CERTIFICATE OF CONFORMITY

1. **ELECTRICAL EQUIPMENT PER US REQUIREMENTS**

2. **Certificate No:** **FM16NUS0014**

3. **Equipment:**
   (Type Reference and Name)
   ELSR-WA Series Self-Regulating Heating Cables
   ELSR-MA Series Self-Regulating Heating Cables
   EL-ECW End Termination Kit
   EL-ECM End Termination Kit
   EL-ECMF End Termination Kit
   ELVB-SRAM Power Termination Kit
   ELVB-SRAW Power Termination Kit

4. **Name of Listing Company:** **eltherm production GmbH**

5. **Address of Listing Company:** **Ernst-Heinkel Str 6-10**
   Burbach
   57299
   Germany

6. The examination and test results are recorded in confidential report number:

   3050047 dated 23rd February 2015

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

   IEEE 515:2011

8. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

9. Equipment Ratings:
   Suitable for use only in an ordinary (unclassified) locations. Maximum pressure rating 20 bar; Maximum current rating 40A and Voltage rating is 120Vac or 240Vac. See Specific Conditions of Use.

Certificate issued by:

J.E. Marquedant
Manager, Electrical Systems

14 December 2016
Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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SCHEDULE

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10. **Description of Equipment:**

The self-regulating heating cables ELSR have two sub-categories namely, WA series (warm water) with maximum design temperatures of 55°C (for 3W/ft) or 65°C (for 4W/ft) and MA series (micro) with nominal power dissipated at 10°C in W/ft.

There are two forms of ground connections for each sub-category namely "A" for aluminium foil and "B" for metallic braid. The outer jacket is from two options namely; "O" for polypropylene and "F" for food approved.

The self-regulating heating cable ELSR-MA is very flexible and is used for special applications where installation dimensions are needed to be kept small. Typically suited for short heating circuits; it can be used for frost protection and temperature maintenance up to 65°C.

ELSR-MA-BF/AF is the light construction self-regulating heating cable consisting of an outer jacket that is manufactured using HALAR 350LC material produced by SOLVAY.

The ratings of these Self-regulating Heat Trace Cable Systems are shown below.

Type	Design	Voltage AC	Nominal Power	Max. Temperatures
ELSR-WA-..-1-AO	2 nickel plated bus wires (1.23mm²), PVDF Matrix, PP insulation, aluminum screen (100%) with embedded earth conductor, PP sheath	120V	3W/ft at 55°C (WA-55-1), 4W/ft at 65°C (WA-65-1)	80°C/176°F energized 90°C/194°F de-energized
ELSR-WA-..-1-BO	as above except for tin plated braid (80%) instead of aluminum screen	as above	as above	as above
ELSR-WA-..-2-AO	as NA-..-1-AO	240V	3W/ft at 55°C (WA-55-2), 4W/ft at 65°C (WA-65-2)	as above
ELSR-WA-..-2-BO	as NA-..-1-BO	as above	as above	as above
ELSR-MA-..-1-BF	2 nickel plated bus wires (0.57mm²), PE Matrix, PP insulation, tin plated braid (80%), ECTFE sheath	120V	3W/ft at 10°C	65°C/156°F energized and de-energized
ELSR-MA-..-1-BO	as above, except for PP sheath instead of ECTFE sheath	as above	3W/ft at 10°C (MA-3-1), 5W/ft at 65°C (MA-5-1)	as above
ELSR-MA-..-1-AO	as above, except for aluminum screen (100%) with embedded earth conductor instead of braid	as above	as above	as above
ELSR-MA-..-2-BF	as MA-1-BF	240V	3W/ft at 10°C	as above
ELSR-MA-..-2-BO	as MA-1-BO	as above	3W/ft at 10°C (MA-3-2), 5W/ft at 65°C (MA-5-2)	as above
ELSR-MA-..-2-AO	as MA-1-AO	as above	as above	as above

Integral Components

The integral components used on the ELSR Series Self-regulating Heat Trace Cable Systems are: End termination kits which include the end caps that is made from a silicone material sealed with a silicone

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glue and Power termination kits which includes cable glands for flat cables and silicone glue for sealing the cables. The details of the respective kits used on the relevant cables are shown below.

The correlations between the respective kits used on the relevant cables are shown below.

Power Termination Kits

Accessories	ELSR-WA (-WS)	ELSR-MA (-WS)	ELSR-MA-…-BF (-PS)
Power Termination Kit ELVB-SRAM-¾ ST	-	+	+
Power Termination Kit ELVB-SRAW-¾ ST	+	+	-

End Termination Kits

Accessories	ELSR-WA	ELSR-MA	ELSR-MA-…-BF
End Termination Kit EL-ECM	-	+	-
End Termination Kit EL-ECMF	-	+	+
End Termination Kit EL-ECW	+	-	-

The products ratings are as shown below:

ELSR-WA-a-b-cO self-regulating heating cable ELSR-WA series

Max. 40A

a = power output (55 = 3W/ft @ 55°C or 65 = 4W/ft @ 65°C)

b = nominal voltage (1 = 120Vac or 2 = 240Vac)

c = type of conductive covering (A = Aluminium or B = Braid)

Specific Conditions of Use

1. *Power Connections shall only be made using a suitable certified Junction Box with minimum Approval rating compatible for the connection of the heating cable.*
2. *Minimum installation temperature is -45°C.*
3. *Minimum start up temperature is -30°C.*
4. *Maximum operating temperature is 80°C when power is on.*
5. *Maximum exposure temperature is 90°C when power is off.*
6. *The suitable end termination kit is EL-ECW model and optionally, the EL-ECN-Ex model may be used.*
7. *The suitable power termination kit is ELVB-SRAW-¾ ST model. Optionally, ELVB-SREx-20 BR HT, ELVB-SREx- ½" BR HT, ELVB-SREx- ¾" BR HT models may be used.*
8. *A ground fault protection device must be used with this heating device.*

ELSR-MA-a-b cO self-regulating heating cable

Max. 40A

a = power output (3 or 5 W/ft @ 10°C)

b = nominal voltage (1 = 120Vac or 2 = 240Vac)

c = type of conductive covering (A = Aluminium or B = Braid)

Specific Conditions of Use

1. *Power Connections shall only be made using an NRTL Listed Junction Box with minimum Approval rating compatible for the connection of the heating cable.*
2. *The end termination kits to be used for connection are the EL-ECM and the EL-ECMF models.*
3. *Minimum installation temperature is -45°C.*
4. *Maximum operating temperature is 60°C.*

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5. *Maximum exposure temperature is 60°C when power is off.*
6. *The power termination model kit suitable for cable connection is the ELVB-SRAM-¾ ST.*
7. *A ground fault protection device must be used with this heating device.*

ELSR-MA-3-a BF self-regulating heating cable
Maximum pressure rating 20 bar; Max. 40A; 3W/ft @ 10°C
a = nominal voltage (1 = 120Vac or 2 = 240Vac)

Specific Conditions of Use
1. *Power Connections shall only be made using an NRTL Listed Junction Box with minimum Approval rating compatible for the connection of the heating cable.*
2. *The only end termination kit to be used for connection is the EL-ECMF model.*
3. *Minimum installation temperature is -25°C.*
4. *Maximum operating temperature is 60°C.*
5. *Maximum exposure temperature is 60°C when power is off.*
6. *The power termination model kit suitable for cable connection is the ELVB-SRAM-¾ ST.*
7. *A ground fault protection device must be used with this heating device.*

EL-ECW End Termination Kit
EL-ECM End Termination Kit
Max Voltage 240V; Max. 40A; Max Power 10W/ft

Specific Conditions of Use
1. *Minimum installation temperature is -45°C.*
2. *Maximum exposure temperature is 90°C.*

EL-ECMF End Termination Kit
Maximum pressure rating 20 bar; Max Voltage 240V; Max. 40A; Max Power 10W/ft

Specific Conditions of Use
1. *Minimum installation temperature is -25°C.*
2. *Maximum exposure temperature is 90°C.*

Ex ELVB-SRAM- ¾" ST Power Termination Kit
Max Voltage 240V; Max. 40A; Max Power 10W/ft

Specific Conditions of Use
1. *Minimum installation temperature is -45°C.*
2. *Maximum exposure temperature is 90°C.*

Ex ELVB-SRAW- ¾" ST Power Termination Kit
Max Voltage 240V; Max. 40A; Max Power 10W/ft

Specific Conditions of Use
1. *Minimum installation temperature is -45°C.*
2. *Maximum exposure temperature is 90°C.*

11. **Test and Assessment Procedure and Conditions:**

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

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12. **Schedule Drawings**

A copy of the technical documentation has been kept by FM Approvals.

13. **Specific Conditions of Use:**

None

14. **Certificate History**

Details of the supplements to this certificate are described below:

Date	Description
23rd February 2015	Original Issue.
14th December 2016	Supplement 1: Report Reference: – RR206603 dated 14th December 2016. Description of the Change: 1. Removal of the restriction placed on the use of EL-ECMF End Termination Kit for use on the ELSR-MA-3-a BF self-regulating heating cable system. 2. Addition of ELSR-WA series. 3. CDL & Listing update. 4. New Certificate Format.

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