

TYPE APPROVAL CERTIFICATE**This is to certify:****That the Electric Power Cable**with type designation(s)
HF-CXO & HF-CXO(o)

Issued to

Seoul Electric Wire Co., Ltd.
Eumseong-gun, Chungcheongbuk-do, Republic of Korea

is found to comply with

DNV GL rules for classification – Ships, offshore units, and high speed and light craft
IEC 60092-353 (2016-09)**Application :****General power and control.****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) 90Issued at **Busan** on **2018-11-15**for **DNV GL**This Certificate is valid until **2021-12-31**.DNV GL local station: **Seoul**Approval Engineer: **Eun Jin Lee**

Andreas Kristoffersen
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.



Job Id: **262.1-003981-5**
 Certificate No: **TAE00001SG**
 Revision No: **1**

Product description

Type 0.6/1 kV HF-CXO, HF-CXO(o)

Conductors : Tinned or Plain annealed stranded copper conductor, Class 2 or Class 5
 Core insulation : XLPE
 Overall screen: Al-Mylar or Cu-Mylar tape with drain wire('-(o)'type only)
 Inner covering : Halogen free inner covering(Lap)
 Outer sheath : SHF1

Number Of Cores X Conductor- section				
	mm ²			
HF-CXO				
1 x 1	2 x 70	4 x 70	37 x 1.0	18 x 2.5
1 x 1.5	2 x 95	4 x 95	44 x 1.0	19 x 2.5
1 x 2.5	2 x 120	4 x 120		20 x 2.5
1 x 4	2 x 150	4 x 150	5 x 1.5	23 x 2.5
1 x 6	2 x 185	4 x 185	6 x 1.5	24 x 2.5
1 x 10	2 x 240		7 x 1.5	27 x 2.5
1 x 16	2 x 300	5 x 4	8 x 1.5	28 x 2.5
1 x 25		5 x 6	9 x 1.5	30 x 2.5
1 x 35	3 x 1	5 x 10	10 x 1.5	32 x 2.5
1 x 50	3 x 1.5	5 x 16	12 x 1.5	33 x 2.5
1 x 70	3 x 2.5	5 x 25	14 x 1.5	34 x 2.5
1 x 95	3 x 4	5 x 35	16 x 1.5	37 x 2.5
1 x 120	3 x 6	5 x 50	18 x 1.5	44 x 2.5
1 x 150	3 x 10	5 x 70	19 x 1.5	
1 x 185	3 x 16		20 x 1.5	2x1.0 + E
1 x 240	3 x 25	5 x 1.0	23 x 1.5	2x1.5+ E
1 x 300	3 x 35	6 x 1.0	24 x 1.5	2x2.5+ E
1 x 400	3 x 50	7 x 1.0	27 x 1.5	2x4+ E
	3 x 70	8 x 1.0	28 x 1.5	2x6+ E
	3 x 95	9 x 1.0	30 x 1.5	2x10+ E
	3 x 120	10 x 1.0	32 x 1.5	2x16+ E
	3 x 150	12 x 1.0	33 x 1.5	2x25+ 16E
	3 x 185	14 x 1.0	34 x 1.5	2x35+ 25E
	3 x 240	16 x 1.0	37 x 1.5	2x50+ 25E
		18 x 1.0	44 x 1.5	2x70+ 35E
		19 x 1.0		2x95+ 50E
2 x 1	4 x 1	20 x 1.0	5 x 2.5	2x120+ 70E
2 x 1.5	4 x 1.5	23 x 1.0	6 x 2.5	2x150+ 95E
2 x 2.5	4 x 2.5	24 x 1.0	7 x 2.5	2x185+ 95E
2 x 4	4 x 4	27 x 1.0	8 x 2.5	2x240+ 120E
2 x 6	4 x 6	28 x 1.0	9 x 2.5	
2 x 10	4 x 10	30 x 1.0	10 x 2.5	3x1.0 + E
2 x 16	4 x 16	32 x 1.0	12 x 2.5	3x1.5+ E
2 x 25	4 x 25	33 x 1.0	14 x 2.5	3x2.5+ E
2 x 35	4 x 35	34 x 1.0	16 x 2.5	3x4+ E
2 x 50	4 x 50			

Job Id: **262.1-003981-5**
 Certificate No: **TAE00001SG**
 Revision No: **1**

3x6+ E		4x95+ 50E	4 x 1	12 x 1
3x10+ E	4x1.0 + E	4x120+ 70E	4 x 1.5	12 x 1.5
3x16+ E	4x1.5+ E	4x150+ 95E	4 x 2.5	12 x 2.5
3x25+ 16E	4x2.5+ E	4x185+ 95E	5 x 1	19 x 1
3x35+ 25E	4x4+ E	4x240+ 120E	5 x 1.5	19 x 1.5
3x50+ 25E	4x6+ E	HF-CXO(o)	5 x 2.5	19 x 2.5
3x70+ 35E	4x10+ E	2 x 1	7 x 1	27 x 1
3x95+ 50E	4x16+ E	2 x 1.5	7 x 1.5	27 x 1.5
3x120+ 70E	4x25+ 16E	2 x 2.5	7 x 2.5	27 x 2.5
3x150+ 95E	4x35+ 25E	3 x 1	10 x 1	
3x185+ 95E	4x50+ 25E	3 x 1.5	10 x 1.5	
3x240+ 120E	4x70+ 35E	3 x 2.5	10 x 2.5	

Application/Limitation

The requirement of SOLAS Chapter II-1 Part D Reg. 45, 5.2 to limit Fire Propagation along Bunches of Cables or Wires are fulfilled without any additional measures.

Type Approval documentation

Specification : SES-QI-599-4 Rev.9 dated 2012-07-23
 SES-QI-599-4-2 Rev.2 dated 2017-01-23
 SEE-I100-3731 Rev.0 dated 2018-05-01

Test report : C EUISI2012-0090, C EUISI2012-0133, CE2012-511 and CE2012-512 dated 2012-05-04~07 by Korea Testing Certification
 Test report applicable for SES-QI-599-4 Rev.9 dated 2012-07-25~2012-08-10
 Test report 170004 applicable for SES-QI-599-4-2 Rev.2 dated 2016-11-23~2017-01-26
 Test report 171212 dated 2017-12-14~2017-12-27

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	Power cables for rated voltages 1kV and 3kV	
IEC 60092-360	2014-04	Insulating and sheathing materials for shipboard and offshore units, power, control, instrumentation, telecommunication cables	
IEC 60332-1	2004-07	Test for vertical flame propagation for a single insulated wire or cable	
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 Cat.A
IEC 60754-1	2011	Test on gases evolved during combustion of materials from cables – Determination of the amount of halogen acid gas	Low Halogen : < 0.5% halogen
IEC 60754-2	2011	Test on gases evolved during combustion of materials from cables – Determination of the	Halogen free : pH > 4.3

Job Id: **262.1-003981-5**
Certificate No: **TAE00001SG**
Revision No: **1**

		degree of acidity of gases evolved during the combustion of materials taken from electric cables by measuring pH and conductivity	Conductivity < 10µS
IEC 60684-2	2011	Flexible insulating sleeving – Part 2: Methods of test.	Fluorine content <0,1%
IEC 61034-1/2	2013-06	Measurement of smoke density of cables burning under defined conditions – Test apparatus, procedure and requirements	Low smoke >60%
CSA C22.2 No. 03	2009-09	5.11 Flexibility at any specified temperature	Cold bend -40°C
CSA C22.2 No. 03	2009-09	5.12 Abnormal low temperature – impact	Cold impact -35°C

Marking of product

0.6/1kV – Type designation – Size – IEC60332-3 Cat.A – Seoul Elec. – Year of manufacture – Length

Periodical assessment

The scope of the retention/renewal survey is to verify that the conditions stipulated for the Type Approval Certificate are complied with and that no alterations are made to the design and/or the material of product.

The main elements of the survey are:

- Inspection on factory samples, selected at random from the production line (where practicable)
- Routine Tests(RT) is to be carried out and check the results
- Review of type approval documentation
- Review of possible changes in design, material 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