

## TRACER WIRE MARKET INFORMATION:

1.) The purpose of tracer wire is not to warn contractors of underground utilities. Tracer wire serves one purpose: to locate underground utility lines through means of conductive locating.

2.) Tracer wire is categorized by 2 properties: **Conductor Material** and **Insulation Material**.

### ❖ Tracer Wire Conductor Materials

- **Copper Conductors (Abbreviated: CU)**
  - DSA: Dead-Soft-Annealed (Standard Temper)
- **Copper-Clad Steel Conductors (Abbreviated: CCS)**
  - **HF-CCS: High-Flex CCS**
    - 43% Stronger, the closest feeling to traditional copper tracer wire
  - **HS-CCS: High-Strength CCS**
    - 200% stronger, feels stiffer than copper, but a good sole spec option for utilities doing open-cut and small bores that aren't "critical" installs.
  - **HDD-CCS: Horizontal Directional Drilling CCS**
    - 600-700% stronger, designed as the strongest tracer wire in the market to prevent breakage of tracer wire during pull back of critical directional drilling installs.
- **Stainless Steel Type 304 (Abbreviated: SS-T304)**
  - SS-T304: Stainless Steel Type 304
    - 367% Stronger, old item used for tracer wire in bores. Expensive and better options.

### ❖ Tracer Wire Insulation Materials

- **PVC & Nylon Insulation (Referred to as: THHN)**
  - 15-20 mils of PVC with a secondary 4 mil Nylon insulation that is useless underground.
  - Not rated direct burial, breaks down, short life expectancy, insulation is too thin
  - Available on Copper conductors
- **PVC Insulation (Referred to as: Type UF)**
  - 60 mils of PVC (very thick insulation)
  - Direct Burial Rated
  - Available on Copper conductors
- **30 MIL HDPE Insulation (Referred to as: PE30)**
  - High-density, high molecular weight polyethylene insulation
  - Direct Burial Rated, PE30 is minimum requirement for this rating.
  - Available on Copper or CCS or Stainless Steel conductors
- **45 MIL HDPE Insulation (Referred to as: PE45)**
  - High-density, high molecular weight polyethylene insulation
  - Direct Burial Rated, a thicker insulation than PE30 for more abrasion protection.
  - Available on Copper or CCS or Stainless Steel conductors

3.) Correct tracer wire descriptions and brief information about each type of wire. Please note that the following descriptions all represent a 12 AWG for comparing each type.

**12 SOL CU | THHN | 197 LBS | BLUE 500' REEL**

Copper wire that is insulated with 15-20 mils of PVC over which a 4 mil Nylon layer is applied. This product is NOT rated for direct burial and should not be used as it breaks down underground.

**12 SOL CU | PE30 or PE45 | 197 LBS | | BLUE 500' REEL**

Copper wire that is insulated with 30 or 45 mils of HDPE. This product is rated for direct burial.

**12 SOL HF-CCS | PE30 or PE45 | 282 LBS | PRO-TRACE | BLUE 500' REEL**

High-Flex Copper Clad Steel wire (HF-CCS) that is insulated with 30 or 45 mils of HDPE. HF-CCS is designed to have a 43% higher break load, the same flexibility and feel as copper wire. This product is rated for direct burial.

**12 SOL HS-CCS | PE30 | 452 LBS | PRO-TRACE | BLUE 500' REEL**

High-Strength Copper Clad Steel wire (HS-CCS) that is insulated with 30 or 45 mils of HDPE. HS-CCS is designed to have a 200% higher break load, but stiffer feel than copper. Great product for utilities who want 1 spec for open-cut, but strong enough for small bore installs. This product is rated for direct burial.

**12 SOL HDD-CCS | PE45 | 1330 LBS | PRO-TRACE | BLUE 500' REEL**

Horizontal-Directional-Drilling Copper Clad Steel wire (HDD-CCS) that is insulated with 45 mils of HDPE. HDD-CCS is designed to have a 600-700% higher break load and excels in directional boring installs. Its flexibility is reduced because of the conductors' extreme break loads. This product is rated for direct burial.

**12 SOL SD-CU | UF | 197 LBS | BLUE 500' REEL**

Copper wire that is insulated with 60 mils of PVC. This product is rated for direct burial. Most expensive copper wire used for tracer wire, but PE45 is better insulation.

4.) Comparing the break loads of copper, copper-clad steel, and stainless steel conductor. Please note that break loads are based on conductor only as insulation has virtually no effect on this property.

RATED BREAK LOADS (lbs)					
AWG SIZE	COPPER	COPPER-CLAD STEEL			STAINLESS STEEL
	DSA	HF-CCS	HS-CCS	HDD-CCS	SS-T304
14 SOLID	125 lbs	177 lbs	282 lbs	725 lbs	480 lbs
12 SOLID	197 lbs	282 lbs	452 lbs	1,330 lbs	920 lbs
10 SOLID	313 lbs	448 lbs	685 lbs	1,940 lbs	1,260 lbs
8 SOLID	479 lbs	713 lbs	972 lbs	2,785 lbs	1,700 lbs

**CORROSION QUESTIONS ABOUT PRO-TRACE™ COPPER-CLAD STEEL (CCS) TRACER WIRE**

- 1.) If the insulation of PRO-TRACE tracer wire is punctured will I have corrosion issues?
  - a. No. For corrosion to occur between dissimilar metals, you must have an anode (steel), a cathode (copper), and an electrolyte (moisture). The CCS conductor used to make PRO-TRACE™ starts with a carbon steel core, metallurgically bonded with a copper cladding that is uniform and continuous, creating a bi-metal conductor that acts as one metal and corrosion resistant. The metallurgical bond achieved in this process means the electrolyte (moisture) cannot migrate in between the interface of the anode (steel core) and cathode (copper). The metallurgical bond integrity of CCS is exceptional preventing copper separation and moisture penetration.
  
- 2.) If I were to cut the wire exposing the copper-cladding and steel core and leave the cut end as is, will PRO-TRACE™ corrode underground?
  - a. Corrosion does occur and travels into the interface (area between the steel core and copper-cladding). However, corrosion will only travel into the exposed area, along the interface (area between the steel core and copper-cladding), at a maximum distance of 2X the conductor diameter. At the maximum corrosion distance, a rust barrier is formed and effectively seals out the electrolyte (moisture) and the corrosive action ceases. Uniquely, copper-clad steel is a conductor that stops itself from corroding due to its' physical construction and metal densities. Another unique characteristic of copper-clad steel is when cut, the copper cladding "cold flows" over the interface and partially onto the steel core which reduces the area of exposure for the steel core. Copper-clad steel conductors are widely used in many utility applications today that are buried underground.

**All tracer wire should be utilized with underground marking tape, either non-detectable or detectable tape for the "stop-sign effect".**