



## HF-CCS PE30

## (HIGH-FLEX)

Tracer Wire • High-Flex Copper Clad Steel (HF-CCS) Conductor • 21% IACS Conductivity • Corrosion Resistant High-Density, High Molecular Weight Polyethylene (HDPE) Insulation • Moisture, Chemical, and Oil Resistant Impact, Crush, and Abrasion Resistant • RoHS Compliant • Direct Burial Rated • 30 Volts • Made in the USA



### Applications and Information

- **PRO-TRACE™ HF-CCS PE30** conductors are used for tracer wire applications not exceeding 30 Volts. Tracer wire is used to conductively locate buried utility lines for the gas, water, sewer, telecommunication, and electrical markets.
- **PRO-TRACE™ HF-CCS PE30** is designed to have the flexibility, memory, and feel of copper. It also has a 30% higher break-load, minimizing damage during installation and while in service. Equal to copper in signal tracing performance. It simply outperforms copper tracer wire.
- Considerably lower in cost and great price stability compared to copper.
- RoHS Compliant, made in the USA, and works with connectors you already use.

### Standards and References

**PRO-TRACE™ HF-CCS PE30** conductors meets or exceeds all applicable ASTM specifications, requirements of the National Electrical Code.

- ASTM B910 / B190M: Standard Specification for Annealed Copper-Clad Steel Wire
- ASTM B170: Standard Specification for Oxygen-Free Electrolytic Copper
- ASTM D1238: Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer

### Construction

**PRO-TRACE™ HF-CCS PE30** is a high-flex, copper-clad steel conductor. 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 30% higher in strength which means less breaks than copper tracer wire.

**PRO-TRACE™ HF-CCS PE30** uses a 30 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.

### Specification Example

Tracer wire shall be a 12 AWG solid, **PRO-TRACE™ HF-CCS PE30**. Tracer wire shall consist of a dead soft annealed, 21% IACS conductivity, copper clad steel conductor with a minimum break load of 256 lbs (50,000 psi) to ensure flexibility. Conductor shall be extruded with a 30 mil, high density polyethylene insulation, and blue in color to meet the APWA color code of the buried utility line. Tracer wire shall be rated for direct burial use at 30 volts and RoHS compliant. Tracer wire shall be **PRO-TRACE™ HF-CCS PE30** and made in the USA.

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

PROPERTY	14 AWG	12 AWG	10 AWG	8 AWG
Conductor Type	HF-CCS	HF-CCS	HF-CCS	HF-CCS
Conductor Temper	Annealed	Annealed	Annealed	Annealed
Rated Break Load	161 lbs	256 lbs	407 lbs	648 lbs
Rated Tensile Strength	50,000 psi	50,000 psi	50,000 psi	50,000 psi
Elongation	30.0%	30.0%	30.0 %	30.0%
Nominal Copper Thickness ( % of Diameter )	3.0%	3.0%	3.0%	3.0%
Nominal Copper Weight ( Per 1,000' )	13.0%	13.0%	13.0%	13.0%
Nominal DC Resistance	12.020 ohms	7.565 ohms	4.757 ohms	2.991 ohms

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

TEST DESCRIPTION	ASTM STANDARD	TYPICAL VALUES
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

PRODUCT PART NO.	CONDUCTOR		RATED BREAK LOAD	RATED TENSILE STRENGTH	HDPE INSULATION THICKNESS	NOMINAL O.D.	APPROX. WEIGHT PER 1,000 FT		STANDARD PACKAGES
	AWG SIZE	STANDARD					COPPER WEIGHT	FINISHED WEIGHT	
<b>WEIGHTS, MEASUREMENTS AND PACKAGING</b>									
74411XXXX	14 AWG SOLID	21% IACS	161 lbs	50,000 psi	0.030"	0.124"	1.4479	16.13	500/2500
74412XXXX	12 AWG SOLID	21% IACS	256 lbs	50,000 psi	0.030"	0.141"	2.3007	23.80	500/1000/2500
74413XXXX	10 AWG SOLID	21% IACS	407 lbs	50,000 psi	0.030"	0.162"	3.6592	37.90	500/1000/2500
74414XXXX	8 AWG SOLID	21% IACS	648 lbs	50,000 psi	0.030"	0.189"	5.8189	54.67	CUSTOM ORDER

INSULATION COLOR & REEL SIZE			
COLOR	500' REEL	1000' REEL	2500' REEL
BLACK	0132	0141	0147
BLUE	0232	0241	0247
GREEN	0532	0541	0547
ORANGE	0632	0641	0647
PURPLE	0832	0841	0847
RED	0932	0941	0947
WHITE	1132	1141	1147
YELLOW	1232	1241	1247

\*\*\*SOME PART NUMBERS MAY BE SUBJECT TO MINS\*\*\*

REEL & PACKAGING INFORMATION						
SIZE	LENGTH	FLANGE	TRAVERSE	MATERIAL	CARTON QTY	PALLET QTY
14 AWG	500	8.0"	4.0"	PLYWOOD	BULK	144,000 FT
	1000	8.0"	9.0"	PLYWOOD	BULK	144,000 FT
	2500	12.0"	9.0"	PLYWOOD	BULK	140,000 FT
12 AWG	500	8.0"	6.0"	PLYWOOD	BULK	102,500 FT
	1000	8.0"	9.0"	PLYWOOD	BULK	108,000 FT
	2500	12.0"	12.0"	PLYWOOD	BULK	105,000 FT
10 AWG	500	8.0"	9.0"	PLYWOOD	BULK	72,000 FT
	1000	10.0"	7.0"	PLYWOOD	BULK	64,000 FT
	2500	14.0"	10.0"	PLYWOOD	BULK	67,500 FT
8 AWG	500	10.0"	7.0"	PLYWOOD	BULK	48,000 FT
	1000	12.0"	6.0"	PLYWOOD	BULK	36,000 FT
	2500	14.0"	10.0"	PLYWOOD	BULK	45,000 FT