Braided / Shielded & Instrumentation Cables

Zenium Cables Manufactures multi-core screened (Shielded / braided) flexible cables used for low noise signal cables and control purposes. These cables are generally confirming to PAS - 5308 and are manufactured with flexible copper conductors, PVC insulation, Tinned copper braided / shielded with overall PVC sheath. These cables are especially developed for defence, Telecommunication and electronic applications. Very feeble signals can be transmitted with least interference

INSTRUMENTATION CABLES Zenium manufactures multi-pair / triad instrumentation cables for use inside plants and electrical equipments where there is low frequency. These cables consists of annealed copper conductor draw from bright electrolytic grade copper PVC / POLYETHEYLENE / XLPE insulated, individually, or overall shielded with BOPP & AL MYLAR Tape, Tinned copper drain wire & overall PVC sheath. Here bunched conductors are insulated with various specially formulated and developed compounds with high resistance & low capacitance values.

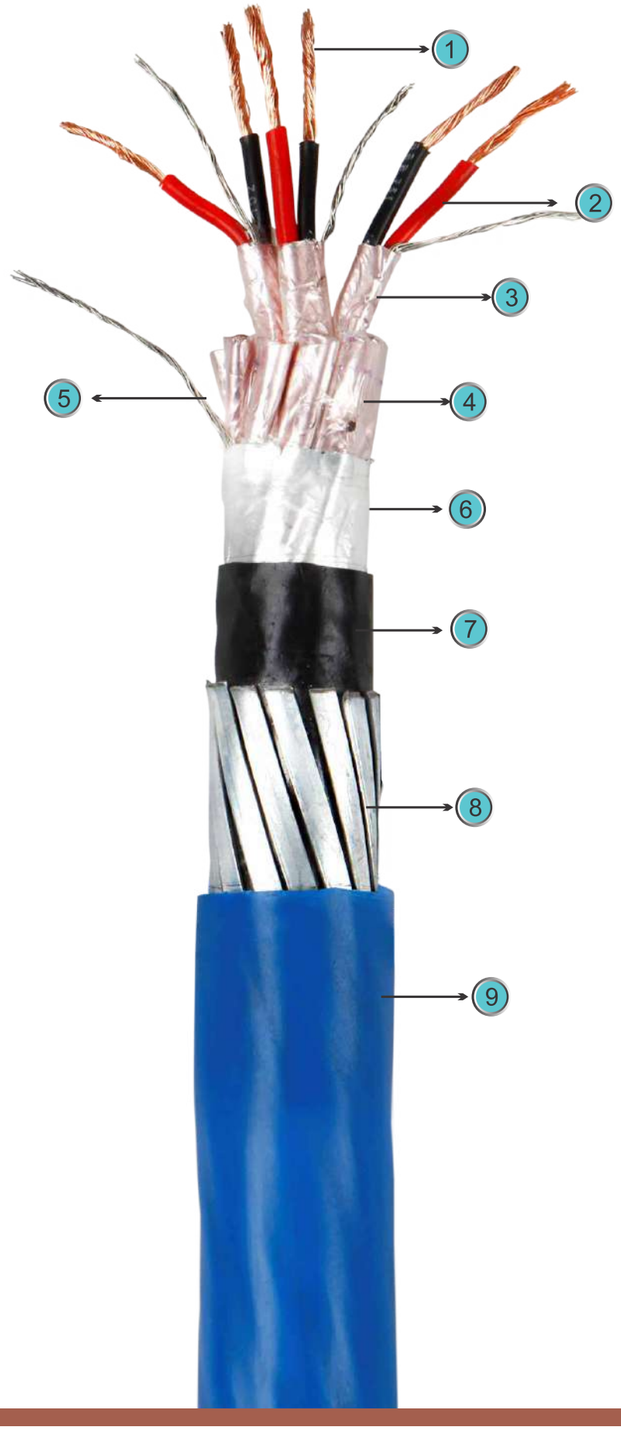
TABLE 4.1

BRAIDED / SHIELDED MULTICORE
CABLES 300 / 500 V Generally Confirming to PAS-5308 / Pt. 2

Nominal area of cond.	Approx. No. of Cond/Dia of wires	Max. D.C. resistance at 20°C	Current Carrying Capacity	Thickness of PVC Insulation (Nom.)	2 CORE			3 CORE			4 CORE		
					Thickness of PVC Outer sheath	Approx. Overall Diameter	Approx. Net Wt. of Cable	Thickness of PVC Outer sheath	Approx. Overall Diameter	Approx. Net Wt. of Cable	Thickness of PVC Outer sheath	Approx. Overall Diameter	Approx. Net Wt. of Cable
mm²	mm	Ohm/Km	Amps	mm	mm	mm	Kg/Km	mm	mm	Kg/Km	mm	mm	Kg/Km
0.5	16/0.2	39.0	04	0.6	0.9	8.25	96	0.9	8.5	104	0.9	9.15	122
0.75	24/0.2	26.0	07	0.6	0.9	8.65	107	0.9	8.95	119	0.9	9.60	139
1.0	32/0.2	19.5	12	0.6	0.9	9.00	119	0.9	9.3	132	0.9	10.00	156
1.5	48/0.2	13.3	15	0.6	0.9	9.50	137	0.9	9.9	156	1.0	10.70	186
2.5	80/0.2	7.98	20	0.7	1.0	11.00	188	1.0	11.5	217	1.0	12.50	262
4.0	56/0.3	4.95	23	0.8	1.0	12.30	240	1.0	13.0	287	1.0	14.30	356
6.0	84/0.3	3.30	35	0.8	1.1	13.60	306	1.1	14.3	368	1.2	16.00	468
10.0	80/0.4	1.91	46	1.0	1.2	16.60	472	1.2	17.3	566	1.3	19.30	719
16.0	126/0.4	1.21	62	1.0	1.3	19.30	671	1.3	20.2	815	1.4	22.50	1036
25.0	196/0.4	0.78	80	1.2	1.4	24.40	1029	1.5	25.8	1261	1.6	28.80	1602
35.0	276/0.4	0.554	102	1.2	1.5	27.10	1320	1.6	28.6	1626	1.7	32.00	2081
50.0	396/0.4	0.386	138	1.4	1.6	31.70	1823	1.7	33.5	2257	1.8	37.60	2904

The above data is approximate and subject to manufacturing tolerance

Hi Shield Protective Layers



TYPICAL CONSTRUCTION:

1 APC / ATC conductor.

2 PVC/Low Density Polyethylene/Cross-linked Polyethylene (XLPE) insulation.

3 Individual pair screen (optional).

4 Polyester tape.

5 Tinned solid / bunched copper drain wire.

6 Aluminium/Polymer foil tape,

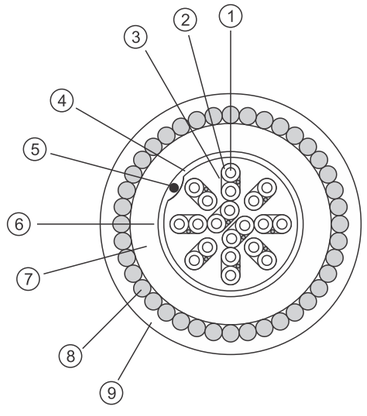
- Impermeable to moisture.
- Protection against EMI.

7 Extruded Inner Sheath

- Resistant to inorganic chemicals.

8 Galvanised steel wire / strip

9 FRLSH/Fire retardant PVC.



PVC Insulated as per PAS 5308 Part 2

This specification covers multicore and multipair cables used in the provision of communication services and the interconnection of electrical equipment and instruments, particularly in and around process plants, where transducer generated signals are transmitted through marshalled circuits to panels, controllers and associated devices.

Cables as per PAS-5308 Part 1 are widely used throughout the petroleum industry, while Part 2 are more common to the chemical and petrochemical industries.

Type 1 unarmoured cables are generally for indoor applications.

Type 2 armoured cables are suitable for burial underground.

These cables are designed for use in intrinsically safe systems. However it must be noted that cables used when installing an intrinsically safe system are required to conform to any relevant requirement on the certification documents, either for the system or for the intrinsically safe and associated apparatus forming parts of the system. Cables should also be suitable for the environment in which they are going to be used.

AVAILABILITY:

Cables in this range are manufactured as per customer's order. Alternative constructions e.g. other conductor sizes or pair combinations, generally to this specification, can also be produced to order, as can a range of thermocouple, extension and compensating cables. Specifications to suit individual customer requirements, based on the as per PAS 5308 part 2 specification, can also be manufactured. Our technical personnel are available to provide information and assistance in designing cables for your specific installation and operating requirements.

ZERO HALOGEN, LOW SMOKE

For applications where minimal smoke and acid gas emissions are critical, Zenium India's proprietary compounds are rated Zero Halogen, Low Smoke to BSEN 50267 (IEC 754) and BSEN 61034.

Where any of these options are ordered customers should specify if the compound is required on the bedding (where applicable), the sheath, or both (where applicable).

Zenium offer designs utilising these materials that can comply with the appropriate category for the cable size in BSEN 60332-3.

Please contact us to discuss your particular requirements.

Technical Data of XLPE Insulated

	POLYETHYLENE		PVC	
Maximum conductor operating temp:	+70°C		+70°C	
Minimum ambient temp:	-20°C after installation and only when cable is in a fixed position		-15°C after installation and only when cable is in a fixed position	
* Maximum working voltage:	300/500V r.m.s.		300/500V r.m.s.	
Test voltage:	1000V r.m.s. between conductors and between conductors and screen/armour		1000V r.m.s. between conductors and between conductors and screen/armour.	
Maximum D.C. conductor resistance W/km AT 20° C	Conductor size	APC	Conductor size	ATC
	0.5mm² Class 1	36.00	0.5mm² Class 1	36.70
	0.5mm² Class 5	39.00	0.5mm² Class 5	40.10
	1.0mm² Class 1	18.10	1.0mm² Class 1	18.20
	1.5mm² Class 2	12.10	1.5mm² Class 2	12.20
Minimum insulation resistance	Individual cores - 5000 MW/km Between individual screens-1MW/km at 20°C		Individual cores-36.5 MW/km Between individual screens-1MW/km at 20°C	
Maximum mutual capacitance	Cables without individual pair screens, 0.5mm² and 1.0mm² - 75pF/m,1.5mm² - 85pF/m. All cables with individual pair screens and 1 or 2 pair cables collectively screened-115 pF/m, except 7/0.53mm (1.5mm²)-120 pF/m.		Pair or adjacent cores - 250 pF/m at 1KHz	
Maximum capacitance unbalance	250 pF/M at 1KHz			
Maximum capacitance conductor To screen:	400 pF/M			
Maximum L/R ratio	Conductor size	µH/W	Conductor size	µH/W
	0.5mm²	25	0.5mm²	25
	1.0mm²	25	1.0mm²	25
	1.5mm²	40	1.5mm²	40
Minimum bending radius	10 x overall diameter			

Cables using this composite sheath should not be connected to a low impedance source i.e. the mains power voltage supply.

The new HI-SHIELD system is also suitable for applications requiring termite and rodent protection.

XLPE Insulated

MAXIMUM CONDUCTOR OPERATING TEMP: +70°C

MINIMUM AMBIENT TEMP:

-20°C after installation and only when cable is in a fixed position.

MAXIMUM WORKING VOLTAGE: 300/500V r.m.s.

TEST VOLTAGE:

1000V r.m.s. between conductors and between conductors and screen/armour.

MAXIMUM CONDUCTOR D.C. RESISTANCE: W/km at 20°C

	Conductor Size	APC	ATC
1/0.80mm	(0.5mm²) Class 1	36.0	36.7
16/0.20mm	(0.5mm²) Class 5	39.0	40.1
1/1.13mm	(1.0mm²) Class 1	18.10	18.20
7/0.53mm	(1.5mm²) Class 2	12.10	12.20

MINIMUM INSULATION RESISTANCE:

Individual conductors - 5000 MW/km at 20°C. Between individual screens - 1 MW/km

MAXIMUM MUTUAL CAPACITANCE AT 1KHZ: Cables without individual pair screens, 0.5mm² and 1.0mm² - 75 pF/m, 1.5mm² - 85 pF/m. All cables with individual pair screens and 1 or 2 pair cables collectively screened, 115 pF/m.

MAXIMUM CAPACITANCE UNBALANCE: 250pF/M at 1kHz

MAXIMUM L/R RATIO:

Conductor Size	µH/W
0.5mm²	25
1.0mm²	25
1.5mm²	40

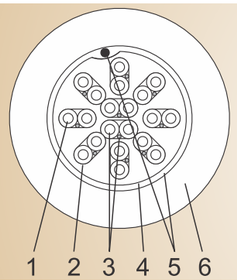
SPREAD OF FLAME:

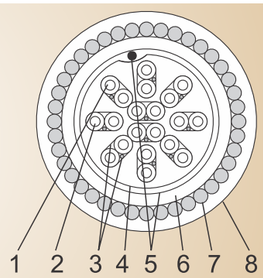
Type 1 complies with EN50265, IEC 60332-1. Type 2 complies as type 1 additionally with EN 50266-2-4, IEC 60332-3C. Type 3 complies as Type 2

MINIMUM BENDING RADIUS:

Type 1 - 7 x overall diameter. Type 2 - 8 x overall diameter.

CONSTRUCTION :





Type 1

1 Plain annealed copper wire conductors to BSEN 60228.

2 Polyethylene insulation to BSEN 50290-2-23 (L/MD) or LPE to BSEN 50290-2-29

3 Individual pair screen (optional):-

a) Aluminium/polyester tape, metallic side down, in contact with minimum 0.5mm² tinned copper drain wire.

b) Polyester isolating tape(s) numbered for identification

4 Polyester binder tape.

5 Collective screen (optional) - Aluminium/polyester tape, metallic side down, in contact with minimum 0.5mm² tinned copper drain wire.

6 Type TM1 PVC sheath to BSEN 50290-2-22.

Type 2

1 Plain annealed copper wire conductors to BSEN 60228.

2 Polyethylene insulation to BSEN 50290-2-23 (L/MD) or PE to BSEN 50290-2-29

3 Individual pair screen (optional):-

a) Aluminium/polyester tape, metallic side down, in contact with minimum 0.5mm² tinned copper drain wire.

b) Polyester isolating tape(s) numbered for identification

4 Polyester binder tape.

5 Collective screen (optional) - Aluminium/polyester tape, metallic side down, in contact with minimum 0.5mm² tinned copper drain wire.

6 Polythene bedding conforming to BSEN 50290-2-24 grade LD.

7 Single layer galvanised steel wire armour to BS EN 10257-1

8 Type TM1 PVC sheath to BSEN 50290-2-22.

PHYSICAL DATA

A: Pairs - Unscreened pairs: Are identified by means of coloured insulation in the sequence as per PAS 5308

PVC Insulated as per PAS 5308 Part 2

TECHNICAL DATA :

MAXIMUM CONDUCTOR OPERATING TEMP: +70°C.

MINIMUM AMBIENT TEMP: -15°C after installation and only when cable is in a fixed position.

MAXIMUM WORKING VOLTAGE: 300/500V r.m.s.

TEST VOLTAGE: 1000V r.m.s. between conductors and between conductors and screen/armour.

MAXIMUM CONDUCTOR D.C. RESISTANCE: W/km at 20°C

Conductor Size	APC	ATC
16/0.20mm (0.5mm^2)	39.0	40.10
24/0.20mm (0.75mm^2)	26.0	26.70
7/0.53mm (1.5mm^2)	12.1	12.20

MINIMUM INSULATION RESISTANCE: Individual conductors - 25 MOhm/km @20°C. Between individual screens - 1 MOhm/Km @20°C

MAXIMUM MUTUAL CAPACITANCE AT 1KHZ:

Pair of adjacent cores - 250 pF/m at 1kHz.

MAXIMUM CAPACITANCE TO SCREEN: 450pF/m at 1kHz

MAXIMUM L/R RATIO:

Conductor Size	µH/W
0.5mm^2	25
1.0mm^2	25
1.5mm^2	40

SPREAD OF FLAME:

Type 1 complies with EN 50265, IEC 60332-1. Type 2 complies as type 1 additionally with EN50266 NMV 1.5, IEC 60332-3C.

MINIMUM BENDING RADIUS:

Type 1 - 8 x overall diameter. Type 2 - 10 x overall diameter.

CONSTRUCTION :

Type 1

1 Plain annealed copper conductors to BSEN 60228.

2 Type TI1 PVC insulation to BSEN 50290-2-21.

3 Individual pair screen (optional)-

a) Aluminium/polyester tape, metallic side down, in contact with minimum 0.5mm^2 tinned copper drain wire.

b) Polyester isolating tape(s) numbered for identification.

4 Polyester binder tape.

5 Collective screen (optional) - Aluminium / polyester tape, metallic side down, in contact with minimum 0.5mm^2 tinned copper drain wire.

6 Type TM1 PVC sheath to BSEN 50290-2-22.

Type 2

1 Plain annealed copper wire conductors to BSEN 60228.

2 Type TI1 PVC insulation to BSEN 50290-2-21.

3 Individual pair screen (optional)-

a) Aluminium/polyester tape, metallic side down, in contact with minimum 0.5mm2 tinned copper drain wire.

b) Polyester isolating tape(s) numbered for identification

4 Polyester binder tape.

5 Collective screen (optional) - Aluminium / polyester tape, metallic side down, in contact with minimum 0.5mm^2 tinned copper drain wire.

6 Type TM1 PVC bedding conforming to BSEN 50290-2-22.

7 Single layer galvanised steel wire armour to BS EN 10257-1.

8 Type TM1 PVC sheath to BSEN 50290-2-22.

PHYSICAL DATA
A: Pairs - Unscreened pairs: Are identified by means of coloured insulation in the sequence as per PAS 5308

XLPE Insulated

POLYETHYLENE INSULATED AS PER PAS 5308 PART 1

This specification covers multipair cables used in the provision of voice and data services and the interconnection of electrical equipment and instruments, particularly in and around process plants, where transducer generated signals are transmitted through marshalled circuits to panels, controllers and associated devices.

Cables as per PAS- 5308 Part 1 are widely used throughout the petroleum industry, while Part 2 are more common to the chemical and petrochemical industries.

Type 1 unarmoured cables are generally for indoor applications.

Type 2 armoured cables are suitable for burial underground.

These cables are designed for use in Group II intrinsically safe systems. However it must be noted that cables used when installing an intrinsically safe system are required to conform to any relevant requirement on the certification documents, either for the system or for the intrinsically safe and associated apparatus forming parts of the system.

Cables should also be suitable for the environment in which they are going to be used.

AVAILABILITY:

Cables in this range are manufactured as per customer's order. Reduced propagation or with reduced HCL emission PVC sheaths can be supplied when requested. Alternative constructions e.g. other conductor sizes or pair/core combinations, generally to this specification, can also be produced to order.

Specifications to suit individual customer requirements, based on the PAS 5308 Part1 specification, can also be manufactured. Our technical personnel are available to provide information and assistance in designing cables for your specific installation and operating requirements.

ZERO HALOGEN, LOW SMOKE

For applications where minimal smoke and acid gas emissions are critical, Zenium's proprietary compounds are rated Zero Halogen, Low Smoke to BSEN 50267 (IEC 60754) and BSEN 61034.

Where any of these options are ordered customers should specify if the compound is required on the bedding (where applicable), the sheath, or both (where applicable).

Zenium offer designs utilising these materials that can comply with the appropriate category for the cable size in BSEN 60332-3). Please contact us to discuss your particular requirements.