

[1]

EU-TYPE EXAMINATION CERTIFICATE


 [2] **Equipment and Protective System intended for use in potentially explosive atmospheres
Directive 2014/34/EU – Annex III**

 [3] Certificate Number: **EPT 17 ATEX 2646 X** Issue 1

 [4] Equipment: **Armoured electrical heaters**

 Series: **80 ÷ 700**

 [5] Manufacturer: **MASTERWATT S.r.l.**

 [6] Address: **Via Collegno n° 31, 10044 Pianezza (TO) - Italy**

[7] This equipment and its accepted variations are specified in the annex to this Certificate.

[8] Eurofins Product Testing Italy S.r.l., Notified Body n. 0477 in accordance with Article 21 of the Directive 2014/34/EU of the European Parliament and of the Council of 26 February 2014, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Annex II of the Directive.

The examination and test results are recorded in the confidential Report N° EPT.19.REL.03/1913083


[9] Compliance with the essential health and safety requirements is assured through the verification of them and by compliance with the harmonized standards :

EN 60079-0:2018, EN 60079-31:2014, EN 60079-7: 2015+A1:2018

[10] If the sign "X" is placed after the Certificate number, it indicates that the equipment is subject to the special conditions for safe use specified in the annex to this Certificate.

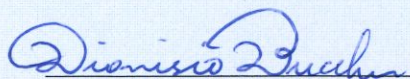
[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, the exam and the tests of the specified equipment.

Further requirements of the Directive 2014/34/EU apply to the manufacture and supply of this equipment. These requirements are not object of this Certificate.

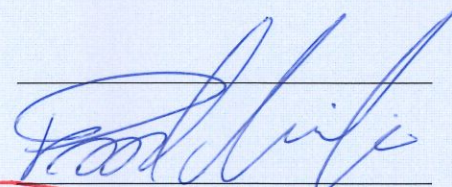
 [12] The equipment shall include the symbol  and at least one of the following strings:

II -/2G Ex eb IIC T6...T1 -/Gb **-xx°C ≤ Ta ≤ +xx°C**
II -/2D Ex tb IIIC T85°C...T450°C -/Db **-xx°C ≤ Ta ≤ +xx°C**
II 2G/2G Ex eb IIC T6...T1 Gb/Gb **-xx°C ≤ Ta ≤ +xx°C**
See the equipment description for details related to the maximum surface temperatures and ambient temperature ranges

 Place and date of issue:
Torino, 2019-12-20



 Dionisio Bucchieri
 Directive Responsible



 Paolo Trisoglio
 Managing Director

PRD N° 119B
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This Certificate has 8 pages and it is reproducible only in its entirety. Conditions of validity are reported below.

[13]

ANNEX

[14]

EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2646 X

Issue 1


[15] Equipment description

The electrical armoured heaters Series 80+700 are composed of a heating unit (characterized by an increased safety construction) and a terminal box (characterized by an increased safety and/or dust tight construction) for the electrical connections.

The heating unit can be made of one or more heating elements and it is attached to the heated vessel through a coupling flange.

The heating elements are made of a resistive wire insulated by means of MgO from the external metallic sheet that is in direct contact with the fluid to heat.

The terminal box enclosure can be directly connected to the coupling flange or can be spaced from it by a neutral extension in order to comply with the maximum service temperature of the terminal box in relation to the process temperature. The heating elements can be permanently fixed to the coupling flange or can be dismountable (bite coupling elements).

The element's external diameter can be from 8 mm to 16 mm.

The elements can be connected internally by means of brass / copper bars or through cable lugs.

The heaters are supplied with one or more thermowells for the insertion of one or more temperature control sensing probes whose terminals are located in the terminal box (probes types intrinsic safety or increased safety or flameproof).

The heaters can be used for the heating of solids, liquids or gases and are intended to be installed in the boundary wall between the process (EPL Gb or no EPL required) and the external atmosphere (EPL Gb and/or EPL Db). They are suitable for gas group IIC and dust group IIIC.

Electrical characteristics

Maximum voltage: 750 Vac or Vdc

Rated frequency: 0 Hz or 50 Hz or 60 Hz

Maximum current density on the heaters terminals 1.5 A/mm²

Protection degree: IP66 or IP 65

Ambient temperature: from -60 to +40 °C (or from -60°C to +60 °C or from -60°C to +70 °C)

Surface temperature

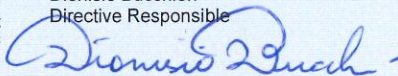
The temperature class of the equipment T6...T1 / T85°C...T450°C is specified on the nameplate by the manufacturer on the basis of the tables below reported. The maximum surface temperature for equipment suitable to be used with flammable dust is selected as the highest temperature value for the corresponding Tclass. The cable design temperature is defined by the manufacturer in the affixed nameplate based on the maximum temperature of the elements terminal studs and on the type of cable connection arranged inside the heater.

The following tables provide the temperature class and indirectly the max surface temperature for applications with combustible dusts (see above) with reference to the ambient temperature range, process temperature, length of the neutral section and current density in the heating element.


PRD N° 119B

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 Page 2 of 8
 2019-12-20

[13]

ANNEX

[14]

EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2646 X

Issue 1

Table 1: Maximum Ambient Temperature : +40 °C – Maximum Terminals Current Density : 0.8 A/mm²

Neutral section length (mm)	Temperature class										
	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
300	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
250	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
200	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
150	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
100	T6	T6	T5	T4	T4	T3	T3	T2			
0	T6	T6	T5	T4	T4	T3					
	60 °C	75 °C	95 °C	100 °C	130 °C	150 °C	195 °C	250 °C	290 °C	350 °C	400 °C
PROCESS TEMPERATURE											

Table 2: Maximum Ambient Temperature : +40 °C – Maximum Terminals Current Density : 1.1 A/mm²

Neutral section length (mm)	Temperature class										
	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
300	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
250	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
200	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
150	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
100	T6	T5	T5	T4	T4	T3	T3	T2			
0	T5	T5	T4	T4	T4	T3					
	60 °C	75 °C	95 °C	100 °C	130 °C	150 °C	195 °C	250 °C	290 °C	350 °C	400 °C
PROCESS TEMPERATURE											

Table 3: Maximum Ambient Temperature : +40 °C – Maximum Terminals Current Density : 1.5 A/mm²

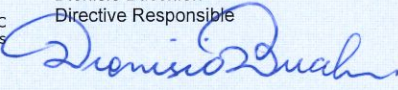
Neutral section length (mm)	Temperature class										
	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
300	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
250	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
200	T6	T6	T5	T4	T4	T3	T3	T2	T2	T1	T1
150	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1
100	T5	T5	T5	T4	T4	T3	T3	T2			
0	T5	T5	T4	T4	T4	T3					
	60 °C	75 °C	95 °C	100 °C	130 °C	150 °C	195 °C	250 °C	290 °C	350 °C	400 °C
PROCESS TEMPERATURE											

Table 4: Maximum Ambient Temperature : +60 °C – Maximum Terminals Current Density : 0.8 A/mm²

Neutral section length (mm)	Temperature class										
	T6	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1
300	T6	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1
250	T6	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1
200	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1
150	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1
100	T5	T5	T5	T4	T4	T3	T3	T2			
0	T5	T5	T4	T4	T4	T3					
	60 °C	75 °C	95 °C	100 °C	130 °C	150 °C	195 °C	250 °C	290 °C	350 °C	400 °C
PROCESS TEMPERATURE											



PRD N° 119B

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Page 3 of 8
2019-12-20

[13]

ANNEX

[14]

EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2646 X

Issue 1


 Table 5: Maximum Ambient Temperature : +60 °C – Maximum Terminals Current Density : 1.1 A/mm²

Neutral section length (mm)	Temperature class											
	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1	
300	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1	
250	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1	
200	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1	
150	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
100	T5	T4	T4	T4	T4	T3	T3	T2				
0	T4	T4	T4	T4	T3	T3						
	60 °C	75 °C	95 °C	100 °C	130 °C	150 °C	195 °C	250 °C	290 °C	350 °C	400 °C	
PROCESS TEMPERATURE												

 Table 6: Maximum Ambient Temperature : +60 °C – Maximum Terminals Current Density : 1.5 A/mm²

Neutral section length (mm)	Temperature class											
	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1	
300	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1	
250	T5	T5	T5	T4	T4	T3	T3	T2	T2	T1	T1	
200	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
150	T4	T4	T4	T4	T4	T3	T3	T2	T2	T1	T1	
100	T4	T4	T4	T4	T4	T3	T3	T2				
0	T4	T4	T4	T3	T3	T3						
	60 °C	75 °C	95 °C	100 °C	130 °C	150 °C	195 °C	250 °C	290 °C	350 °C	40 °C	
PROCESS TEMPERATURE												

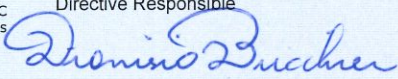
 Table 7: Maximum Ambient Temperature : +70 °C – Maximum Terminals Current Density : 0.8 A/mm²

Neutral section length (mm)	Temperature class											
	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
300	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
250	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
200	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
150	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
100	T5	T4	T4	T4	T4	T3	T3	T2				
0	T4	T4	T4	T4	T3	T3						
	60 °C	75 °C	95 °C	100 °C	130 °C	150 °C	195 °C	250 °C	290 °C	350 °C	400 °C	
PROCESS TEMPERATURE												



PRD N° 119B
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 Directive Responsible



Page 4 of 8
 2019-12-20



[13]

ANNEX

[14]

EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2646 X

Issue 1

Table 8: Maximum Ambient Temperature : +70 °C – Maximum Terminals Current Density : 1.1 A/mm²

Neutral section length (mm)	Temperature class											
	60 °C	75 °C	95 °C	100 °C	130 °C	150 °C	195 °C	250 °C	290 °C	350 °C	400 °C	
300	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
250	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
200	T4	T4	T4	T4	T4	T3	T3	T2	T2	T1	T1	
150	T4	T4	T4	T4	T4	T3	T3	T2	T2	T1	T1	
100	T4	T4	T4	T4	T4	T3	T3	T2				
0	T4	T4	T4	T3	T3	T3						
PROCESS TEMPERATURE												

Table 9: Maximum Ambient Temperature : +70 °C – Maximum Terminals Current Density : 1.5 A/mm²

Neutral section length (mm)	Temperature class											
	60 °C	75 °C	95 °C	100 °C	130 °C	150 °C	195 °C	250 °C	290 °C	350 °C	400 °C	
300	T5	T5	T4	T4	T4	T3	T3	T2	T2	T1	T1	
250	T4	T4	T4	T4	T4	T3	T3	T2	T2	T1	T1	
200	T4	T4	T4	T4	T4	T3	T3	T2	T2	T1	T1	
150	T4	T4	T4	T4	T4	T3	T3	T2	T2	T1	T1	
100	T4	T4	T4	T4	T3	T3	T3	T2				
0	T4	T4	T3	T3	T3	T3						
PROCESS TEMPERATURE												

Cable entries

The cable entry devices used on the enclosures have to be suitably ATEX certified. They have to be chosen according to the type of protection, the operating temperature indicated in the manufacturer's instructions, the type of thread and the degree of protection of the equipment.

Warning label

Do not open when energized

Routine tests

In compliance with clause 7.1 of EN 60079-7, the manufacturer has to perform the dielectric strength test between galvanically isolated parts with a minimum voltage of (2*U+1000) V r.m.s. for 60 s, , where "U" is the working voltage. As an alternative, the test can also be conducted at (2*U+1000)x1.2 V r.m.s. for t>0.1s

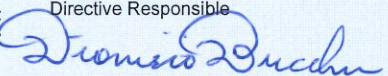
[16] **Assessment Report n° EPT.19.REL.03/1913083**

This EU-Type Examination Certificate is released after the positive result of the conformity assessment of the Council Directive 2014/34/EU and to harmonized technical standards listed in this Certificate; performed by the Notified Body Eurofins Product Testing Italy S.r.l., and reported in the Assessment Report above cited.



PRD N° 119B
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Directive Responsible



Page 5 of 8
2019-12-20

[13]

ANNEX

[14]

EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2646 X

Issue 1


[17] Special condition of use

- The user has to periodically clean the enclosure in order to avoid a dust deposit higher than 5 mm
- The supply cable shall be suitable for an operating temperature equal or greater than the temperature indicated on the label.
- The user shall adopt the following additional safety measures:
 - Heating of liquids: the user shall take adequate measures (e.g. by means of a level switch) to guarantee that the heater is operating only when the fluid level is at least 50 mm above the highest heated part of the heater
 - Heating of static gases in processes with EPL required: the user shall guarantee that the ambient temperature of the volume where the heater is used is maintained below the limits specified on the heater nameplate by the manufacturer. The user shall further protect the equipment with a residual current device according to clause 5.8.6 of EN 60079-7
 - Heating of forced flow gases in processes with Gb EPL required: the user shall take appropriate measures to:
 - protect the equipment with a residual current device according to clause 5.8.6 of EN 60079-7
 - stop the power supply to the heater in case the fluid flow rate drops below the minimum value specified by the manufacturer.
 - connect the safety sensor, installed by the manufacturer in one heating element for surveillance of the maximum skin temperature, to a suitable control system. Make sure that no single failure in the equipment or in the supply (here including also the open circuit of a single heating element) can cause a local reduction of temperature in the controlled element while the other elements normally work (see instructions for the details)
 - make sure that, in case the heater consists of several independent power supply stages, the stage in which the safety sensor is located is always ON or is the first to be switched on and the last to be switched off. If this is not possible, the user shall request to the manufacturer to supply a heater with one safety device for each power supply stage

Heating of dynamic fluids: special case hothead execution (low inlet temperature of the fluid to be heated): in addition to the safety devices described in the above, these heaters shall be equipped with a safety device that monitors the fluid temperature, in the area close to the heater coupling device to the plant, and intervenes when this temperature exceeds the safety value specified in the manufacturer's documents and representing the basis for the definition of the maximum temperature inside the heater terminal box.

All the safety functions above mentioned must be in addition to the normal process control functions and shall:

- produce the shutdown of the heater and realize the transition to a safe state of the plant in case of activation of any of the safety devices; the activation cannot have an automatic reset
- set up a safety chain SIL 1 in accordance with the prescriptions of EN 50495 standard in the case where EPL Gb is required in the process side.

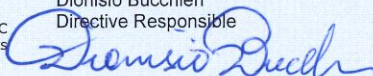
[18] Essential Health and Safety Requirements

Assured by compliance with harmonized standards.



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Page 6 of 8
 2019-12-20

[13]

ANNEX

[14]

EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2646 X

Issue 1

[19] **Descriptive documents**

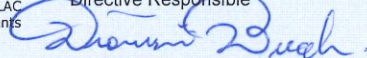
The equipment object of this Certificate is described by the following documents that are scheduled documents and therefore they cannot be modified without the explicit authorization of the Notified Body.

Type of document	Document identification	Rev.	Date
Design document	CAP-EX-0001	01	2019-07-20
Safety instruction	MAN-EX-0003	00	2019-07-10
Drawing: Flanged heaters for submersion Byte-coupling	7014081	02	2017-02-20
Drawing: Pipe Ch. 22 M22x1,5 H15	7040066	04	2018-12-21
Drawing: Ogive $\Phi 20 \times 10,6$	7040067	03	2018-12-21
Drawing: Pipe Ch. 14 M14x1,5 H 5	7040068	00	2011-01-10
Drawing: Ogive $\Phi 8 \times 6,5$	7040069	01	2011-03-01
Flanged heat rs for submersion Series 80 ÷ 450	7014082	02	2019-12-20
Enclosure side electrical terminals	7014093	01	2017-02-20
Drawing: Buckle Ch.14 M14x1.5	7040085	00	2013-01-16
Drawing: Buckle Ch 22 M22x1.5	7040086	00	2013-01-16
Drawing: Buckle ½" gas H26	7040087	01	2013-06-04
Drawing: Buckle EX-e	7040090	00	2014-03-28
Drawing: Buckle $\phi 18 \times 267$ m14x1,5	7040096	00	2014-12-16
Drawing: Buckle $\phi 34 \times 30$ ¾" Gas	7040097	00	2015-01-09
Drawing: Buckle ½" gas HF11	7040024	01	2000-06-22
Drawing: Nut Ch.30	7124019	02	2013-11-12
Drawing: hexagonal nut m14x1,5 / Ch.24 / H12	7124020	00	2014-12-16
Drawing: hexagonal nut Ex-e ¾" GAS H12 Ch.32	7124022	00	2015-01-09
Drawing: Washer $\phi e10 \phi i6.2$	7560045	00	2013-01-16
Drawing: Washer $\phi e20 \phi i16.2$	7560046	00	2013-01-16
Technical note	7606012	0	2017-02-20
Drawing: sensitive unit for smooth probe $\Phi 10$	7040137	00	2019-03-15
Drawing: sensitive unit for smooth probe $\Phi 16$	7040138	00	2019-03-15
Marking label ATEX 290x12,5	7657240	01	2017-02-20
Marking label ATEX 290x12,5	7657241	01	2017-02-20
Marking label ATEX 105x105	7657242	01	2017-02-20
Marking label ATEX 105x105	7657250	01	2017-02-20

**PRD N° 119B**

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Directive Responsible



Page 7 of 8
2019-12-20



[13]

ANNEX

[14]

EU-TYPE EXAMINATION CERTIFICATE N. EPT 17 ATEX 2646 X

Issue 1

[20] Terms and conditions

The product liability rests with the Manufacturer, his representative or, in the absence of a representative, with the importer, in accordance with the General Product Safety Directive 2001/95/EC.

The following conditions may render this certificate invalid:

- changes in the design or construction of the product;
- changes or amendments to the 2014/34/EU Directive;
- changes or amendments in the standards which form the basis for documenting compliance with the essential requirements of the 2014/34/EU Directive.

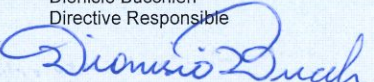
[21] Certificate History

Issue	Description	Issue date
0	First emission	2017-07-06
1	Standard update and addition of the possibility to use increased safety heating elements when process requires EPL Gb, better identification of surface temperature for dusts.	2019-12-20


PRD N° 119B

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 Directive Responsible



End of Certificate

 Page 8 of 8
 2019-12-20