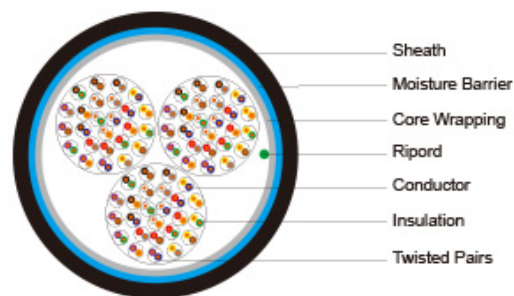


Solid PE Insulated & AP Sheathed (ALPETH) Air Core Cables to GR-421



Application	The cables are designed for use as subscriber distribution cables and as connection between central offices. The cables are suitable for installation in ducts, direct burial in the ground and also for aerial installation with integral suspension strand. An armoured option is offered for direct burial installations. A figure-8 self support option is offered for aerial installation.	
Standards	Telcordia (Bellcore) GR-421	
Construction		
Conductors:	Solid annealed bare copper, 0.4/0.5/0.63/0.9mm, as per ASTM B-3/class 1 of IEC 60228	
Insulation:	Solid medium or high density polyethylene as per ASTM D 1248/IEC 60708	
Twisted Pairs:	Insulated conductors are twisted into pairs with varying lay length to minimize crosstalk	
Cabling Element:	Twisted Pairs	
Cable Assembly:	Core	Cables with up to 400 pairs are composed of 25-pair units or 12/13-pair units; cables with over 400 pairs are composed of 50 or 100-pair units. Any extra pairs form a separate unit. Units are identified by colour coded binders. Construction is per GR-421 given in Cable Make Up Diagram.
Core Wrapping:		One or more non-hygroscopic polyester tapes are helically or longitudinally laid with an overlap. These tapes furnish thermal, mechanical as well as high dielectric protection between shielding and individual conductors
Moisture Barrier:		A layer of bare aluminium tape (0.2mm/8mil) is applied longitudinally with overlap over the cable core to provide 100% electrical shielding coverage and ensures a barrier against water vapor. In cables with more than 200 pairs, the aluminum tape may be corrugated for improved cable flexibility
Sheath:		Black low density polyethylene as per ASTM D 1248/IEC 60708, being able to withstand exposure to sunlight, temperature variations, ground chemicals and other environmental contaminants
Ripcord:		Ripcord may be provided for slitting the sheath longitudinally to facilitate its removal
Spare (optional):	Pairs	Spare pairs may be incorporated for large pair cables
Continuity (optional):	Wire	One tinned copper drain wire may be longitudinally laid to ensure electrical continuity of the screen
Optional Construction		
Armoured Cable:		0.15mm thick corrugated steel tape armour is applied with an overlap over an optional inner polyethylene sheath. An outer polyethylene sheath is applied over the armour

Self-Support Cables	A 7-strand galvanized steel strand is used as support wire. Black polyethylene sheath covers both core and support wire in a figure-8 construction
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Aabbreviations

LAP (CAP):	Copolymer coated aluminium tape + PE sheath
LAPSP (CAPSP):	LAP sheath + steel tape armour + PE sheath
AP (ALPETH):	Bare aluminium tape + PE sheath
PAP:	PE inner sheath + bare aluminium tape + PE sheath
PASP:	PE inner sheath + bare aluminium tape + steel tape armour + PE outer sheath
ASP (STAPETH):	Bare aluminium tape + steel tape armour + PE outer sheath
CACSP:	Copolymer coated aluminum tape + copolymer coated steel tape armour + PE outer sheath
LAPSP:	Copolymer coated aluminum tape +PE inner sheath + steel tape armour + PE outer sheath
FIGURE 8 LAP:	Copolymer coated aluminum tape + PE outer sheath + self supporting

Electrical Properties

Nominal Conductor Diameter	mm		0.4	0.5	0.63	0.9
Conductor Gauge Size	AWG		26	24	22	19
Maximum Average DC Resistance	Ω/km Ω/mile	/	140/225	87/140	55/88.6	27.0/43.4
Maximum Individual DC Resistance	Ω/km Ω/mile	/	144.2/232	89.5/144	56.5/91.0	28.0/45.0
Minimum Insulation Resistance @500V DC	M Ω .km M Ω .mile	/	1600/1000	1600/1000	1600/1000	1600/1000
Maximum Average Resistance Unbalance	%		1.5	1.5	1.5	1.5
Maximum Individual Resistance Unbalance	%		5	5	5	5
Average Mutual Capacitance	nF/km nF/kft	/	48.5-54.0 /14.8-16.5	48.5-54.0 /14.8-16.5	48.5-54.0 /14.8-16.5	48.5-54.0 /14.8-16.5
Maximum Individual Mutual Capacitance	nF/km nF/kft	/	57/17.4	57/17.4	57/17.4	57/17.4
Maximum Individual Capacitance Unbalance pair-to-pair	pF/km pF/kft	/	145/44	145/44	145/44	145/44
Capacitance Unbalance RMS pair-to-pair	pF/km pF/kft	/	45/13.7	45/13.7	45/13.7	45/13.7

Maximum Individual Capacitance Unbalance pair-to-ground	pF/km pF/kft	/	2625/800	2625/800	2625/800	2625/800
Maximum Average Capacitance Unbalance pair-to-ground	pF/km pF/kft	/	574/175	574/175	574/175	574/175
Maximum Conductor Loop Resistance @20°C	Ω/km Ω/mile	/	300/482	192/309	114/183.6	60/96.4
Impedance @1KHz	Ω		994	796	660	445
Impedance @100KHz	Ω		147	134	125	122
Impedance @512KHz	Ω		120	118	117	116
Impedance @1MHz	Ω		117	115	114	113
Maximum Average Attenuation @0.8KHz	dB/km dB/kft	/	1.64/0.5	1.30/0.39	1.04/0.32	0.74/0.22
Maximum Average Attenuation @1KHz	dB/km dB/kft	/	1.68/0.51	1.35/0.41	1.08/0.33	0.76/0.23
Maximum Average Attenuation @3KHz	dB/km dB/kft	/	3.18/0.97	2.52/0.77	2.01/0.61	1.42/0.43
Maximum Average Attenuation @150KHz	dB/km dB/kft	/	11.4/3.47	8.3/2.53	6.2/1.89	4.4/1.34
Maximum Average Attenuation @772KHz	dB/km dB/kft	/	24.3/7.4	19.4/5.9	15.4/4.7	10.8/3.3
Maximum Average Attenuation @1000KHz	dB/km dB/kft	/	27.1/8.25	21.4/6.52	17.5/5.33	12.8/3.89
Dielectric Strength						
Conductor to Conductor (3secs)	V DC		2400	3000	4000	5000
Conductor to Conductor (3secs)	V DC		10000	10000	10000	10000
Minimum EL Far-end Cross-talk-Mean Power Sum						
@150KHz	dB/305m dB/kft	/	61	63	63	65
@772KHz	dB/305m dB/kft	/	47	49	49	57
@1.6MHz	dB/305m dB/kft	/	41	42	43	44
@3.15MHz	dB/305m dB/kft	/	35	37	37	39

@6.3MHz	dB/305m / dB/kft	29	31	31	33
Minimum Far-end Cross-talk- Worst Pair Power Sum					
@150KHz	dB/305m / dB/kft	57	57	57	59
@772KHz	dB/305m / dB/kft	43	43	43	45
@1.6MHz	dB/305m / dB/kft	37	37	37	39
@3.15MHz	dB/305m / dB/kft	31	31	31	33
@6.3MHz	dB/305m / dB/kft	25	25	25	27
Minimum Near-end Cross-talk- Mean Power Sum					
@150KHz	dB/305m / dB/kft	58	58	58	58
@772KHz	dB/305m / dB/kft	47	47	47	47
@1.6MHz	dB/305m / dB/kft	43	43	43	43
@3.15MHz	dB/305m / dB/kft	38	38	38	38
@6.3MHz	dB/305m / dB/kft	34	34	34	34
Minimum Near-end Cross-talk- Worst Pair Power Sum					
@150KHz	dB/305m / dB/kft	53	53	53	53
@772KHz	dB/305m / dB/kft	42	42	42	42
@1.6MHz	dB/305m / dB/kft	38	38	38	38
@3.15MHz	dB/305m / dB/kft	33	33	33	33
@6.3MHz	dB/305m / dB/kft	29	29	29	29
Nominal Insulation Thickness	mm	0.175	0.2	0.26	0.3
Nominal Insulated Conductor Diameter	mm	0.75	0.9	1.15	1.5