

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 (HMWPE-HDPE) Insulation • Moisture, Chemical, and Oil Resistant
 Impact, Crush, and Abrasion Resistant • RoHS Compliant • Direct Burial Rated • 30 Volts • Made in the USA

HF-CCS -- FLEXIBILITY & STRENGTH -- "IT'S THE FUTURE OF TRACER WIRE"



Applications and Information

- **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.
- **Type 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

HF-CCS PE45 conductors meet or exceed 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 D1248: Standard Specification for Polyethylene Plastics Extrusion Materials For Wire and Cable

Construction

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.

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-cut installation shall be a 12 AWG solid HF-CCS PE45. Conductor shall be annealed, 21% IACS, copper-clad steel, utilizing a AISI 1006 low carbon steel core with minimum break load of 282 lbs or 55,000 psi (required to meet break load, flexibility, and ASTM B910). Conductor shall be extruded with a 45 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 made in the USA.

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
Rated Break Load (Minimum)	70 lbs	111 lbs	177 lbs	282 lbs	448 lbs	713 lbs
Rated Tensile Strength (Minimum)	55,000 psi	55,000 psi	55,000 psi	55,000 psi	55,000 psi	55,000 psi
Elongation (ASTM B869)	≥ 15.0%	≥ 15.0%	≥ 15.0%	≥ 15.0%	≥ 15.0%	≥ 15.0%
Nominal Copper Thickness (% of Diameter)	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Nominal 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)

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 ¹⁵ ohm-cm

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

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
						CCS WEIGHT	FINISHED WEIGHT	
PRO-TRACE HF-CCS PE45 TRACER WIRE -- OPEN-CUT, PLOW-IN, BLOW-IN								
74448.XXXX	18 AWG HF-CCS PE45	70 lbs	55,000 psi	0.045"	0.131"	4.4191	7.14	500' / 1000' / 2500'
74446.XXXX	16 AWG HF-CCS PE45	112 lbs	55,000 psi	0.045"	0.141"	7.0219	10.15	500' / 1000' / 2500'
74441.XXXX	14 AWG HF-CCS PE45	177 lbs	55,000 psi	0.045"	0.154"	11.1800	19.00	500' / 1000' / 2500'
74442.XXXX	12 AWG HF-CCS PE45	282 lbs	55,000 psi	0.045"	0.171"	17.7644	27.00	500' / 1000' / 2500'
74443.XXXX	10 AWG HF-CCS PE45	448 lbs	55,000 psi	0.045"	0.192"	28.2537	40.00	500' / 1000' / 2500'
74444.XXXX	8 AWG HF-CCS PE45	713 lbs	55,000 psi	0.045"	0.219"	44.9297	58.00	CUSTOM ORDER

12 AWG SOLID HF-CCS • 45 MIL HDPE • HIGH-FLEX TRACER WIRE (282 LBS) • 30V • DIRECT BURIAL • CAUTION GAS LINE BELOW

INSULATION COLOR AND REEL SIZE				REEL AND PACKAGING INFORMATION					
COLOR	500' REEL	1000' REEL	2500' REEL	SIZE	LENGTH	MATERIAL	REEL DIMENSION	ARBOR HOLE	PALLET QUANTITY
BLACK	0132	0141	0147	14 AWG	500	PLYWOOD or PLASTIC	8" x 6"	1.5"	144,000 FT
BLUE	0232	0241	0247		1000	PLYWOOD or PLASTIC	8" x 9"	1.5"	144,000 FT
BROWN	0332	0341	0347		2500	PLYWOOD or PLASTIC	12" x 12"	1.5"	160,000 FT
GREEN	0532	0541	0547	12 AWG	500	PLYWOOD or PLASTIC	8" x 6"	1.5"	108,000 FT
ORANGE	0632	0641	0647		1000	PLYWOOD or PLASTIC	12" x 6"	1.5"	112,000 FT
PURPLE	0832	0841	0847		2500	PLYWOOD or PLASTIC	12" x 12"	1.5"	120,000 FT
RED	0932	0941	0947	10 AWG	500	PLYWOOD or PLASTIC	8" x 9"	1.5"	72,000 FT
WHITE	1132	1141	1147		1000	PLYWOOD or PLASTIC	12" x 6"	1.5"	64,000 FT
YELLOW	1232	1241	1247		2500	PLYWOOD or PLASTIC	16" x 10"	1.5"	67,500 FT

*** Some colors and sizes may be subject to mins ***

*** Custom length reels are available upon request, some restrictions may apply ***
 *** Bulk reels up to 60,000' are available, some restrictions may apply ***

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