

Many buried utility systems have an estimated 80-year life, but a locatable life that ranges from zero to twenty years. Getting more locating years out of a tracer system involves proper construction and testing of the wire. The reduction of avoidable utility damage is the goal of every utility company. This document is to provide you with detailed information about different tracer wire systems and allow you to make good engineering decisions.

### TRACER WIRE: BACKGROUND

The primary focus of these design guidelines is to ensure that the tracer wire installation on underground utilities meets requirements for the effective use of pipe and cable locating equipment. For best locating results over the entire system, the tracer wire needs to be continuous, insulated from the earth and grounded on its ends. The weak links of any tracer wire system are: below ground connections, end points, and breaks due to excavation damage during backfill of open-trench or directional boring.

### TRACER WIRE: CONDUCTOR CHOICE

Tracer wire is manufactured using both a copper (CU) and copper-clad steel (CCS) conductor. Standard tracer wire sizes range from 14, 12, 10 AWG solid conductors. The wire should be a minimum 12 AWG which is also the most common tracer wire size.

Both CU and CCS are equal in signal and locability performance, but differ in cost, strength and flexibility depending on the temper. CCS in general is considerably less expensive and offers both flexibility and strength depending on your utility applications. The higher the tensile strength the lower it's flexibility. In directional boring, the strength and cost of CCS can save between 200-400% over using multiple conductors.

CONDUCTOR OVERVIEW & COMPARISON (12 AWG SOLID)					
CONDUCTOR	STRENGTH	FLEXIBILITY	COST	VOLITILITY	APPLICATIONS
COPPER	AVERAGE	GOOD	POOR	POOR	OPEN-TRENCH
HF-CCS	GOOD	GOOD	GOOD	EXCELLENT	OPEN-TRENCH
HS-CCS	GOOD	BELOW AVERAGE	GOOD	EXCELLENT	OPEN-TRENCH
HDD-CCS	EXCELLENT	POOR	EXCELLENT	EXCELLENT	DIRECTIONAL BORING

- **HF-CCS:** has a 43% higher tensile strength over copper tracer wire, but maintains the same flexibility. Although the slightly higher tensile strength can help to reduce breaks in open trench applications, the main benefit is flexibility equal to copper, with a lower cost.
- **HS-CCS:** has a 200% higher tensile strength over copper tracer wire and greatly reduces breaks in open trench applications, with a lower cost.
- **HDD-CCS:** has a 600% higher tensile strength over copper tracer wire, and designed for directional boring. When 12, 10, or 8 AWG copper tracer wire is used for directional boring a contractor will use multiple conductors to obtain the needed strength in hopes that 1 conductor will successfully make it without breaking. In comparison, using 1 conductor of 12, 10, or 8 AWG HDD-CCS is successful and saves 200-400% of material cost.

### TRACER WIRE: INSULATION CHOICE

Insulation should be a minimum, 30 mil HDPE insulation, and rated for direct burial use. A 45 mil HDPE or 60 mil PVC insulation is available for added protection as an option. It is important to note that THHN/THWN is not rated for direct burial and should not be used as a tracer wire.