

**PRO-TRACE® HF-CCS PE30/PE45****TRACER-WIRE**

Tracer Wire • High-Flex Copper Clad Steel (HF-CCS) • 21% IACS Conductivity • Corrosion Resistant • 30 or 600 Volts High-Density, High Molecular Weight Polyethylene (HMWPE-HDPE) Insulation • Moisture, Chemical, and Oil Resistant Impact, Crush, and Abrasion Resistant • RoHS Compliant • Direct Burial Rated • Buy American / AIS Compliant

**“PRO-TRACE® HF-CCS -- FLEXIBILITY & STRENGTH -- THE STANDARD FOR OPEN-TRENCH”**



## Applications and Information

- **PRO-TRACE® HF-CCS** is used for tracer wire applications to conductively locate buried utility lines for the gas, water, sewer, telecommunication, and electrical markets.
- **PRO-TRACE® HF-CCS** is designed to embody the flexibility, memory, and feel of copper. It also has a 50% higher break-load, minimizing damage during installation and while in service. Equal to copper in signal tracing performance.
- For installation in open-trench, plow-in, or inside conduit using 1 wire.
- Available in 30 mil (30v) and 45 mil (600v) insulation for desired level of protection.
- Equal to copper in signal performance, lower in cost, and great price stability.
- RoHS Compliant and works with connectors you already use.

## Standards and References

**PRO-TRACE® HF-CCS** meets or exceeds all applicable UL Standards, ASTM specifications, and requirements of the National Electrical Code. Buy American / AIS Compliant.

- ASTM B910 / B190M: Standard Specification for Annealed Copper-Clad Steel Wire
- ASTM B170: Standard Specification for Oxygen-Free Electrolytic Copper
- ASTM D1248: Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable
- UL 2989 [not listed]: in accordance with USPSHTC Section 307.8.1, 18 AWG tracer wire for water service lines.

## Construction

**PRO-TRACE® HF-CCS** is a flexible, copper-clad steel tracer wire. A low carbon steel core, metallurgically bonded with a copper cladding, that is uniform and continuous, creating a bi-metal conductor that acts as one and is corrosion resistant. Special annealing processes are performed during the cladding process giving HF-CCS the flexibility and feel of copper, but 43% higher in strength which means less breaks than copper tracer wire.

**PRO-TRACE® HF-CCS** uses a 30 mil or 45 mil, high-density, high molecular weight polyethylene (HDPE) insulation. HDPE provides an excellent balance of surface smoothness, processing ease and electrical consistency. HDPE provides superior strength against underground elements that help prevent accidental breaks caused by rocks in shifting soil conditions. All insulation spark tested @5000 VAC (30 mil) and @7500 VAC (45 mil).

## Specification Example

Tracer wire for open-cut installation shall be a 12 AWG SOLID PRO-TRACE® HF-CCS PE30. Conductor shall be annealed, 21% IACS, copper-clad steel, utilizing a AISI 1006 low carbon steel core with rated break load of 302 lbs (required to meet break load, flexibility, and ASTM B910). Conductor shall be extruded with a 30 mil, high density, high molecular weight polyethylene (HMW-HDPE) pursuant to ASTM D1248. Tracer wire shall be rated for direct burial use at 30 volts and RoHS compliant. Tracer wire shall be PRO-TRACE® HF-CCS PE30 as manufactured by **Pro-Line Safety Products**.

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PRO-TRACE® is a registered trademark of Pro-Line Safety Products Co.

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**TABLE 1: CONDUCTOR (Physical, Mechanical and Electrical Properties)**

| PROPERTY                         | 18 AWG      | 16 AWG      | 14 AWG      | 12 AWG     | 10 AWG     | 8 AWG      |
|----------------------------------|-------------|-------------|-------------|------------|------------|------------|
| Conductor Type                   | HF-CCS      | HF-CCS      | HF-CCS      | HF-CCS     | HF-CCS     | HF-CCS     |
| Conductor Temper                 | Annealed    | Annealed    | Annealed    | Annealed   | Annealed   | Annealed   |
| Steel Grade                      | AISI 1006   | AISI 1006   | AISI 1006   | AISI 1006  | AISI 1006  | AISI 1006  |
| Copper Grade                     | UNS C10200  | UNS C10200  | UNS C10200  | UNS C10200 | UNS C10200 | UNS C10200 |
| Break Strength                   | 70 lbs      | 111 lbs     | 177 lbs     | 282 lbs    | 448 lbs    | 713 lbs    |
| Elongation (ASTM B869)           | ≥ 15.0%     | ≥ 15.0%     | ≥ 15.0%     | ≥ 15.0%    | ≥ 15.0%    | ≥ 15.0%    |
| Copper Thickness (% of Diameter) | 3.0%        | 3.0%        | 3.0%        | 3.0%       | 3.0%       | 3.0%       |
| Copper Weight (Per 1,000')       | 13.0%       | 13.0%       | 13.0%       | 13.0%      | 13.0%      | 13.0%      |
| Nominal DC Resistance            | 30.399 ohms | 19.119 ohms | 12.024 ohms | 7.562 ohms | 4.756 ohms | 2.991 ohms |

**TABLE 2: INSULATION & PRINTING (Physical, Mechanical and Electrical Properties)**

|   |            |  |  |                               |  |  |
|---|------------|--|--|-------------------------------|--|--|
| PRO-TRACE® -- 12 AWG SOLID HF-CCS -- 30 MIL HDPE -- 30V -- DIRECT BURIAL TRACER WIRE -- OPEN TRENCH -- CAUTION GAS LINE BELOW *DATE & TRACE* SEQ FT |            |  |  |                               |  |  |
| Density @ 23°C  | ASTM D1505 |  |  | 0.945 g/cm <sup>3</sup>       |  |  |
| Melt Flow Rate  | ASTM D1238 |  |  | 0.70 g/10 min                 |  |  |
| Tensile Strength  | ASTM D638  |  |  | 3,400 psi                     |  |  |
| Tensile Strength Retention  | ASTM D638  |  |  | 90% after 48 hours @ 100°C    |  |  |
| Tensile Elongation  | ASTM D638  |  |  | 500%                          |  |  |
| Tensile Elongation Retention  | ASTM D638  |  |  | 90% after 48 hours @ 100°C    |  |  |
| Environmental Stress Cracking   | ASTM D1693 |  |  | 0 failures @ 48 hours         |  |  |
| Thermal Stress Cracking   | ASTM D2951 |  |  | 0 failures @ 96 hours         |  |  |
| Brittleness Temperature   | ASTM D746  |  |  | -76°C                         |  |  |
| Melting Temperature   | ASTM D3418 |  |  | 260°C                         |  |  |
| Oxidative Induction Time  | ASTM D3895 |  |  | 170 min @ 200°C               |  |  |
| Dielectric Constant   | ASTM D1531 |  |  | 2.32 @ 1 MHz                  |  |  |
| Dissipation Factor  | ASTM D1531 |  |  | 0.00006 @ 1 MHz               |  |  |
| DC Volume Resistivity @ 23°C  | ASTM D257  |  |  | > 1 x 10 <sup>15</sup> ohm-cm |  |  |

**TABLE 3: ORDERING INFORMATION (Weights, Measurements, and Packaging)**

| PRODUCT PART NO.  | AWG SIZE / PRODUCT DESCRIPTION | BREAK STRENGTH (lbs) | CONDUCTOR O.D. (Nominal) | FINISHED O.D. (Nominal) | INSULATION THICKNESS (Nominal) | PRODUCT WEIGHT LBS/1000' | STANDARD LENGTHS          |
|---|--------------------------------|----------------------|--------------------------|-------------------------|--------------------------------|--------------------------|---------------------------|
| <b>PRO-TRACE® HF-CCS PE30 TRACER WIRE (30 mil/30V) -- OPEN TRENCH, PLOW IN, INSIDE CONDUIT</b>  |                                |                      |                          |                         |                                |                          |                           |
| 74418.XXXX  | 18 AWG SOLID HF-CCS PE30       | 70 lbs               | 0.0403"                  | 0.101"                  | 0.030"                         | 7.0                      | 500', 1000', 2500', 5000' |
| 74416.XXXX  | 16 AWG SOLID HF-CCS PE30       | 111 lbs              | 0.0508"                  | 0.111"                  | 0.030"                         | 10.0                     | 500', 1000', 2500', 5000' |
| 74411.XXXX  | 14 AWG SOLID HF-CCS PE30       | 177 lbs              | 0.0641"                  | 0.124"                  | 0.030"                         | 15.0                     | 500', 1000', 2500', 5000' |
| 74412.XXXX  | 12 AWG SOLID HF-CCS PE30       | 282 lbs              | 0.0808"                  | 0.141"                  | 0.030"                         | 22.5                     | 500', 1000', 2500', 5000' |
| 74413.XXXX  | 10 AWG SOLID HF-CCS PE30       | 448 lbs              | 0.1019"                  | 0.162"                  | 0.030"                         | 34.0                     | 500', 1000', 2500', 5000' |
| 74414.XXXX  | 8 AWG SOLID HF-CCS PE30        | 713 lbs              | 0.1285"                  | 0.189"                  | 0.030"                         | 52.0                     | 500', 1000', 2500', 5000' |
| <b>PRO-TRACE® HF-CCS PE45 TRACER WIRE (45 mil/600V) -- OPEN TRENCH, PLOW IN, INSIDE CONDUIT</b> |                                |                      |                          |                         |                                |                          |                           |
| 74448.XXXX  | 18 AWG SOLID HF-CCS PE45       | 70 lbs               | 0.0403"                  | 0.131"                  | 0.045"                         | 9.5                      | 500', 1000', 2500', 5000' |
| 74446.XXXX  | 16 AWG SOLID HF-CCS PE45       | 111 lbs              | 0.0508"                  | 0.141"                  | 0.045"                         | 12.5                     | 500', 1000', 2500', 5000' |
| 74441.XXXX  | 14 AWG SOLID HF-CCS PE45       | 177 lbs              | 0.0641"                  | 0.154"                  | 0.045"                         | 17.5                     | 500', 1000', 2500', 5000' |
| 74442.XXXX  | 12 AWG SOLID HF-CCS PE45       | 282 lbs              | 0.0808"                  | 0.171"                  | 0.045"                         | 26.0                     | 500', 1000', 2500', 5000' |
| 74443.XXXX  | 10 AWG SOLID HF-CCS PE45       | 448 lbs              | 0.1019"                  | 0.192"                  | 0.045"                         | 37.0                     | 500', 1000', 2500', 5000' |
| 74444.XXXX  | 8 AWG SOLID HF-CCS PE45        | 713 lbs              | 0.1285"                  | 0.219"                  | 0.045"                         | 55.0                     | 500', 1000', 2500', 5000' |

| (.XXXX) INSULATION COLOR AND REEL SIZE |       |      |       |       |        |        |      |       |        |
|--|-------|------|-------|-------|--------|--------|------|-------|--------|
| PART# (.XXXX)                          | BLACK | BLUE | BROWN | GREEN | ORANGE | PURPLE | RED  | WHITE | YELLOW |
| 500' REEL                              | 0132  | 0232 | 0332  | 0532  | 0632   | 0832   | 0932 | 1132  | 1232   |
| 1000' REEL                             | 0141  | 0241 | 0341  | 0541  | 0641   | 0841   | 0941 | 1141  | 1241   |
| 2500' REEL                             | 0147  | 0247 | 0347  | 0547  | 0647   | 0847   | 0947 | 1147  | 1247   |
| 5000' REEL                             | 0153  | 0253 | 0353  | 0553  | 0653   | 0853   | 0953 | 1153  | 1453   |

\*Custom lengths are available upon request \*\*Some sizes, colors, and lengths may be subject to mins

| (APWA) UNIFORM COLOR CODE |
|---------------------------|
| POTABLE WATER             |
| SEWER & DRAINAGE          |
| RECLAIMED WATER           |
| GAS & PETROLEUM           |
| COMMUNICATION             |
| ELECTRIC & POWER          |



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**PRO-LINE**  
SAFETY PRODUCTS

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**Budco Cable Supplies**

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