

CERTIFICATE

(1) EU-Type Examination

(2) **Equipment or protective systems intended for use in potentially explosive atmospheres - Directive 2014/34/EU**

(3) EU-Type Examination Certificate Number: **DEKRA 17ATEX0123 X** Issue Number: **0**

(4) Product: **Temperature Sensors Series LEX15, LEX25, LEX30 and LEX50**

(5) Manufacturer: **Thermo-Electra Temperature Sensor Solutions**

(6) Address: **Weteringweg 10, 2641 KM Pijnacker, The Netherlands**

(7) This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

(8) DEKRA Certification B.V., Notified Body number 0344 in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 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 products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential test report number NL/DEK/ExTR16.0091/00.

(9) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0 : 2012 + A11 : 2013
EN 60079-11 : 2012

EN 60079-1 : 2014
EN 60079-31 : 2014

EN 60079-7 : 2015

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 the Specific Conditions of Use specified in the schedule to this certificate.

(11) This EU-Type Examination Certificate relates only to the design and construction of the specified product. 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:



II 2 G Ex eb IIC T6...T1 Gb
II 1 G Ex ia IIC T6...T1 Ga
II 1/2 G Ex ia/ib IIC T6...T1 Ga/Gb
II 2 G Ex ib IIC T6...T1 Gb
II 2 G Ex db IIC T6...T1 Gb
II 1 D Ex ta IIIC T85 °C...T300 °C Da
II 1/2 D Ex ta/tb IIIC T85 °C...T300 °C Da/Db
II 2 D Ex tb IIIC T85 °C...T300 °C Db

Date of certification: 5 December 2017

DEKRA Certification B.V.

T. Pijpker
Certification Manager



© Integral publication of this certificate and adjoining reports is allowed. This Certificate may only be reproduced in its entirety and without any change.

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 17ATEX0123 X**

Issue No. **0**

(15) **Description**

Temperature Sensors Series LEX15 (Ex “e”), LEX25 (Ex “i”), LEX30 (Ex “d”) and LEX50 (Ex “t”), consist of a wide range of sensor types and sensor arrangements, one or more inserts, threaded insert entries, termination options, connection head options, a direct cable connection option, cable sensor options and a ceramic insert option.

The connection head / junction box may be provided with terminals, transmitters or a transmitter / display, depending on the type of protection.

Each temperature sensor assembly is identified by a unique article number which is shown on the marking label.

For further details per LEX Series see the chapters below.

Series LEX 15 (Ex eb)

General description:

Temperature Sensors Series LEX15, in type of protection Ex eb, consist of a wide range of sensor types and sensor arrangements, inserts, threaded insert entries, termination options, connection head options, a direct cable connection option, cable sensor options, flying lead wire options and a ceramic insert option.

Sensors / inserts / cables:

The sensor is enclosed by a closed-end metallic tube or a mineral insulated metal sheathed cable available in various diameters and length. The sensor insert can be a single or multiple thermocouple, PTC or NTC such as KTY, or resistance sensor (RTD).

Metallic inserts can have a measuring tip with various shapes, for example flat, round etc. however always closed by welding. Internal wiring depends on the sensor type: 2, 3, 4, 6 or 8 wires per sensor.

Sensors may have optional mounting accessoires such as a thermowell, a rigid or flexible protection tube and similar add-ons not affecting the type of protection.

Connection head / junction box:

Only separately certified Ex e enclosures are used. The connection head / junction box may be provided with terminals or may have flying leads.

Electrical data:

Sensor circuit, per sensor element: max. 30 Vdc, 10 mA

The sensor circuit may be connected to an (industrial) transmitter in the non-hazardous area.

Thermal data:

The ambient temperature range of the assembly, the service temperature range of the connection head / junction box, the transition parts and the cables depend on the material of the cable insulation as listed in the table below. This table is to be used as basis for evaluation of the complete assembly, as each situation has to be analysed with regards to the actual temperature range that each component will be subjected to in the particular application.

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 17ATEX0123 X**

Issue No. 0

Cable insulation	Service temperature range of the cables	Allowed temperature of end seals, transition pieces and entry gland	Service temperature range of connection head / junction box (typical) **
PVC*	-25 °C / +105 °C	-40 °C / +105 °C	-40 °C / +100 °C
Silicon*	-25 °C / +160 °C	-40 °C / +230 °C	-40 °C / +100 °C
PTFE*	-45 °C / +200 °C	-45 °C / +230 °C	-45 °C / +100 °C

* Cables can have other insulation such as Kapton and/or additionally a glass fibre and / or metallic braiding / sheathing which will alter the allowable temperature range.

** Connection heads / junction boxes can have another service temperature range, depending on the material used for the sealing, etc. The minimum can be as low as -50 °C, the maximum temperature as high as 200 °C.

Maximum ambient temperature range is -45 °C to +80 °C; this can be limited depending on the materials applied (e.g. cables, connection head, junction box)

The relation between the process temperature and the temperature class or maximum service temperature is as follows:

Maximum process temperature Tp (°C)	Temperature class / maximum service temperature (°C) of the assembly
75	T6
90	T5
125	T4
190	T3
285	T2
435	T1
> 435	Tp + 10

Series LEX 25 (Ex ia or Ex ib or Ex ia/ib)

General description:

Temperature Sensors Series LEX25, in type of protection Ex ia or Ex ib or Ex ia/ib, consist of a wide range of sensor types and sensor arrangements, inserts, threaded insert entries, termination options, connection head options, a direct cable connection option, cable sensor options, flying lead wire options and a ceramic insert option.

Sensors / inserts / cables:

The sensor is enclosed by a closed-end metallic tube or a mineral insulated metal sheathed cable, available in various diameters and length. The sensor insert can be a single or multiple thermocouple, PTC or NTC such as KTY, or resistance sensor (RTD).

Metallic inserts can have a measuring tip with various shapes, for example flat, round etc. however always closed by welding. Internal wiring depends on the sensor type: 2, 3, 4, 6 or 8 wires per sensor.

Sensors may have optional mounting accessoires such as a thermowell, a rigid or flexible protection tube and similar add-ons not affecting the type of protection.

Plugs and sockets / Connection head / Junction box:

Aluminium, cast-iron, stainless steel or non-metallic enclosures may be applied, providing a degree of protection of minimum IP65. The connection head / junction box may be provided with

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 17ATEX0123 X**

Issue No. 0

terminals or with a separately certified Ex i transmitter, with or without a display. Combination of an Ex ia sensor with an Ex ia or Ex ib transmitter is allowed; the resulting level of protection of the Ex i circuit is the lowest of the components, e.g. Ex ib.

Plugs and sockets may be applied in the Ex i sensor circuit provided that these are separate from and non-interchangeable with non-intrinsically safe circuits.

Electrical data:

Sensor circuit: only for connection to certified intrinsically safe circuits, with the following maximum values: $U_i = 30\text{ V}$ for IIC and 50 V for IIB, $I_i = 75\text{ mA}$, $P_i = 500\text{ mW}$, $C_i = 0$, $L_i = 0$.

Transmitter: the electrical data specified in the transmitter certificate shall be applied and complied with. The maximum P_i of the transmitter shall not exceed $2,25\text{ W}$.

Thermal data:

The ambient temperature range of the assembly, the service temperature range of the connection head / junction box, the transition parts and the cables depend on the material of the cable insulation as listed in the table below. This table is to be used as basis for evaluation of the complete assembly, as each situation has to be analysed with regards to the actual temperature range that each component will be subjected to in the particular application.

Cable insulation	Service temperature range of the cables	Allowed temperature of end seals, transition pieces and entry gland	Service temperature range of connection head / junction box
PVC*	-25 °C / +105 °C	-40 °C / +105 °C	-40 °C / +100 °C**
Silicon*	-25 °C / +160 °C	-40 °C / +230 °C	-40 °C / +100 °C**
PTFE*	-45 °C / +200 °C	-45 °C / +230 °C	-45 °C / +100 °C**

* Cables can have other insulation such as Kapton and/or additionally a glass fibre and / or metallic braiding / sheathing which will alter the allowable temperature range.

** In case an Ex i transmitter is applied, the maximum service temperature shall be at least 10 K lower than the certified maximum ambient temperature of the transmitter. The minimum service temperature may be limited by the certified minimum ambient temperature of the transmitter.

Maximum ambient temperature range is -45 °C to +80 °C; this can be limited depending on the materials applied (e.g. cables, connection head, junction box) or in case an Ex i temperature transmitter is applied.

The relation between the process temperature and the temperature class or maximum service temperature is as follows:

Maximum process temperature T_p (°C)	Temperature class / maximum service temperature (°C) of the assembly*
75	T6
90	T5
125	T4
190	T3
285	T2
435	T1
> 435	$T_p + 10$

* If an Ex i transmitter is applied, the temperature class of the transmitter shall be taken into account.

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 17ATEX0123 X**

Issue No. 0

Series LEX 30 (Ex db)

General description:

Temperature Sensors Series LEX30, in type of protection Ex db, consist of a wide range of sensor types and sensor arrangements, inserts, threaded insert entries, termination options, connection head options, a direct cable connection option, a feedthrough assembly, cable sensor options, flying lead wire options and a ceramic insert option.

Sensors / inserts / cables:

The sensor is enclosed by a closed-end metallic tube or a mineral insulated metal sheathed cable, available in various diameters and length. The sensor insert can be a single or multiple thermocouple, PTC or NTC such as KTY, or resistance sensor (RTD).

Metallic inserts can have a measuring tip with various shapes, for example flat, round etc. however always closed by welding. Internal wiring depends on the sensor type: 2, 3, 4, 6 or 8 wires per sensor.

Sensors may have optional mounting accessoires such as a thermowell, a rigid or flexible protection tube and similar add-ons not affecting the type of protection.

Connection head / junction box:

Only separately certified Ex db enclosures are used. The connection head / junction box may be provided with terminals or with an industrial transmitter, with or without a display.

Electrical data:

Sensor circuit: max. 50 Vdc, 10 mA

Transmitter: the electrical data specified for the transmitter shall be applied and complied with. The maximum input power to the transmitter shall not exceed 2,25 W.

Thermal data:

The ambient temperature range of the assembly, the service temperature range of the connection head / junction box, the transition parts and the cables depend on the material of the cable insulation as listed in the table below. This table is to be used as basis for evaluation of the complete assembly, as each situation has to be analysed with regards to the actual temperature range that each component will be subjected to in the particular application.

Cable insulation	Service temperature range of the cables	Allowed temperature of end seals, transition pieces and entry gland	Service temperature range of connection head / junction box
PVC*	-25 °C / +105 °C	-40 °C / +105 °C	-40 °C / +100 °C**
Silicon*	-25 °C / +160 °C	-40 °C / +230 °C	-40 °C / +100 °C**
PTFE*	-45 °C / +200 °C	-45 °C / +230 °C	-45 °C / +100 °C**

* Cables can have other insulation such as Kapton and/or additionally a glass fibre and / or metallic braiding / sheathing which will alter the allowable temperature range.

** In case a transmitter is applied, the maximum service temperature shall be at least 10 K lower than the maximum allowed ambient temperature of the transmitter. The minimum service temperature may be limited by the minimum ambient temperature of the transmitter. Connection heads / junction boxes can have another service temperature range, depending on the material used for the sealing, etc. The minimum can be as low as -50 °C, the maximum temperature as high as 200 °C.

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 17ATEX0123 X**

Issue No. **0**

Maximum ambient temperature range is $-45\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$; this can be limited depending on the materials applied (e.g. cables, connection head, junction box) or in case a temperature transmitter is applied.

The relation between the process temperature and the temperature class or maximum service temperature is as follows:

Maximum process temperature T_p ($^{\circ}\text{C}$)	Temperature class / maximum service temperature ($^{\circ}\text{C}$) of the assembly
75	T6
90	T5
125	T4
190	T3
285	T2
435	T1
> 435	$T_p + 10$

Series LEX 50 (Ex ta or Ex tb or Ex ta/tb)

General description:

Temperature Sensors Series LEX50, in type of protection Ex ta or Ex tb or Ex ta/tb, consist of a wide range of sensor types and sensor arrangements, inserts, threaded insert entries, termination options, connection head options, a direct cable connection option, cable sensor options, flying lead wire options and a ceramic insert option.

Sensors / inserts / cables:

The sensor is enclosed by a closed-end metallic tube or a mineral insulated metal sheathed cable, available in various diameters and length. The sensor insert can be a single or multiple thermocouple, PTC or NTC such as KTY, or resistance sensor (RTD).

Metallic inserts can have a measuring tip with various shapes, for example flat, round etc. however always closed by welding. Internal wiring depends on the sensor type: 2, 3, 4, 6 or 8 wires per sensor.

Sensors may have optional mounting accessoires such as a thermowell, a rigid or flexible protection tube and similar add-ons not affecting the type of protection.

Connection head / junction box:

Only separately certified Ex ta or Ex tb enclosures are applied with a degree of protection of at least IP65. The connection head / junction box may be provided with terminals or with an industrial transmitter, with or without a display.

Connectors:

Certified connectors may be applied.

Electrical data:

Sensor circuit: max. 10 Vdc, 10 mA

Transmitter: the electrical data specified for the transmitter shall be applied and complied with. The maximum input power to the transmitter shall not exceed 2,25 W.

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 17ATEX0123 X**

Issue No. **0**

Thermal data:

The ambient temperature range of the assembly, the service temperature range of the connection head / junction box, the transition parts and the cables depend on the material of the cable insulation as listed in the table below. This table is to be used as basis for evaluation of the complete assembly, as each situation has to be analysed with regards to the actual temperature range that each component will be subjected to in the particular application.

Cable insulation	Service temperature range of the cables	Allowed temperature of end seals, transition pieces and entry gland	Service temperature range of connection head / junction box
PVC*	-25 °C / +105 °C	-40 °C / +105 °C	-40 °C / +100 °C**
Silicon*	-25 °C / +160 °C	-40 °C / +230 °C	-40 °C / +100 °C**
PTFE*	-40 °C / +200 °C	-40 °C / +230 °C	-45 °C / +100 °C**

* Cables can have other insulation such as Kapton and/or additionally a glass fibre and / or metallic braiding / sheathing which will alter the allowable temperature range.

** In case a transmitter is applied, the maximum service temperature shall be at least 10 K lower than the maximum allowed ambient temperature of the transmitter. The minimum service temperature may be limited by the minimum ambient temperature of the transmitter. Connection heads / junction boxes can have another service temperature range, depending on the material used for the sealing, etc. The minimum can be as low as -50 °C, the maximum temperature as high as 200 °C.

Maximum ambient temperature range is -40 °C to +75 °C; this can be limited depending on the materials applied (e.g. cables, connection head, junction box) or in case a temperature transmitter is applied.

The relation between the process temperature and the maximum surface temperature is as follows:

Maximum process temperature T_p (°C)	Maximum surface temperature (°C) of the assembly
75	85
90	100
125	135
190	200
290	300

Installation instructions

The instructions provided with the product shall be followed in detail to assure safe operation.

(16) **Report Number**

No. NL/DEK/ExTR16.0091/00

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 17ATEX0123 X**

Issue No. 0

(17) **Specific conditions of use**

All types and levels of protection:

In case that the actual application requires a detailed assessment regarding the service temperatures of the assembly (e.g. due to high process temperature combined with thermal insulation), a temperature measurement shall be conducted to verify that none of the specified temperature limits of the assembly is exceeded.

Ex eb:

The sensor assembly with connection head and extension part, in case not IP54 sealed or closed, shall have a degree of protection of at least IP54, provided by the user with a thermowell or equivalent component at the process side of the assembly.

Ex ia, Ex ib and Ex eb:

In case the nominal tip diameter of the mineral insulated metal sheathed sensor cable is less than 3 mm, the sensor must be considered as connected to ground. It must be assumed that it will not be able to pass the 500 Vac or 700 Vdc dielectric strength test as required by EN 60079-14. In addition, the sensor must be protected against mechanical impacts.

Ex db:

Flameproof joints are not intended to be repaired.

Ex ta and Ex tb:

The sensor assembly with connection head and extension part shall have a degree of protection of at least IP6x, provided by the user with a thermowell or equivalent component at the process side of the assembly.

Ex ta and Ex ta/tb:

The equipment is not capable to withstand a prospective short circuit current of 10 kA. The user shall provide an overcurrent protective device to assure that the maximum current for the sensor (10 mA) or the maximum power to the transmitter (2.25 W) is not exceeded.

Connection heads of Ex i models:

1. If the connection head is made of aluminium and it is mounted in an area where the use of EPL Ga equipment is required, the connection head must be installed such that, even in the event of rare incidents, ignition sources due to impact and friction sparks are excluded.
2. If the connection head is made of aluminium and it is mounted in an area where the use of EPL Da, Db or Gb is required, the enclosure material shall not contain, by mass, more than 7.5 % in total of magnesium, titanium and zirconium.
3. If the connection head is made of non-conductive non-metallic material, precautions must be taken to avoid electrostatic charging.

(18) **Essential Health and Safety Requirements**

Covered by the standards listed at item (9).

(19) **Test documentation**

As listed in Report No. NL/DEK/ExTR16.0091/00.

(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 17ATEX0123 X**

Issue No. **0**

(20) **Certificate history**

Issue 0 - project no. 218794800 initial certificate