

# Unarmoured Power and Control Cables to BS6883

Multi-Core - TAC. EPR. SW4 600/1000V 657\*



## Application

Unarmoured cables, for use where the mechanical protection is not required, for fixed wiring in ships and in mobile and fixed offshore units (e.g. drilling rigs, oil platforms, etc.).

## Specifications

- In accordance with BS6883.
- **Conductor:** Tinned annealed copper conductor. Stranded to BS EN 60228 Class 2.
- **Insulation:** EPR complying with BS7655 GP4.
- **Core Identification:** The cores will be identified by either colours or numbers.
- **Outer Sheath:** LSZH to BSS7655 section 2.6 Type SW4. Enhanced oil resistance, low smoke zero halogen, minimum tear resistance.
- **Identification:** Legend will include manufacturers name, voltage, BS6883, number of cores and c.s.a., cable sheath class (e.g. SW4).
- Standard sheath colours black. Other colours available on request.
- Oxygen index > 32% Temperature 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).
- **Temperature Rating:** 90°C maximum conductor operating temperature.
- **Voltage Rating:** 600/1000V.

\* denotes number of cores.

# Unarmoured Power and Control Cables to BS6883

Multi-Core - TAC. EPR. SW4 600/1000V 657\*

Anixter Number	Nominal Cond Area mm <sup>2</sup>	Nominal Cond Stranding #/mm	Minimum O/D mm	Maximum O/D mm	Approx Weight kg/km	Anixter Number Prysmian A2EX Gland	Anixter Number Hawke A2F Gland
<b>Two core 6572</b>						E1AT-A2EX	E1AT-A2F
A10EB-020015-02	1.5	7/0.53	8.2	9.6	110	-20S	-20SH-A
A10EB-020025-02	2.5	7/0.67	9.0	10.4	141	-20S	-20SH-A
<b>Three core 6573</b>							
A10EB-030015-02	1.5	7/0.53	8.7	10.1	130	-20S	-20SH-A
A10EB-030025-02	2.5	7/0.67	9.8	11.0	168	-20S	-20SH-A
<b>Four core 6574</b>							
A10EB-040015-02	1.5	7/0.53	9.5	10.9	157	-20S	-20SH-A
A10EB-040025-02	2.5	7/0.67	10.5	12.1	210	-20	-20H-A
<b>Seven core 6577</b>							
A10EB-070015-02	1.5	7/0.53	11.5	13.2	259	-20	-20H-A
<b>Twelve core 6570/12</b>							
A10EB-120015-02	1.5	7/0.53	15.2	17.2	427	-25	-25H-A
<b>Nineteen core 6570/19</b>							
A10EB-190015-02	1.5	7/0.53	18.0	20.1	624	-25	-25H-A

For further technical information 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 mm <sup>2</sup>	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.		
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 EPR Insulated cables to BS6883 Armoured and Non-Armoured, Multi-Core

## CABLE TYPES:

Multi-Core TCU/EPR/SW4 "657\*" Type 600/1000V to BS6883

Multi-Core TCU/EPR/SW4/GSWB/SW4 "658\*" Type to BS6883

## 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 <sup>2</sup>	ohms/km	ohms/km	ohms/km	ohms/km
1.5	12.2	15.6	0.142	15.6
1.5*	13.7	17.5	0.142	17.5
2.5	7.56	9.64	0.133	9.64
4.0	4.70	5.99	0.133	5.99
6.0	3.11	3.97	0.126	3.97
10	1.84	2.35	0.118	2.35
16	1.16	1.48	0.112	1.48
25	0.734	0.936	0.107	0.941
35	0.529	0.674	0.104	0.684
50	0.391	0.499	0.103	0.510
70	0.270	0.344	0.102	0.358
95	0.195	0.271	0.099	0.288
120	0.154	0.214	0.097	0.235
150	0.126	0.175	0.097	0.200
185	0.100	0.140	0.097	0.170
240	0.0762	0.108	0.096	0.144
300	0.0607	0.087	0.096	0.129

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

# Conductor Short-Circuit Ratings

EPR or MICA/EPR Insulated Cables

## Short-Circuit Ratings

Conductor Size mm <sup>2</sup>	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.