Firmato digitalmente da: ROMEO MARTINA
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21_30_PV_9PE_RMC_AU_C1EL_3_00	GENNAIO 2022	CARATTERISTICHE TECNICHE DEI CAVI	Ing. Massimiliano Pacifico	Arch. Paola Pastore	Ing. Martina Romeo
N. ELABORATO	DATA EMISSIONE	DESCRIZIONE	ESEGUITO	CONTROLLATO	APPROVATO

OGGETTO:
Progetto dell'impianto agro-fotovoltaico denominato "Impianto Agro-Fotovoltaico Giumenta" della potenza di 116.027,10 kWp da realizzare nel comune di Ramacca (CT)

TITOLO:
RS06EPD0030A0
C1. PIANO TECNICO DELLE OPERE- IMPIANTO DI UTENZA PER LA CONNESSIONE
Caratteristiche tecniche dei cavi

COMMITTENTE:

9PIU' ENERGIA s.r.l.
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ORDINE DEGLI INGEGNERI DELLA PROVINCIA DI CATANIA
DOTT. ING. ROMEO MARTINA
Settori: Civile ed ambientale
Sez. A
n. 7511

SOSTITUISCE:

SOSTITUITO DA:

CARTA:
A4

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High Voltage XLPE cable production

Since the introduction of polymeric insulation, we have made an important contribution to the development of extruded dielectric cables.

Intensive research on materials, together with the processing and investment in advanced extrusion machinery, led to the commercial use of the long land die dry-curing process for the manufacture of high voltage and extra high voltage cables, which meet the highest quality standards. In a triple extrusion process, the semi-conductive conductor screen, the insulation and the insulation screen are applied simultaneously. The temperature of the materials leaving the extrusion head is relatively low so as to prevent premature cross-linking. Cross-linking proper takes place at a high temperature and high pressure in the electrically heated long die, where the materials are heated to the temperature required to activate the chemical reaction effectuating the cross-linking. Gradual cooling at high pressure after cross-linking prevents the formation of voids and the creation of internal mechanical stresses.

Cable finishing

Prysmian Cables and Systems B.V. offer a variety of cable finishing:
- lead alloy sheath;
- welded aluminium sheath;
- copper wire screen.

In addition, Prysmian Cables and Systems B.V. can produce the following optional finishing:
- lead alloy sheath with copper wire screen;
- welded aluminium sheath with copper wire screen;
- copper wire screen with aluminium laminated foil or copper foil;
- integrated optical fibres for distributed temperature measurements;
- aluminium wires or steel armouring;
- LSOH outer sheath;
- extruded semi-conductive layer on outer sheath.

Prysmian Cables and Systems B.V. have the capability of handling 80 tons maximum gross weight of delivery drums. This allows for the production of very long (E)HV cable lengths of up to 3.2 km. Specific cable constructions and test regimes can be offered on request.

Item	Sample A	Sample B	Sample C
Cable type	EYLKrvlwc	YMeKrvasdlwd	EYAKrvlwd
1	**Conductor** Longitudinal watertight solid aluminium rod	**Conductor** Longitudinal watertight stranded and compacted copper, including binder tape	**Conductor** Longitudinal watertight segmental stranded and compacted copper, including binder tape
2	**Conductor screen** Extruded semiconducting copolymer compound	**Conductor screen** Extruded semiconducting copolymer compound	**Conductor screen** Extruded semiconducting copolymer compound
3	**Insulation** Extruded XLPE	**Insulation** Extruded XLPE	**Insulation** Extruded XLPE
4	**Insulation screen** Extruded semiconducting copolymer compound	**Insulation screen** Extruded semiconducting copolymer compound	**Insulation screen** Extruded semiconducting copolymer compound
5	**Bedding** Semiconducting water blocking tapes	**Bedding** Semiconducting water blocking tapes	**Bedding** Semiconducting water blocking tapes
6	**Metallic sheath** Extruded lead alloy	**Metallic screen** A layer of copper wire helix and a copper contact tape counter helix	**Metallic sheath** Aluminium welded sheath
7	**Outer sheath** Extruded PE	**Separation tape** Semiconducting water blocking and binder tapes	**Outer sheath** Extruded PE
8		**Radial water barrier** Aluminium foil laminate	
9		**Outer sheath** Extruded PE	

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Sample constructions

Rated voltages:
U_o/U = 87/150 kV
U_m = 170 kV
U_p = 750 kV

170kV cables 87/150kV Single core, XLPE insulated high voltage power cables

Nominal cross-sectional area of conductor				mm²	400	630	800	1000	1200	1600	2000	2500
Constructional data												
Outer diameter	With aluminium conductor			mm	80	90	91	91	95	113	114	120
	With copper conductor			mm	86	89	93	103	103	109	116	120
Net weight	With aluminium conductor			kg/m	12.7	13.8	14.1	14.3	15.3	20.2	25.3	31.4
with Pb sheath	With copper conductor			kg/m	17.3	19.4	21.5	25.2	25.9	30.5	33.8	39.8
Minimum bending radius during cable laying				m	2.1	2.2	2.3	2.6	2.6	2.8	2.9	3.0
Electrical properties at 150kV and 50 Hz												
Aluminium conductor	Max. DC-resistance	at 20°C		Ω/km	0.0778	0.0469	0.0367	0.0291	0.0247	0.0186	0.0149	0.0127
	AC resistance	at 90°C, approx.		Ω/km	0.101	0.062	0.050	0.041	0.035	0.024	0.020	0.017
Copper conductor	Max. DC-resistance	at 20°C		Ω/km	0.0470	0.0283	0.0221	0.0176	0.0151	0.0113	0.0090	0.0072
	AC resistance	at 90°C, approx.		Ω/km	0.062	0.039	0.032	0.024	0.021	0.017	0.014	0.012
DC-resistance of metallic sheath at 20°C approx.				Ω/km	0.263	0.262	0.255	0.262	0.261	0.255	0.256	0.254
Reactance (approx.)	Metallic sheath closed	Trefoil	touching	Ω/km	0.143	0.132	0.126	0.121	0.118	0.109	0.104	0.100
		Flat	0.15m	Ω/km	0.185	0.174	0.166	0.159	0.154	0.135	0.131	0.125
		Flat	0.30m	Ω/km	0.219	0.209	0.200	0.192	0.186	0.163	0.160	0.158
	Metallic sheath open	Flat	0.15m	Ω/km	0.190	0.179	0.172	0.164	0.159	0.141	0.136	0.130
		Flat	0.30m	Ω/km	0.234	0.223	0.215	0.208	0.203	0.185	0.179	0.173
		Flat	0.45m	Ω/km	0.259	0.248	0.241	0.233	0.228	0.210	0.205	0.199
Operating capacitance				µF/km	0.15	0.19	0.21	0.22	0.24	0.27	0.29	0.32
Charging current				A/km	4.1	5.2	5.7	6.0	6.6	7.4	7.9	8.7

Continuous current-carrying capacities

Conductor	Cables laid	Sheath circuit	Laying formation	Spacing								
Aluminium	In ground	Closed	Trefoil	touching	A	482	625	700	775	826	978	1077	1152
			Flat	0.15m	A	477	594	653	712	748	858	931	987
		Open	Flat	0.15m	A	512	665	753	842	905	1084	1211	1300
			Flat	0.45m	A	564	738	842	948	1028	1256	1424	1557
	In buried ducts	Closed	Flat	0.30m	A	451	545	589	631	654	744	795	883
		Open	Flat	0.30m	A	515	671	763	857	927	1129	1274	1387
	In air	Closed	Trefoil	touching	A	643	846	969	1094	1184	1477	1673	1829
		Closed	Flat	0.15m	A	689	901	1026	1155	1245	1358	1430	103
		Open	Flat	0.15m	A	714	957	1112	1271	1390	1784	2084	2313
Copper	In ground	Closed	Trefoil	touching	A	608	774	855	940	981	1051	1187	1258
			Flat	0.15m	A	586	709	769	819	844	887	985	1029
		Open	Flat	0.15m	A	654	842	944	1077	1142	1259	1445	1548
			Flat	0.45m	A	722	943	1067	1231	1324	1503	1742	1917
	In buried ducts	Closed	Flat	0.30m	A	539	629	670	700	713	733	847	882
		Open	Flat	0.30m	A	659	855	964	1116	1196	1349	1552	1698
	In air	Closed	Trefoil	touching	A	815	1068	1207	1379	1475	1641	1888	2049
		Closed	Flat	0.15m	A	863	1119	1260	1421	1512	1679	1710	1738
		Open	Flat	0.15m	A	913	1231	1418	1667	1811	2085	2520	2819

Maximum permissible short-circuit currents for short circuit duration of one second

Aluminium conductor	kA	38.4	60.3	76.5	95.5	114.5	152.5	190.4	256.1
Copper conductor	kA	57.9	91.0	115.5	144.2	172.9	230.3	287.7	359.5
Metallic sheath	kA	24.9	24.5	24.9	24.1	24.2	24.7	24.6	24.7

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