

## Operating Manual

### Resistance thermometer and thermo- couples Type WME, TME, MW08, MT08

29.06.2020

#### BA\_W6-002\_EN



#### 1. Safety Reference

The resistance thermometer WME, MW08 and the thermocouple TME and MT08 are electrical instruments which fulfill the “very high” protection-level (EPL) Ga and Da. They can be used in conjunction with thermowells that follow EN 60079-26 Section 4.1.3 with a specified mechanical separation that are mounted to receptacles or pipes which follow atmospheric specifications (-20°C to +60°C; 0.8 bar to 1.1 bar) that are found in constant or long term explosion potential areas (Category 0). The connection head of the thermometer fits into Category 1. Please pay attention to EN 60079-26 for this application as well as Section 6 for reduced maximum values.

#### 2. Application Possibilities

The resistance thermometer WME, MW08 and thermocouples TME and MT08 are electrical equipment used in explosion potential areas.

The resistance thermometer WME, MW08 and thermocouples TME and MT08 are electrical sensors for temperature measuring range of -50°C to +450°C.

Using the sensors in Ex-zone 0, they have to be connected to intrinsically safe power supply, category “ia”. Installing partition walls, which fulfill the requirements acc. EN 60070-26, the insert can also be connected to intrinsically safe power supply, category “ib”.

#### 3. Marking

EU- Type Examination Certificate:	PTB 02 ATEX 2151X
IECEx Certificate of Conformity:	PTB 13.0042X
EAC Ex Certificate:	RU C-DE.EX01.B.00032/19

#### 4. Identification

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

Temperature-sensor without thermowell to use in zone 0

II 1/2 G Ex ib IIC T1...T6 Ga/Gb / II 1/2 D Ex tb IIIC T440°C...T80°C Da/Db

Temperature-sensor with thermowell and mechanical separation acc. EN 60079-26:2007 to use in zone 0

II 2 G Ex ib IIC T1...T6 Gb / II 2 D Ex tb IIC T440°C...T63°C Db

Temperature-sensor to be used in zone 1

#### 5. Electrical Data

measurement circuit in explosive category intrinsic Ex ia IIC :

##### Maximum Value

U<sub>i</sub> : 30 V  
I<sub>i</sub> : 60 mA  
P<sub>i</sub> : 500 mW

Maximum workable inner capacity  
C<sub>i</sub> : 250 pF / Meter

Maximum workable inner inductivity  
L<sub>i</sub> : 50 µH / Meter

## 6. Warming

The highest allowable ambient temperature and the medium temperature are according to the temperature classification. Constriction are made when the maximum temperature endurance of the filling compound in the connection socket and the connection cable. Therefore the allowable ambient temperature is set at -40...+85°C.

The highest allowable temperature at the sensor tip follows according the following association:

$$T_s = T_k - P_i \cdot R_w \text{ [k/w]}$$

Therefore is :

- $T_s$  : highest allowable temperature at the sensor tip [°C]
- $T_k$  : highest allowable temperatur according to the Temperature Classification [°C]
- $P_i$  : Input power from connected electrical circuit [W]
- $R_w$  : outer thermal resistance of sensor (sensor surface to ambient area) [k/w]

If 2 Sensors are connected, then the input power value  $P_i$  is to be added.

The value  $T_k$  by Category 2 G and 3 G according the following table:

Temperature Class	T1	T2	T3	T4	T5	T6
Maximum Surface Temperature	440	290	195	130	95	80

The value  $T_k$  by Category 1 G according the following table:

Temperaturklasse	T1	T2	T3	T4	T5	T6
Maximale Oberflächentemperatur	350	230	155	103	75	63

The values for the outer thermal resistance of the sensor ( $R_w$ ) is given as the warming measurement and are the follows:

WME und MW08, Ø 3 mm, without Thermowell : 93 [k/w]  
 WME und MW08, Ø 3 mm, with Thermowell t = 1 mm \* : 27 [k/w]

WME und MW08, Ø 6 mm, without Thermowell : 51 [k/w]  
 WME und MW08, Ø 6 mm, with Thermowell t = 1 mm \* : 29 [k/w]

\* Thickwall Thermowells reduce the outer thermal resistance ( $R_w$ ).

The value for the outer thermal resistance ( $R_w$ ) for Thermocouples TME and MT08 are so few and must be followed for safety reason with  $R_w = 4$  [k/w].

## 7. Installation

For the connection these operating instructions are decisive.

The resistance thermometer WME, MW08 and thermocouples TME and MT08 are used for explosion potential areas for measuring temperatures in receptacles and pipe lines where combustible and noncombustible liquids, gases or gas-air-mixtures are found. The power supply and evaluation is carried out via a certified, intrinsically safe electrical circuit.

The temperature sensor must be tied into the potential equalization of the site of usage. The installation into metallic pipes acc. EN 60079-0 is sufficient.

## 8. Special conditions for safe use

1. The temperature indicators are only allowed an intrinsic safety circuit of the Category "ia" and "ib".
2. When two intrinsic safety circuits are used in close conjunction to one another, the voltage and current addition must be calculated. The addition of both used voltages cannot exceed 30V, and of current 60mA.
3. Only certified Temperature transmitters specified in the Operating Manual with indicated maximum values can be used with the temperature indicators.
4. The maximum allowed surface temperature of each temperature class and category must be taken from the specified tables in the Operating Manual.
5. If two transmitters are used with intrinsic safety circuits, the sum of the values cannot exceed the values indicated in the Operating Manual.
6. The ambient temperature must remain within the area of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .
7. The temperature indicators with a certified intrinsic safety circuit in Category "ib" and Category 1G (process side) can be used in connection with a protective element or a Thermowell with a thickness of  $\geq 1$  mm with stainless steel and  $\geq 3$  mm with other Steel types.
8. Temperature indicators with 1 or 2 intrinsic safety circuit(s) can run with Category 2G. Those with 2 or 3 wire circuit can only be run with a diameter of 3 mm.
9. With the use of non metal housings, this must contain a material according to EN 60079-0 with a surface resistance of  $<10^9$  Ohm.
10. With the use of light metals housings, the alloy must not exceed 6% Mg.
11. The implementation of connections require separate examination certificates for cables.
12. The temperature indicators must be linked into the electrical potential balance in the area of use.



(1) **EC-TYPE-EXAMINATION CERTIFICATE**  
(Translation)

(2) Equipment and Protective Systems intended for Use in Potentially Explosive Atmospheres – **Directive 94/9/EG**

(3) EC-type-examination Certificate Number:

**PTB 02 ATEX 2151 X**



(4) Equipment: Temperature Indicator Type WME, TME, MW08 and MT08

(5) Manufacturer: Schramm GmbH

(6) Address: Flinschstrasee 18a, 60388 Frankfurt am Main, Germany

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

(8) The Physikalisch-Technische Bundesanstalt notified body No. 0102 in accordance with Article 9 of the council of Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

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

**EN 50014:1997 + A1 + A2    EN 50020:1994    EN 50284:1999**  
**EN 1127-1:1997**

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

(11) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(12) The marking of the equipment shall include the following:

**II 1G    EEx ia IIC T6 or II 2G    EEx ib IIC T6 or II 1/2G    EEx ib IIC T6**

Zertifizierungsstelle Explosionsschutz  
Im Auftrag

Braunschweig October 10, 2002

Dipl.-Ing. R. Wilkens



(13)

## A N N E X

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 02 ATEX 2151 X**

(15) Description of Equipment

The electrical indicators work with measuring inserts for use in intrinsically safe circuits. The resistance thermometer WME consists of a resistor, mineral insulated cable and the terminal connection. The resistance thermometer MW08 consists of a resistor, mineral insulated cable and the connection cable. The resistance thermometer can be manufactured and installed in 2, 3 and 4-wire constructions. The Thermocouple TME consists of a junction point made of various metals, mineral insulated cable and the terminal connection. The Thermocouple MT08 consists of a junction point made of various metals, mineral insulated cable and the connection cable. The terminal connection of the element is mounted in a connection head that has a minimum Safety Protection Type IP 54 according to En 60529. The special requirements for the construction of equipment from Equipment Group II, Category 1G are met through the use of separative elements made of stainless steel with a thickness of min. 1 mm. These separative elements are tested for pressure.

### Electrical Data

Supply

Type of Protection for intrinsic safety  
EEx ia IIC and EEx ib IIC

Max. Value:

U<sub>i</sub> = 30 v

I<sub>i</sub> = 60 mA

P<sub>i</sub> = 500 mW

L<sub>i</sub> = 50 µH per meter

C<sub>i</sub> = 250 pF per meter

(16) Test Report PTB Ex 02-21075

(17) Special Requirements

1. The temperature indicators are only allowed an intrinsic safety circuit of the Category "ia" and "ib".
2. When two intrinsic safety circuits are used in close conjunction to one another, the voltage and current addition must be calculated. The addition of both used voltages cannot exceed 30V, and of current 60mA.
3. Only certified Temperature transmitters specified in the Operating Manual with indicated maximum values can be used with the temperature indicators.
4. The maximum allowed surface temperature of each temperature class and category must be taken from the specified tables in the Operating Manual.

## Annex to EC-Type-Examination Certificate PTB 02 ATEX 2151 X

5. If two transmitters are use with intrinsical safety circuits, the sum of the values cannot exceed the values indicated in the Operating Manual.
6. The ambient temperature must remain within the area of  $-40^{\circ}\text{C}$  to  $+ 85^{\circ}\text{C}$ .
7. The temperature indicators with a certified intrinsical safety circuit in Category "ib" and Category 1G (process side) can be used in connection with a seratative element or a Thermowell with a thickness of  $\geq 1$  mm with stainless steel and  $\geq 3$  mm with other Steel types.
8. Temperature indicators with 1 or 2 intrinsical safety circuit(s) can run with Category 2G. Those with 2 or 3 wire circuit can only be run with a diameter of 3 mm.
9. With the use of non metal housings, this must contain a material according to EN 50014 with a surface resistance of  $<10^9$  Ohm.
10. With the use of light metals housings, the alloy must not exceed 6% Mg.
11. The implementation of connections require separate examination certificates for cables.
12. The temperature indicators must be linked into the electrical potential balance in the area of use.

(18) Basic policy for accuracy and constitution

Covered by aforesaid standard

Zertifizierungsstelle Explosionsschutz  
Im Auftrag

  
Dipl.-Ing. R. Wilkens



Braunschweig October 10, 2002

## 1. SUPPLEMENT (Translation)

acc. Directive 94/9/EG appendix III no. 6

### to EC-type-examination certificate PTB 02 ATEX 2151 X

Equipment: Temperature Indicator Type WME, TME, MW08 and MT08

Marking:  $\text{Ex}$  II 1G EEx ia IIC T6 or  $\text{Ex}$  II 2G EEx ib IIC T6 or  
 $\text{Ex}$  II 1/2G EEx ib IIC T6

Manufacturer: Schramm GmbH

Address: Flinschstrasee 18a, 60388 Frankfurt am Main, Germany

#### Description of supplement

The temperature-sensors typ WME, TME, MW08 and MT08 ca also be operated in areas, in which potentially explosive atmospheres of dust/air ca appear occasionally. Besides that, the temperature-sensors ca operated in temperature-class T1 to T6 under dependency of the surface-temperature. The new marking is:

$\text{Ex}$  II 1G EEx ia IIC T1 to T6 or  $\text{Ex}$  II 2G EEx ib IIC T1 to T6 or  
 $\text{Ex}$  II 1/2G EEx ib IIC T1 to T6 and  $\text{Ex}$  II 1D IP65 T350°C to T63°C or  
 $\text{Ex}$  II 2D IP65 T440°C to 80°C oder  $\text{Ex}$  II 1/2D IP65 T440°C to T80°C

#### Applied standardization

EN 50014:1997 + A1 + A2  
EN 1127-1:1997

EN 50020:1994  
EN 50281-1-1:1998

EN 50284:1999

Test report PTB Ex 06-26053

Zertifizierungsstelle Explosionsschutz  
Im Auftrag

  
Dr.-Ing. U. Johannsmeyer  
Direktor und Professor




## 2. SUPPLEMENT (Translation)

acc. Directive 94/9/EG appendix III no. 6

### to EC-type-examination certificate PTB 02 ATEX 2151 X

Equipment: Temperature Indicator Type WME, TME, MW08 and MT08

Marking:  II 1 G Ex ia IIC T1...T6 Ga or  
II 2 G Ex ib IIC T1...T6 Gb or  
II 1/2 G Ex ib IIC T1...T6 Ga/Gb and  
II 2 D Ex t IIIC T440°C...T63°C Db IP65 or  
II 1/2 D Ex t IIIC T440°C...T80°C Da/Db IP65

Manufacturer: Schramm GmbH

Address: Flinschstrasse 18a, 60388 Frankfurt am Main, Germany

#### Description of amendments and revisions

Subject of this supplement is to revise and supplement the inspection documents for organizational reasons. Further changes were not made.

The thermal and electrical limits, the special conditions and any other terms of the EC-type examination remain unchanged.

#### Electrical Data

Supply

Only for connection to a certified  
intrinsically safe circuit type type of  
protection  
Intrinsic Ex ia IIC or Ex ib IIC

Max. Value

$U_i = 30V$

$I_i = 60 \text{ mA}$

$P_i = 500 \text{ mW}$

$L_i = 50 \text{ } \mu\text{H/m}$

$C_i = 250 \text{ pF/m}$



Applied standardization

EN 60079-0: 2009    EN 60079-11:2007    EN 60079-26:2007    EN 60079-31:2009

Test report    PTB Ex 11-20323

Braunschweig, April 19/2011



# IECEX Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification Scheme for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.: IECEx PTB 13.0042X Issue No: 0 Certificate history:  
Issue No. 0 (2013-10-24)

Status: **Current** Page 1 of 4

Date of Issue: **2013-10-24**

Applicant: **Schramm GmbH**  
Flirschstrasse 18a  
60388 Frankfurt am Main  
**Germany**

Electrical Apparatus: **temperature sensor, type WME, TME, MW08 and MT08**  
Optional accessory:

Type of Protection: **intrinsic safety, protection by enclosure**

Marking:

Ex ia IIC T1 ...T6 Ga or  
Ex ib IIC T1 ...T6 Gb or  
Ex ib IIC T1 ...T6 Ga/Gb

and

Ex t IIIC T440°C ...T63°C Db or  
Ex t IIIC T440°C ...T80°C Da/Db

IP 65

Approved for issue on behalf of the IECEx  
Certification Body:

Dr.-Ing. U. Johannsmeyer

Position:

Department Head "Explosion Protection in Sensor Technology and  
Instrumentation"

Signature:  
(for printed version)

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting the [Official IECEx Website](http://www.iecex.com).

Certificate issued by:



# IECEX Certificate of Conformity

Certificate No: IECEx PTB 13.0042X Issue No: 0  
Date of Issue: **2013-10-24** Page 2 of 4  
Manufacturer: **Schramm GmbH**  
Flinschstrasse 18a  
60388 Frankfurt am Main  
Germany

Additional Manufacturing  
location(s):

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended.

## STANDARDS:

The electrical apparatus and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards:

<b>IEC 60079-0 : 2007-10</b> Edition:5	Explosive atmospheres - Part 0:Equipment - General requirements
<b>IEC 60079-11 : 2006</b> Edition:5	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"
<b>IEC 60079-26 : 2006</b> Edition:2	Explosive atmospheres - Part 26: Equipment with equipment protection level (EPL) Ga
<b>IEC 60079-31 : 2008</b> Edition:1	Explosive atmospheres – Part 31: Equipment dust ignition protection by enclosure 't'

This Certificate **does not** indicate compliance with electrical safety and performance requirements other than those expressly included in the Standards listed above.

## TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in

Test Report:

[DE/PTB/ExTR13.0060/00](#)

Quality Assessment Report:

[DE/PTB/QAR13.0004/00](#)



# IECEx Certificate of Conformity

Certificate No: IECEx PTB 13.0042X

Issue No: 0

Date of Issue: 2013-10-24

Page 3 of 4

## Schedule

### EQUIPMENT:

Equipment and systems covered by this certificate are as follows:

The temperature sensors work with measuring inserts for use in intrinsically safe circuits.

The resistance thermometer WME consists of a resistor, mineral insulated cable and the terminal connection. The resistance thermometer MW08 consists of a resistor, mineral insulated cable and the connection cable. The resistance thermometer can be manufactured and installed in 2, 3 and 4-wire constructions.

The thermocouple TME consists of a junction point made of various metals, mineral insulated cable and the terminal connection. The Thermocouple MT08 consists of a junction point made of various metals, mineral insulated cable and the connection cable.

The terminal connection of the element is mounted in a connection head that has a minimum Safety Protection Type IP 65 according to IEC 60529.

The special requirements for the construction of equipment from Equipment Group II, Category 1G are met through the use of separative elements made of stainless steel with a thickness of min. 1 mm. These separative elements are tested for pressure.

### Electrical Data

Only for connection to a certified intrinsically safe circuit of the type of protection Ex ia IIC or Ex ib IIC

Maximum values:  $U_i = 30 \text{ V}$

$I_i = 60 \text{ mA}$

$P_i = 500 \text{ mW}$

$L_i = 50 \text{ } \mu\text{H per meter}$

$C_i = 250 \text{ pF per meter}$

### CONDITIONS OF CERTIFICATION: YES as shown below:

1. The temperature sensors are only allowed to be operated in an intrinsically safe circuit of the level of protection "ia" or "ib".
2. When two intrinsically safe circuits are used in close conjunction to one another, the voltage and current addition shall be calculated. The addition of both used voltages shall not exceed 30V, and the addition of current 60mA.
3. Only certified temperature transmitters specified in the Operating Manual with indicated maximum values shall be used with the temperature sensors.
4. The maximum allowed surface temperature of each temperature class must be taken from the specified tables in the Operating Manual.
5. If two transmitters are used with intrinsically safe circuits, the sum of the values shall not exceed the values indicated in the Operating Manual.
6. The ambient temperature shall remain within the area of  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$ .
7. The temperature sensors with a certified intrinsically safe circuit in Level of protection "ib" and EPL Ga (process side) may be used in connection with a separative element or a thermowell with a thickness of  $\geq 1 \text{ mm}$  with stainless steel and  $\geq 3 \text{ mm}$  with other steel types.
8. Temperature sensors with one or two intrinsically safe circuit(s) may be operated in EPL Gb. Those with 2 or 3 wire circuit are only



# IECEX Certificate of Conformity

Certificate No: IECEx PTB 13.0042X

Issue No: 0

Date of Issue: **2013-10-24**

Page 4 of 4

allowed to be operated with sensor diameters of more than 3 mm.

9. When non metal housings are used, the material shall be according to IEC 60079-0 with a surface resistance not exceeding 1 GOhm.
10. With the use of light metals housings, the alloy shall not exceed 6% Mg.
11. The implementation of cable entries require separate examination certificates.
12. The temperature sensors shall be connected to the electrical potential equalization system of the area of use.



## EU-Konformitätserklärung EU-Declaration of Conformity

Wir/We	Schramm GmbH Flinschstr. 18 a 60388 Frankfurt am Main Germany
erklären in alleiniger Verantwortung, dass das Produkt	Temperaturfühler Typ WME, TME, MW08, MT08
bearing sole responsibility, hereby declare that the product	Temperature sensor Type WME, TME, MW08, MT08
<p>auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder normativen Dokument(en) übereinstimmt. Auch wenn die in der EU-Baumusterprüfbescheinigung angewandten Normen nicht den neuesten Ausgaben der heute gültigen Normen entsprechen, erfüllt das Produkt die Grundlegenden Sicherheits- und Gesundheitsanforderungen der Richtlinie.</p> <p>which is the subject of this declaration, is in conformity with the following standards or normative documents. As well the named standards of the EU-Type-Examination Certificate are not the newest issue of the standard which is valid today, the equipment fulfils the Essential Health and Safety Requirements of the Directive</p>	
<b>Bestimmung der Richtlinie</b> Provisions of the directive	<b>Titel und/oder Nummer sowie Ausgabe der Norm(en)</b> Titel and/or No. and class of issue of the standard(s)
<b>2014/34/EU: Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen</b> 2014/34/EU: Equipment and protective systems intended for use potentially explosive atmospheres	<b>EN IEC 60079-0:2018</b> <b>EN 60079-11:2012</b> <b>EN 60079-26:2015</b> <b>EN 60079-31:2014</b>
<b>EU Baumusterprüfbescheinigung:</b> EU-Type-Examination Certificate:	<b>PTB 02 ATEX 2151 X</b> Physikalisch-Technische Bundesanstalt, 0102
<b>Kennzeichnung:</b> Marking:	<p>⊕ II 1 G Ex ia IIC T1 bis T6 Ga</p> <p>⊕ II 2 G Ex ib IIC T1 bis T6 Gb</p> <p>⊕ II 1/2 G Ex ib IIC T1 bis T6 Ga/Gb</p> <p>⊕ II 2 D Ex tb IIIC T440°C ...T80°C Db</p> <p>⊕ II 1/2 D Ex tb IIIC T440°C ...T80°C Da/Db</p>
<b>Qualitätssicherung Produktion:</b> Production Quality Assessment:	<b>EPS 17 ATEX Q 147</b> Bureau Veritas, 2004
<b>2014/30/EU: Elektromagnetische Verträglichkeit</b> 2014/30/EU: Electromagnetic compatibility	<b>EN 61000-6-4:2007 + A1:2011</b>
Frankfurt, 29. Juni 2020 <b>Ort und Datum</b> Place and Date	Dipl. Ing. Robin Schramm <b>Qualitätsleitung</b> Quality Management 