



Submittal - 024 Pump Station

Pro-Line "Pro-Trace" Trace wire (Submittal on the following page(s), this sheet is the response page)

Response:

MKEC ENGINEERING, INC.
411 North Webb Road - Wichita, KS 67206

Reviewed Reviewed As Noted *BWT*
 Revise and Resubmit Rejected
 Not Required by the Contract Documents

Reviewed for conformance with the design concept of the project and compliance with the information given in the contract documents. Contractor is responsible for: dimensions to be confirmed and correlated at the job site; information that pertains solely to the fabrication process or to techniques of construction; and coordination of work of all other trades. If "Resubmit" or "Rejected" are not checked resubmission is neither desired or required.

Belg Shell Date: *6-28-16*

HF-CCS PE30

(HIGH-FLEX / OPEN-TRENCH)

Tracer wire for 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"



PRO-TR
 30 MIL HDPE TRACER WIRE
 HF-CCS



Applications and Information

- PRO-TRACE® HF-CCS PE30 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 PE30 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 PE30 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 PE30 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 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 for open-trench installation shall be a 12 AWG solid, PRO-TRACE® HF-CCS PE30. 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 30 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 PE30 as manufactured by Pro-Line Safety Products and made in the USA.

Specification Updated: 4.15.2011 08:32:00 CST

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

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 ¹⁵ ohm-cm

PRODUCT PART NO.	PRODUCT DESCRIPTION	RATED BREAK LOAD	RATED TENSILE STRENGTH	HOPE INSULATION THICKNESS	NOMINAL O.D.	APPROX. WEIGHT PER 1,000 FT		STANDARD PACKAGES
						COPPER WEIGHT	FINISHED WEIGHT	
WEIGHTS, MEASUREMENTS AND PACKAGING								
74411XXXX	14 SOL HF-CCS PE30	177 lbs	55,000 psi	0.030"	0.124"	1.4479	16.00	500' / 2500'
74412XXXX	12 SOL HF-CCS PE30	282 lbs	55,000 psi	0.030"	0.141"	2.3007	24.00	500' / 1000' / 2500'
74413XXXX	10 SOL HF-CCS PE30	448 lbs	55,000 psi	0.030"	0.162"	3.6592	36.00	500' / 1000' / 2500'
74414XXXX	8 SOL HF-CCS PE30	713 lbs	55,000 psi	0.030"	0.189"	5.8189	54.00	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 4"	1.625"	162,000 FT
	1000	PLYWOOD (TREATED)	8" x 9"	1.625"	144,000 FT
	2500	PLYWOOD (TREATED)	12" x 9"	1.625"	160,000 FT
12 AWG	500	PLYWOOD (TREATED)	8" x 6"	1.625"	108,000 FT
	1000	PLYWOOD (TREATED)	8" x 9"	1.625"	108,000 FT
	2500	PLYWOOD (TREATED)	12" x 12"	1.625"	120,000 FT
10 AWG	500	PLYWOOD (TREATED)	8" x 9"	1.625"	72,000 FT
	1000	PLYWOOD (TREATED)	12" x 6"	1.625"	80,000 FT
	2500	PLYWOOD (TREATED)	14" x 10"	2.5"	67,500 FT
8 AWG	500	PLYWOOD (TREATED)	8" x 9"	1.625"	54,000 FT
	1000	PLYWOOD (TREATED)	12" x 6"	1.625"	48,000 FT
	2500	PLYWOOD (TREATED)	16" x 10"	2.5"	45,000 FT

use Purple



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PRO-LINE SAFETY PRODUCTS

A DIVISION OF PRO-PAK, INC.

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