

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 18ATEX0033 X** Issue Number: **0**

(4) Product: **Skin effect trace heating system IRHS-15000**

(5) Manufacturer: **SDB <<Gamma>> LLC**

(6) Address: **1, Fabrichnyj proezd, Ivanteevka, Moscow region, 141280 Russia**

(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 221949600 issue 0.

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

EN 60079-0 : 2012 + A11: 2013

EN 60079-7 : 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 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 ... T2 Gb
II 2 D Ex tb IIIC T85 °C ... T300 °C Db

Date of certification: 14 June 2018

DEKRA Certification B.V.

R. Schuller
Certification Manager



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(13) **SCHEDULE**

(14) **to EU-Type Examination Certificate DEKRA 18ATEX0033 X**

Issue No. **0**

(15) **Description**

The skin effect trace heating system IRHS-15000 consists of an IR heater which is the ferro magnetic heat tube. The IR-conductor, which is the insulated skin effect conductor is pulled internally to the IR-heater. The IR-conductor is electrically connected to the IR-heater at the end of a heating run while AC voltage is supplied between the IR-conductor and the IR-heater at the run head. The voltage value is calculated basing on the required heat output and the heated run length.

AC currents of the IR-conductor and the IR-heater have opposite directions and thus skin and proximity effects originate in the system. As a result the IR-heater current flows in the inner layer close to the inner surface of the IR-heater such that the outer surface of the IR-heater is considered potential free and may be bonded to ground.

The IR-conductor is non-magnetic, thus, it does not feature any noticeable skin effect and AC flows throughout the whole cross section of the IR-conductor. The main heat-producing element of IRHS is the IR-heater/heat tube, which produces up to 80% of the system output.

The skin effect trace heating system IRHS-15000 comprises a steel tube Skin Bend, to enter into a separately certified IR Feed Box IRFB for terminating the IR-heater and IR-conductor. On the opposite side of the Skin Bend, it is strapped or welded to the workpiece. The Skin Bend with cold lead is interconnected to the IR-heater by means of the IR Connection Box IRCB. IR-heater sections are interconnected by IR Pull Boxes IRPB's allowing the IR-conductor to be pulled through the IR-heater. In the IR End Box IREB the IR-conductor is electrically connected to the IR-heater.

Electrical data

For details on the kits, temperature data, electrical data and nomenclature see Annex 1 to this Certificate.

Installation instructions

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

(16) **Report Number**

No. 221949600 issue 0.

(13) **SCHEDULE**

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Issue No. 0

(17) **Specific conditions of use**

The skin effect trace heating system IRHS-15000 is assessed as other electrical equipment in accordance with clause 5.10. of EN 60079-7 The system therefore also complies with IEEE 844.1 / CSA C22.2 No.293.1 "Standard for Skin Effect Trace Heating".

For controlled design:

The device applied as a temperature limiter for the controlled temperature design shall comply with the requirements of clause 4.4.2.3.2 of IEEE 844.1 / CSA C22.2 No.293.1 (adopted from EN 60079-30-1).

The temperature sensors and / or limiter for temperature control or limitation shall comply with the types of protections listed in clause 1 of EN 60079-0 certified as Category 2 G or 2 D, EPL Gb or Db equipment.

The drawings/instructions for the installation and maintenance of the skin effect trace heating system shall include the temperature set point of the temperature limiting device which relates to the specified maximum surface temperature or temperature class T2 to T6.

Alternatively for Category 3 G or 3 D, EPL Gc or Dc:

The device applied as a temperature limiter for the controlled temperature design shall comply with the requirements of clause 4.4.2.3.3 of IEEE 844.1 / CSA C22.2 No.293.1 (adopted from EN 60079-30-1).

The temperature sensors and / or limiter for temperature control or limitation shall comply with the types of protections listed in clause 1 of EN 60079-0 certified as Category 3 G or 3 D or as EPL Gc or Dc equipment.

The drawings/instructions for the installation and maintenance of the skin effect trace heating system shall include the temperature set point of the temperature limiting device which relates to the specified maximum surface temperature or temperature class T2 to T6.

For stabilized design:

The design information such as project drawings or design data charts shall include all design parameters that ensure temperature stabilisation at lower values than the specified maximum surface temperature or temperature class T2 to T6.

General:

Notification shall be given that the design information shall be retained as a record of system documentation for each stabilized and controlled designed system for as long as the system is in use. The in case of controlled design, set point in the system documentation shall be checked during commissioning of the system.

The separately certified IR Feed Box IRFB and the entry device of the Skin Bend into the IR Feed Box IRFB, shall be suitably certified for the electrical ratings of the IRHS-15000 system and it's environment with an ingress protection of at least IP65. The sealing of the entry device for the Skin Bend shall additionally be certified for the appropriate outer diameter of the Skin Bend and a service temperature at the point of entry of at least +85 °C.

Every time, before re-closing of the IR Connection Box IRCB, IR Pull Boxes IRPB's or IR End Box IREB, the Silicone gaskets shall be visually inspected for ruptures, damages or other irregularities. Should any of these be detected, the Gasket shall be replaced by an original gasket provided by SDB <<Gamma>> LLC for this certified skin effect trace heating system IRHS-15000. When replacing, it shall be ensured the correct gasket is applied suitable for either the steel casing models or the welded iron models.

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(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 are considered relevant to this product, and conformity is demonstrated in the report:

EHSR: Subject: Skin Effect Trace Heating of Pipelines, Vessels, Equipment, and Structures — General, Testing, Marking, and Documentation Requirements, IEEE 844.1-17 / CSA C22.2 No.293.1-17

(19) **Test documentation**

As listed in Report No. 221949600 issue 0.

(20) **Certificate history**

Issue 0 - 221949600 initial certificate

Annex 1 to EU-Type Examination Certificate DEKRA 18ATEX0033 X, Issue No. 0
Annex 1 to ATEX Assessment Report 221949600, Issue No. 0

Description

The skin effect trace heating system IRHS-15000 consists of an IR heater which is the ferro magnetic heat tube. The IR-conductor, which is the insulated skin effect conductor is pulled internally to the IR-heater. The IR-conductor is electrically connected to the IR-heater at the end of a heating run while AC voltage is supplied between the IR-conductor and the IR-heater at the run head. The voltage value is calculated basing on the required heat output and the heated run length.

AC currents of the IR-conductor and the IR-heater have opposite directions and thus skin and proximity effects originate in the system. As a result the IR-heater current flows in the inner layer close to the inner surface of the IR-heater such that the outer surface of the IR-heater is considered potential free and may be bonded to ground.

The IR-conductor is non-magnetic, thus, it does not feature any noticeable skin effect and AC flows throughout the whole cross section of the IR-conductor. The main heat-producing element of IRHS is the IR-heater/heat tube, which produces up to 80% of the system output.

The skin effect trace heating system IRHS-15000 comprises a steel tube Skin Bend, to enter into a separately certified IR Feed Box IRFB for terminating the IR-heater and IR-conductor. On the opposite side of the Skin Bend, it is strapped or welded to the workpiece. The Skin Bend with cold lead is interconnected to the IR-heater by means of the IR Connection Box IRCB. IR-heater sections are interconnected by IR Pull Boxes IRPB's allowing the IR-conductor to be pulled through the IR-heater. In the IR End Box IREB the IR-conductor is electrically connected to the IR-heater.

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Thermal data and product ratings

The maximum surface temperature in or on the skin effect trace heating system IRHS-15000 is limited to the maximum allowed values by means of controlled design or stabilized design in accordance with IEEE 844.1.

Ambient temperature range, as defined in IEEE 844.1 :	Skin effect trace heating system IRHS-15000 with: Connection-, Pull- and End Boxes with Silicone gaskets	$-60\text{ }^{\circ}\text{C} \leq T_a \leq +70\text{ }^{\circ}\text{C}$
Maximum workpiece temperature, power "on":	IR conductor types: - IRC 01 PolyEthylene - IRC 02 Flouropolymer FEP - IRC 03 Flouropolymer PFA Splice kits: - IRCON low temperature - IRCON high temperature - IRCON high temperature special IR CB, IRPB's and IR EB with Silicone gaskets	+85 °C +180 °C +240 °C +85 °C +180 °C +240 °C +130 °C
Maximum withstand temperature, power "off":	IR- conductor types: - IRC 01 PolyEthylene - IRC 02 Flouropolymer FEP - IRC 03 Flouropolymer PFA Splice kits: - IRCON low temperature - IRCON high temperature - IRCON high temperature special IR CB, IRPB's and IR EB with Silicone gaskets	+100 °C +200 °C +260 °C +100 °C +200 °C +260 °C +150 °C
Minimum installation temperature:	IR- conductor types: - IRC 01 PolyEthylene - IRC 02 Flouropolymer FEP - IRC 03 Flouropolymer PFA	-40 °C
Minimum bending radius IR-conductor:	8 mm ² (8 AWG) 10 mm ² (7 AWG) 15 mm ² (6 AWG) 20 mm ² (4 AWG) 30 mm ² (2 AWG) 40 mm ² (1 AWG)	6 x outer diameter
Maximum pull length between IR Connection Boxes	All IR-conductor types	500 m
Degrees of protection, per EN 60079-0 and EN 60529:	- IRCB (Connection Box), steel castings - IRPB (Pull Box), steel castings - IREB (End Box), steel castings	IP65
	- IRCB (Connection Box), welded iron - IRPB (Pull Box), welded iron - IREB (End Box), welded iron	IP66

Electrical data

Maximum power output: 170 W/m, depending on above mentioned temperature limits
 Maximum rated voltage: see "system elements" below

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System elements

Description	Type	Comments
IR-conductor / cold lead	<ul style="list-style-type: none"> - IRC 01 PolyEthylene - IRC 02 Fluoropolymer FEP - IRC 03 Fluoropolymer PFA 	Max. rated voltage: - 1 000, 1 500, 2 000, 2 500, 3 000, 3 500, 4 000, 5 000, Vac Sizes: 8 mm ² (8 AWG) 10 mm ² (7 AWG) 15 mm ² (6 AWG) 20 mm ² (4 AWG) 30 mm ² (2 AWG) 40 mm ² (1 AWG)
IR-conductor / end termination	IRCON termination lug kit	8 mm ² (8 AWG) 10 mm ² (7 AWG) 15 mm ² (6 AWG) 20 mm ² (4 AWG) 30 mm ² (2 AWG) 40 mm ² (1 AWG)
IR-conductor / cold lead connection and splice kits	<ul style="list-style-type: none"> - IRCON low temperature - IRCON high temperature - IRCON high temperature special 	8 mm ² (8 AWG) 10 mm ² (7 AWG) 15 mm ² (6 AWG) 20 mm ² (4 AWG) 30 mm ² (2 AWG) 40 mm ² (1 AWG)
Under thermal insulation connection, pull and termination (end) boxes	<ul style="list-style-type: none"> - IRCB (Connection Box), steel castings - IRPB (Pull Box), steel castings - IREB (End Box), steel castings - IRCB (Connection Box), welded iron - IRPB (Pull Box), welded iron - IREB (End Box), welded iron 	IR-heater sizes: ¾" NPS 1" NPS 1 ¼" NPS
Connection tube between IRFB - IRCB	Rigid conduit (Skin Bend)	Sizes: ¾" NPS 1" NPS 1 ¼" NPS
Skin effect connection	Rigid conduit with IR-heater coupling	Connection between Skin Bend, IR-heater, IRCB, IRPB and IREB boxes.
IR-heater	GOST Schedule 8732, 8734; ANSI/ASTM Schedule A53, A106	¾" NPS 1" NPS 1 ¼" NPS
IR-heater coupling	Carbon Steel	For IR-heater sizes: ¾" NPS 1" NPS 1 ¼" NPS