete or asphalt.

DSI-116S Wire.

The DSI-116S wire is a 16 ga. stranded wire with 0.050" thick cross linked polyethylene insulation and with an added 0.032" thick loose fitting tubed polyester sleeve. The outer diameter of the wire is 0.245" maximum, allowing it to be easily installed in a 1/4" saw cut. This wire is especially recommended for problem pavement installations, particulary asphalt, where the pavement may tend to shift or seperate. The stress loads created by shifting pavement are taken up by the sleeve, not by the wire.

DIS-120 Wire.

The DSI-120 wire is a 20 ga. stranded wire with 0.050" thick cross linked polyethylene insulation. The outer diameter of the wire is 0.120" maximum and fits easily in an 1/8" saw cut. This wire is the solution in concrete installation; where pretensioning cables or rebar are too close to the surface to allow the installation of the larger diameter wire types.

Summary.

The use of the correct type of wire for the job, as well as the proper installation techniques, will avoid frequent service calls beginning soon after installation and result in years of trouble-free service and in satisfied customers.

RESISTANCE TO CHEMICALS	*INSULATION TYPE*	
	XLPE	THHN
Ethyl Alcohol	High	Good
Acetone	High	Fair
Gasoline	High	Poor
PHYSICAL CONDITIONS		
Abrasion Resistance	E	F-G
Resistance to Degreaser Solvant	E	P-F
Low Temperature Flexibility	E	P-F
Electrical	F-O	F-G
Water Absorbency (% in 24 hours)	0.01	0.75
Service Temperature Range (C°)	-65 to +150	-55 to +105

P = Poor F = Fair G = Good E = Excellent O = Outstanding

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