

Armoured Power and Control Cables – Fire Resistant

Low Smoke Zero Halogen TAC. MGT. EPR. ZH. GSWB. SW4, 600/1000V



Application

Armoured cables for fixed wiring in ships and offshore units where circuit integrity is essential under fire conditions, e.g. safety and emergency lighting, fire pumps, shut down systems, communications systems, gas detectors, alarms, etc. For use in regularly occupied areas such as accommodation facilities, control rooms and computer suites. Any application where life may be endangered by smoke and noxious fumes and where vital, sensitive equipment may be damaged by acid forming gases.

Specifications

- In accordance with BS7917. Fire resisting properties, relevant to the internationally recognised test of IEC60331.
 - **Conductor:** Tinned annealed copper conductor. Stranded to BS EN 60228 Class 2 or flexible to BS EN 60228 Class 5.
 - **Insulation:** Mica Glass Tape, EPR complying with BS7655 GP4.
 - **Core Identification:** The cores shall be identified by numbers unless specified otherwise.
 - **Inner Sheath:** zero halogen rubber complying generally with BS7655.
 - **Armour:** wire braid in the following optional materials:
 - Galvanised mild steel to BS EN 10257-1.
 - Tinned phosphor bronze to BS EN 12166.
 - Copper to BS4109.
- N.B. Galvanised mild steel should not be used on single core cables where used for a.c. circuits.
- **Outer Sheath:** Low smoke zero halogen type SW4 to BS7655 Section 2.6. Enhanced oil resistance, low smoke zero halogen, minimum tear resistance.
 - **Identification:** Legend will include manufacturers name, voltage, number of cores and c.s.a, cable sheath class (e.g. SW4), IEC 60331 and UK00A reference where applicable.
 - Standard sheath colour black. Other colours available on request.
 - Oxygen index > 32%. Temp index 250°C, HCL emission < 0.5% of weight of compound at 800°C.
 - Flame retardant to IEC 60332-3-22 Category A (reduced propagation).
 - Fire resistant to IEC 60331 (enhanced to 1000°C for 3 hours).
 - **Temperature Rating:** 90°C maximum conductor operating temperature.
 - **Voltage Rating:** 600/1000V.

Armoured Power and Control Cables – Fire Resistant

Low Smoke Zero Halogen TAC. MGT. EPR. ZH. GSWB. SW4, 600/1000V

Anixter Number	UK00A Code	Nominal Cond Area mm ²	Nominal Cond Stranding #/mm	Diameter Over Inner Sheath		Minimum O/D mm	Maximum O/D mm	Approx Weight kg/km	Anixter No Prysmian E1XF Gland	Anixter Number Hawke Gland
				Minimum mm	Maximum mm					
Multi-Core TAC. MGT. EPR. ZH. GSWB. SW4 600/1000V										
Two core										
A10FN-020015F-02	YD202	1.5	30/0.25	9.2	10.4	13.4	14.7	304	E1BP-E1XF	E1DZ-UNI
A10FN-020025-02	YD203	2.5	7/0.67	10.0	11.4	14.1	15.5	341	-20S	-20S
Three core										
A10FN-030015F-02	YD302	1.5	30/0.25	9.8	11.0	13.8	15.2	328	-20S	-20S
A10FN-030025-02	YD303	2.5	7/0.67	10.7	12.0	14.9	16.4	387	-20	-20
A10FN3-0040-02	YD304	4.0	7/0.85	12.9	14.3	17.1	18.8	515	-20	-20
A10FN3-0060-02	YD306	6.0	7/1.04	14.1	15.5	18.5	20.2	626	-25	-25
A10FN3-0100-02	YD310	10	7/1.35	16.3	17.8	20.8	22.9	844	-25	-25
A10FN3-0160-02	YD316	16	7/1.70	18.8	20.3	23.5	25.6	1133	-25	-25
A10FN3-0250-02	YD325	25	19/1.35	23.2	25.2	28.4	30.6	1677	-32	-32
A10FN3-0350-02	YD335	35	19/1.53	25.3	27.2	31.3	33.8	2111	-40	-40
A10FN3-0500-02	YD350	50	19/1.78	28.9	30.9	35.1	37.6	2723	-40	-40
A10FN3-0700-02	YD370	70	19/2.14	33.0	35.4	39.6	42.5	3610	-50S	N/A
A10FN3-0950-02	YD395	95	37/1.78	37.9	40.3	44.9	47.9	4683	-50	-50
Four core										
A10FN-040015F-02	YD402	1.5	30/0.25	10.7	12.0	14.9	16.5	384	-20	-20
A10FN-040025-02	YD403	2.5	7/0.67	11.7	13.1	15.9	17.6	453	-20	-20
A10FN4-0040-02	YD404	4.0	7/0.85	14.2	15.6	18.6	20.3	621	-25	-25
A10FN4-0060-02	YD406	6.0	7/1.04	15.8	17.3	20.3	22.3	771	-25	-25
A10FN4-0100-02	YD410	10	7/1.35	18.2	19.7	22.9	25.0	1050	-25	-25
A10FN4-0160-02	YD416	16	7/1.70	20.9	22.8	25.9	28.0	1415	-32	-32
A10FN4-0250-02	YD425	25	19/1.35	25.9	27.9	31.9	34.4	2199	-40	N/A
A10FN4-0350-02	YD435	35	19/1.53	28.1	30.1	34.3	36.9	2630	-40	-40
A10FN4-0500-02	YD450	50	19/1.78	32.2	34.5	38.8	41.7	3421	-50S	N/A
A10FN4-0700-02	YD470	70	19/2.14	36.7	39.2	43.7	46.7	4556	-50	-50
A10FN4-0950-02	YD495	95	37/1.78	42.2	44.9	49.5	52.9	5950	-63S	-50
Seven core										
A10FN-070015F-02	YD702	1.5	30/0.25	13.0	14.4	17.2	18.9	520	-20	-20
A10FN-070025-02	YD703	2.5	7/0.67	14.2	15.6	18.6	20.3	646	-25	-25
Twelve core										
A10FN-120015F-02	YDA02	1.5	30/0.25	17.3	18.8	21.8	24.0	804	-25	-25
A10FN-120025-02	YDA03	2.5	7/0.67	19.3	20.8	24.0	26.2	1005	-32	-32
Nineteen core										
A10FN-190015F-02	YDB02	1.5	30/0.25	20.5	22.4	25.3	27.5	1108	-32	-32
A10FN-190025-02	YDB03	2.5	7/0.67	22.8	24.7	27.8	30.0	1392	-32	-32
Twenty seven core										
A10FN-270015F-02	YDC02	1.5	30/0.25	25.1	26.9	30.1	32.8	1510	-40	-32
A10FN-270025-02	YDC03	2.5	7/0.67	27.9	30.2	33.9	36.7	2000	-40	-40
Thirty seven core										
A10FN-370015F-02	YDD02	1.5	30/0.25	28.3	30.4	34.3	37.0	2010	-40	-40

For further technical information please refer to page 6:32.

Technical Information

Twin and Multi-Core Cables, EPR Insulated

Continuous current ratings for groups of circuits (up to six cables bunched) for twin and multi-core EPR insulated cables, run open or enclosed. Also applicable to mica taped fire resistant types.

CURRENT RATINGS

Nominal Conductor Area	Twin Cables			Three & Four Core Cables	
	Current Rating Single Phase a.c. or d.c.	Voltage Drop Per Ampere Per Metre		Current Rating Three Phase a.c.	Voltage Drop Per Ampere Per Metre
		d.c.	Single Phase a.c.		
mm ²	A	mV	mV	A	mV
1.0	14	54	54	12	47
1.5	18	35	35	15	30
2.5	25	18	18	21	16
4.0	34	12	12	29	10
6.0	43	7.8	7.8	36	6.7
10	60	4.6	4.6	50	4.0
16	81	2.7	2.7	67	2.3
25	105	1.7	1.7	89	1.5
35	135	1.2	1.2	105	1.1
50	165	0.98	1.0	135	0.89
70	200	0.68	0.70	170	0.64
95	250	0.49	0.53	205	0.50
120	290	0.39	0.43	240	0.44
150	330	0.31	0.36	270	0.38
185	370	0.25	0.32	305	0.34
240	445	0.19	0.27	365	0.31
300	505	0.15	0.24	415	0.29

Where more than six cables are bunched, a rating factor of 0.85 should be applied to the current rating.

For ambient temperatures other than 45°C, the following rating factors should be applied:

Ambient air temp °C	35	40	45	50	55	60	65	70	75	80
Rating factor	1.11	1.05	1.0	0.94	0.88	0.82	0.75	0.67	0.58	0.47

Technical Information

600/1000V MICA/EPR Insulated Fire Survival Cables to BS7917 Armoured and Non-Armoured, Multi-Core Only

CABLE TYPES:

Multi-Core TCU/MICA/EPR/SW4 600/1000V to BS7917

Multi-Core TCU/MICA/EPR/ZH/GSWB/SW4 600/1000V to BS7917

ELECTRICAL CHARACTERISTICS

Conductor Size	Maximum d.c. Conductor Resistance @ 20°C	Maximum a.c. Conductor Resistance @ 90°C	Reactance @ 60 Hz	Impedance @ 90°C, 60 Hz
mm ²	ohms/km	ohms/km	ohms/km	ohms/km
1.5	12.2	15.6	0.152	15.6
1.5*	13.7	17.5	0.152	17.5
2.5	7.56	9.64	0.142	9.64
4.0	4.70	5.99	0.139	5.99
6.0	3.11	3.97	0.131	3.97
10	1.84	2.35	0.123	2.35
16	1.16	1.48	0.116	1.48
25	0.734	0.936	0.111	0.943
35	0.529	0.674	0.108	0.683
50	0.391	0.499	0.107	0.510
70	0.270	0.344	0.103	0.359
95	0.195	0.271	0.101	0.289
120	0.154	0.214	0.099	0.236
150	0.126	0.175	0.099	0.201
185	0.100	0.140	0.099	0.171
240	0.0762	0.108	0.097	0.145
300	0.0607	0.087	0.097	0.130

* Class 5 (30/0.25mm) flexible conductors.

Conductor Short-Circuit Ratings

EPR or MICA/EPR Insulated Cables

Short-Circuit Ratings

Conductor Size mm ²	0.2s duration kA	1.0s duration kA	3.0s duration kA
1.5	0.479	0.214	0.123
2.5	0.799	0.357	0.206
4.0	1.27	0.572	0.330
6.0	1.91	0.858	0.495
10	3.19	1.43	0.825
16	5.11	2.28	1.32
25	7.99	3.57	2.06
35	11.1	5.0	2.88
50	15.9	7.15	4.12
70	22.3	10.0	5.77
95	30.3	13.5	7.84
120	38.3	17.1	9.9
150	47.9	21.4	12.3
185	59.1	26.4	15.2
240	76.7	34.3	19.8
300	95.9	42.9	24.7
400	127	57.2	33.0
500	159	71.5	41.2
630	201	90.0	52.0

N.B: The above ratings assume an adiabatic temperature rise and are based on a conductor temperature of 90°C at start of short-circuit and 250°C at end of shortcircuit.

Installation Guide for Offshore Cables

General Precautions

Cables described in this section should not be installed at temperatures below minus 15°C, nor in any situation where the cooling air temperature exceeds 75°C. The cables meet the IEE requirement concerning impervious sheathing for cables installed on decks, exposed to weather, in damp or wet situations, in machinery compartments and in general, where water condensation or harmful vapours (including oil vapour) may be present. The sheathing compounds will withstand normal handling, installation and service but in areas where mechanical stress is envisaged unarmoured cables should be fitted in pipes or conduit or trunking. Alternatively, armoured and sheathed cables should be used. Cables should be protected from avoidable risks of mechanical damage and routed away from heat sources such as boilers, hot pipes and resistors. Cable runs should be selected to avoid action from condensed moisture or drips. Cables should not be installed across expansion joints, but where this is unavoidable a proportioned loop of cable should be arranged, suitably supported and having an internal radius not less than twelve times its diameter. For services with duplicate supplies, the cables should

follow different paths and be separated as far apart as is reasonably practical. Cables and wiring for mains and emergency power, lighting, internal communications or signalling should be routed away from galleys, machinery spaces and other high fire-risk areas except when supplying equipment in those places. In situations offering considerable risk of mechanical damage, such as storage spaces, cables should be protected by steel casing, trunking or conduit if the structure or attached parts do not afford sufficient protection, even to armoured cables. Any metal casing so used should be sufficiently protected against corrosion. All cable supports and accessories should be robust and constructed from corrosion-resistant material, or suitably treated to resist corrosion. Metals or alloys with low melting points (e.g. aluminium) should not be used. Cables passing through watertight decks or bulkheads should be provided with deck-tubes, watertight glands, multi-transit assemblies, or fire-retardant packed boxes as appropriate to meet the requirements of the Authority approving the installation.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

Installation Guide for Offshore Cables

General Precautions

Where cables pass through non-watertight bulkheads, beams or other steel structure, the holes should be glanded or bushed with non-corroding materials to prevent damage to both cables and structure. The means of fixing of conductors and terminals should be capable of withstanding the thermal and dynamic effects of short circuits. When single core cables, having a current rating greater than 250A need to be installed close to a steel bulkhead, the clearance between cable and metal surface should be at least 50mm,

unless the cables belonging to the same a.c. circuit are installed in trefoil. In the interests of safety and circuit reliability, it is assumed that installers will adhere to the IEE Regulations and Recommendations for the Electrical Equipment of Ships and of Mobile and Fixed Offshore installations. Particular attention should be paid to recommendations concerning cables, with regard to their effect on navigational and radio equipment.

MINIMUM BENDING RADIUS

Ideally cables should be bent as little as possible and never to radii less than the following:

Type of Cable*	Minimum Bending Radius
Instrumentation	8 x diameter
Power & Control up to 3.3/3.3 kW **	
Armoured up to 25mm D	4 x diameter
Armoured over 25mm D	6 x diameter
Unarmoured up to 10mm D	3 x diameter
Unarmoured over 10mm up to 25mm D	4 x diameter
Unarmoured over 25mm D	6 x diameter
Power cable 3.8/6.6 kW and above **	
Un-screened	12 x diameter
Screened - single core	20 x diameter
Screened - three core	15 x diameter

* All fire survival (FS) cables - 8 x diameter. ** 4 x diameter Class 2 flexible cables.