DNV·GL

Certificate No:
TAE000028Y

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Power Cable

with type designation(s)
P1 TFOU, P1/P8 TFOU

Issued to
Baosheng Science & Technology Innovation Co., Ltd.
Yangzhou, China

is found to comply with
DNV GL rules for classification – Ships, offshore units, and high speed and light craft

Application :

Product(s) approved by this certificate is/are accepted for installation on all vessels classed by DNV GL.
Rated voltage (kV) 0,6/1
Temp. class (°C) 90

Issued at **Hamburg** on **2017-09-12**
This Certificate is valid until **2022-09-11**.
DNV GL local station: **Nanjing**

Approval Engineer: **Holger Jansen**

for **DNV GL**

Joannis Papanuskas
Head of Section

This Certificate is subject to terms and conditions overleaf. Any significant change in design or construction may render this Certificate invalid.
The validity date relates to the Type Approval Certificate and not to the approval of equipment/systems installed.

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Product description

Type: P1 TFOU 0,6/1 kV, P1/P8 TFOU 0,6/1 kV

Conductor:	Copper class 2
Insulation:	XLPE
Inner covering:	Halogen free compound
Metalic covering:	Tinned copper wire braid
Outer sheath:	SHF2

Conductor number x cross section	Cable diameter nom	Cable diameter max
mm^2	mm	mm
1 x 1,5	10,34	10,54
1 x 2,5	10,82	11,02
1 x 4	11,38	11,58
1 x 6	11,98	12,19
1 x 10	12,98	13,20
1 x 16	14,10	14,32
1 x 25	15,98	16,21
1 x 35	17,30	17,55
1 x 50	19,30	19,56
1 x 70	21,43	21,70
1 x 95	23,46	23,74
1 x 120	25,41	25,70
1 x 150	27,53	27,84
1 x 185	29,96	30,29
1 x 240	33,02	33,36
1 x 300	35,81	36,18
2 x 1,5	14,17	14,39
2 x 2,5	15,20	15,42
2 x 4	16,32	16,55
2 x 6	17,52	17,76
2 x 10	19,96	20,22
2 x 16	22,19	22,46
2 x 25	25,95	26,24
2 x 35	28,60	28,92
2 x 50	31,72	32,06
2 x 70	35,98	36,34
2 x 95	40,86	41,25
3 x 1,5	14,69	14,92
3 x 2,5	15,80	16,03
3 x 4	17,01	17,25
3 x 6	18,31	18,56
3 x 10	20,92	21,18
3 x 16	23,31	23,59

Conductor number x cross section	Cable diameter nom	Cable diameter max
mm^2	mm	mm
3 x 25	27,37	27,68
3 x 35	30,25	30,57
3 x 50	33,61	33,96
3 x 70	39,03	39,41
3 x 95	43,41	43,82
4 x 1,5	15,55	15,78
4 x 2,5	16,78	17,02
4 x 4	18,14	18,39
4 x 6	20,03	20,29
4 x 10	22,46	22,74
4 x 16	25,15	25,44
4 x 25	29,70	30,02
4 x 35	32,91	33,26
4 x 50	36,69	37,06
4 x 70	42,66	43,07
4 x 95	48,01	48,44
5 x 1,5	16,46	16,70
7 x 1,5	17,44	17,68
8 x 1,5	18,89	19,15
10 x 1,5	21,14	21,41
12 x 1,5	21,66	21,93
14 x 1,5	22,48	22,75
16 x 1,5	23,43	23,71
19 x 1,5	24,40	24,69
5 x 2,5	17,83	18,08
7 x 2,5	19,41	19,67
8 x 2,5	20,58	20,85
10 x 2,5	23,19	23,47
12 x 2,5	23,79	24,07
14 x 2,5	24,73	25,02
16 x 2,5	25,82	26,12
19 x 2,5	26,96	27,27

Application/Limitation

The requirements of SOLAS Amendments Chapter II-1, Part D, Reg. 45, 5.2 (provision to be taken to limit Fire Propagation along Bunches of Cables or Wires) are fulfilled without any additional measures.

General power and lighting. Flame retardant in bunch Cat.A. Halogen free. Low smoke. Mud resistant for type P1/P8

Type Approval documentation

Tests carried out

Standard	Release	General description	Limitation
IEC 60092-350	2014-08	General construction and test methods of power, control and instrumentation cables for shipboard and offshore applications	
IEC 60092-353	2016-09	Electrical installation in ships – Part 353: Power cables for rated voltages 1kV and 3kV	*0,6/1 kV*
IEC 60092-360	2014-04	Electrical installations in ships - Part 360: Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation and telecommunication cables.	
IEC 60332-3-22	2009-02	Tests on electric and optical fibre cables under fire conditions – Part 3-22: Test for vertical flame spread of vertically-mounted bunched wires or cables – Category A	Bunch test Category A
IEC 60754-1	2011-11	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content	Low Halogen: <0,5% Halogen
IEC 60754-2	2011-11	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity	Halogen free: pH > 4,3 Conductivity<10µS/mm
IEC 60684-2	2011-08	Flexible insulating sleeving – Part 2: Tethods of test	Halogen contents as specified in standard
IEC 61034-1/2	2013-06	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Light transmittance > 60%
NEK TS 606 Ed. 5	2016-01	Cables for offshore installations. Halogen-free and/or mud resistant. Technical specification.	Mud resistance test: IRM903 100°C 7d. Calcium Bromide 70°C 56d. Carbo Sea 70°C 56d.

Marking of product

Baosheng Science & Technology Innovation Co., Ltd. – P1 TFOU or P1/P8 TFOU – 0,6/1 kV – size – IEC 60332-3-22

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval are complied with and that no alterations are made to the product design or choice of materials.

The main elements of the assessment are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Results from Routine Tests (RT) checked (if not available tests according to RT to be carried out)
- Review of type approval documentation
- Review of possible change in design, materials and performance
- Ensuring traceability between manufacturer's product type marking and Type Approval Certificate.

Periodical assessment is to be performed after 2 years and after 3.5 years. A renewal assessment will be performed at renewal of the certificate.

END OF CERTIFICATE