

HF-CCS PE45

(HIGH-FLEX / OPEN-TRENCH)

Tracer Wire • High-Flex Copper Clad Steel (HF-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® HF-CCS -- FLEXIBILITY & STRENGTH -- IT'S THE FUTURE OF TRACER WIRE"



Applications and Information

- **PRO-TRACE® HF-CCS PE45** is 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 PE45** is designed to embody the flexibility, memory, and feel of copper. It also has a 43% higher break-load, minimizing damage during installation and while in service. Equal to copper in signal tracing performance. It simply outperforms copper tracer wire. Designed for open-trench and plow-in installations using 1 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 PE45 conductors meets or exceeds all applicable ASTM specifications, and 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 PE45 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 PE45 uses 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 provides superior strength against underground elements that help prevent accidental breaks caused by rocks in shifting soil conditions.

Specification Example

Tracer wire for open-trench installation shall be a 12 AWG solid, PRO-TRACE® HF-CCS PE45. Conductor shall be soft-drawn, 21% IACS, copper clad steel, utilizing a AISI 1006 low carbon steel core (required to meet break load and flexibility), with break load of 282 lbs (55,000 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® HF-CCS PE45 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
Steel Grade	AISI 1006	AISI 1006	AISI 1006	AISI 1006
Copper Grade	UNS C10200	UNS C10200	UNS C10200	UNS C10200
Rated Break Load	177 lbs	282 lbs	448 lbs	713 lbs
Rated Tensile Strength	55,000 psi	55,000 psi	55,000 psi	55,000 psi
Elongation	20.0%	21.0%	21.0%	22.0%
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	12.024 ohms	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 D1505	0.945 g/cm ³
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 ¹³ 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	
WEIGHTS, MEASUREMENTS AND PACKAGING								
74441XXXX	14 SOL HF-CCS PE45	177 lbs	55,000 psi	0.045"	0.154"	1.4479	19.00	CUSTOM ORDER
74442XXXX	12 SOL HF-CCS PE45	282 lbs	55,000 psi	0.045"	0.171"	2.3007	27.00	500' / 2500'
74443XXXX	10 SOL HF-CCS PE45	448 lbs	55,000 psi	0.045"	0.192"	3.6592	40.00	CUSTOM ORDER
74444XXXX	8 SOL HF-CCS PE45	713 lbs	55,000 psi	0.045"	0.219"	5.8189	58.00	CUSTOM ORDER

INSULATION COLOR & REEL LENGTH			
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	MATERIAL	REEL DIMENSION	ARBOR HOLE	PALLET QUANTITY
14 AWG	500	PLYWOOD (TREATED)	8" x 6"	1.625"	126,000 FT
	1000	PLYWOOD (TREATED)	12" x 4"	1.625"	144,000 FT
	2500	PLYWOOD (TREATED)	12" x 12"	1.625"	160,000 FT
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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