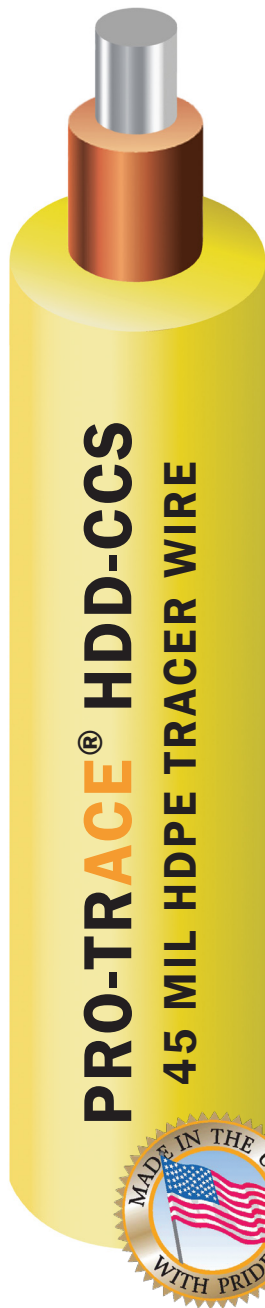


# HDD-CCS PE45

## (DIRECTIONAL DRILLING)

Tracer Wire • Horizontal Directional Drilling Copper Clad Steel (HDD-CCS) • 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

**“PRO-TRACE® HDD-CCS -- DIRECTIONAL BORING DONE RIGHT THE FIRST TIME -- EVERY TIME!”**



### Applications and Information

- **PRO-TRACE® HDD-CCS PE45** conductor is equal to copper in signal tracing performance 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® HDD-CCS PE45** has almost **6X** the break load of copper, which allows 1 wire to be installed in directional boring, plow-in, or open trench applications.
- Has 3-5% elongation, providing the perfect balance between tensile strength, ductility, and decreasing brittleness.
- 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® HDD-CCS PE45** conductors meets or exceeds all applicable ASTM specifications, and requirements of the National Electrical Code.

- ASTM B869: Specification for 21% Conductivity, Hard Drawn, Copper-Clad Steel Wire
- ASTM B170: Specification for Oxygen-Free Electrolytic Copper
- ASTM D1238: Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer

### Construction

**PRO-TRACE® HDD-CCS PE45** is an extra high-strength, copper clad steel tracer wire. A high 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. The high break load of allows only 1 conductor to be used in any tracer wire application while providing the perfect balance between break load, ductility, and decreasing brittleness. It is the best performing tracer wire on the market.

**PRO-TRACE® HDD-CCS PE45** is protected with a 45 mil, high-density, high molecular weight polyethylene (HDPE) insulation. HDPE provides an excellent balance of surface smoothness, processing ease and electrical consistency. HDPE insulation provides superior strength against underground elements that help prevent accidental breaks caused by rocks in shifting soil conditions.

### Specification Example

Tracer wire for directional boring installation shall be a 12 AWG solid, PRO-TRACE® HDD-CCS PE45. Conductor shall be hard-drawn, 21% IACS, copper clad steel, utilizing a AISI 1045 high carbon steel core (required to meet break load), with rated break load of 1,030 lbs (201,000 psi). Conductor shall be extruded with a 45 mil, high-density polyethylene, and 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® HDD-CCS PE45 as manufactured by **Pro-Line Safety Products** and made in the USA.

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

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

PROPERTY	12 AWG	10 AWG	8 AWG
Conductor Type	HDD-CCS	HDD-CCS	HDD-CCS
Conductor Temper	Hard-Drawn	Hard-Drawn	Hard-Drawn
Steel Grade	AISI 1045	AISI 1045	AISI 1045
Copper Grade	UNS C10200	UNS C10200	UNS C10200
Rated Break Load	1,030 lbs	1,500 lbs	2,150 lbs
Rated Tensile Strength	201,000 psi	184,000 psi	165,800 psi
Elongation	3.0%	4.0%	5.0%
Copper Thickness (% of Diameter)	3.0%	3.0%	3.0%
Minimum Copper Weight (Per 1,000')	13.0%	13.0%	13.0%
Nominal DC Resistance	7.562 ohms	4.756 ohms	2.991 ohms

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

TEST DESCRIPTION	ASTM STANDARD	TYPICAL VALUES
Density @ 23°C	ASTM D792	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 Test @ 23°C	ASTM D257	> 1 x 10 <sup>15</sup> ohm-cm

PRODUCT PART NO.	PRODUCT DESCRIPTION	RATED BREAK LOAD	RATED TENSILE STRENGTH	HDPE INSULATION THICKNESS	NOMINAL O.D.	APPROX. WEIGHT PER 1,000 FT		STANDARD PACKAGES
						COPPER WEIGHT	FINISHED WEIGHT	
<b>WEIGHTS, MEASUREMENTS AND PACKAGING</b>								
74642XXXX	12 SOL HDD-CCS PE45	1,030 lbs	201,000 psi	0.045"	0.171"	2.3007	27.00	500' / 1000' / 2500'
74643XXXX	10 SOL HDD-CCS PE45	1,500 lbs	184,000 psi	0.045"	0.192"	3.6592	40.00	500' / 1000' / 2500'
74644XXXX	8 SOL HDD-CCS PE45	2,150 lbs	165,800 psi	0.045"	0.219"	5.8189	58.00	500' / 1000'

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 COLORS AND SIZES MAY BE SUBJECT TO MINS\*\*\*

REEL & PACKAGING INFORMATION					
SIZE	LENGTH	MATERIAL	REEL DIMENSION	ARBOR HOLE	PALLET QUANTITY
12 AWG	500	PLYWOOD (TREATED)	8" x 9"	1.625"	90,000 FT
	1000	PLYWOOD (TREATED)	12" x 6"	1.625"	96,000 FT
	2500	PLYWOOD (TREATED)	12" x 12"	1.625"	110,000 FT
10 AWG	500	PLYWOOD (TREATED)	8" x 9"	1.625"	72,000 FT
	1000	PLYWOOD (TREATED)	12" x 6"	1.625"	64,000 FT
	2500	PLYWOOD (TREATED)	16" x 10"	2.5"	67,500 FT
8 AWG	500	PLYWOOD (TREATED)	12" x 6"	1.625"	48,000 FT
	1000	PLYWOOD (TREATED)	12" x 9"	1.625"	48,000 FT
	2500	PLYWOOD (TREATED)	16" x 10"	2.5"	45,000 FT



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