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CERTIFICATE

[1] **EU-TYPE EXAMINATION CERTIFICATE**

[2] **Equipment or Protective System intended for use in potentially explosive atmospheres Directive 2014/34/EU**

[3] EU-Type Examination Certificate number:

CESI 23 ATEX 019 X

[4] Product: Multipoint thermometers **iTHERM® TMS31 Multisens Bundle**

[5] Manufacturer: Endress+Hauser Wetzer GmbH + Co. KG

[6] Address: Obere Wank 1
87484 Nesselwang - Germany

[7] This Product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

[8] CESI, notified body n. 0722 in accordance with Article 17 of the Directive 2014/34/EU of the European Parliament and Council of 26 February 2014, certifies that this Product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment or protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential report n. EX-C3009443.

[9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN IEC 60079-0:2018 **EN 60079-1:2014** **EN 60079-11:2012**
EN 60079-26:2015 **EN 60079-31:2014**

except in respect of those requirements listed at item 18 of the Schedule.

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

[11] This EU-TYPE EXAMINATION CERTIFICATE relates only to the design, examination and tests of the specified Product in accordance to the Directive 2014/34/EU. Further requirements of the Directive apply to the manufacturing process and supply of this Product. These are not covered by this certificate.

[12] The marking of the Product shall include the following:

Ex **II 1G** Ex ia IIC T6...T1 Ga *or*

Ex **II 1/2G**

Ex ia IIC T6...T1 Ga/Gb
Ex db IIC T6...T1 Ga/Gb
Ex ia/db IIC T6...T1 Ga/Gb

II 1/2D

Ex ia IIIC T85°C...T450°C Da/Db
Ex ia IIIC T85°C…T450°C Da/Db
Ex ta/tb IIIC T85°C...T450°C Da/Db
Ex ia/tb IIIC T85°C...T450°C Da/Db

Date 2023/06/26 - Translation issued on 2023/06/26

Prepared	**Verified**	**Approved**
Tiziano COLA	Alessandro FEDATO	Roberto PICCIN

Schema di certificazione CESI-ATEX

ACCREDIA
PRD N. 018B
Membro degli Accordi di Mutuo Riconoscimento EA, IAF e ILAC
Signatory of EA, IAF and ILAC Mutual Recognition Agreements

[13] **Schedule**

[14] **EU-TYPE EXAMINATION CERTIFICATE n. CESI 23 ATEX 019 X**

[15] **Description of Product**

The product, **iTHERM® TMS31 Multisens Bundle,** is a multi-point thermometer designed to measure the temperatures, of process media, at different depths (from 2 to 40), for obtaining the temperature profile.
The basic sensor (which measures the temperature in a single point) is a thermometric insert obtained from a metal sheathed mineral insulated cable (MgO), closed by welding at the bottom. Such insert can contain 1 to 3 TCs or 1 to 2 RTDs. Each TC or RTD shall be managed by unique, independent circuits.
While inserts with RTDs are always part of thermometers already covered by an independent certificate, inserts with TCs, without certification, are managed as simple apparatuses and powered through I.S. barrier. The hot junction of the thermocouples can be insulated or in connection with the metal sheath at the bottom of the insert. In the latter case the inserts must always be powered through Intrinsically Safe circuits or insulated inside a thermowell having thickness ≥3 mm.
The inserts enter the process medium through gas tight compression fittings installed on a special flange. All the inserts are then fixed by retaining rings (ogives) to a metal rope which is kept straight thanks to a weight attached at its lower edge. To measure the temperature at different depths the inserts have different length ad stop just after one of the retaining rings.

Category 1G (EPL Ga) outside the process is guaranteed only by the products marked:
Ex **ia** IIC T6...T1 Ga
The Inserts shall be connected through suitable I.S. circuits (one for each sensor) and the associated apparatuses shall be selected and connected (according with the standard EN 60079-25) considering, as possible malfunction, the short circuit among the sensors in the insert.

Depending on the type of protection shown on the marking plate, the wires of each insert are then independently connected, outside the process, to extension cables. The junction is carried out inside a special sealed bushing which must be protected inside the enclosure (protection: Ex db and/or Ex tb) or also outside when part of an I.S. circuit.
The extension cables are then collected inside an independently certified junction box or enclosure where additional devices, like temperature transmitters, can be installed.
The sealed bushing must be located inside a flameproof enclosure (Ex db) in case the product is marked:
Ex **db** IIC T6...T1 Ga/Gb (suitable for gas)
a dust tight enclosure (Ex tb) in case the product is marked:
Ex **ta/tb** IIIC T85°C...T450°C Da/Db (suitable for dust)
or both requirements fulfilled in case the product is marked:
Ex **db** IIC T6...T1 Ga/Gb Ex **ta/tb** IIIC T85°C...T450°C Da/Db (suitable for gas or dust)
In case it is part of an Intrinsically Safe circuit, it does not need to be placed inside an enclosure but must be protected against mechanical risks and kept at a temperature within the ambient temperature range. Marking:

Ex **ia** IIC T6...T1 Ga	Ex **ia** IIIC T85°C...T450°C Da/Db
Ex **ia** IIC T6...T1 Ga/Gb	Ex **ia** IIIC T85°C…T450°C Da/Db
Ex **ia/db** IIC T6...T1 Ga/Gb	Ex **ia/tb** IIIC T85°C...T450°C Da/Db

According with the thickness of the insert sheath, the inserts can be directly put inside the process (zone 0 or zone 20) or shall be protected inside a thermowell having thickness not thinner than 3 mm (EN 60079-26). A flexible conduit can also be used but only as mechanical protection not in substitution of the thermowell.

Within the other limits, previously defined, the following rules apply:

a) The inserts of the products marked Ex ia, covered by independent certification (those used in the certifications ***EPS 18 ATEX 1152X***, ***DEKRA 12 ATEX 0161X***, ***IECEx IMQ 23 ATEX 009X***), can only be used in products marked "Ex i"; the limits and conditions stated by relevant certificates must be fulfilled.
b) The inserts of point a) may contain thermocouples of type different from those foreseen by the certificates (i.e., of type different from K, J or N and in number of up to 3); they shall anyway conform with the following rules:
   1. They must always be connected through I.S. circuits (taking into account possible short circuits among the different sensors circuits in the insert).

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[14] EU-TYPE EXAMINATION CERTIFICATE n. CESI 23 ATEX 019 X

2. Inserts with sheath thickness < 0.2 mm must always be protected by a thermowell with thickness ≥ 1 mm;
3. Inserts containing thermocouples, with grounded hot junction, shall always be protected inside a thermowell having thickness ≥ 3 mm and kept insulated from the thermowell itself.

c) Inserts of products marked Ex db and/or Ex tb are only those covered by the certificate ***DEKRA 18 ATEX 0103X*** (*type TM 131*). They can only be used in products marked Ex db and/or Ex tb and shall be provided with a thermowell (according with the certificate *DEKRA 18 ATEX 0103X*). The limits and conditions stated by such certificate must be fulfilled.

d) The sealed bushing (cold junction) and the junction box or enclosure shall be located at a distance from the process sufficient to guarantee the ambient temperature is compliant with that one marked on the product.

e) The extension cables must always have a suitable external mechanical protection, unless provided with external shield able to guarantee the mechanical protection itself; their installation shall also be compliant with the standard EN 60079-14.

f) The power dissipated and hence the number of terminal blocks or transmitters which can be installed in the terminal box / enclosure are defined by the tables annexed to this report, depending on temperature class and ambient temperature.

g) The devices used for the cable/insert entry of the terminal box/enclosure shall be selected and installed according with the standard EN 60079-14 and guarantee the protection of the housing itself.

Marking

The characteristics of the *Multipoint thermometers iTHERM® Model TMS31*, according with their marking plate, are the following:

- Ex **ta/tb** IIIC T85°C...T450°C **Da/Db**
  The equipment has a dust tight junction box / enclosure (Ex tb certified) inside of which the cold junctions of the inserts are protected. They are suitable for a process classified zone 20 (EPL Da) and an external environment classified zone 21 (EPL Db).
- Ex **ia** IIC T6...T1 **Ga** Ex **ia** IIIC T85°C... T450°C **Da/Db**
  This equipment is powered by an Intrinsically Safe circuit. The barriers shall be installed in safe area or otherwise adopting a protection compliant with the area of installation. They are suitable for a process classified zone 20 or 0 (EPL Da or Ga) and an external environment classified zone 21 or 0 (EPL Db or Ga).
- Ex **ia** IIC T6...T1 **Ga/Gb** Ex **ia** IIIC T85°C… T450°C **Da/Db**
  The equipment differs from those of previous point because the external environment cannot be zone 0 (EPL Ga) but only zone 1 (EPL Gb).
- Ex **db** IIC T6...T1 **Ga/Gb** Ex **ta/tb** IIIC T85°C... T450°C **Da/Db**
  The equipment has a dust tight, explosion proof junction box / enclosure (Ex db and Ex tb certified) inside of which the cold junctions of the inserts are protected. They are suitable for a process classified zone 20 (EPL Da) and according with the requirements of the standard EN 60079-26 they are also suitable for a process classified zone 0 (EPL Ga). Besides, they are suitable for an external environment classified zone 21 or 1 (EPL Db or Gb).
- Ex **ia/db** IIC T6...T1 **Ga/Gb** Ex **ia/tb** IIIC T85°C... T450°C **Da/Db**
  The equipment has a dust tight, explosion proof enclosure (Ex db and Ex tb certified) which could contain terminal blocks or electronic devices as well as the I.S. barriers, according with the constrains defined by the manufacturer of the enclosure. They are suitable for a process classified zone 20 or zone 0 (EPL Da or EPL Ga), thanks to I.S. protection of the inserts, and an external environment classified zone 21 or 1 (EPL Db or Gb).

Identification code

The products are completely defined by the code described below. Only the main fields impacting the safety are described (thorough details are in the annexed technical description).

TMS315 - 010 ... 050 ... 070 080 ... 100 110 ... 150 ... 180 190 200 ...

010 *Ex Approval (on plate)*:
- **I...** *IECEx Approval (N/A)*
- **8...** *ATEX + IECEx Approvals*
- **B...** *ATEX Approval*

[13] **Schedule**

[14] **EU-TYPE EXAMINATION CERTIFICATE n. CESI 23 ATEX 019 X**

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050 *Design type*:
- **A** *With a metallic rope*
- **B** *With a flexible conduit*
- **C** *With a thermowell*
- **Z** *Other versions*

070 *Maximum immersion length of the inserts*:
- **X** *lengths in inches*
- **8** *lengths in mm*

080 *Insert type: diameter, material, measuring range*
- **A** *TC type K: 3 mm, 316L, (-270°C ... +800°C)*
- **B** *TC type J: 3 mm, 316L, (-210°C ... +520°C)*
- **C** *TC type K: 6 mm, 316L, (-270°C ... +800°C)*
- **D** *TC type J: 6 mm, 316L, (-210°C ... +520°C)*
- **Z** *Other versions*
- **1** *PT100 TF: 3 mm, 316L, (-50°C ... +400°C)*
- **2** *PT100 WW: 3 mm, 316L, (-200°C ... +600°C)*
- **3** *PT100 Str.S.: 6 mm, 316L, (-50°C ... +500°C)*
- **4** *PT100 TF: 6 mm, 316L, (-50°C ... +400°C)*
- **5** *PT100 WW: 6 mm, 316L, (-200°C ... +600°C)*

100 *Insert execution*
- **G1** *Grounded single TC*
- **G2** *Grounded duplex TC*
- **T1** *TF, single (4 wires)*
- **T2** *TF, double (2x3 wires)*
- **T3** *TF, single (3 wires)*
- **U1** *Ungrounded single TC*
- **U2** *Ungrounded duplex TC*
- **W1** *TF, single (4 wires)*
- **W2** *TF, double (2x3 wires)*
- **W3** *TF, single (3 wires)*
- **S1** *PT100 TF Strong Sense*
- **S2** *PT100 TF Quick Sense*
- **ZZ** *Other executions*

110 *Number of measuring points:* **Xnn** (**nn** *within 2 to 40)*

150 *Extension cable and measuring range*
- **A** *Shielded, PVC sheath (-60°C...+105°C)*
- **C** *Shielded, Hyflon MFA sheath (-200°C...+250°C)*
- **D** *Unshielded, MFA flying leads (-60°C...+105°C)*
- **E** *Unshielded, PVC sheath (-20°C...+105°C)*
- **F** *Unshielded, FEP sheath (-200°C...+200°C)*
- **G** *Shielded, Hyflon PFA sheath (-200°C...+260°C)*
- **Z** *Other type*

180 *Housing*
- **0** *Without*
- **2** *Direct mounts*
- **3** *Remote, without protecting hose*
- **4** *Remote, with protecting hose*

190 *Housing material, Ex approval*
- **A, B, J, K, L, M** *Aluminium / Stainless Steel, Ex e / Ex d*
- **Z** *Other*
- **0** *N/A*

200 *Cable entry, process side*
- **F** *M20x1.5, Ni plated brass*
- **H** *M20x1.5, Stainless steel*
- **Z** *Other*
- **0** *N/A*

[13] **Schedule**

[14] **EU-TYPE EXAMINATION CERTIFICATE n. CESI 23 ATEX 019 X**

Electrical characteristics

Each TC or RTD circuit shall be managed according with the marking of the product and following the instructions supplied by the manufacturer. The inserts of the thermometers protected by intrinsic safety shall be power supplied by I.S. barriers compliant with the following parameters of the apparatus:

Insert		*Ui*	*Ii*	*Pi*	*Ci*	*Li*	*Certificate*
iTHERM TS111	*(TC)* *(RTD)*	9.8 V	30 mA	60 mW 50 mW	40.2 nF	200.8 µH	**EPS 18 ATEX 1 152 X**
TPx100	*(TC)* *(RTD)*	9.8 V	30 mA	60 mW 50 mW	40 nF	200 µH	**DEKRA 12ATEX0161X**
TSx310	*(TC)* *(RTD)*	9.8 V	30 mA	60 mW 50 mW	40 nF	200 µH	
iTHERM TS901	*(TC)*	9.0 V	80 mA	160 mW	10 nF	50 µH	**IMQ 23 ATEX 009X**

The temperature class and the maximum surface temperature depend on the surface temperature of the inserts and the surface temperature of the enclosure, whichever is higher.
The following tables show the maximum process temperature allowed, depending on the temperature class / maximum surface temperature marked on plate:

- *Inserts holding **RTD sensors** (maximum length: single=200m, double=100m)*

Temperature class / Maximum surface temperature	***Maximum allowed Process temperature***	
	RTD Power supply ≤ 50 mW	*RTD Power supply ≤ 100 mW*
T6 / T85°C	66°C	55°C
T5 / T100°C	81°C	70°C
T4 / T135°C	116°C	105°C
T3 / T200°C	181°C	170°C
T2 / T300°C	276°C	265°C
T1 / T450°C	426°C	415°C

- *Inserts holding **TC sensors** (maximum length: single=200m, double=100m, triple=66.7m)*

Temperature class / Maximum surface temperature	***Maximum allowed Process temperature***
T6 / T85°C	80°C
T5 / T100°C	95°C
T4 / T135°C	130°C
T3 / T200°C	195°C
T2 / T300°C	290°C
T1 / T450°C	440°C

Concerning the housing, the temperature class and the maximum surface temperature depend on the ambient temperature in the place of installation (keeping into account the possible heat due to the near process) and the number of terminal blocks or transmitters installed. Such data can be found in the tables contained in the annexed documentation.

Warning labels

The enclosure / terminal box when the inserts are protected by Intrinsic Safety shall be suitably identified as part of an Intrinsically safe circuit.

[16] **Report n. EX-C3009443**

Routine tests

- The manufacturer shall carry out, on the inserts containing TC and extension cables, the verification tests prescribed by the relevant industrial standards (e.g.: IEC 61515)
- Inserts shall withstand a test voltage to earth (500 Vrms for 60 sec.) according to clause 6.3.13 of the standard EN 60079-11.

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- Thermowells shall be subjected to pressure test at the pressure of the process medium for 1 minute with no leakage (clause 5.2 EN 60079-26).

[17] **Special conditions for safe use (X)**

- Install and use the product according to the manufacturer's Safety Instructions and any other valid standard and regulation (e.g.: EN 60079-14, EN 60079-25).
- The materials shall not be subjected to environmental conditions which might adversely affect the partition wall between areas requiring different EPLs.
- The inserts must be protected against the risk due to mechanical danger and the extension cables, when running outside the enclosure, shall be protected, according with the requirements of the standard EN 60079-14.
- The enclosure and/or terminal box shall be kept at a distance from the process flange sufficient to guarantee it is installed in an ambient temperature compliant with the temperature limits stated by the relevant certificate. The same should be evaluated concerning the position of the cold junctions (EPL Gb or Db), in case it were not placed inside the enclosure (products marked Ex ia).
- If the equipment is installed across the boundary wall, between an area requiring EPL Ga or Da and a less hazardous area, the construction shall fulfil the conditions of clause 4.3 (standard EN 60079-26)
- By construction, all inserts sheaths have equipotential connection to each other and then to earth. In accordance with EN 60079-11, in case their protection were I.S. (Ex ia), each sensor should be powered by a galvanically isolated Intrinsically Safe circuit. Possible shorts among different I.S. circuits of the same insert shall be considered as accountable faults.
- The user shall ensure that the material of inserts will not be subjected to environmental and process conditions which could adversely affect their strength.
- Using the special earthing device, the terminal box/enclosure shall be connected to the same earth of the process medium container.
- To carry out the external connections of the enclosure, select the cables and entry accessory according with the technical instruction of the enclosures. For temperatures above +70°C, they shall be suitable for the actual temperature.

[18] **Essential Health and Safety Requirements**

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following requirements shall be considered too.

Clause	subject
1.2.7	Protection against other hazards
1.2.8	Overloading of equipment
1.4	Hazards arising from external effects

[19] **Descriptive documents** (prot. EX-C3009442)

- Technical description for ATEX & IECEx rev. 01.05	doc. No. 10000013047	(90 pages)	dated 2023/04/20
- Safety Instructions Ex i version	doc. No. 10000013060	(16 pages)	dated 2022/01/05
- Safety Instructions Ex d / Ex t version	doc. No. 10000013061	(12 pages)	dated 2022/01/05
- Risk analysis	doc. No. 10000013153	(6 pages)	dated 2022/02/07
- Drawings	doc. No. 10000013048	(12 pages)	dated 2021/11/18
- Nameplate drawing Ex i version	doc. No. 10000013050	(3 pages)	dated 2022/01/04
- Nameplate drawing Ex d / Ex t version	doc. No. 10000013051	(3 pages)	dated 2022/01/04
- Temperature transmitter Ex d - Tamb	doc. No. 10000013056	(4 pages)	dated 2022/01/04
- Temperature transmitter Ex e - Tamb	doc. No. 10000013057	(10 pages)	dated 2022/01/04
- Terminal Blocks - Tamb	doc. No. 10000013058	(6 pages)	dated 2022/01/04
- Documentation of the apparatuses used (36 pages)			

One copy of all documents mentioned above is kept in CESI files.