DNV·GL

Certificate No:
TAE00002TM

TYPE APPROVAL CERTIFICATE

This is to certify:

That the Electric Heating Cable

with type designation(s)
RSX, VSX, BSX, KSX, HTSX, KSR, VSX-HT

Issued to
Thermon, Inc.
San Marcos, TX, USA

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

Application :

Products approved by this certificate are accepted for installation on all vessels classed by DNV GL.

Type	Rated voltage (V)	Temp. class (°C)	Power [W/m] @ref. temp.	Suitable for Hazardous areas
RSX	208-277	T6-T4 (85-120)	32-48	Yes
VSX	120-277	T3 (200)	16-66	Yes
BSX	120-277	T6-T5 (85-100)	10-33	Yes
KSX	120-277	T6-T3 (85-200)	16-66	Yes
HTSX	120-277	T3-T2 (200-230)	10-66	Yes
KSR	120 & 230	T2 (230)	90	Yes
VSX-HT	120-277	T3-T2 (200-230)	16-66	Yes

Issued at **Høvik** on **2018-04-27**

for **DNV GL**

This Certificate is valid until **2022-12-31**.
DNV GL local station: **Houston**

Approval Engineer: **Nicolay Horn**

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.

© DNV GL 2014. DNV GL and the Horizon Graphic are trademarks of DNV GL AS.

Product description

Type: RSX – Self-Regulating Heating Cable

Conductors:	2.0 mm^2 nickel-plated copper
Heating element:	Semiconductive heating matrix core
Primary Jacket/Insulation:	Cross-linked polyolefin dielectric
Braid:	Tinned copper or nickel-plated copper
Sheath:	Thermoplastic elastomer or Fluoropolymer

Type: VSX and VSX-HT – Self-Regulating Heating Cable

Conductors:	2.0 mm^2 nickel-plated copper
Heating element:	Semiconductive heating matrix core
Primary Jacket/Insulation:	Fluoropolymer dielectric
Braid:	Nickel-plated copper
Sheath:	Fluoropolymer

Type: BSX – Self-Regulating Heating Cable

Conductors:	1,3 mm^2 nickel-plated copper
Heating element:	Semiconductive heating matrix core
Primary Jacket/Insulation:	Cross-linked polyolefin dielectric
Braid:	Tinned copper or nickel-plated copper
Sheath:	Thermoplastic elastomer or Fluoropolymer

Type: KSX – Self-Regulating Heating Cable

Conductors:	1.3 mm^2 nickel-plated copper
Heating element:	Semiconductive heating matrix core
Primary Jacket/Insulation:	Fluoropolymer dielectric
Braid:	Tinned copper or nickel-plated copper
Sheath:	Fluoropolymer

Type: HTSX – Self-Regulating Heating Cable

Conductors:	1.3 mm^2 nickel-plated copper
Heating element:	Semiconductive heating matrix core
Primary Jacket/Insulation:	Fluoropolymer dielectric
Braid:	Nickel-plated copper
Sheath:	Fluoropolymer

Type: KSR – Self-Regulating Heating Cable

Conductors:	1.3 mm^2 nickel-plated copper
Heating element:	Semiconductive heating matrix core
Primary Jacket/Insulation:	Fluoropolymer dielectric
Braid:	Tinned copper or nickel-plated copper
Sheath:	Silicone

Type designation	Ex e or eb*	Ex tD or tb*	P	Un
Ref.	Temp.class	Temp.class	Nominal (W/m)	(V)
RSX 10-2-FOJ	Ex eb IIC T5	Ex tb IIIC T95 ºC	32	230
RSX 15-2-OJ	Ex eb IIC 120 ºC (T4)	Ex tb IIIC T120 ºC	48	230
RSX 15-2-FOJ	Ex eb IIC T5	Ex tb IIIC T95 ºC	48	230
VSX 5-2- OJ	Ex e II T3	N/A	16	240
VSX 10-2- OJ	Ex e II T3	N/A	33	240
VSX 15-2- OJ	Ex e II T3	N/A	49	240
VSX 20-2- OJ	Ex e II T3	N/A	66	240
VSX 5-1- OJ	Ex e II T3	N/A	16	120
VSX 10-1- OJ	Ex e II T3	N/A	33	120
VSX 15-1- OJ	Ex e II T3	N/A	49	120
VSX 20-1- OJ	Ex e II T3	N/A	66	120
VSX-HT 5-2- OJ	Ex eb IIC T3	Ex tb IIIC T200 ºC	16	240
VSX-HT 10-2- OJ	Ex eb IIC T3	Ex tb IIIC T200 ºC	33	240
VSX-HT 15-2- OJ	Ex eb IIC 230 ºC (T2)	Ex tb IIIC T230 ºC	49	240
VSX-HT 20-2- OJ	Ex eb IIC 230 ºC (T2)	Ex tb IIIC T230 ºC	66	240
VSX-HT 5-1- OJ	Ex eb IIC T3	Ex tb IIIC T200 ºC	16	120
VSX-HT 10-1- OJ	Ex eb IIC T3	Ex tb IIIC T200 ºC	33	120
VSX-HT 15-1- OJ	Ex eb IIC 230 ºC (T2)	Ex tb IIIC T230 ºC	49	120
VSX-HT 20-1- OJ	Ex eb IIC 230 ºC (T2)	Ex tb IIIC T230 ºC	66	120
BSX 3-2- OJ/-FOJ	Ex eb IIC T6	Ex tb IIIC T85 °C	10	240
BSX 5-2- OJ/-FOJ	Ex eb IIC T6	Ex tb IIIC T85 °C	16	240
BSX 8-2- OJ/-FOJ	Ex eb IIC T6	Ex tb IIIC T85 °C	26	240
BSX 10-2- OJ/-FOJ	Ex eb IIC T5	Ex tb IIIC T100 °C	33	240
BSX 3-1- OJ/-FOJ	Ex eb IIC T6	Ex tb IIIC T85 °C	10	120
BSX 5-1- OJ/-FOJ	Ex eb IIC T6	Ex tb IIIC T85 °C	16	120
BSX 8-1- OJ/-FOJ	Ex eb IIC T6	Ex tb IIIC T85 °C	26	120
BSX 10-1- OJ/-FOJ	Ex eb IIC T5	Ex tb IIIC T100 °C	33	120
KSX 5-2- OJ	Exe II T3 to T6	Ex tD A21 T200°C to T85°C	16	240
KSX 10-2- OJ	Exe II T3 to T6	Ex tD A21 T200°C to T85°C	33	240
KSX 15-2- OJ	Exe II T3 to T6	Ex tD A21 T200°C to T85°C	49	240
KSX 20-2- OJ	Exe II T3 to T6	Ex tD A21 T200°C to T85°C	66	240
KSX 5-1- OJ	Exe II T3 to T6	Ex tD A21 T200°C to T85°C	16	120
KSX 10-1- OJ	Exe II T3 to T6	Ex tD A21 T200°C to T85°C	33	120
KSX 15-1- OJ	Exe II T2 to T6	Ex tD A21 T200°C to T85°C	49	120
KSX 20-1- OJ	Exe II T2 to T6	Ex tD A21 T200°C to T85°C	66	120
HTSX 3-2- OJ	Ex eb IIC T3	Ex tb IIIC T200°C	10	240
HTSX 6-2- OJ	Ex eb IIC T3	Ex tb IIIC T200°C	20	240
HTSX 9-2- OJ	Ex eb IIC T3	Ex tb IIIC T200°C	30	240
HTSX 12-2- OJ	Ex eb IIC T3	Ex tb IIIC T200°C	39	240
HTSX 15-2- OJ	Ex eb IIC T3	Ex tb IIIC T200°C	49	240
HTSX 20-2- OJ	Ex eb IIC 230°C (T2)	Ex tb IIIC T230°C	66	240
HTSX 3-1- OJ	Ex eb IIC T3	Ex tb IIIC T200°C	10	120
HTSX 6-1- OJ	Ex eb IIC T3	Ex tb IIIC T200°C	20	120
HTSX 9-1- OJ	Ex eb IIC T3	Ex tb IIIC T200°C	30	120
HTSX 12-1- OJ	Ex eb IIC T3	Ex tb IIIC T200°C	39	120
HTSX 15-1- OJ	Ex eb IIC 215°C (T2)	Ex tb IIIC T215°C	49	120
HTSX 20-1- OJ	Ex eb IIC 215°C (T2)	Ex tb IIIC T215°C	66	120

Type designation	Ex e or eb*	Ex tD or tb*	P	Un
Ref.	Temp.class	Temp.class	Nominal (W/m)	(V)
KSR-1-OJ	Ex eb IIC 230°C (T2)	Ex tb IIIC T230°C	90	120
KSR-2-OJ	Ex eb IIC 230°C (T2)	Ex tb IIIC T230°C	90	230

*The T-class and/or maximum surface temperature T-ratings may be obtained by stabilized design and/or controlled design of a trace heating system using methods described in EN/IEC 60079-30-2 clause 6.7, made under Thermon's responsibility.

Application/Limitation

The installation has to be done in accordance with the installation instructions. Installation of Ex equipment in DNV vessels is subject for approval and shall be submitted in each case.

Heating cables are not to be installed in contact with woodwork or other combustible material. If installed close to such materials, a separation by means of a non-flammable material may be required.

Type Approval documentation

Tests carried out

IEC Standard	Releas	General description	Limitation
IEC 62086 –1	2001	Electrical Apparatus for Explosive Gas Atmospheres - Electrical Resistance Trace Heating - Part 1: General and Testing Requirements	VSX, KSX
IEC 60079-0	2004	Explosive atmospheres - Part 0: Equipment - General requirement	VSX, KSX
IEC 60079-0	2011	Explosive atmospheres - Part 0: Equipment - General requirement	VSX-HT, BSX, RSX, HTSX
IEC 60079-7	2001	Explosive atmospheres – Part 7: Equipment protection by increased safety "e"	VSX, KSX
IEC 60079-30-1	2007	Explosive atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements	RSX, VSX-HT, BSX, KSX, HTSX
IEC 60079-31	2008	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"	BSX
IEC 60079-31	2013	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"	RSX, VSX-HT, HTSX
IEC 61241-0	2004	Electrical apparatus for use in the presence of combustible dust - Part 0: General requirements	KSX
IEC61241-1	2004	Electrical apparatus for use in the presence of combustible dust - Part 1: Protection by enclosures "tD"	KSX

EN Standard	Release	General description	Limitation
EN 50014 + A1- A2	1999	Electrical apparatus for potentially explosive atmospheres. General requirements	KSR
EN 50281-1-1 + A1-A2	2002	Electrical apparatus for use in the presence of combustible dust. Electrical apparatus protected by enclosures. Construction and testing	VSX, KSR
EN 60079-0	2004	Electrical apparatus for explosive gas atmospheres. General requirements	VSX, KSX
EN 60079-0	2012	Electrical apparatus for explosive gas atmospheres. General requirements	RSX, VSX-HT, BSX, HTSX
EN 60079-7	2003	Electrical apparatus for explosive gas atmospheres. Increased safety "e"	VSX, KSX, KSR
EN 60079-30-1	2007	Explosive atmospheres - Part 30-1: Electrical resistance trace heating - General and testing requirements	RSX, VSX-HT, BSX, KSX, HTSX

EN 60259+A1	2000	Degree of protection provided by enclosures	BSX, KSX, HTSX
EN 61241-0	2006	Electrical apparatus for use in the presence of combustible dust. General requirements	KSX
EN 61241-1	2004	Electrical apparatus for use in the presence of combustible dust. Protection by enclosures "tD"	KSX
EN 62086-1	2005	Electrical apparatus for explosive gas atmospheres. Electrical resistance trace heating. General and testing requirements	VSX, KSX, KSR
EN 60079-31	2014	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"	RSX, VSX-HT, HTSX

Marking of product

Thermon – Type designation – Voltage.

Periodical assessment

The scope of the periodical assessment is to verify that the conditions stipulated for the Type approval is 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 Routines (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